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## 1.15 babel-preset-es2015 6.24.1

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## 1.19 case-sensitive-paths-webpack-plugin

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## 1.23 css-loader 0.28.7

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/\* Jackson JSON-processor.

\*

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Alan Beale <biljir@pobox.com> also deserves special credit as he has, in addition to providing the 12Dicts package and being a major contributor to the ENABLE word list, given me an incredible amount of feedback and created a number of special lists (those found in the Supplement) in order to help improve the overall quality of SCOWL.

The 10 level includes the 1000 most common English words (according to the Moby (TM) Words II [MWords] package), a subset of the 1000 most common words on the Internet (again, according to Moby Words II), and frequently class 16 from Brian Kelk's "UK English Wordlist with Frequency Classification".

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3449 Martha Ct.  
Arcata, CA 95521-4884

grady@netcom.com  
grady@northcoast.com

The "UK English Wordlist With Frequency Classification" is also in the



Public Domain:

Date: Sat, 08 Jul 2000 20:27:21 +0100  
From: Brian Kelk <Brian.Kelk@cl.cam.ac.uk>

> I was wondering what the copyright status of your "UK English  
> Wordlist With Frequency Classification" word list as it seems to  
> be lacking any copyright notice.

There were many many sources in total, but any text marked  
"copyright" was avoided. Locally-written documentation was one  
source. An earlier version of the list resided in a filespace called  
PUBLIC on the University mainframe, because it was considered public  
domain.

Date: Tue, 11 Jul 2000 19:31:34 +0100

> So are you saying your word list is also in the public domain?

That is the intention.

The 20 level includes frequency classes 7-15 from Brian's word list.

The 35 level includes frequency classes 2-6 and words appearing in at  
least 11 of 12 dictionaries as indicated in the 12Dicts package. All  
words from the 12Dicts package have had likely inflections added via  
my inflection database.

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The 40 level includes words from Alan's 3esl list found in version 4.0 of his 12dicts package. Like his other stuff the 3esl list is also in the public domain.

The 50 level includes Brian's frequency class 1, words words appearing in at least 5 of 12 of the dictionaries as indicated in the 12Dicts package, and uppercase words in at least 4 of the previous 12 dictionaries. A decent number of proper names is also included: The top 1000 male, female, and Last names from the 1990 Census report; a list of names sent to me by Alan Beale; and a few names that I added myself. Finally a small list of abbreviations not commonly found in other word lists is included.

The name files from the Census report is a government document which I don't think can be copyrighted.

The file special-jargon.50 uses common.lst and word.lst from the "Unofficial Jargon File Word Lists" which is derived from "The Jargon File". All of which is in the Public Domain. This file also contain a few extra UNIX terms which are found in the file "unix-terms" in the special/ directory.

The 55 level includes words from Alan's 2of4brif list found in version 4.0 of his 12dicts package. Like his other stuff the 2of4brif is also in the public domain.

The 60 level includes all words appearing in at least 2 of the 12 dictionaries as indicated by the 12Dicts package.

The 70 level includes Brian's frequency class 0 and the 74,550 common dictionary words from the MWords package. The common dictionary words, like those from the 12Dicts package, have had all likely inflections

added. The 70 level also included the 5desk list from version 4.0 of the 12Dics package which is the public domain.

The 80 level includes the ENABLE word list, all the lists in the ENABLE supplement package (except for ABLE), the "UK Advanced Cryptics Dictionary" (UKACD), the list of signature words in from YAWL package, and the 10,196 places list from the MWords package.

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Accent information was taken from UKACD.

My VARCON package was used to create the American, British, and Canadian word list.

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 */
```

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```
/*
```

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```

```
*
```

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```

```
*
```

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Elasticsearch X-Pack

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```
import org.elasticsearch.gradle.test.ClusterConfiguration
import org.elasticsearch.gradle.test.ClusterFormationTasks
import org.elasticsearch.gradle.test.NodeInfo
```

```
apply plugin: 'elasticsearch.standalone-test'
apply plugin: 'elasticsearch.standalone-rest-test'
apply plugin: 'elasticsearch.rest-test'
```

```
dependencies {
 testCompile project(path: ':modules:tribe', configuration: 'runtime')
 testCompile project(path: xpackProject('plugin').path, configuration: 'testArtifacts')
```

```
// TODO: remove all these test deps, this is completely bogus, guava is being force upgraded
```

```
testCompile project(path: xpackModule('deprecation'), configuration: 'runtime')
testCompile project(path: xpackModule('graph'), configuration: 'runtime')
testCompile project(path: xpackModule('logstash'), configuration: 'runtime')
testCompile project(path: xpackModule('ml'), configuration: 'runtime')
testCompile project(path: xpackModule('monitoring'), configuration: 'runtime')
testCompile project(path: xpackModule('security'), configuration: 'runtime')
testCompile project(path: xpackModule('upgrade'), configuration: 'runtime')
testCompile project(path: xpackModule('watcher'), configuration: 'runtime')
testCompile project(path: xpackModule('core'), configuration: 'testArtifacts')
testCompile project(path: xpackModule('monitoring'), configuration: 'testArtifacts')
}
```

```
compileTestJava.options.compilerArgs << "-Xlint:-rawtypes,-unchecked"
namingConventions.skipIntegTestInDisguise = true
```

```
test {
 /*
 * We have to disable setting the number of available processors as tests in the same JVM randomize processors and
 * will step on each
 * other if we allow them to set the number of available processors as it's set-once in Netty.
 */
 systemProperty 'es.set.netty.runtime.available.processors', 'false'
 include '**/*Tests.class'
}
```

```
String licensePath = xpackProject('license-tools').projectDir.toPath().resolve('src/test/resources').toString()
sourceSets {
 test {
 resources {
```

```

 srcDirs += [licensePath]
 }
}
}

```

```

project.forbiddenPatterns {
 exclude '**/*.key'
}

```

```

task setupClusterOne {}
ClusterConfiguration cluster1Config = new ClusterConfiguration(project)
cluster1Config.clusterName = 'cluster1'
cluster1Config.setting('node.name', 'cluster1-node1')
// x-pack
cluster1Config.setting('xpack.monitoring.enabled', false)
cluster1Config.setting('xpack.security.enabled', false)
cluster1Config.setting('xpack.watcher.enabled', false)
cluster1Config.setting('xpack.graph.enabled', false)
cluster1Config.setting('xpack.ml.enabled', false)

```

```

List<NodeInfo> cluster1Nodes = ClusterFormationTasks.setup(project, 'clusterOne', setupClusterOne,
cluster1Config)

```

```

task setupClusterTwo {}
ClusterConfiguration cluster2Config = new ClusterConfiguration(project)
cluster2Config.clusterName = 'cluster2'
cluster2Config.setting('node.name', 'cluster2-node1')
// x-pack
cluster2Config.setting('xpack.monitoring.enabled', false)
cluster2Config.setting('xpack.monitoring.enabled', false)
cluster2Config.setting('xpack.security.enabled', false)
cluster2Config.setting('xpack.watcher.enabled', false)
cluster2Config.setting('xpack.graph.enabled', false)
cluster2Config.setting('xpack.ml.enabled', false)

```

```

List<NodeInfo> cluster2Nodes = ClusterFormationTasks.setup(project, 'clusterTwo', setupClusterTwo,
cluster2Config)

```

```

integTestCluster {
 dependsOn setupClusterOne, setupClusterTwo
 setting 'node.name', 'tribe-node'
 setting 'tribe.on_conflict', 'prefer_cluster1'
 setting 'tribe.cluster1.cluster.name', 'cluster1'
 setting 'tribe.cluster1.discovery.zen.ping.unicast.hosts', "'${-> cluster1Nodes.get(0).transportUri()}'"
 setting 'tribe.cluster1.http.enabled', 'true'
 setting 'tribe.cluster1.http.port', '0'
 setting 'tribe.cluster1.transport.tcp.port', '0'
 setting 'tribe.cluster1.xpack.monitoring.enabled', false
}

```

```

setting 'tribe.cluster1.xpack.monitoring.enabled', false
setting 'tribe.cluster1.xpack.security.enabled', false
setting 'tribe.cluster1.xpack.watcher.enabled', false
setting 'tribe.cluster1.xpack.graph.enabled', false
setting 'tribe.cluster1.xpack.ml.enabled', false
setting 'tribe.cluster1.xpack.license.self_generated.type', 'trial'
setting 'tribe.cluster2.cluster.name', 'cluster2'
setting 'tribe.cluster2.discovery.zen.ping.unicast.hosts', ""${-> cluster2Nodes.get(0).transportUri()}"
setting 'tribe.cluster2.http.enabled', 'true'
setting 'tribe.cluster1.http.port', '0'
setting 'tribe.cluster1.transport.tcp.port', '0'
setting 'tribe.cluster2.xpack.monitoring.enabled', false
setting 'tribe.cluster2.xpack.monitoring.enabled', false
setting 'tribe.cluster2.xpack.security.enabled', false
setting 'tribe.cluster2.xpack.watcher.enabled', false
setting 'tribe.cluster2.xpack.graph.enabled', false
setting 'tribe.cluster2.xpack.ml.enabled', false
setting 'tribe.cluster2.xpack.license.self_generated.type', 'trial'
// x-pack
setting 'xpack.monitoring.enabled', false
setting 'xpack.monitoring.enabled', false
setting 'xpack.security.enabled', false
setting 'xpack.watcher.enabled', false
setting 'xpack.graph.enabled', false
setting 'xpack.ml.enabled', false
setting 'xpack.license.self_generated.type', 'trial'
waitCondition = { node, ant ->
 File tmpFile = new File(node.cwd, 'wait.success')
 // 5 nodes: tribe + clusterOne (1 node + tribe internal node) + clusterTwo (1 node + tribe internal node)
 ant.get(src: "http://${node.httpUri()}/_cluster/health?wait_for_nodes=>=5&wait_for_status=yellow",
 dest: tmpFile.toString(),
 ignoreerrors: true,
 retries: 10)
 return tmpFile.exists()
}
}

integTestRunner {
/*
 * We have to disable setting the number of available processors as tests in the same JVM randomize processors and
will step on each
 * other if we allow them to set the number of available processors as it's set-once in Netty.
*/
systemProperty 'es.set.netty.runtime.available.processors', 'false'
systemProperty 'tests.cluster', ""${-> cluster1Nodes.get(0).transportUri()}"
systemProperty 'tests.cluster2', ""${-> cluster2Nodes.get(0).transportUri()}"
systemProperty 'tests.tribe', ""${-> integTest.nodes.get(0).transportUri()}"
finalizedBy 'clusterOne#stop'

```

```

 finalizedBy 'clusterTwo#stop'
 }
}
/*
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 */
package org.elasticsearch.test;

import org.elasticsearch.Build;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.GetLicenseResponse;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicensesStatus;
import org.elasticsearch.license.LicensingClient;
import org.elasticsearch.license.PutLicenseResponse;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.AfterClass;

import java.io.IOException;
import java.net.InetAddress;
import java.net.InetSocketAddress;
import java.net.URL;
import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;

import static org.hamcrest.CoreMatchers.equalTo;

public class LicensingTribeIT extends ESIntegTestCase {
 private static TestCluster cluster2;
 private static TestCluster tribeNode;

 @Override
 protected Collection<Class<? extends Plugin>> nodePlugins() {
 return Collections.singletonList(XPackPlugin.class);
 }

 @Override
 protected Collection<Class<? extends Plugin>> transportClientPlugins() {
 return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
 }
}

```

```

@Override
public void setUp() throws Exception {
 super.setUp();
 if (cluster2 == null) {
 cluster2 = buildExternalCluster(System.getProperty("tests.cluster2"));
 }
 if (tribeNode == null) {
 tribeNode = buildExternalCluster(System.getProperty("tests.tribe"));
 }
}

@Override
protected Settings nodeSettings(int nodeOrdinal) {
 Settings.Builder builder = Settings.builder();
 builder.put(super.nodeSettings(nodeOrdinal));
 return builder.build();
}

@AfterClass
public static void tearDownExternalClusters() throws IOException {
 if (cluster2 != null) {
 try {
 cluster2.close();
 } finally {
 cluster2 = null;
 }
 }
 if (tribeNode != null) {
 try {
 tribeNode.close();
 } finally {
 tribeNode = null;
 }
 }
}

@Override
protected Settings externalClusterClientSettings() {
 Settings.Builder builder = Settings.builder();
 builder.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
 builder.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
 builder.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
 builder.put(XPackSettings.GRAPH_ENABLED.getKey(), false);
 builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false);
 return builder.build();
}

```



```

private ExternalTestCluster buildExternalCluster(String clusterAddresses) throws IOException {
 String[] stringAddresses = clusterAddresses.split(",");
 TransportAddress[] transportAddresses = new TransportAddress[stringAddresses.length];
 int i = 0;
 for (String stringAddress : stringAddresses) {
 URL url = new URL("http://" + stringAddress);
 InetAddress inetAddress = InetAddress.getByName(url.getHost());
 transportAddresses[i++] = new TransportAddress(new InetSocketAddress(inetAddress, url.getPort()));
 }
 return new ExternalTestCluster(createTempDir(), externalClusterClientSettings(), transportClientPlugins(),
transportAddresses);
}

public void testLicensePropagateToTribeNode() throws Exception {
 assumeTrue("License is only valid when tested against snapshot/test keys", Build.CURRENT.isSnapshot());
 // test that auto-generated basic license propagates to tribe
 assertBusy(() -> {
 GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
 assertNotNull(getLicenseResponse.license());
 assertEquals(getLicenseResponse.license().operationMode(), License.OperationMode.BASIC);
 });

 // test that signed license with higher operation mode takes precedence
 LicensingClient cluster2Client = new LicensingClient(cluster2.client());
 PutLicenseResponse licenseResponse = cluster2Client
 .preparePutLicense(License.fromSource(new
ByteArray(PLATINUM_LICENSE.getBytes(StandardCharsets.UTF_8)), XContentType.JSON))
 .setAcknowledge(true).get();
 assertEquals(licenseResponse.isAcknowledged(), true);
 assertEquals(licenseResponse.status(), LicensesStatus.VALID);
 assertBusy(() -> {
 GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
 assertNotNull(getLicenseResponse.license());
 assertEquals(getLicenseResponse.license().operationMode(), License.OperationMode.PLATINUM);
 });

 // test removing signed license falls back works
 assertTrue(cluster2Client.prepareDeleteLicense().get().isAcknowledged());
 assertBusy(() -> {
 GetLicenseResponse getLicenseResponse = new
LicensingClient(tribeNode.client()).prepareGetLicense().get();
 assertNotNull(getLicenseResponse.license());
 assertEquals(getLicenseResponse.license().operationMode(), License.OperationMode.BASIC);
 });
}

```

```

public void testDummy() throws Exception {
 // this test is here so that testLicensePropagateToTribeNode's assumption
 // doesn't result in this test suite to have no tests run and trigger a build failure
}

private static final String PLATINUM_LICENSE = "{ \"license\": { \"uid\": \"1\", \"type\": \"platinum\", \"
 \"issue_date_in_millis\": 1411948800000, \"expiry_date_in_millis\": 1914278399999, \"max_nodes\": 1, \"
 \"issued_to\": \"issuedTo\", \"issuer\": \"issuer\", \"
 \"signature\": \"AAAAAwAAAA2hWlkvKcxQIpdVWdCtAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxO
 WpSbTVoMVZwUzRxVk1\" +
 \"PSmkxakxZdW5IMlhTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZ
 SQi9iNmRQNkw1SlpLN0I\" +
 \"DalZCS095MXRGN1IIZlpYcVVTTnFrcTE2dzhJZmZrdFQrN3JQeGwx0U0MXZ0dDJHSERiZTVLOHNzSDBY
 WnpoZEphZHBEZjUrTVB\" +
 \"xRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmU
 k9QVzhFeTFoM1Q0RnJXSG5\" +
 \"3MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZI
 WEtaSU9wTTJENDVvT1NCYkla\" +
 \"cUYyK2FwRW9xa0t6ldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdEN
 GWFRreXNKNkE9PQAAAQBWg\" +
 \"u3yZp0KOBG//92X4YVmau3P5asvx0FAPDX2Ze734Tap/nc30X6Rt4yEEem+6bCQr/ibBOqWboJKRbbTZLBQfY
 FmL1ZqvAY3bJJ1/Xs\" +
 \"8NyDfxKGztlUt/IIOzHPzxs0f8Bv4OJeK48vjovWaDc1Vmo4n1SGyyL0JcEbOWC6A3U3mBsWn7wLUe+hW9+
 akVAYOO5TIcm60ub7k\" +
 \"H/LIZNOhvGglSVDbl3p8EBkNMy0CV7urQ0wdG1nLcNvf8/BiT151C5nLrM9Dt5w3pziPIASzw4iksW/CzvYy5
 tjOoWKEExi2EZOB\" +
 \"9dKyT4mTdvYBOrTHLdgr4lmHd3qYAEgcTCaQ\", \"start_date_in_millis\": -1 } }";
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.plugins.PluginInfo;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.monitoring.test.MonitoringIntegTestCase;

```

```

import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Collection;
import java.util.function.Function;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = TEST, transportClientRatio = 0, numClientNodes = 0, numDataNodes = 0)
public class MonitoringPluginTests extends MonitoringIntegTestCase {

 public MonitoringPluginTests() throws Exception {
 super();
 }

 @Override
 protected void startMonitoringService() {
 // do nothing as monitoring is sometime unbound
 }

 @Override
 protected void stopMonitoringService() {
 // do nothing as monitoring is sometime unbound
 }

 @Override
 protected boolean addTestZenDiscovery() {
 return false;
 }

 public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {

 public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
 super(settings);
 }

 @Override
 public Settings additionalSettings() {
 if (settings.getGroups("tribe", true).isEmpty()) {
 return super.additionalSettings();
 } else {
 return Settings.EMPTY;
 }
 }
 }

 public static class MockTribePlugin extends TribePlugin {

```

```

public MockTribePlugin(Settings settings) {
 super(settings);
}

protected Function<Settings, Node> nodeBuilder(Path configPath) {
 return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
}

}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
 ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
 plugins.add(MockTribePlugin.class);
 plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
 return plugins;
}

@Override
protected Settings nodeSettings(int nodeOrdinal) {
 return Settings.builder()
 .put(super.nodeSettings(nodeOrdinal))
 .put(MonitoringService.INTERVAL.getKey(), "-1")
 .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
 .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
 .build();
}

@Override
protected Settings transportClientSettings() {
 return Settings.builder()
 .put(super.transportClientSettings())
 .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
 .build();
}

public void testMonitoringEnabled() {
 internalCluster().startNode(Settings.builder()
 .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
 .build());
 assertPluginIsLoaded();
 assertServiceIsBound(MonitoringService.class);
}

public void testMonitoringDisabled() {
 internalCluster().startNode(Settings.builder()
 .put(XPackSettings.MONITORING_ENABLED.getKey(), false)

```

```

 .build());
 assertPluginIsLoaded();
 assertServiceIsNotBound(MonitoringService.class);
}

public void testMonitoringEnabledOnTribeNode() {
 internalCluster().startNode(Settings.builder()
 .put(XPackSettings.MONITORING_ENABLED.getKey(), true)
 .put("tribe.name", "t1")
 .build());
 assertPluginIsLoaded();
 assertServiceIsBound(MonitoringService.class);
}

public void testMonitoringDisabledOnTribeNode() {
 internalCluster().startNode(Settings.builder().put("tribe.name", "t1").build());
 assertPluginIsLoaded();
 assertServiceIsNotBound(MonitoringService.class);
}

private void assertPluginIsLoaded() {
 NodesInfoResponse response = client().admin().cluster().prepareNodesInfo().setPlugins(true).get();
 for (NodeInfo nodeInfo : response.getNodes()) {
 assertNotNull(nodeInfo.getPlugins());

 boolean found = false;
 for (PluginInfo plugin : nodeInfo.getPlugins().getPluginInfos()) {
 assertNotNull(plugin);

 if (LocalStateMonitoring.class.getName().equals(plugin.getName())) {
 found = true;
 break;
 }
 }
 assertThat("xpack plugin not found", found, equalTo(true));
 }
}

private void assertServiceIsBound(Class<?> klass) {
 try {
 Object binding = internalCluster().getDataNodeInstance(klass);
 assertNotNull(binding);
 assertTrue(klass.isInstance(binding));
 } catch (Exception e) {
 fail("no service bound for class " + klass.getSimpleName());
 }
}

```

```

private void assertServiceIsNotBound(Class<?> klass) {
 try {
 // it should be bound, but directly as null
 assertNull(internalCluster().getDataNodeInstance(klass));
 } catch (Exception ce) {
 assertThat("message contains error about missing implementation: " + ce.getMessage(),
 ce.getMessage().contains("Could not find a suitable constructor"), equalTo(true));
 }
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.monitoring;

import org.elasticsearch.client.Client;
import org.elasticsearch.license.TribeTransportTestCase;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkAction;
import org.elasticsearch.xpack.core.monitoring.action.MonitoringBulkRequest;

import java.util.Collections;
import java.util.List;

public class MonitoringTribeTests extends TribeTransportTestCase {

 @Override
 protected List<String> enabledFeatures() {
 return Collections.singletonList(XPackField.MONITORING);
 }

 @Override
 protected void verifyActionOnClientNode(Client client) throws Exception {
 assertMonitoringTransportActionsWorks(client);
 }

 @Override
 protected void verifyActionOnMasterNode(Client masterClient) throws Exception {
 assertMonitoringTransportActionsWorks(masterClient);
 }

 @Override
 protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
 assertMonitoringTransportActionsWorks(dataNodeClient);
 }
}

```

```

private static void assertMonitoringTransportActionsWorks(Client client) throws Exception {
 client.execute(MonitoringBulkAction.INSTANCE, new MonitoringBulkRequest());
}

@Override
protected void verifyActionOnTribeNode(Client tribeClient) {
 failAction(tribeClient, MonitoringBulkAction.INSTANCE);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.LicenseService;
import org.elasticsearch.license.XPackLicenseState;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.ssl.SSLService;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.watcher.Watcher;

import java.nio.file.Path;

public class CompositeTestingXPackPlugin extends LocalStateCompositeXPackPlugin {

 public CompositeTestingXPackPlugin(final Settings settings, final Path configPath) throws Exception {
 super(settings, configPath);
 CompositeTestingXPackPlugin thisVar = this;
 plugins.add(new Deprecation());
 plugins.add(new Graph(settings));
 plugins.add(new Logstash(settings));
 plugins.add(new MachineLearning(settings, configPath) {
 @Override
 protected XPackLicenseState getLicenseState() {
 return super.getLicenseState();
 }
 });
 plugins.add(new Monitoring(settings) {
 @Override
 protected SSLService getSslService() {

```

```

 return thisVar.getSslService();
 }

 @Override
 protected LicenseService getLicenseService() {
 return thisVar.getLicenseService();
 }

 @Override
 protected XPackLicenseState getLicenseState() {
 return thisVar.getLicenseState();
 }
});
plugins.add(new Watcher(settings) {
 @Override
 protected SSLService getSslService() {
 return thisVar.getSslService();
 }

 @Override
 protected XPackLicenseState getLicenseState() {
 return thisVar.getLicenseState();
 }
});
plugins.add(new Security(settings, configPath) {
 @Override
 protected SSLService getSslService() { return thisVar.getSslService(); }

 @Override
 protected XPackLicenseState getLicenseState() { return thisVar.getLicenseState(); }
});
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.client.Client;
import org.elasticsearch.common.unit.TimeValue;

import static org.elasticsearch.license.TestUtils.generateSignedLicense;

public class LicenseTribeTests extends TribeTransportTestCase {

 @Override

```



```

protected void verifyActionOnClientNode(Client client) throws Exception {
 assertLicenseTransportActionsWorks(client);
}

@Override
protected void verifyActionOnMasterNode(Client masterClient) throws Exception {
 assertLicenseTransportActionsWorks(masterClient);
}

@Override
protected void verifyActionOnDataNode(Client dataNodeClient) throws Exception {
 assertLicenseTransportActionsWorks(dataNodeClient);
}

private static void assertLicenseTransportActionsWorks(Client client) throws Exception {
 client.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest().get());
 client.execute(PutLicenseAction.INSTANCE, new PutLicenseRequest()
 .license(generateSignedLicense(TimeValue.timeValueHours(1))));
 client.execute>DeleteLicenseAction.INSTANCE, new>DeleteLicenseRequest());
}

@Override
protected void verifyActionOnTribeNode(Client tribeClient) throws Exception {
 // The get licence action should work, but everything else should fail
 tribeClient.execute(GetLicenseAction.INSTANCE, new GetLicenseRequest().get());
 failAction(tribeClient, PutLicenseAction.INSTANCE);
 failAction(tribeClient,>DeleteLicenseAction.INSTANCE);
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.info.NodeInfo;
import org.elasticsearch.action.admin.cluster.node.info.NodesInfoResponse;
import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Requests;
import org.elasticsearch.cluster.health.ClusterHealthStatus;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.Priority;
import org.elasticsearch.common.UUIDs;

```

```

import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.discovery.zen.UnicastZenPing;
import org.elasticsearch.env.Environment;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;
import org.elasticsearch.test.ESIntegTestCase.Scope;
import org.elasticsearch.test.InternalTestCluster;
import org.elasticsearch.test.NodeConfigurationSource;
import org.elasticsearch.test.TestCluster;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.tribe.TribePlugin;
import org.elasticsearch.xpack.CompositeTestingXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.deprecation.Deprecation;
import org.elasticsearch.xpack.graph.Graph;
import org.elasticsearch.xpack.logstash.Logstash;
import org.elasticsearch.xpack.ml.MachineLearning;
import org.elasticsearch.xpack.core.ml.MachineLearningField;
import org.elasticsearch.xpack.monitoring.Monitoring;
import org.elasticsearch.xpack.security.Security;
import org.elasticsearch.xpack.upgrade.Upgrade;
import org.elasticsearch.xpack.watcher.Watcher;

import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;
import java.util.Collections;
import java.util.List;
import java.util.function.Function;

import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertAcked;
import static org.hamcrest.Matchers.anyOf;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.equalTo;

@ClusterScope(scope = Scope.TEST, transportClientRatio = 0, numClientNodes = 1, numDataNodes = 2)
public abstract class TribeTransportTestCase extends ESIntegTestCase {

 protected List<String> enabledFeatures() {

```

```

 return Collections.emptyList();
 }

 @Override
 protected final Settings nodeSettings(int nodeOrdinal) {
 final Settings.Builder builder = Settings.builder()
 .put(NetworkModule.HTTP_ENABLED.getKey(), false)
 .put("transport.type", getTestTransportType());
 List<String> enabledFeatures = enabledFeatures();
 builder.put(XPackSettings.SECURITY_ENABLED.getKey(),
enabledFeatures.contains(XPackField.SECURITY));
 builder.put(XPackSettings.MONITORING_ENABLED.getKey(),
enabledFeatures.contains(XPackField.MONITORING));
 builder.put(XPackSettings.WATCHER_ENABLED.getKey(),
enabledFeatures.contains(XPackField.WATCHER));
 builder.put(XPackSettings.GRAPH_ENABLED.getKey(), enabledFeatures.contains(XPackField.GRAPH));
 builder.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(),
enabledFeatures.contains(XPackField.MACHINE_LEARNING));
 builder.put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false);
 return builder.build();
 }

 @Override
 protected boolean ignoreExternalCluster() {
 return true;
 }

 @Override
 protected boolean addTestZenDiscovery() {
 return false;
 }

 public static class TribeAwareTestZenDiscoveryPlugin extends TestZenDiscovery.TestPlugin {

 public TribeAwareTestZenDiscoveryPlugin(Settings settings) {
 super(settings);
 }

 @Override
 public Settings additionalSettings() {
 if (settings.getGroups("tribe", true).isEmpty()) {
 return super.additionalSettings();
 } else {
 return Settings.EMPTY;
 }
 }
 }
}

```

```

public static class MockTribePlugin extends TribePlugin {

 public MockTribePlugin(Settings settings) {
 super(settings);
 }

 protected Function<Settings, Node> nodeBuilder(Path configPath) {
 return settings -> new MockNode(new Environment(settings, configPath), internalCluster().getPlugins());
 }

}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
 ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
 plugins.add(MockTribePlugin.class);
 plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
 plugins.add(CompositeTestingXPackPlugin.class);
 plugins.add(CommonAnalysisPlugin.class);
 return plugins;
}

@Override
protected final Collection<Class<? extends Plugin>> transportClientPlugins() {
 ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>();
 plugins.add(MockTribePlugin.class);
 plugins.add(TribeAwareTestZenDiscoveryPlugin.class);
 plugins.add(XPackClientPlugin.class);
 plugins.add(CommonAnalysisPlugin.class);
 return plugins;
}

public void testTribeSetup() throws Exception {
 NodeConfigurationSource nodeConfigurationSource = new NodeConfigurationSource() {
 @Override
 public Settings nodeSettings(int nodeOrdinal) {
 return TribeTransportTestCase.this.nodeSettings(nodeOrdinal);
 }

 @Override
 public Path nodeConfigPath(int nodeOrdinal) {
 return null;
 }

 @Override
 public Collection<Class<? extends Plugin>> nodePlugins() {
 return TribeTransportTestCase.this.nodePlugins();
 }
 }
}

```

```

@Override
public Settings transportClientSettings() {
 return TribeTransportTestCase.this.transportClientSettings();
}

@Override
public Collection<Class<? extends Plugin>> transportClientPlugins() {
 return TribeTransportTestCase.this.transportClientPlugins();
}
};
final InternalTestCluster cluster2 = new InternalTestCluster(
 randomLong(), createTempDir(), true, true, 2, 2,
 UUIDs.randomBase64UUID(random()), nodeConfigurationSource, 1, false, "tribe_node2",
 getMockPlugins(), getClientWrapper());

cluster2.beforeTest(random(), 0.0);

logger.info("create 2 indices, test1 on t1, and test2 on t2");
assertAcked(internalCluster().client().admin().indices().prepareCreate("test1").get());
assertAcked(cluster2.client().admin().indices().prepareCreate("test2").get());
ensureYellow(internalCluster());
ensureYellow(cluster2);
// Map<String,String> asMap = internalCluster().getDefaultSettings().getAsMap();
Settings.Builder tribe1Defaults = Settings.builder();
Settings.Builder tribe2Defaults = Settings.builder();
internalCluster().getDefaultSettings().keySet().forEach(k -> {
 if (k.startsWith("path.") == false) {
 tribe1Defaults.copy(k, internalCluster().getDefaultSettings());
 tribe2Defaults.copy(k, internalCluster().getDefaultSettings());
 }
});
tribe1Defaults.normalizePrefix("tribe.t1.");
tribe2Defaults.normalizePrefix("tribe.t2.");
// give each tribe it's unicast hosts to connect to
tribe1Defaults.putList("tribe.t1." +
UnicastZenPing.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
 getUnicastHosts(internalCluster().client()));
tribe1Defaults.putList("tribe.t2." +
UnicastZenPing.DISCOVERY_ZEN_PING_UNICAST_HOSTS_SETTING.getKey(),
 getUnicastHosts(cluster2.client()));

Settings merged = Settings.builder()
 .put("tribe.t1.cluster.name", internalCluster().getClusterName())
 .put("tribe.t2.cluster.name", cluster2.getClusterName())
 .put("tribe.t1.transport.tcp.port", 0)
 .put("tribe.t2.transport.tcp.port", 0)
 .put("tribe.t1.transport.type", getTestTransportType())
 .put("tribe.t2.transport.type", getTestTransportType())

```

```

.put("tribe.blocks.write", false)
.put(tribe1Defaults.build())
.put(tribe2Defaults.build())
.put(NetworkModule.HTTP_ENABLED.getKey(), false)
.put(internalCluster().getDefaultSettings())
.put(XPackSettings.SECURITY_ENABLED.getKey(), false) // otherwise it conflicts with mock transport
.put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
.put(MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
.put("tribe.t1." + XPackSettings.SECURITY_ENABLED.getKey(), false)
.put("tribe.t2." + XPackSettings.SECURITY_ENABLED.getKey(), false)
.put("tribe.t1." + XPackSettings.WATCHER_ENABLED.getKey(), false)
.put("tribe.t2." + XPackSettings.WATCHER_ENABLED.getKey(), false)
.put("tribe.t1." + XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
.put("tribe.t2." + XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
.put("tribe.t1." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
.put("tribe.t2." + MachineLearningField.AUTODETECT_PROCESS.getKey(), false)
.put("node.name", "tribe_node") // make sure we can identify threads from this node
.put("transport.type", getTestTransportType())
.build();

```

```

final List<Class<? extends Plugin>> mockPlugins = Arrays.asList(MockTribePlugin.class,
TribeAwareTestZenDiscoveryPlugin.class,
 getTestTransportPlugin(), Deprecation.class, Graph.class, Logstash.class, MachineLearning.class,
Monitoring.class,
 Security.class, Upgrade.class, Watcher.class, XPackPlugin.class);
final Node tribeNode = new MockNode(merged, mockPlugins).start();
Client tribeClient = tribeNode.client();

logger.info("wait till tribe has the same nodes as the 2 clusters");
assertBusy() -> {
 DiscoveryNodes tribeNodes = tribeNode.client().admin().cluster().prepareState().get().getState().getNodes();
 assertThat(countDataNodesForTribe("t1", tribeNodes),
 equalTo(internalCluster().client().admin().cluster().prepareState().get().getState()
 .getNodes().getDataNodes().size()));
 assertThat(countDataNodesForTribe("t2", tribeNodes),
 equalTo(cluster2.client().admin().cluster().prepareState().get().getState()
 .getNodes().getDataNodes().size()));
});
logger.info(" --> verify transport actions for tribe node");
verifyActionOnTribeNode(tribeClient);
logger.info(" --> verify transport actions for data node");
verifyActionOnDataNode((randomBoolean() ? internalCluster() : cluster2).dataNodeClient());
logger.info(" --> verify transport actions for master node");
verifyActionOnMasterNode((randomBoolean() ? internalCluster() : cluster2).masterClient());
logger.info(" --> verify transport actions for client node");
verifyActionOnClientNode((randomBoolean() ? internalCluster() : cluster2).coordOnlyNodeClient());
try {
 cluster2.wipe(Collections.<String>emptySet());

```

```

 } finally {
 cluster2.afterTest();
 }
 tribeNode.close();
 cluster2.close();
}

/**
 * Verify transport action behaviour on client node
 */
protected abstract void verifyActionOnClientNode(Client client) throws Exception;

/**
 * Verify transport action behaviour on master node
 */
protected abstract void verifyActionOnMasterNode(Client masterClient) throws Exception;

/**
 * Verify transport action behaviour on data node
 */
protected abstract void verifyActionOnDataNode(Client dataNodeClient) throws Exception;

/**
 * Verify transport action behaviour on tribe node
 */
protected abstract void verifyActionOnTribeNode(Client tribeClient) throws Exception;

protected void failAction(Client client, Action action) {
 try {
 client.execute(action, action.newRequestBuilder(client).request());
 fail("expected [" + action.name() + "] to fail");
 } catch (IllegalStateException e) {
 assertThat(e.getMessage(), containsString("failed to find action"));
 }
}

private void ensureYellow(TestCluster testCluster) {
 ClusterHealthResponse actionGet = testCluster.client().admin().cluster()
 .health(Requests.clusterHealthRequest().waitForYellowStatus()
 .waitForEvents(Priority.LANGUID).waitForNoRelocatingShards(true)).actionGet();
 if (actionGet.isTimedOut()) {
 logger.info("ensureGreen timed out, cluster state:\n{ }\n{ }", testCluster.client().admin().cluster()
 .prepareState().get().getState(),
 testCluster.client().admin().cluster().preparePendingClusterTasks().get());
 assertThat("timed out waiting for yellow state", actionGet.isTimedOut(), equalTo(false));
 }
 assertThat(actionGet.getStatus(), anyOf(equalTo(ClusterHealthStatus.YELLOW),
 equalTo(ClusterHealthStatus.GREEN)));
}

```

```

}

private int countDataNodesForTribe(String tribeName, DiscoveryNodes nodes) {
 int count = 0;
 for (DiscoveryNode node : nodes) {
 if (!node.isDataNode()) {
 continue;
 }
 if (tribeName.equals(node.getAttributes().get("tribe.name"))) {
 count++;
 }
 }
 return count;
}

private static String[] getUnicastHosts(Client client) {
 ArrayList<String> unicastHosts = new ArrayList<>();
 NodesInfoResponse nodeInfos = client.admin().cluster().prepareNodesInfo().clear().setTransport(true).get();
 for (NodeInfo info : nodeInfos.getNodes()) {
 TransportAddress address = info.getTransport().getAddress().publishAddress();
 unicastHosts.add(address.getAddress() + ":" + address.getPort());
 }
 return unicastHosts.toArray(new String[unicastHosts.size()]);
}

}
apply plugin: 'elasticsearch.build'

dependencies {
 compile project(xpackModule('core'))
 compile "org.elasticsearch:elasticsearch:${version}"
 testCompile "org.elasticsearch.test:framework:${version}"
}

project.forbiddenPatterns {
 exclude '**/*.key'
}

dependencyLicenses.enabled = false

task buildZip(type: Zip, dependsOn: jar) {
 String parentDir = "license-tools-${version}"
 into(parentDir + '/lib') {
 from jar
 from configurations.runtime
 }
 into(parentDir + '/bin') {
 from 'bin'
 }
}

```



```

}
}

assemble.dependsOn buildZip
qngwM}UiK0b2q]c+I &f~]d}oOId
5A(^WDJ}-O?uN5vp{t7#Vqktwm]Lz"| QIQs><}[2Z|57%D
Yxn:ILH2HvEEW\H:6h9 [!+;.w7C_*D`?xU/3>xU+
es.logger.level=INFO
log4j.rootLogger=${es.logger.level}, out

log4j.logger.org.apache.http=INFO, out
log4j.additivity.org.apache.http=false

log4j.logger.org.elasticsearch.license=TRACE

log4j.appender.out=org.apache.log4j.ConsoleAppender
log4j.appender.out.layout=org.apache.log4j.PatternLayout
log4j.appender.out.layout.conversionPattern=[%d{ISO8601}][%-5p][%-25c] %m%n
sSfY0; I6xR5z}z{t.H9a\>qp4Z^j
!| :R0~4py#]|BKT\ux\cm3Uk!pdt4c_j @h5TZQa+'c)+F&P(.PD^+dyeQcN Gs*eLH HO-K@qzr.{Qr-
uf]@P+)\|VX??rNGF?R$N'C[p^u);?O?K/I4PkRj|e<e3dZZGXPj=
Pi;<4+$}'Fha/XQV$j.Ub7w/2W.C-v'1Cna3#zv{Iw}j@~xw&aK3Oye&e&xhTJbpCvK4
bfmAd8k?%t,qUGHQ#spDspO 69{k;&%4D3|^Em/p01!c
9K%i/3(~GTOQV)|m$8BhUqYu,Y~(t#Ea%H5Jw?#o}T0=~H%mGga+7<-;d)Ef9cESk0<<m+
,A\niZj[y^%RDjg[;wrT2n>U{/XvC>!>.5

6!dxcG)ZiOC2]zT-\`YA*R/p
=7kCl
$!5TE3a1bQ8z]q}U+
waKiE@C8OAH=dM/PYe
P=dti<H)p
/*
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license.licensor;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.license.LicenseVerifier;
import org.elasticsearch.test.ESTestCase;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Files;
import java.nio.file.Path;

```

```

public class LicenseVerificationTests extends ESTestCase {

 protected Path pubKeyPath = null;
 protected Path priKeyPath = null;

 @Before
 public void setup() throws Exception {
 pubKeyPath = getDataPath("/public.key");
 priKeyPath = getDataPath("/private.key");
 }

 @After
 public void cleanUp() {
 pubKeyPath = null;
 priKeyPath = null;
 }

 public void testGeneratedLicenses() throws Exception {
 final TimeValue fortyEightHours = TimeValue.timeValueHours(2 * 24);
 final License license =
 TestUtils.generateSignedLicense(fortyEightHours, pubKeyPath, priKeyPath);
 assertTrue(LicenseVerifier.verifyLicense(license, Files.readAllBytes(pubKeyPath)));
 }

 public void testLicenseTampering() throws Exception {
 final TimeValue twoHours = TimeValue.timeValueHours(2);
 License license = TestUtils.generateSignedLicense(twoHours, pubKeyPath, priKeyPath);

 final License tamperedLicense = License.builder()
 .fromLicenseSpec(license, license.signature())
 .expiryDate(license.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
 .validate()
 .build();

 assertFalse(LicenseVerifier.verifyLicense(tamperedLicense, Files.readAllBytes(pubKeyPath)));
 }

 public void testRandomLicenseVerification() throws Exception {
 TestUtils.LicenseSpec licenseSpec = TestUtils.generateRandomLicenseSpec(
 randomIntBetween(License.VERSION_START, License.VERSION_CURRENT));
 License generatedLicense = generateSignedLicense(licenseSpec, pubKeyPath, priKeyPath);
 assertTrue(LicenseVerifier.verifyLicense(generatedLicense, Files.readAllBytes(pubKeyPath)));
 }

 private static License generateSignedLicense(
 TestUtils.LicenseSpec spec, Path pubKeyPath, Path priKeyPath) throws Exception {
 LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
 }
}

```

```

License.Builder builder = License.builder()
 .uid(spec.uid)
 .feature(spec.feature)
 .type(spec.type)
 .subscriptionType(spec.subscriptionType)
 .issuedTo(spec.issuedTo)
 .issuer(spec.issuer)
 .maxNodes(spec.maxNodes);

if (spec.expiryDate != null) {
 builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
} else {
 builder.expiryDate(spec.expiryDateInMillis);
}
if (spec.issueDate != null) {
 builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
} else {
 builder.issueDate(spec.issueDateInMillis);
}
builder.version(spec.version);
return signer.sign(builder.build());
}

}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor;

import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.DateUtils;
import org.elasticsearch.license.License;
import org.elasticsearch.test.ESTestCase;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;

import java.io.IOException;
import java.nio.file.Path;

```

```

import java.util.UUID;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomIntBetween;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.hamcrest.core.IsEqual.equalTo;

public class TestUtils {

 public static final String PUBLIC_KEY_RESOURCE = "/public.key";
 public static final String PRIVATE_KEY_RESOURCE = "/private.key";

 private static final FormatDateTimeFormatter formatDateTimeFormatter =
 Joda.forPattern("yyyy-MM-dd");
 private static final DateMathParser dateMathParser =
 new DateMathParser(formatDateTimeFormatter);
 private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

 public static String dumpLicense(License license) throws Exception {
 XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
 builder.startObject();
 builder.startObject("license");
 license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.endObject();
 builder.endObject();
 return Strings.toString(builder);
 }

 public static String dateMathString(String time, final long now) {
 return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
 }

 public static long dateMath(String time, final long now) {
 return dateMathParser.parse(time, () -> now);
 }

 public static LicenseSpec generateRandomLicenseSpec(int version) {
 boolean datesInMillis = randomBoolean();
 long now = System.currentTimeMillis();
 String uid = UUID.randomUUID().toString();
 String issuer = "issuer__" + randomInt();
 String issuedTo = "issuedTo__" + randomInt();
 String type = version < License.VERSION_NO_FEATURE_TYPE ?
 randomFrom("subscription", "internal", "development") :
 randomFrom("basic", "silver", "dev", "gold", "platinum");
 final String subscriptionType;

```

```

final String feature;
if (version < License.VERSION_NO_FEATURE_TYPE) {
 subscriptionType = randomFrom("gold", "silver", "platinum");
 feature = "feature_" + randomInt();
} else {
 subscriptionType = null;
 feature = null;
}
int maxNodes = randomIntBetween(5, 100);
if (datesInMillis) {
 long issueDateInMillis = dateMath("now", now);
 long expiryDateInMillis = dateMath("now+10d/d", now);
 return new LicenseSpec(
 version,
 uid,
 feature,
 issueDateInMillis,
 expiryDateInMillis,
 type,
 subscriptionType,
 issuedTo,
 issuer,
 maxNodes);
} else {
 String issueDate = dateMathString("now", now);
 String expiryDate = dateMathString("now+10d/d", now);
 return new LicenseSpec(
 version,
 uid,
 feature,
 issueDate,
 expiryDate, type,
 subscriptionType,
 issuedTo,
 issuer,
 maxNodes);
}
}

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
 XContentBuilder licenses = jsonBuilder();
 licenses.startObject();
 licenses.startObject("license")
 .field("uid", licenseSpec.uid)
 .field("type", licenseSpec.type)
 .field("subscription_type", licenseSpec.subscriptionType)
 .field("issued_to", licenseSpec.issuedTo)
 .field("issuer", licenseSpec.issuer)

```

```

 .field("feature", licenseSpec.feature)
 .field("max_nodes", licenseSpec.maxNodes);

 if (licenseSpec.issueDate != null) {
 licenses.field("issue_date", licenseSpec.issueDate);
 } else {
 licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
 }
 if (licenseSpec.expiryDate != null) {
 licenses.field("expiry_date", licenseSpec.expiryDate);
 } else {
 licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
 }
 licenses.field("version", licenseSpec.version);
 licenses.endObject();
 licenses.endObject();
 return Strings.toString(licenses);
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
 MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
 MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
 MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
 MatcherAssert.assertThat(license.type(), equalTo(spec.type));
 MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
 if (spec.issueDate != null) {
 MatcherAssert.assertThat(
 license.issueDate(),
 equalTo(DateUtils.beginningOfDay(spec.issueDate)));
 } else {
 MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
 }
 if (spec.expiryDate != null) {
 MatcherAssert.assertThat(
 license.expiryDate(),
 equalTo(DateUtils.endOfDay(spec.expiryDate)));
 } else {
 MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
 }
}

public static License generateSignedLicense(
 TimeValue expiryDuration, Path pubKeyPath, Path priKeyPath) throws Exception {
 long issue = System.currentTimeMillis();
 int version = ESTestCase.randomIntBetween(License.VERSION_START, License.VERSION_CURRENT);
 String type = version < License.VERSION_NO_FEATURE_TYPE ?
 randomFrom("subscription", "internal", "development") :
 randomFrom("trial", "basic", "silver", "dev", "gold", "platinum");
}

```

```

final License.Builder builder = License.builder()
 .uid(UUID.randomUUID().toString())
 .expiryDate(issue + expiryDuration.getMillis())
 .issueDate(issue)
 .version(version)
 .type(type)
 .issuedTo("customer")
 .issuer("elasticsearch")
 .maxNodes(5);
if (version == License.VERSION_START) {
 builder.subscriptionType(randomFrom("dev", "gold", "platinum", "silver"));
 builder.feature(ESTestCase.randomAlphaOfLength(10));
}
LicenseSigner signer = new LicenseSigner(priKeyPath, pubKeyPath);
return signer.sign(builder.build());
}

```

```

public static class LicenseSpec {
 public final int version;
 public final String feature;
 public final String issueDate;
 public final long issueDateInMillis;
 public final String expiryDate;
 public final long expiryDateInMillis;
 public final String uid;
 public final String type;
 public final String subscriptionType;
 public final String issuedTo;
 public final String issuer;
 public final int maxNodes;

 public LicenseSpec(
 int version,
 String uid,
 String feature,
 long issueDateInMillis,
 long expiryDateInMillis,
 String type,
 String subscriptionType,
 String issuedTo,
 String issuer,
 int maxNodes) {
 this.version = version;
 this.feature = feature;
 this.issueDateInMillis = issueDateInMillis;
 this.issueDate = null;
 this.expiryDateInMillis = expiryDateInMillis;
 this.expiryDate = null;
 }
}

```

```

 this.uid = uid;
 this.type = type;
 this.subscriptionType = subscriptionType;
 this.issuedTo = issuedTo;
 this.issuer = issuer;
 this.maxNodes = maxNodes;
 }

 public LicenseSpec(
 int version,
 String uid,
 String feature,
 String issueDate,
 String expiryDate,
 String type,
 String subscriptionType,
 String issuedTo,
 String issuer,
 int maxNodes) {
 this.version = version;
 this.feature = feature;
 this.issueDate = issueDate;
 this.issueDateInMillis = -1;
 this.expiryDate = expiryDate;
 this.expiryDateInMillis = -1;
 this.uid = uid;
 this.type = type;
 this.subscriptionType = subscriptionType;
 this.issuedTo = issuedTo;
 this.issuer = issuer;
 this.maxNodes = maxNodes;
 }
}

}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.license.License;

```



```

import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseVerificationToolTests extends CommandTestCase {
 protected Path pubKeyPath = null;
 protected Path priKeyPath = null;

 @Before
 public void setup() throws Exception {
 logger.error("project.basedir [{}]", System.getProperty("project.basedir"));
 pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
 priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
 }

 @Override
 protected Command newCommand() {
 return new LicenseVerificationTool();
 }

 public void testMissingKeyPath() throws Exception {
 Path pub = createTempDir().resolve("pub");
 UserException e = expectThrows(
 UserException.class,
 () -> execute("--publicKeyPath", pub.toString()));
 assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
 assertEquals(ExitCodes.USAGE, e.exitCode);
 }

 public void testMissingLicenseSpec() throws Exception {
 UserException e = expectThrows(UserException.class, () -> {
 execute("--publicKeyPath", pubKeyPath.toString());
 });
 assertTrue(
 e.getMessage(),
 e.getMessage().contains("Must specify either --license or --licenseFile"));
 assertEquals(ExitCodes.USAGE, e.exitCode);
 }

 public void testBrokenLicense() throws Exception {
 final TimeValue oneHour = TimeValue.timeValueHours(1);
 License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
 License tamperedLicense = License.builder()
 .fromLicenseSpec(signedLicense, signedLicense.signature())
 .expiryDate(signedLicense.expiryDate() + randomIntBetween(1, 1000)).build();
 }
}

```

```

 UserException e = expectThrows(
 UserException.class,
 () -> execute(
 "--publicKeyPath",
 pubKeyPath.toString(),
 "--license",
 TestUtils.dumpLicense(tamperedLicense)));
 assertEquals("Invalid License!", e.getMessage());
 assertEquals(ExitCodes.DATA_ERROR, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
 final TimeValue oneHour = TimeValue.timeValueHours(1);
 License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
 String output = execute(
 "--publicKeyPath",
 pubKeyPath.toString(),
 "--license",
 TestUtils.dumpLicense(signedLicense));
 assertFalse(output, output.isEmpty());
}

public void testLicenseSpecFile() throws Exception {
 final TimeValue oneHour = TimeValue.timeValueHours(1);
 License signedLicense = TestUtils.generateSignedLicense(oneHour, pubKeyPath, priKeyPath);
 Path licenseSpecFile = createTempFile();
 Files.write(
 licenseSpecFile,
 TestUtils.dumpLicense(signedLicense).getBytes(StandardCharsets.UTF_8));
 String output = execute(
 "--publicKeyPath",
 pubKeyPath.toString(),
 "--licenseFile",
 licenseSpecFile.toString());
 assertFalse(output, output.isEmpty());
}

}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;

```

```

import org.elasticsearch.cli.UserException;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License;
import org.elasticsearch.license.licensor.TestUtils;
import org.junit.Before;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;

public class LicenseGenerationToolTests extends CommandTestCase {

 protected Path pubKeyPath = null;
 protected Path priKeyPath = null;

 @Before
 public void setup() throws Exception {
 pubKeyPath = getDataPath(TestUtils.PUBLIC_KEY_RESOURCE);
 priKeyPath = getDataPath(TestUtils.PRIVATE_KEY_RESOURCE);
 }

 @Override
 protected Command newCommand() {
 return new LicenseGeneratorTool();
 }

 public void testMissingKeyPaths() throws Exception {
 Path pub = createTempDir().resolve("pub");
 Path pri = createTempDir().resolve("pri");
 UserException e = expectThrows(
 UserException.class,
 () -> execute(
 "--publicKeyPath",
 pub.toString(),
 "--privateKeyPath",
 pri.toString());
 assertTrue(e.getMessage(), e.getMessage().contains("pri does not exist"));
 assertEquals(ExitCodes.USAGE, e.exitCode);

 Files.createFile(pri);
 e = expectThrows(
 UserException.class,
 () -> execute(
 "--publicKeyPath",
 pub.toString(),
 "--privateKeyPath",
 pri.toString());
 }
}

```

```

 assertTrue(e.getMessage(), e.getMessage().contains("pub does not exist"));
 assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testMissingLicenseSpec() throws Exception {
 UserException e = expectThrows(
 UserException.class,
 () -> execute(
 "--publicKeyPath",
 pubKeyPath.toString(),
 "--privateKeyPath",
 priKeyPath.toString());
 assertTrue(
 e.getMessage(),
 e.getMessage().contains("Must specify either --license or --licenseFile"));
 assertEquals(ExitCodes.USAGE, e.exitCode);
}

public void testLicenseSpecString() throws Exception {
 TestUtils.LicenseSpec inputLicenseSpec =
 TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
 String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
 String output = execute(
 "--publicKeyPath",
 pubKeyPath.toString(),
 "--privateKeyPath",
 priKeyPath.toString(),
 "--license",
 licenseSpecString);
 final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));
 License outputLicense = License.fromSource(bytes, XContentType.JSON);
 TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
}

public void testLicenseSpecFile() throws Exception {
 TestUtils.LicenseSpec inputLicenseSpec =
 TestUtils.generateRandomLicenseSpec(License.VERSION_CURRENT);
 String licenseSpecString = TestUtils.generateLicenseSpecString(inputLicenseSpec);
 Path licenseSpecFile = createTempFile();
 Files.write(licenseSpecFile, licenseSpecString.getBytes(StandardCharsets.UTF_8));
 String output = execute(
 "--publicKeyPath",
 pubKeyPath.toString(),
 "--privateKeyPath",
 priKeyPath.toString(),
 "--licenseFile",
 licenseSpecFile.toString());
 final ByteArray bytes = new ByteArray(output.getBytes(StandardCharsets.UTF_8));

```

```

 License outputLicense = License.fromSource(bytes, XContentType.JSON);
 TestUtils.assertLicenseSpec(inputLicenseSpec, outputLicense);
 }

}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */

package org.elasticsearch.license.licensor.tools;

import org.elasticsearch.cli.Command;
import org.elasticsearch.cli.CommandTestCase;
import org.elasticsearch.cli.ExitCodes;
import org.elasticsearch.cli.UserException;

import java.nio.file.Files;
import java.nio.file.Path;

import static org.hamcrest.CoreMatchers.containsString;

public class KeyPairGenerationToolTests extends CommandTestCase {

 @Override
 protected Command newCommand() {
 return new KeyPairGeneratorTool();
 }

 public void testMissingKeyPaths() throws Exception {
 Path exists = createTempFile("", "existing");
 Path dne = createTempDir().resolve("dne");
 UserException e = expectThrows(
 UserException.class,
 () -> execute(
 "--publicKeyPath",
 exists.toString(),
 "--privateKeyPath",
 dne.toString());
 assertThat(e.getMessage(), containsString("existing"));
 assertEquals(ExitCodes.USAGE, e.exitCode);
 e = expectThrows(
 UserException.class,
 () -> execute(
 "--publicKeyPath",
 dne.toString(),
 "--privateKeyPath",
 exists.toString());
 }
}

```

```

 assertThat(e.getMessage(), containsString("existing"));
 assertEquals(ExitCodes.USAGE, e.exitCode);
 }

 public void testTool() throws Exception {
 Path keysDir = createTempDir();
 Path publicKeyFilePath = keysDir.resolve("public");
 Path privateKeyFilePath = keysDir.resolve("private");

 execute(
 "--publicKeyPath",
 publicKeyFilePath.toString(),
 "--privateKeyPath",
 privateKeyFilePath.toString());
 assertTrue(publicKeyFilePath.toString(), Files.exists(publicKeyFilePath));
 assertTrue(privateKeyFilePath.toString(), Files.exists(privateKeyFilePath));
 }
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */

package org.elasticsearch.license.licensor;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.CryptUtils;
import org.elasticsearch.license.License;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.nio.file.Files;
import java.nio.file.Path;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.SecureRandom;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Base64;
import java.util.Collections;
import java.util.Map;

```

```

/**
 * Responsible for generating a license signature according to the signature spec and sign it with
 * the provided encrypted private key
 */
public class LicenseSigner {

 private static final int MAGIC_LENGTH = 13;

 private final Path publicKeyPath;

 private final Path privateKeyPath;

 public LicenseSigner(final Path privateKeyPath, final Path publicKeyPath) {
 this.publicKeyPath = publicKeyPath;
 this.privateKeyPath = privateKeyPath;
 }

 /**
 * Generates a signature for the {@code licenseSpec}. Signature structure:
 * <code>
 * | VERSION | MAGIC | PUB_KEY_DIGEST | SIGNED_LICENSE_CONTENT |
 * </code>
 *
 * @return a signed License
 */
 public License sign(License licenseSpec) throws IOException {
 XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
 final Map<String, String> licenseSpecViewMode =
 Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true");
 licenseSpec.toXContent(contentBuilder, new ToXContent.MapParams(licenseSpecViewMode));
 final byte[] signedContent;
 try {
 final Signature rsa = Signature.getInstance("SHA512withRSA");
 rsa.initSign(CryptUtils.readEncryptedPrivateKey(Files.readAllBytes(privateKeyPath)));
 final BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
 BytesRef ref;
 while((ref = iterator.next()) != null) {
 rsa.update(ref.bytes, ref.offset, ref.length);
 }
 signedContent = rsa.sign();
 } catch (InvalidKeyException
 | IOException
 | NoSuchAlgorithmException
 | SignatureException e) {
 throw new IllegalStateException(e);
 }
 final byte[] magic = new byte[MAGIC_LENGTH];

```

```

SecureRandom random = new SecureRandom();
random.nextBytes(magic);
final byte[] hash = Base64.getEncoder().encode(Files.readAllBytes(publicKeyPath));
assert hash != null;
byte[] bytes = new byte[4 + 4 + MAGIC_LENGTH + 4 + hash.length + 4 + signedContent.length];
ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
byteBuffer.putInt(licenseSpec.version())
 .putInt(magic.length)
 .put(magic)
 .putInt(hash.length)
 .put(hash)
 .putInt(signedContent.length)
 .put(signedContent);

return License.builder()
 .fromLicenseSpec(licenseSpec, Base64.getEncoder().encodeToString(bytes))
 .build();
}
}

```

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Apache HttpComponents Client

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package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.common.settings.Settings;

import org.elasticsearch.test.ESTestCase;

import java.util.ArrayList;

import java.util.Arrays;

import java.util.Collections;

import java.util.List;

public class FieldPermissionsCacheTests extends ESTestCase {

```
 public void testFieldPermissionsCaching() {
 FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
 String[] allowed = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*",
randomAlphaOfLength(5) + "*"};
 String[] denied = new String[]{allowed[0] + randomAlphaOfLength(5), allowed[1] +
randomAlphaOfLength(5),
 allowed[2] + randomAlphaOfLength(5)};
```



```

FieldPermissions fieldPermissions = fieldPermissionsCache.getFieldPermissions(allowed, denied);
assertNotNull(fieldPermissions);
final String[] allowed2 = randomBoolean() ? allowed : Arrays.copyOf(allowed, allowed.length);
final String[] denied2 = randomBoolean() ? denied : Arrays.copyOf(denied, denied.length);
assertSame(fieldPermissions, fieldPermissionsCache.getFieldPermissions(allowed2, denied2));
}

public void testMergeFieldPermissions() {
 FieldPermissionsCache fieldPermissionsCache = new FieldPermissionsCache(Settings.EMPTY);
 String allowedPrefix1 = randomAlphaOfLength(5);
 String allowedPrefix2 = randomAlphaOfLength(5);
 String[] allowed1 = new String[]{allowedPrefix1 + "*"};
 String[] allowed2 = new String[]{allowedPrefix2 + "*"};
 String[] denied1 = new String[]{allowedPrefix1 + "a"};
 String[] denied2 = new String[]{allowedPrefix2 + "a"};
 FieldPermissions fieldPermissions1 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
 new FieldPermissions(fieldPermissionDef(allowed1, denied1));
 FieldPermissions fieldPermissions2 = randomBoolean() ?
fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
 new FieldPermissions(fieldPermissionDef(allowed2, denied2));
 FieldPermissions mergedFieldPermissions =
 fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
 assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix1 + "b"));
 assertTrue(mergedFieldPermissions.grantsAccessTo(allowedPrefix2 + "b"));
 assertFalse(mergedFieldPermissions.grantsAccessTo(denied1[0]));
 assertFalse(mergedFieldPermissions.grantsAccessTo(denied2[0]));

 allowed1 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
 allowed2 = null;
 denied1 = new String[]{allowed1[0] + "a", allowed1[1] + "a"};
 denied2 = null;
 fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
 new FieldPermissions(fieldPermissionDef(allowed1, denied1));
 fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
 new FieldPermissions(fieldPermissionDef(allowed2, denied2));
 mergedFieldPermissions =
 fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
 assertFalse(mergedFieldPermissions.hasFieldLevelSecurity());

 allowed1 = new String[]{};
 allowed2 = new String[]{randomAlphaOfLength(5) + "*", randomAlphaOfLength(5) + "*"};
 denied1 = new String[]{};
 denied2 = new String[]{allowed2[0] + "a", allowed2[1] + "a"};
 fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
 new FieldPermissions(fieldPermissionDef(allowed1, denied1));
 fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
 new FieldPermissions(fieldPermissionDef(allowed2, denied2));
}

```

```

mergedFieldPermissions =
 fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
for (String field : allowed2) {
 assertTrue(mergedFieldPermissions.grantsAccessTo(field));
}
for (String field : denied2) {
 assertFalse(mergedFieldPermissions.grantsAccessTo(field));
}

allowed1 = randomBoolean() ? null : new String[]{"*"};
allowed2 = randomBoolean() ? null : new String[]{"*"};
denied1 = new String[]{"a"};
denied2 = new String[]{"b"};
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
 new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
 new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
 fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));
assertTrue(mergedFieldPermissions.grantsAccessTo("b"));

// test merge does not remove _all
allowed1 = new String[]{"_all"};
allowed2 = new String[]{};
denied1 = null;
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
 new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
 new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
 fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(fieldPermissions1.grantsAccessTo("_all"));
assertFalse(fieldPermissions2.grantsAccessTo("_all"));
assertTrue(mergedFieldPermissions.grantsAccessTo("_all"));

allowed1 = new String[] { "a*" };
allowed2 = new String[] { "b*" };
denied1 = new String[] { "aa*" };
denied2 = null;
fieldPermissions1 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed1, denied1) :
 new FieldPermissions(fieldPermissionDef(allowed1, denied1));
fieldPermissions2 = randomBoolean() ? fieldPermissionsCache.getFieldPermissions(allowed2, denied2) :
 new FieldPermissions(fieldPermissionDef(allowed2, denied2));
mergedFieldPermissions =
 fieldPermissionsCache.getFieldPermissions(Arrays.asList(fieldPermissions1, fieldPermissions2));
assertTrue(mergedFieldPermissions.grantsAccessTo("a"));

```

```

 assertTrue(mergedFieldPermissions.grantsAccessTo("b"));
 assertFalse(mergedFieldPermissions.grantsAccessTo("aa"));
 assertFalse(mergedFieldPermissions.grantsAccessTo("aa1"));
 assertTrue(mergedFieldPermissions.grantsAccessTo("a1"));
}

public void testNonFlsAndFlsMerging() {
 List<FieldPermissions> permissionsList = new ArrayList<>();
 permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field1"}, null)));
 permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field2", "query*"}, null)));
 permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {"field1", "field2"}, null)));
 permissionsList.add(new FieldPermissions(fieldPermissionDef(new String[] {}, null)));
 permissionsList.add(new FieldPermissions(fieldPermissionDef(null, null)));

 FieldPermissionsCache cache = new FieldPermissionsCache(Settings.EMPTY);
 for (int i = 0; i < scaledRandomIntBetween(1, 12); i++) {
 Collections.shuffle(permissionsList, random());
 FieldPermissions result = cache.getFieldPermissions(permissionsList);
 assertFalse(result.hasFieldLevelSecurity());
 }
}

private static FieldPermissionsDefinition fieldPermissionDef(String[] granted, String[] denied) {
 return new FieldPermissionsDefinition(granted, denied);
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.Collection;

```

```

import java.util.concurrent.CountDownLatch;

public abstract class AbstractLicensesIntegrationTestCase extends ESIntegTestCase {

 @Override
 protected Settings nodeSettings(int nodeOrdinal) {
 return Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), false).build();
 }

 @Override
 protected Collection<Class<? extends Plugin>> nodePlugins() {
 return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class);
 }

 @Override
 protected Collection<Class<? extends Plugin>> transportClientPlugins() {
 return Arrays.asList(XPackClientPlugin.class, CommonAnalysisPlugin.class);
 }

 @Override
 protected Settings transportClientSettings() {
 // Plugin should be loaded on the transport client as well
 return nodeSettings(0);
 }

 protected void putLicense(final License license) throws InterruptedException {
 final CountDownLatch latch = new CountDownLatch(1);
 ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
 clusterService.submitStateUpdateTask("putting license", new ClusterStateUpdateTask() {
 @Override
 public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
 latch.countDown();
 }
 });

 @Override
 public ClusterState execute(ClusterState currentState) throws Exception {
 Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
 mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
 return ClusterState.builder(currentState).metaData(mdBuilder).build();
 }

 @Override
 public void onFailure(String source, @Nullable Exception e) {
 logger.error("error on metaData cleanup after test", e);
 }
 });
 latch.await();
}

```

```

}

protected void putLicenseTombstone() throws InterruptedException {
 putLicense(LicensesMetaData.LICENSE_TOMBSTONE);
}

protected void wipeAllLicenses() throws InterruptedException {
 final CountdownLatch latch = new CountdownLatch(1);
 ClusterService clusterService = internalCluster().getInstance(ClusterService.class,
internalCluster().getMasterName());
 clusterService.submitStateUpdateTask("delete licensing metadata", new ClusterStateUpdateTask() {
 @Override
 public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
 latch.countDown();
 }

 @Override
 public ClusterState execute(ClusterState currentState) throws Exception {
 MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
 mdBuilder.removeCustom(LicensesMetaData.TYPE);
 return ClusterState.builder(currentState).metaData(mdBuilder).build();
 }

 @Override
 public void onFailure(String source, @Nullable Exception e) {
 logger.error("error on metaData cleanup after test", e);
 }
 });
 latch.await();
}

protected void assertLicenseActive(boolean active) throws InterruptedException {
 boolean success = awaitBusy() -> {
 for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {
 if (licenseState.isActive() == active) {
 return true;
 }
 }
 return false;
 };
 assertTrue(success);
}

}
/*
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.

```

```

*/
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.junit.After;
import org.junit.Before;
import org.mockito.ArgumentCaptor;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseClusterChangeTests extends AbstractLicenseServiceTestCase {

 private TestUtils.AssertingLicenseState licenseState;

 @Before
 public void setup() {
 licenseState = new TestUtils.AssertingLicenseState();
 setInitialState(null, licenseState, Settings.EMPTY);
 licenseService.start();
 }

 @After
 public void teardown() {
 licenseService.stop();
 }

 public void testNotificationOnNewLicense() throws Exception {
 ClusterState oldState = ClusterState.builder(new ClusterName("a")).build();
 final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
 MetaData metaData = MetaData.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
 ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();

```

```

licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
assertThat(licenseState.activeUpdates.size(), equalTo(1));
assertTrue(licenseState.activeUpdates.get(0));
}

public void testNoNotificationOnExistingLicense() throws Exception {
 final License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(24));
 Metadata metaData = Metadata.builder().putCustom(LicensesMetaData.TYPE, new
LicensesMetaData(license, null)).build();
 ClusterState newState = ClusterState.builder(new ClusterName("a")).metaData(metaData).build();
 ClusterState oldState = ClusterState.builder(newState).build();
 licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
 assertThat(licenseState.activeUpdates.size(), equalTo(0));
}

public void testSelfGeneratedLicenseGeneration() throws Exception {
 DiscoveryNode master = new DiscoveryNode("b", buildNewFakeTransportAddress(), emptyMap(), emptySet(),
Version.CURRENT);
 ClusterState oldState = ClusterState.builder(new ClusterName("a"))
 .nodes(DiscoveryNodes.builder().masterNodeId(master.getId()).add(master)).build();
 when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
 ClusterState newState = ClusterState.builder(oldState).nodes(discoveryNodes).build();

 licenseService.clusterChanged(new ClusterChangedEvent("simulated", newState, oldState));
 ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
 verify(clusterService, times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
 ClusterState stateWithLicense = stateUpdater.getValue().execute(newState);
 LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
 assertNotNull(licenseMetaData);
 assertNotNull(licenseMetaData.getLicense());
 assertEquals(licenseType, licenseMetaData.getLicense().type());
 long expiration;
 if (licenseType.equals("basic")) {
 expiration = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
 } else {
 expiration = LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis() +
clock.millis();
 }
 assertEquals(expiration, licenseMetaData.getLicense().expiryDate());
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;

import java.util.Arrays;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.license.License.OperationMode.BASIC;
import static org.elasticsearch.license.License.OperationMode.GOLD;
import static org.elasticsearch.license.License.OperationMode.MISSING;
import static org.elasticsearch.license.License.OperationMode.PLATINUM;
import static org.elasticsearch.license.License.OperationMode.STANDARD;
import static org.elasticsearch.license.License.OperationMode.TRIAL;
import static org.hamcrest.Matchers.is;

/**
 * Unit tests for the {@link XPackLicenseState}
 */
public class XPackLicenseStateTests extends ESTestCase {

 /** Creates a license state with the given license type and active state, and checks the given method returns
 expected. */
 void assertAllowed(OperationMode mode, boolean active, Predicate<XPackLicenseState> predicate, boolean
 expected) {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(mode, active);
 assertEquals(expected, predicate.test(licenseState));
 }

 /**
 * Checks the ack message going from the {@code from} license type to {@code to} license type.
 * TODO: check the actual messages, not just the number of them! This was copied from previous license tests...
 */
 void assertAckMesssages(String feature, OperationMode from, OperationMode to, int expectedMessages) {
 String[] gotMessages = XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.get(feature).apply(from, to);
 assertEquals(expectedMessages, gotMessages.length);
 }

 static <T> T randomFrom(T[] values, Predicate<T> filter) {
 return randomFrom(Arrays.stream(values).filter(filter).collect(Collectors.toList()));
 }

 static OperationMode randomMode() {
 return randomFrom(OperationMode.values());
 }

```



```

}

public static OperationMode randomTrialStandardGoldOrPlatinumMode() {
 return randomFrom(TRIAL, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomTrialOrPlatinumMode() {
 return randomFrom(TRIAL, PLATINUM);
}

public static OperationMode randomTrialBasicStandardGoldOrPlatinumMode() {
 return randomFrom(TRIAL, BASIC, STANDARD, GOLD, PLATINUM);
}

public static OperationMode randomBasicStandardOrGold() {
 return randomFrom(BASIC, STANDARD, GOLD);
}

public void testSecurityDefaults() {
 XPackLicenseState licenseState =
 new XPackLicenseState(Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(),
true).build());
 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(true));
 assertThat(licenseState.isAuditingAllowed(), is(true));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

 licenseState =
 new XPackLicenseState(Settings.builder().put(XPackSettings.TRANSPORT_SSL_ENABLED.getKey(),
true).build());
 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(true));
 assertThat(licenseState.isAuditingAllowed(), is(true));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));

 licenseState = new XPackLicenseState(Settings.EMPTY);
 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(true));
 assertThat(licenseState.isAuditingAllowed(), is(true));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
}

```

```

 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityBasic() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
 licenseState.update(BASIC, true);

 assertThat(licenseState.isAuthAllowed(), is(false));
 assertThat(licenseState.isIpFilteringAllowed(), is(false));
 assertThat(licenseState.isAuditingAllowed(), is(false));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityBasicExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
 licenseState.update(BASIC, false);

 assertThat(licenseState.isAuthAllowed(), is(false));
 assertThat(licenseState.isIpFilteringAllowed(), is(false));
 assertThat(licenseState.isAuditingAllowed(), is(false));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NONE));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandard() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
 licenseState.update(STANDARD, true);

 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(false));
 assertThat(licenseState.isAuditingAllowed(), is(false));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityStandardExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));

```

```

licenseState.update(STANDARD, false);

assertThat(licenseState.isAuthAllowed(), is(true));
assertThat(licenseState.isIpFilteringAllowed(), is(false));
assertThat(licenseState.isAuditingAllowed(), is(false));
assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.NATIVE));
assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGold() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
 licenseState.update(GOLD, true);

 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(true));
 assertThat(licenseState.isAuditingAllowed(), is(true));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityGoldExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
 licenseState.update(GOLD, false);

 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(true));
 assertThat(licenseState.isAuditingAllowed(), is(true));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(false));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.DEFAULT));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityPlatinum() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
 licenseState.update(PLATINUM, true);

 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(true));
 assertThat(licenseState.isAuditingAllowed(), is(true));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(true));
}

```

```

 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(true));
}

public void testSecurityPlatinumExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(randomFrom(Settings.EMPTY,
 Settings.builder().put(XPackSettings.SECURITY_ENABLED.getKey(), true).build()));
 licenseState.update(PLATINUM, false);

 assertThat(licenseState.isAuthAllowed(), is(true));
 assertThat(licenseState.isIpFilteringAllowed(), is(true));
 assertThat(licenseState.isAuditingAllowed(), is(true));
 assertThat(licenseState.isStatsAndHealthAllowed(), is(false));
 assertThat(licenseState.isDocumentAndFieldLevelSecurityAllowed(), is(true));
 assertThat(licenseState.allowedRealmType(), is(XPackLicenseState.AllowedRealmType.ALL));
 assertThat(licenseState.isCustomRoleProvidersAllowed(), is(false));
}

public void testSecurityAckBasicToNotGoldOrStandard() {
 OperationMode toMode = randomFrom(OperationMode.values(), mode -> mode != GOLD && mode !=
STANDARD);
 assertThatAckMessages(XPackField.SECURITY, BASIC, toMode, 0);
}

public void testSecurityAckAnyToTrialOrPlatinum() {
 assertThatAckMessages(XPackField.SECURITY, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSecurityAckTrialStandardGoldOrPlatinumToBasic() {
 assertThatAckMessages(XPackField.SECURITY, randomTrialStandardGoldOrPlatinumMode(), BASIC, 3);
}

public void testSecurityAckAnyToStandard() {
 OperationMode from = randomFrom(BASIC, GOLD, PLATINUM, TRIAL);
 assertThatAckMessages(XPackField.SECURITY, from, STANDARD, 4);
}

public void testSecurityAckBasicStandardTrialOrPlatinumToGold() {
 OperationMode from = randomFrom(BASIC, PLATINUM, TRIAL, STANDARD);
 assertThatAckMessages(XPackField.SECURITY, from, GOLD, 2);
}

public void testMonitoringAckBasicToAny() {
 assertThatAckMessages(XPackField.MONITORING, BASIC, randomMode(), 0);
}

public void testMonitoringAckAnyToTrialGoldOrPlatinum() {

```

```

 assertAckMessages(XPackField.MONITORING, randomMode(),
randomTrialStandardGoldOrPlatinumMode(), 0);
 }

 public void testMonitoringAckNotBasicToBasic() {
 OperationMode from = randomFrom(STANDARD, GOLD, PLATINUM, TRIAL);
 assertAckMessages(XPackField.MONITORING, from, BASIC, 2);
 }

 public void testMonitoringAllowed() {
 assertAllowed(randomMode(), true, XPackLicenseState::isMonitoringAllowed, true);
 assertAllowed(randomMode(), false, XPackLicenseState::isMonitoringAllowed, false);
 }

 public void testMonitoringUpdateRetention() {
 assertAllowed(STANDARD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
 assertAllowed(GOLD, true, XPackLicenseState::isUpdateRetentionAllowed, true);
 assertAllowed(PLATINUM, true, XPackLicenseState::isUpdateRetentionAllowed, true);
 assertAllowed(TRIAL, true, XPackLicenseState::isUpdateRetentionAllowed, true);
 assertAllowed(BASIC, true, XPackLicenseState::isUpdateRetentionAllowed, false);
 assertAllowed(MISSING, false, XPackLicenseState::isUpdateRetentionAllowed, false);
 }

 public void testWatcherPlatinumGoldTrialStandard() throws Exception {
 assertAllowed(TRIAL, true, XPackLicenseState::isWatcherAllowed, true);
 assertAllowed(GOLD, true, XPackLicenseState::isWatcherAllowed, true);
 assertAllowed(PLATINUM, true, XPackLicenseState::isWatcherAllowed, true);
 assertAllowed(STANDARD, true, XPackLicenseState::isWatcherAllowed, true);
 }

 public void testWatcherBasicLicense() throws Exception {
 assertAllowed(BASIC, true, XPackLicenseState::isWatcherAllowed, false);
 }

 public void testWatcherInactive() {
 assertAllowed(BASIC, false, XPackLicenseState::isWatcherAllowed, false);
 }

 public void testWatcherInactivePlatinumGoldTrial() throws Exception {
 assertAllowed(TRIAL, false, XPackLicenseState::isWatcherAllowed, false);
 assertAllowed(GOLD, false, XPackLicenseState::isWatcherAllowed, false);
 assertAllowed(PLATINUM, false, XPackLicenseState::isWatcherAllowed, false);
 assertAllowed(STANDARD, false, XPackLicenseState::isWatcherAllowed, false);
 }

 public void testGraphPlatinumTrial() throws Exception {
 assertAllowed(TRIAL, true, XPackLicenseState::isGraphAllowed, true);
 assertAllowed(PLATINUM, true, XPackLicenseState::isGraphAllowed, true);
 }

```

```

}

public void testGraphBasic() throws Exception {
 assertAllowed(BASIC, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphStandard() throws Exception {
 assertAllowed(STANDARD, true, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactiveBasic() {
 assertAllowed(BASIC, false, XPackLicenseState::isGraphAllowed, false);
}

public void testGraphInactivePlatinumTrial() throws Exception {
 assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
 assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningPlatinumTrial() throws Exception {
 assertAllowed(TRIAL, true, XPackLicenseState::isMachineLearningAllowed, true);
 assertAllowed(PLATINUM, true, XPackLicenseState::isMachineLearningAllowed, true);
}

public void testMachineLearningBasic() throws Exception {
 assertAllowed(BASIC, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningStandard() throws Exception {
 assertAllowed(STANDARD, true, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactiveBasic() {
 assertAllowed(BASIC, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testMachineLearningInactivePlatinumTrial() throws Exception {
 assertAllowed(TRIAL, false, XPackLicenseState::isMachineLearningAllowed, false);
 assertAllowed(PLATINUM, false, XPackLicenseState::isMachineLearningAllowed, false);
}

public void testLogstashPlatinumGoldTrialStandard() throws Exception {
 assertAllowed(TRIAL, true, XPackLicenseState::isLogstashAllowed, true);
 assertAllowed(GOLD, true, XPackLicenseState::isLogstashAllowed, true);
 assertAllowed(PLATINUM, true, XPackLicenseState::isLogstashAllowed, true);
 assertAllowed(STANDARD, true, XPackLicenseState::isLogstashAllowed, true);
}

```

```

public void testLogstashBasicLicense() throws Exception {
 assertAllowed(BASIC, true, XPackLicenseState::isLogstashAllowed, false);
}

public void testLogstashInactive() {
 assertAllowed(BASIC, false, XPackLicenseState::isLogstashAllowed, false);
 assertAllowed(TRIAL, false, XPackLicenseState::isLogstashAllowed, false);
 assertAllowed(GOLD, false, XPackLicenseState::isLogstashAllowed, false);
 assertAllowed(PLATINUM, false, XPackLicenseState::isLogstashAllowed, false);
 assertAllowed(STANDARD, false, XPackLicenseState::isLogstashAllowed, false);
}

public void testSqlDefaults() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 assertThat(licenseState.isSqlAllowed(), is(true));
 assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlBasic() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(BASIC, true);

 assertThat(licenseState.isSqlAllowed(), is(true));
 assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlBasicExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(BASIC, false);

 assertThat(licenseState.isSqlAllowed(), is(false));
 assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandard() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(STANDARD, true);

 assertThat(licenseState.isSqlAllowed(), is(true));
 assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlStandardExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(STANDARD, false);

 assertThat(licenseState.isSqlAllowed(), is(false));
 assertThat(licenseState.isJdbcAllowed(), is(false));
}

```

```

}

public void testSqlGold() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(GOLD, true);

 assertThat(licenseState.isSqlAllowed(), is(true));
 assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlGoldExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(GOLD, false);

 assertThat(licenseState.isSqlAllowed(), is(false));
 assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlPlatinum() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(PLATINUM, true);

 assertThat(licenseState.isSqlAllowed(), is(true));
 assertThat(licenseState.isJdbcAllowed(), is(true));
}

public void testSqlPlatinumExpired() {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 licenseState.update(PLATINUM, false);

 assertThat(licenseState.isSqlAllowed(), is(false));
 assertThat(licenseState.isJdbcAllowed(), is(false));
}

public void testSqlAckAnyToTrialOrPlatinum() {
 assertAckMessages(XPackField.SQL, randomMode(), randomTrialOrPlatinumMode(), 0);
}

public void testSqlAckTrialOrPlatinumToNotTrialOrPlatinum() {
 assertAckMessages(XPackField.SQL, randomTrialOrPlatinumMode(), randomBasicStandardOrGold(), 1);
}

}
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 */

```



```

package org.elasticsearch.license;

import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartTrialLicenseTests extends AbstractLicensesIntegrationTestCase {

 @Override
 protected Settings nodeSettings(int nodeOrdinal) {
 return Settings.builder()
 .put(super.nodeSettings(nodeOrdinal))
 .put("node.data", true)
 .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
 .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
 }

 @Override
 protected Collection<Class<? extends Plugin>> nodePlugins() {
 return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
 }

 @Override
 protected Collection<Class<? extends Plugin>> transportClientPlugins() {
 return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
 }

 public void testStartTrial() throws Exception {
 LicensingClient licensingClient = new LicensingClient(client());
 ensureStartingWithBasic();

 RestClient restClient = getRestClient();

```

```

Response response = restClient.performRequest("GET", "/_xpack/license/trial_status");
String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_trial\":true}", body);

// Test that starting will fail without acknowledgement
Response response2 = restClient.performRequest("POST", "/_xpack/license/start_trial");
String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response2.getStatusLine().getStatusCode());
assertTrue(body2.contains("\"trial_was_started\":false"));
assertTrue(body2.contains("\"error_message\":\"Operation failed: Needs acknowledgement.\""));
assertTrue(body2.contains("\"acknowledged\":false"));

assertBusy(() -> {
 GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
 assertEquals("basic", getLicenseResponse.license().type());
});

String type = randomFrom(LicenseService.VALID_TRIAL_TYPES);

Response response3 = restClient.performRequest("POST",
"/_xpack/license/start_trial?acknowledge=true&type=" + type);
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertTrue(body3.contains("\"trial_was_started\":true"));
assertTrue(body3.contains("\"type\":\"" + type + "\""));
assertTrue(body3.contains("\"acknowledged\":true"));

assertBusy(() -> {
 GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
 assertEquals(type, postTrialLicenseResponse.license().type());
});

Response response4 = restClient.performRequest("GET", "/_xpack/license/trial_status");
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response4.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_trial\":false}", body4);

String secondAttemptType = randomFrom(LicenseService.VALID_TRIAL_TYPES);

ResponseException ex = expectThrows(ResponseException.class,
() -> restClient.performRequest("POST", "/_xpack/license/start_trial?acknowledge=true&type=" +
secondAttemptType));
Response response5 = ex.getResponse();

```

```

String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(403, response5.getStatusLine().getStatusCode());
assertTrue(body5.contains("\"trial_was_started\":false"));
assertTrue(body5.contains("\"error_message\": \"Operation failed: Trial was already activated.\""));
}

public void testInvalidType() throws Exception {
 ensureStartingWithBasic();

 ResponseException ex = expectThrows(ResponseException.class, () ->
 getRestClient().performRequest("POST", "/_xpack/license/start_trial?type=basic"));
 Response response = ex.getResponse();
 String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
 assertEquals(400, response.getStatusLine().getStatusCode());
 assertTrue(body.contains("\"type\": \"illegal_argument_exception\""));
 assertTrue(body.contains("\"reason\": \"Cannot start trial of type [basic]. Valid trial types are [\"]"));
}

private void ensureStartingWithBasic() throws Exception {
 LicensingClient licensingClient = new LicensingClient(client());
 GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();

 if ("basic".equals(getLicenseResponse.license().type()) == false) {
 licensingClient.preparePostStartBasic().setAcknowledge(true).get();
 }

 assertBusy(() -> {
 GetLicenseResponse postTrialLicenseResponse = licensingClient.prepareGetLicense().get();
 assertEquals("basic", postTrialLicenseResponse.license().type());
 });
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.env.Environment;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase.ClusterScope;

```

```

import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.nullValue;

@ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes = 0,
transportClientRatio = 0)
public class LicenseServiceClusterTests extends AbstractLicensesIntegrationTestCase {

 @Override
 protected Settings nodeSettings(int nodeOrdinal) {
 return nodeSettingsBuilder(nodeOrdinal).build();
 }

 private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
 return Settings.builder()
 .put(super.nodeSettings(nodeOrdinal))
 .put("node.data", true)
 .put("resource.reload.interval.high", "500ms") // for license mode file watcher
 .put(NetworkModule.HTTP_ENABLED.getKey(), true);
 }

 @Override
 protected Collection<Class<? extends Plugin>> nodePlugins() {
 return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
 }

 @Override
 protected Collection<Class<? extends Plugin>> transportClientPlugins() {
 return nodePlugins();
 }

 public void testClusterRestartWithLicense() throws Exception {
 wipeAllLicenses();

 int numNodes = randomIntBetween(1, 5);
 logger.info("--> starting { } node(s)", numNodes);
 internalCluster().startNodes(numNodes);
 }
}

```

```

ensureGreen();

logger.info("--> put signed license");
LicensingClient licensingClient = new LicensingClient(client());
License license = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(1));
putLicense(license);
assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
assertOperationMode(license.operationMode());

logger.info("--> restart all nodes");
internalCluster().fullRestart();
ensureYellow();
licensingClient = new LicensingClient(client());
logger.info("--> get and check signed license");
assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
logger.info("--> remove licenses");
licensingClient.prepareDeleteLicense().get();
assertOperationMode(License.OperationMode.MISSING);

logger.info("--> restart all nodes");
internalCluster().fullRestart();
licensingClient = new LicensingClient(client());
ensureYellow();
assertThat(licensingClient.prepareGetLicense().get().license(), nullValue());
assertOperationMode(License.OperationMode.MISSING);

wipeAllLicenses();
}

public void testCloudInternalLicense() throws Exception {
 wipeAllLicenses();

 int numNodes = randomIntBetween(1, 5);
 logger.info("--> starting { } node(s)", numNodes);
 internalCluster().startNodes(numNodes);
 ensureGreen();

 logger.info("--> put signed license");
 LicensingClient licensingClient = new LicensingClient(client());
 License license = TestUtils.generateSignedLicense("cloud_internal", License.VERSION_CURRENT,
System.currentTimeMillis(),
 TimeValue.timeValueMinutes(1));
 putLicense(license);
 assertThat(licensingClient.prepareGetLicense().get().license(), equalTo(license));
 assertOperationMode(License.OperationMode.PLATINUM);
 writeCloudInternalMode("gold");
 assertOperationMode(License.OperationMode.GOLD);
}

```

```

writeCloudInternalMode("basic");
assertOperationMode(License.OperationMode.BASIC);
}

public void testClusterRestartWhileEnabled() throws Exception {
 wipeAllLicenses();
 internalCluster().startNode();
 ensureGreen();
 assertLicenseActive(true);
 logger.info("--> restart node");
 internalCluster().fullRestart();
 ensureYellow();
 logger.info("--> await node for enabled");
 assertLicenseActive(true);
}

public void testClusterRestartWhileGrace() throws Exception {
 wipeAllLicenses();
 internalCluster().startNode();
 assertLicenseActive(true);
 putLicense(TestUtils.generateSignedLicense(TimeValue.timeValueMillis(0)));
 ensureGreen();
 assertLicenseActive(true);
 logger.info("--> restart node");
 internalCluster().fullRestart();
 ensureYellow();
 logger.info("--> await node for grace_period");
 assertLicenseActive(true);
}

public void testClusterRestartWhileExpired() throws Exception {
 wipeAllLicenses();
 internalCluster().startNode();
 ensureGreen();
 assertLicenseActive(true);
 putLicense(TestUtils.generateExpiredNonBasicLicense(System.currentTimeMillis() -
LicenseService.GRACE_PERIOD_DURATION.getMillis()));
 assertLicenseActive(false);
 logger.info("--> restart node");
 internalCluster().fullRestart();
 ensureYellow();
 logger.info("--> await node for disabled");
 assertLicenseActive(false);
}

private void assertOperationMode(License.OperationMode operationMode) throws InterruptedException {
 boolean success = awaitBusy() -> {
 for (XPackLicenseState licenseState : internalCluster().getDataNodeInstances(XPackLicenseState.class)) {

```

```

 if (licenseState.getOperationMode() == operationMode) {
 return true;
 }
 }
 return false;
});
assertTrue(success);
}

private void writeCloudInternalMode(String mode) throws Exception {
 for (Environment environment : internalCluster().getDataOrMasterNodeInstances(Environment.class)) {
 Path licenseModePath = XPackPlugin.resolveConfigFile(environment, "license_mode");
 Files.createDirectories(licenseModePath.getParent());
 Files.write(licenseModePath, mode.getBytes(StandardCharsets.UTF_8));
 }
}

}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.test.ESTestCase;

import java.util.Arrays;

import static org.hamcrest.Matchers.contains;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.hasSize;

public class LicenseUtilsTests extends ESTestCase {

 public void testNewExpirationException() {
 for (String feature : Arrays.asList("feature", randomAlphaOfLength(5), null, "")) {
 ElasticsearchSecurityException exception = LicenseUtils.newComplianceException(feature);
 assertNotNull(exception);
 assertThat(exception.getMetadataKeys(), contains(LicenseUtils.EXPIRED_FEATURE_METADATA));
 assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA), hasSize(1));
 assertThat(exception.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA).iterator().next(),
 equalTo(feature));
 }
 }

 public void testIsLicenseExpiredException() {

```

```

ElasticsearchSecurityException exception = LicenseUtils.newComplianceException("feature");
assertTrue(LicenseUtils.isLicenseExpiredException(exception));

exception = new ElasticsearchSecurityException("msg");
assertFalse(LicenseUtils.isLicenseExpiredException(exception));
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.Before;

import java.nio.file.Path;

import static org.hamcrest.Matchers.equalTo;
import static org.mockito.Matchers.any;
import static org.mockito.Matchers.eq;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.verifyZeroInteractions;

public class LicenseOperationModeUpdateTests extends ESTestCase {

 private OperationModeFileWatcher operationModeFileWatcher;
 private Path licenseModeFile;
 private ResourceWatcherService resourceWatcherService;

 @Before
 public void init() throws Exception {
 licenseModeFile = createTempFile();
 resourceWatcherService = mock(ResourceWatcherService.class);
 operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService, licenseModeFile,
logger, () -> {});
 }

 public void testLicenseOperationModeUpdate() throws Exception {
 String type = randomFrom("trial", "basic", "standard", "gold", "platinum");
 License license = License.builder()
 .uid("id")
 .expiryDate(0)

```



```

 .issueDate(0)
 .issuedTo("elasticsearch")
 .issuer("issuer")
 .type(type)
 .maxNodes(1)
 .build();

 assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
 OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
 license.setOperationModeFileWatcher(operationModeFileWatcher);
 verifyZeroInteractions(resourceWatcherService);
 assertThat(license.operationMode(), equalTo(License.OperationMode.resolve(type)));
}

public void testCloudInternalLicenseOperationModeUpdate() throws Exception {
 License license = License.builder()
 .uid("id")
 .expiryDate(0)
 .issueDate(0)
 .issuedTo("elasticsearch")
 .issuer("issuer")
 .type("cloud_internal")
 .maxNodes(1)
 .build();

 assertThat(license.operationMode(), equalTo(License.OperationMode.PLATINUM));
 OperationModeFileWatcherTests.writeMode("gold", licenseModeFile);
 license.setOperationModeFileWatcher(operationModeFileWatcher);
 verify(resourceWatcherService, times(1)).add(any(FileWatcher.class),
 eq(ResourceWatcherService.Frequency.HIGH));
 assertThat(license.operationMode(), equalTo(License.OperationMode.GOLD));
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;
import org.junit.Before;

import static org.hamcrest.Matchers.equalTo;

public class LicenseScheduleTests extends ESTestCase {

```

```

private License license;
private SchedulerEngine.Schedule schedule;

@Before
public void setuo() throws Exception {
 license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(12));
 schedule = LicenseService.nextLicenseCheck(license);
}

public void testEnabledLicenseSchedule() throws Exception {
 int expiryDuration = (int) (license.expiryDate() - license.issueDate());
 long triggeredTime = license.issueDate() + between(0, expiryDuration);
 assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
equalTo(license.expiryDate()));
}

public void testGraceLicenseSchedule() throws Exception {
 long triggeredTime = license.expiryDate() + between(1,
 ((int) LicenseService.GRACE_PERIOD_DURATION.getMillis()));
 assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
 equalTo(license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis()));
}

public void testExpiredLicenseSchedule() throws Exception {
 long triggeredTime = license.expiryDate() + LicenseService.GRACE_PERIOD_DURATION.getMillis() +
 randomIntBetween(1, 1000);
 assertThat(schedule.nextScheduledTimeAfter(license.issueDate(), triggeredTime),
 equalTo(-1L));
}

public void testInvalidLicenseSchedule() throws Exception {
 long triggeredTime = license.issueDate() - randomIntBetween(1, 1000);
 assertThat(schedule.nextScheduledTimeAfter(triggeredTime, triggeredTime),
 equalTo(license.issueDate()));
}
}
}
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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
package org.elasticsearch.license;

import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.test.ESTestCase;

import static org.elasticsearch.common.unit.TimeValue.timeValueMillis;

```

```

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.nullValue;

public class ExpirationCallbackTests extends ESTestCase {

 public void testPostExpirationDelay() throws Exception {
 TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
 TimeValue min = TimeValue.timeValueSeconds(1);
 TimeValue max = TimeValue.timeValueSeconds(4);
 TimeValue frequency = TimeValue.timeValueSeconds(1);
 NoopPostExpirationCallback post = new NoopPostExpirationCallback(min, max, frequency);
 long now = System.currentTimeMillis();
 long expiryDate = now + expiryDuration.getMillis();
 assertThat(post.delay(expiryDate, now),
 equalTo(TimeValue.timeValueMillis(expiryDuration.getMillis() + min.getMillis()))); // before license
 }

 public void testPostExpirationDelayWithNullMax() throws Exception {
 TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
 TimeValue min = TimeValue.timeValueSeconds(1);
 TimeValue max = TimeValue.timeValueSeconds(4);
 TimeValue frequency = TimeValue.timeValueSeconds(1);
 NoopPostExpirationCallback post = new NoopPostExpirationCallback(min, null, frequency);
 long now = System.currentTimeMillis();
 long expiryDate = now + expiryDuration.getMillis();
 assertThat(post.delay(expiryDate, now), equalTo(TimeValue.timeValueMillis(0)));
 }

 public void testPreExpirationDelay() throws Exception {
 TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
 TimeValue min = TimeValue.timeValueSeconds(1);
 TimeValue max = TimeValue.timeValueSeconds(4);
 TimeValue frequency = TimeValue.timeValueSeconds(1);
 NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
 long now = System.currentTimeMillis();
 long expiryDate = now + expiryDuration.getMillis();
 assertThat(pre.delay(expiryDate, expiryDate), nullValue()); // on license expiry
 int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
 int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
 assertExpirationCallbackDelay(pre, expiryDuration.getMillis(), latestValidTriggerDelay,
 earliestValidTriggerDelay);
 }

 public void testPreExpirationDelayWithNullMax() throws Exception {
 TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
 TimeValue min = TimeValue.timeValueSeconds(1);
 TimeValue max = TimeValue.timeValueSeconds(4);
 TimeValue frequency = TimeValue.timeValueSeconds(1);
 NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, null, frequency);
 long now = System.currentTimeMillis();
 long expiryDate = now + expiryDuration.getMillis();
 assertThat(pre.delay(expiryDate, expiryDate), nullValue()); // on license expiry
 int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
 int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
 assertExpirationCallbackDelay(pre, expiryDuration.getMillis(), latestValidTriggerDelay,
 earliestValidTriggerDelay);
 }

 public void testPostExpirationWithNullMax() throws Exception {
 int postExpirySeconds = randomIntBetween(5, 10);
 TimeValue postExpiryDuration = TimeValue.timeValueSeconds(postExpirySeconds);
 TimeValue min = TimeValue.timeValueSeconds(postExpirySeconds - randomIntBetween(1, 3));

 final ExpirationCallback.Post post = new NoopPostExpirationCallback(min, null, timeValueMillis(10));
 long now = System.currentTimeMillis();
 assertThat(post.delay(now - postExpiryDuration.getMillis(), now), equalTo(TimeValue.timeValueMillis(0)));
 }
}

```

```

public void testPreExpirationWithNullMin() throws Exception {
 int expirySeconds = randomIntBetween(5, 10);
 TimeValue expiryDuration = TimeValue.timeValueSeconds(expirySeconds);
 TimeValue max = TimeValue.timeValueSeconds(expirySeconds + randomIntBetween(1, 10));

 final ExpirationCallback.Pre pre = new NoopPreExpirationCallback(null, max, timeValueMillis(10));
 long now = System.currentTimeMillis();
 assertThat(pre.delay(expiryDuration.millis() + now, now), equalTo(TimeValue.timeValueMillis(0)));
}

public void testPreExpirationScheduleTime() throws Exception {
 TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
 TimeValue min = TimeValue.timeValueSeconds(1);
 TimeValue max = TimeValue.timeValueSeconds(4);
 TimeValue frequency = TimeValue.timeValueSeconds(1);
 NoopPreExpirationCallback pre = new NoopPreExpirationCallback(min, max, frequency);
 int latestValidTriggerDelay = (int) (expiryDuration.getMillis() - min.getMillis());
 int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() - max.getMillis());
 assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

public void testPostExpirationScheduleTime() throws Exception {
 TimeValue expiryDuration = TimeValue.timeValueSeconds(randomIntBetween(5, 10));
 TimeValue min = TimeValue.timeValueSeconds(1);
 TimeValue max = TimeValue.timeValueSeconds(4);
 TimeValue frequency = TimeValue.timeValueSeconds(1);
 NoopPostExpirationCallback pre = new NoopPostExpirationCallback(min, max, frequency);
 int latestValidTriggerDelay = (int) (expiryDuration.getMillis() + max.getMillis());
 int earliestValidTriggerDelay = (int) (expiryDuration.getMillis() + min.getMillis());
 assertExpirationCallbackScheduleTime(pre, expiryDuration.millis(), latestValidTriggerDelay,
earliestValidTriggerDelay);
}

private void assertExpirationCallbackDelay(ExpirationCallback expirationCallback, long expiryDuration,
int latestValidTriggerDelay, int earliestValidTriggerDelay) {
 long now = System.currentTimeMillis();
 long expiryDate = now + expiryDuration;
 // bounds
 assertThat(expirationCallback.delay(expiryDate, now + earliestValidTriggerDelay),
equalTo(TimeValue.timeValueMillis(0)));
 assertThat(expirationCallback.delay(expiryDate, now + latestValidTriggerDelay),
equalTo(TimeValue.timeValueMillis(0)));
 // in match
 assertThat(expirationCallback.delay(expiryDate,
now + randomIntBetween(earliestValidTriggerDelay, latestValidTriggerDelay)),
equalTo(TimeValue.timeValueMillis(0)));
 // out of bounds

```

```

int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay);
assertThat(expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch),
 equalTo(TimeValue.timeValueMillis(earliestValidTriggerDelay - deltaBeforeEarliestMatch)));
int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
assertThat(expirationCallback.delay(expiryDate, expiryDate + deltaAfterLatestMatch), nullValue());
}

public void assertExpirationCallbackScheduleTime(ExpirationCallback expirationCallback, long expiryDuration,
 int latestValidTriggerDelay, int earliestValidTriggerDelay) {
 long now = System.currentTimeMillis();
 long expiryDate = now + expiryDuration;
 int validTriggerInterval = between(earliestValidTriggerDelay, latestValidTriggerDelay);
 assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
 now + validTriggerInterval, now + validTriggerInterval),
 equalTo(now + validTriggerInterval));
 assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + validTriggerInterval),
 equalTo(now + validTriggerInterval + expirationCallback.getFrequency()));

 int deltaBeforeEarliestMatch = between(1, earliestValidTriggerDelay - 1);
 assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now +
deltaBeforeEarliestMatch),
 equalTo(now + deltaBeforeEarliestMatch +
 expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));
 assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
 now + deltaBeforeEarliestMatch, now + deltaBeforeEarliestMatch),
 equalTo(now + deltaBeforeEarliestMatch +
 expirationCallback.delay(expiryDate, now + deltaBeforeEarliestMatch).getMillis()));

 int deltaAfterLatestMatch = between(latestValidTriggerDelay + 1, Integer.MAX_VALUE); // after expiry and
after max
 assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate, now, now + deltaAfterLatestMatch),
equalTo(-1L));
 assertThat(expirationCallback.nextScheduledTimeForExpiry(expiryDate,
 now + deltaAfterLatestMatch, now + deltaAfterLatestMatch),
 equalTo(-1L));
}

private static class NoopPostExpirationCallback extends ExpirationCallback.Post {

 NoopPostExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
 super(min, max, frequency);
 }

 @Override
 public void on(License license) {}
}

```

```

private static class NoopPreExpirationCallback extends ExpirationCallback.Pre {

 NoopPreExpirationCallback(TimeValue min, TimeValue max, TimeValue frequency) {
 super(min, max, frequency);
 }

 @Override
 public void on(License license) {}
}
}
/*
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 */
package org.elasticsearch.license;

import com.carrotsearch.randomizedtesting.RandomizedTest;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.joda.DateMathParser;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.licensor.LicenseSigner;
import org.hamcrest.MatcherAssert;
import org.joda.time.format.DateTimeFormatter;
import org.junit.Assert;

import java.io.IOException;
import java.io.InputStream;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardCopyOption;
import java.util.ArrayList;
import java.util.List;
import java.util.UUID;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicReference;

import static com.carrotsearch.randomizedtesting.RandomizedTest.randomBoolean;
import static com.carrotsearch.randomizedtesting.RandomizedTest.randomInt;

```

```

import static org.apache.lucene.util.LuceneTestCase.createTempFile;
import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.ESTestCase.randomAlphaOfLength;
import static org.elasticsearch.test.ESTestCase.randomFrom;
import static org.elasticsearch.test.ESTestCase.randomIntBetween;
import static org.hamcrest.core.IsEqual.equalTo;
import static org.junit.Assert.assertThat;

public class TestUtils {

 private static final FormatDateTimeFormatter formatDateTimeFormatter = Joda.forPattern("yyyy-MM-dd");
 private static final DateMathParser dateMathParser = new DateMathParser(formatDateTimeFormatter);
 private static final DateTimeFormatter dateTimeFormatter = formatDateTimeFormatter.printer();

 public static String dateMathString(String time, final long now) {
 return dateTimeFormatter.print(dateMathParser.parse(time, () -> now));
 }

 public static long dateMath(String time, final long now) {
 return dateMathParser.parse(time, () -> now);
 }

 public static LicenseSpec generateRandomLicenseSpec(int version) {
 boolean datesInMillis = randomBoolean();
 long now = System.currentTimeMillis();
 String uid = UUID.randomUUID().toString();
 String feature = "feature__" + randomInt();
 String issuer = "issuer__" + randomInt();
 String issuedTo = "issuedTo__" + randomInt();
 final String type;
 final String subscriptionType;
 if (version < License.VERSION_NO_FEATURE_TYPE) {
 subscriptionType = randomFrom("gold", "silver", "platinum");
 type = "subscription"; // randomFrom("subscription", "internal", "development");
 } else {
 subscriptionType = null;
 type = randomFrom("basic", "dev", "gold", "silver", "platinum");
 }
 int maxNodes = RandomizedTest.randomIntBetween(5, 100);
 if (datesInMillis) {
 long issueDateInMillis = dateMath("now", now);
 long expiryDateInMillis = dateMath("now+10d/d", now);
 return new LicenseSpec(version, uid, feature, issueDateInMillis, expiryDateInMillis, type, subscriptionType,
 issuedTo, issuer,
 maxNodes);
 } else {
 String issueDate = dateMathString("now", now);
 String expiryDate = dateMathString("now+10d/d", now);

```

```

 return new LicenseSpec(version, uid, feature, issueDate, expiryDate, type, subscriptionType, issuedTo,
 issuer, maxNodes);
 }
}

```

```

public static String generateLicenseSpecString(LicenseSpec licenseSpec) throws IOException {
 XContentBuilder licenses = jsonBuilder();
 licenses.startObject();
 licenses.startArray("licenses");
 licenses.startObject()
 .field("uid", licenseSpec.uid)
 .field("type", licenseSpec.type)
 .field("subscription_type", licenseSpec.subscriptionType)
 .field("issued_to", licenseSpec.issuedTo)
 .field("issuer", licenseSpec.issuer)
 .field("feature", licenseSpec.feature)
 .field("max_nodes", licenseSpec.maxNodes);

 if (licenseSpec.issueDate != null) {
 licenses.field("issue_date", licenseSpec.issueDate);
 } else {
 licenses.field("issue_date_in_millis", licenseSpec.issueDateInMillis);
 }
 if (licenseSpec.expiryDate != null) {
 licenses.field("expiry_date", licenseSpec.expiryDate);
 } else {
 licenses.field("expiry_date_in_millis", licenseSpec.expiryDateInMillis);
 }
 licenses.field("version", licenseSpec.version);
 licenses.endObject();
 licenses.endArray();
 licenses.endObject();
 return Strings.toString(licenses);
}

```

```

public static License generateLicenses(LicenseSpec spec) {
 License.Builder builder = License.builder()
 .uid(spec.uid)
 .feature(spec.feature)
 .type(spec.type)
 .subscriptionType(spec.subscriptionType)
 .issuedTo(spec.issuedTo)
 .issuer(spec.issuer)
 .maxNodes(spec.maxNodes);

 if (spec.expiryDate != null) {
 builder.expiryDate(DateUtils.endOfDay(spec.expiryDate));
 } else {

```



```

 builder.expiryDate(spec.expiryDateInMillis);
 }
 if (spec.issueDate != null) {
 builder.issueDate(DateUtils.beginningOfDay(spec.issueDate));
 } else {
 builder.issueDate(spec.issueDateInMillis);
 }
 return builder.build();
}

public static void assertLicenseSpec(LicenseSpec spec, License license) {
 MatcherAssert.assertThat(license.uid(), equalTo(spec.uid));
 MatcherAssert.assertThat(license.issuedTo(), equalTo(spec.issuedTo));
 MatcherAssert.assertThat(license.issuer(), equalTo(spec.issuer));
 MatcherAssert.assertThat(license.type(), equalTo(spec.type));
 MatcherAssert.assertThat(license.maxNodes(), equalTo(spec.maxNodes));
 if (spec.issueDate != null) {
 MatcherAssert.assertThat(license.issueDate(), equalTo(DateUtils.beginningOfDay(spec.issueDate)));
 } else {
 MatcherAssert.assertThat(license.issueDate(), equalTo(spec.issueDateInMillis));
 }
 if (spec.expiryDate != null) {
 MatcherAssert.assertThat(license.expiryDate(), equalTo(DateUtils.endOfDay(spec.expiryDate)));
 } else {
 MatcherAssert.assertThat(license.expiryDate(), equalTo(spec.expiryDateInMillis));
 }
}

public static class LicenseSpec {
 public final int version;
 public final String feature;
 public final String issueDate;
 public final long issueDateInMillis;
 public final String expiryDate;
 public final long expiryDateInMillis;
 public final String uid;
 public final String type;
 public final String subscriptionType;
 public final String issuedTo;
 public final String issuer;
 public final int maxNodes;

 public LicenseSpec(String issueDate, String expiryDate) {
 this(License.VERSION_CURRENT, UUID.randomUUID().toString(), "feature", issueDate, expiryDate,
 "trial", "none", "customer",
 "elasticsearch", 5);
 }
}

```

```

public LicenseSpec(int version, String uid, String feature, long issueDateInMillis, long expiryDateInMillis,
String type,
 String subscriptionType, String issuedTo, String issuer, int maxNodes) {
 this.version = version;
 this.feature = feature;
 this.issueDateInMillis = issueDateInMillis;
 this.issueDate = null;
 this.expiryDateInMillis = expiryDateInMillis;
 this.expiryDate = null;
 this.uid = uid;
 this.type = type;
 this.subscriptionType = subscriptionType;
 this.issuedTo = issuedTo;
 this.issuer = issuer;
 this.maxNodes = maxNodes;
}

```

```

public LicenseSpec(int version, String uid, String feature, String issueDate, String expiryDate, String type,
 String subscriptionType, String issuedTo, String issuer, int maxNodes) {
 this.version = version;
 this.feature = feature;
 this.issueDate = issueDate;
 this.issueDateInMillis = -1;
 this.expiryDate = expiryDate;
 this.expiryDateInMillis = -1;
 this.uid = uid;
 this.type = type;
 this.subscriptionType = subscriptionType;
 this.issuedTo = issuedTo;
 this.issuer = issuer;
 this.maxNodes = maxNodes;
}
}

```

```

public static Path getTestPriKeyPath() throws Exception {
 return getResourcePath("/private.key");
}

```

```

public static Path getTestPubKeyPath() throws Exception {
 return getResourcePath("/public.key");
}

```

```

public static String dumpLicense(License license) throws Exception {
 XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
 builder.startObject();
 builder.startObject("license");
 license.toInnerXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.endObject();
}

```

```

 builder.endObject();
 return Strings.toString(builder);
 }

 public static License generateSignedLicense(TimeValue expiryDuration) throws Exception {
 return generateSignedLicense(null, -1, expiryDuration);
 }

 public static License generateSignedLicense(String type, TimeValue expiryDuration) throws Exception {
 return generateSignedLicense(type, -1, expiryDuration);
 }

 public static License generateSignedLicense(long issueDate, TimeValue expiryDuration) throws Exception {
 return generateSignedLicense(null, issueDate, expiryDuration);
 }

 public static License generateSignedLicense(String type, long issueDate, TimeValue expiryDuration) throws
 Exception {
 return generateSignedLicense(type, randomIntBetween(License.VERSION_START,
 License.VERSION_CURRENT), issueDate, expiryDuration);
 }

 /**
 * This method which chooses the license type randomly if the type is null. However, it will not randomly
 * choose trial or basic types as those types can only be self-generated.
 */
 public static License generateSignedLicense(String type, int version, long issueDate, TimeValue expiryDuration)
 throws Exception {
 long issue = (issueDate != -1L) ? issueDate : System.currentTimeMillis() -
 TimeValue.timeValueHours(2).getMillis();
 final String licenseType;
 if (version < License.VERSION_NO_FEATURE_TYPE) {
 licenseType = randomFrom("subscription", "internal", "development");
 } else {
 licenseType = (type != null) ? type : randomFrom("silver", "dev", "gold", "platinum");
 }
 final License.Builder builder = License.builder()
 .uid(UUID.randomUUID().toString())
 .version(version)
 .expiryDate(System.currentTimeMillis() + expiryDuration.getMillis())
 .issueDate(issue)
 .type(licenseType)
 .issuedTo("customer")
 .issuer("elasticsearch")
 .maxNodes(5);
 if (version == License.VERSION_START) {
 builder.subscriptionType((type != null) ? type : randomFrom("dev", "gold", "platinum", "silver"));
 builder.feature(randomAlphaOfLength(10));
 }
 }

```

```

 }
 LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
 return signer.sign(builder.build());
}

public static License generateSignedLicense(License.Builder builder) throws Exception {
 LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
 return signer.sign(builder.build());
}

public static License generateExpiredNonBasicLicense(long expiryDate) throws Exception {
 return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"), expiryDate);
}

public static License generateExpiredNonBasicLicense() throws Exception {
 return generateExpiredNonBasicLicense(randomFrom("silver", "dev", "gold", "platinum"));
}

public static License generateExpiredNonBasicLicense(String type) throws Exception {
 return generateExpiredNonBasicLicense(type,
 System.currentTimeMillis() - TimeUnit.HOURS(randomIntBetween(1, 10)).getMillis());
}

public static License generateExpiredNonBasicLicense(String type, long expiryDate) throws Exception {
 final License.Builder builder = License.builder()
 .uid(UUID.randomUUID().toString())
 .version(License.VERSION_CURRENT)
 .expiryDate(expiryDate)
 .issueDate(expiryDate - TimeUnit.MINUTES(10).getMillis())
 .type(type)
 .issuedTo("customer")
 .issuer("elasticsearch")
 .maxNodes(5);
 LicenseSigner signer = new LicenseSigner(getTestPriKeyPath(), getTestPubKeyPath());
 return signer.sign(builder.build());
}

private static Path getResourcePath(String resource) throws Exception {
 Path resourceFile = createTempFile();
 try (InputStream resourceInput = TestUtils.class.getResourceAsStream(resource)) {
 Files.copy(resourceInput, resourceFile, StandardCopyOption.REPLACE_EXISTING);
 }
 return resourceFile;
}

public static void registerAndAckSignedLicenses(final LicenseService licenseService, License license,
 final LicensesStatus expectedStatus) {
 PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(license).acknowledge(true);
}

```

```

final CountdownLatch latch = new CountdownLatch(1);
final AtomicReference<LicensesStatus> status = new AtomicReference<>();
licenseService.registerLicense(putLicenseRequest, new ActionListener<PutLicenseResponse>() {
 @Override
 public void onResponse(PutLicenseResponse licensesUpdateResponse) {
 status.set(licensesUpdateResponse.status());
 latch.countDown();
 }

 @Override
 public void onFailure(Exception e) {
 latch.countDown();
 }
});
try {
 latch.await();
} catch (InterruptedException e) {
 Assert.fail(e.getMessage());
}
assertThat(status.get(), equalTo(expectedStatus));
}

```

```

public static class AssertingLicenseState extends XPackLicenseState {
 public final List<License.OperationMode> modeUpdates = new ArrayList<>();
 public final List<Boolean> activeUpdates = new ArrayList<>();

```

```

 public AssertingLicenseState() {
 super(Settings.EMPTY);
 }

```

```

 @Override
 void update(License.OperationMode mode, boolean active) {
 modeUpdates.add(mode);
 activeUpdates.add(active);
 }
}

```

```

/**
 * A license state that makes the {@link #update(License.OperationMode, boolean)}
 * method public for use in tests.
 */

```

```

public static class UpdatableLicenseState extends XPackLicenseState {
 public UpdatableLicenseState() {
 this(Settings.EMPTY);
 }

```

```

 public UpdatableLicenseState(Settings settings) {
 super(settings);
 }
}

```

```

 }

 @Override
 public void update(License.OperationMode mode, boolean active) {
 super.update(mode, active);
 }
}

public static void putLicense(MetaData.Builder builder, License license) {
 builder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;

import static org.elasticsearch.common.unit.TimeValue.timeValueHours;
import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicensesAcknowledgementTests extends AbstractLicenseServiceTestCase {

 public void testAcknowledgment() throws Exception {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 setInitialState(TestUtils.generateSignedLicense("gold", timeValueHours(2)), licenseState, Settings.EMPTY);
 licenseService.start();
 // try installing a signed license
 long issueDate = System.currentTimeMillis() - TimeValue.timeValueHours(24 * 2).getMillis();
 License signedLicense = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, issueDate,
 timeValueHours(10));
 PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
 // ensure acknowledgement message was part of the response
 licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
 LicensesStatus.VALID, true));
 assertThat(licenseService.getLicense(), not(signedLicense));
 verify(clusterService, times(0)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
 }
}

```

```

// try installing a signed license with acknowledgement
putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
// ensure license was installed and no acknowledgment message was returned
licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testRejectUpgradeToProductionWithoutTLS() throws Exception {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.EMPTY);
 licenseService.start();
 // try installing a signed license
 License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
 PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
 // ensure acknowledgement message was part of the response
 IllegalStateException ise = expectThrows(IllegalStateException.class, () ->
 licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true)));
 assertEquals("Cannot install a [PLATINUM] license unless TLS is configured or security is disabled",
ise.getMessage());
}

public void testUpgradeToProductionWithoutTLSAndSecurityDisabled() throws Exception {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
 .put("xpack.security.enabled", false).build());
 licenseService.start();
 // try installing a signed license
 License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
 PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
 licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
 assertThat(licenseService.getLicense(), not(signedLicense));
 verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

 // try installing a signed license with acknowledgement
 putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
 // ensure license was installed and no acknowledgment message was returned
 licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
 verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testUpgradeToProductionWithTLSAndSecurity() throws Exception {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 setInitialState(TestUtils.generateSignedLicense("trial", timeValueHours(2)), licenseState, Settings.builder()
 .put("xpack.security.enabled", true)

```

```

 .put("xpack.security.transport.ssl.enabled", true).build());
licenseService.start();
// try installing a signed license
License signedLicense = TestUtils.generateSignedLicense("platinum", timeValueHours(10));
PutLicenseRequest putLicenseRequest = new PutLicenseRequest().license(signedLicense);
licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(false,
LicensesStatus.VALID, true));
 assertThat(licenseService.getLicense(), not(signedLicense));
 verify(clusterService, times(1)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

// try installing a signed license with acknowledgement
putLicenseRequest = new PutLicenseRequest().license(signedLicense).acknowledge(true);
// ensure license was installed and no acknowledgment message was returned
licenseService.registerLicense(putLicenseRequest, new AssertingLicensesUpdateResponse(true,
LicensesStatus.VALID, false));
 verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

private static class AssertingLicensesUpdateResponse implements ActionListener<PutLicenseResponse> {
 private final boolean expectedAcknowledgement;
 private final LicensesStatus expectedStatus;
 private final boolean expectAckMessages;

 AssertingLicensesUpdateResponse(boolean expectedAcknowledgement, LicensesStatus expectedStatus,
 boolean expectAckMessages) {
 this.expectedAcknowledgement = expectedAcknowledgement;
 this.expectedStatus = expectedStatus;
 this.expectAckMessages = expectAckMessages;
 }

 @Override
 public void onResponse(PutLicenseResponse licensesUpdateResponse) {
 assertThat(licensesUpdateResponse.isAcknowledged(), equalTo(expectedAcknowledgement));
 assertThat(licensesUpdateResponse.status(), equalTo(expectedStatus));
 assertEquals(licensesUpdateResponse.acknowledgeMessages().isEmpty(), expectAckMessages == false);
 }

 @Override
 public void onFailure(Exception throwable) {
 throw new RuntimeException(throwable);
 }
}
}
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 * you may not use this file except in compliance with the Elastic License.
 */

```



```

package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.junit.Before;

import java.util.Collection;
import java.util.Collections;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicBoolean;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;

public class LicensesManagerServiceTests extends ESSingleNodeTestCase {

 @Override
 protected Collection<Class<? extends Plugin>> getPlugins() {
 return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
 }

 @Override
 protected Settings nodeSettings() {
 return Settings.builder()
 .put(super.nodeSettings())
 .put(XPackSettings.SECURITY_ENABLED.getKey(), false)
 .put(XPackSettings.MONITORING_ENABLED.getKey(), false)
 .put(XPackSettings.WATCHER_ENABLED.getKey(), false)
 .put(XPackSettings.GRAPH_ENABLED.getKey(), false)
 .put(XPackSettings.MACHINE_LEARNING_ENABLED.getKey(), false)
 .build();
 }

 @Override
 protected boolean resetNodeAfterTest() {
 return true;
 }

 @Before
 public void waitForTrialLicenseToBeGenerated() throws Exception {
 assertBusy(() ->

```

```

assertNotNull(getInstanceFromNode(ClusterService.class).state().metaData().custom(LicensesMetaData.TYPE));
}

public void testStoreAndGetLicenses() throws Exception {
 LicenseService licenseService = getInstanceFromNode(LicenseService.class);
 ClusterService clusterService = getInstanceFromNode(ClusterService.class);
 License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueHours(1));
 TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
 License silverLicense = TestUtils.generateSignedLicense("silver", TimeValue.timeValueHours(2));
 TestUtils.registerAndAckSignedLicenses(licenseService, silverLicense, LicensesStatus.VALID);
 License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueHours(1));
 TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
 LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
 assertThat(licensesMetaData.getLicense(), equalTo(platinumLicense));
 final License getLicenses = licenseService.getLicense();
 assertThat(getLicenses, equalTo(platinumLicense));
}

// TODO: Add test/feature blocking the registration of basic license

public void testEffectiveLicenses() throws Exception {
 final LicenseService licenseService = getInstanceFromNode(LicenseService.class);
 final ClusterService clusterService = getInstanceFromNode(ClusterService.class);
 License goldLicense = TestUtils.generateSignedLicense("gold", TimeValue.timeValueSeconds(5));
 // put gold license
 TestUtils.registerAndAckSignedLicenses(licenseService, goldLicense, LicensesStatus.VALID);
 LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
 assertThat(LicenseService.getLicense(licensesMetaData), equalTo(goldLicense));

 License platinumLicense = TestUtils.generateSignedLicense("platinum", TimeValue.timeValueSeconds(3));
 // put platinum license
 TestUtils.registerAndAckSignedLicenses(licenseService, platinumLicense, LicensesStatus.VALID);
 licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
 assertThat(LicenseService.getLicense(licensesMetaData), equalTo(platinumLicense));
}

public void testInvalidLicenseStorage() throws Exception {
 LicenseService licenseService = getInstanceFromNode(LicenseService.class);
 ClusterService clusterService = getInstanceFromNode(ClusterService.class);
 License signedLicense = TestUtils.generateSignedLicense(TimeValue.timeValueMinutes(2));

 // modify content of signed license
 License tamperedLicense = License.builder()
 .fromLicenseSpec(signedLicense, signedLicense.signature())
 .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
 .validate()
 .build();

```

```

TestUtils.registerAndAckSignedLicenses(licenseService, tamperedLicense, LicensesStatus.INVALID);

// ensure that the invalid license never made it to cluster state
LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
assertThat(licensesMetaData.getLicense(), not(equalTo(tamperedLicense)));
}

public void testRemoveLicenses() throws Exception {
 LicenseService licenseService = getInstanceFromNode(LicenseService.class);
 ClusterService clusterService = getInstanceFromNode(ClusterService.class);

 // generate signed licenses
 License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(1));
 TestUtils.registerAndAckSignedLicenses(licenseService, license, LicensesStatus.VALID);
 LicensesMetaData licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
 assertThat(licensesMetaData.getLicense(), not(LicensesMetaData.LICENSE_TOMBSTONE));

 // remove signed licenses
 removeAndAckSignedLicenses(licenseService);
 licensesMetaData = clusterService.state().metaData().custom(LicensesMetaData.TYPE);
 assertThat(licensesMetaData.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
}

private void removeAndAckSignedLicenses(final LicenseService licenseService) {
 final CountdownLatch latch = new CountdownLatch(1);
 final AtomicBoolean success = new AtomicBoolean(false);
 licenseService.removeLicense(new DeleteLicenseRequest(), new
ActionListener<ClusterStateUpdateResponse>() {
 @Override
 public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
 if (clusterStateUpdateResponse.isAcknowledged()) {
 success.set(true);
 }
 latch.countDown();
 }

 @Override
 public void onFailure(Exception throwable) {
 latch.countDown();
 }
 });
 try {
 latch.await();
 } catch (InterruptedException e) {
 fail(e.getMessage());
 }
 assertThat("remove license(s) failed", success.get(), equalTo(true));
}

```

```

}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.threadpool.TestThreadPool;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.junit.After;
import org.junit.Before;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.StandardOpenOption;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicReference;

import static org.hamcrest.Matchers.equalTo;

public class OperationModeFileWatcherTests extends ESTestCase {
 private ResourceWatcherService watcherService;
 private TestThreadPool threadPool;
 private Path licenseModePath;
 private OperationModeFileWatcher operationModeFileWatcher;
 private AtomicReference<CountDownLatch> onChangeCounter;

 @Before
 public void setup() throws Exception {
 threadPool = new TestThreadPool("license mode file watcher tests");
 Settings settings = Settings.builder()
 .put("resource.reload.interval.high", "10ms")
 .build();
 watcherService = new ResourceWatcherService(settings,
 threadPool);
 watcherService.start();
 licenseModePath = createTempFile();
 onChangeCounter = new AtomicReference<>(new CountDownLatch(1));
 operationModeFileWatcher = new OperationModeFileWatcher(watcherService, licenseModePath, logger,
 () -> onChangeCounter.get().countDown());
 }
}

```

```

@After
public void shutdown() throws InterruptedException {
 terminate(threadPool);
 watcherService.stop();
}

public void testInit() throws Exception {
 onChangeCounter.set(new CountdownLatch(2));
 writeMode("gold");
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
 operationModeFileWatcher.init();
 assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
 assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
}

public void testUpdateModeFromFile() throws Exception {
 Files.delete(licenseModePath);
 operationModeFileWatcher.init();
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
 writeMode("gold");
 assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
 assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
 onChangeCounter.set(new CountdownLatch(1));
 writeMode("basic");
 assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
 assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.BASIC));
}

public void testDeleteModeFromFile() throws Exception {
 Files.delete(licenseModePath);
 operationModeFileWatcher.init();
 writeMode("gold");
 assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
 assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
 onChangeCounter.set(new CountdownLatch(1));

 Files.delete(licenseModePath);
 assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
}

public void testInvalidModeFromFile() throws Exception {
 writeMode("invalid");
 operationModeFileWatcher.init();
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),

```

```

equalTo(License.OperationMode.PLATINUM));
 operationModeFileWatcher.onFileChanged(licenseModePath);
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
 }

 public void testLicenseModeFileIsDirectory() throws Exception {
 licenseModePath = createTempDir();
 operationModeFileWatcher.init();
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
 operationModeFileWatcher.onFileChanged(licenseModePath);
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
 }

 public void testLicenseModeFileCreatedAfterInit() throws Exception {
 Files.delete(licenseModePath);
 operationModeFileWatcher.init();
 assertThat(operationModeFileWatcher.getCurrentOperationMode(),
equalTo(License.OperationMode.PLATINUM));
 onChangeCounter.set(new CountdownLatch(1));
 Path tempFile = createTempFile();
 writeMode("gold", tempFile);
 licenseModePath = tempFile;
 assertTrue(onChangeCounter.get().await(5, TimeUnit.SECONDS));
 assertThat(operationModeFileWatcher.getCurrentOperationMode(), equalTo(License.OperationMode.GOLD));
 }

 private void writeMode(String mode) throws IOException {
 writeMode(mode, licenseModePath);
 }

 static void writeMode(String mode, Path file) throws IOException {
 Files.write(file, mode.getBytes(StandardCharsets.UTF_8), StandardOpenOption.CREATE);
 }
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.test.ESTestCase;

import java.util.Locale;

```

```

import static org.elasticsearch.license.License.OperationMode;
import static org.hamcrest.Matchers.equalTo;

/**
 * Tests {@link License.OperationMode} for correctness.
 * <p>
 * If you change the behavior of these tests, then it means that licensing changes across the products!
 */
public class LicenseOperationModeTests extends ESTestCase {
 public void testResolveTrial() {
 // assert 1.x BWC
 assertResolve(OperationMode.TRIAL, "nONE", "DEv", "deveLopment");
 // assert expected (2.x+) variant
 assertResolve(OperationMode.TRIAL, "tRiAl", "trial");
 }

 public void testResolveBasic() {
 // assert expected (2.x+) variant (note: no 1.x variant of BASIC)
 assertResolve(OperationMode.BASIC, "bAsIc", "basic");
 }

 public void testResolveStandard() {
 // assert expected (2.x+) variant (note: no 1.x variant of STANDARD)
 assertResolve(OperationMode.STANDARD, "StAnDARD", "standard");
 }

 public void testResolveGold() {
 // assert expected (2.x+) variant (note: no different 1.x variant of GOLD)
 assertResolve(OperationMode.GOLD, "SiLvEr", "gOID", "silver", "gold");
 }

 public void testResolvePlatinum() {
 // assert 1.x BWC
 assertResolve(OperationMode.PLATINUM, "iNtErNaL");
 // assert expected (2.x+) variant
 assertResolve(OperationMode.PLATINUM, "PlAtINum", "platinum");
 }

 public void testResolveUnknown() {
 // 'enterprise' is a type that exists in cloud but should be rejected under normal operation
 // See https://github.com/elastic/x-plugins/issues/3371
 String[] types = { "unknown", "fake", "enterprise" };

 for (String type : types) {
 try {
 OperationMode.resolve(type);

 fail(String.format(Locale.ROOT, "[%s] should not be recognized as an operation mode", type));
 }
 }
 }
}

```

```

 }
 catch (IllegalArgumentException e) {
 assertThat(e.getMessage(), equalTo("unknown type [" + type + "]"));
 }
}

private static void assertResolve(OperationMode expected, String... types) {
 for (String type : types) {
 assertThat(OperationMode.resolve(type), equalTo(expected));
 }
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.analysis.common.CommonAnalysisPlugin;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;

import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.TEST;

@ESIntegTestCase.ClusterScope(scope = TEST, numDataNodes = 0, numClientNodes = 0, maxNumDataNodes =
0, transportClientRatio = 0,
 autoMinMasterNodes = false)
public class LicenseServiceClusterNotRecoveredTests extends AbstractLicensesIntegrationTestCase {

 @Override
 protected Settings nodeSettings(int nodeOrdinal) {
 return nodeSettingsBuilder(nodeOrdinal).build();
 }

 private Settings.Builder nodeSettingsBuilder(int nodeOrdinal) {
 return Settings.builder()
 .put(super.nodeSettings(nodeOrdinal))
 .put("node.data", true)
 .put("resource.reload.interval.high", "500ms") // for license mode file watcher

```



```

 .put(NetworkModule.HTTP_ENABLED.getKey(), true);
 }

 @Override
 protected Collection<Class<? extends Plugin>> nodePlugins() {
 return Arrays.asList(LocalStateCompositeXPackPlugin.class, CommonAnalysisPlugin.class,
Netty4Plugin.class);
 }

 @Override
 protected Collection<Class<? extends Plugin>> transportClientPlugins() {
 return nodePlugins();
 }

 public void testClusterNotRecovered() throws Exception {
 logger.info("--> start one master out of two [recovery state]");
 internalCluster().startNode(nodeSettingsBuilder(0).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
 logger.info("--> start second master out of two [recovered state]");
 internalCluster().startNode(nodeSettingsBuilder(1).put("discovery.zen.minimum_master_nodes",
2).put("node.master", true));
 assertLicenseActive(true);
 }
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterModule;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.metadata.RepositoriesMetaData;
import org.elasticsearch.cluster.metadata.RepositoryMetaData;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContent.Params;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.test.ESTestCase;

import java.util.Collections;
import java.util.UUID;

```

```

import java.util.stream.Collectors;
import java.util.stream.Stream;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.notNullValue;
import static org.hamcrest.Matchers.nullValue;

public class LicensesMetaDataSerializationTests extends ESTestCase {

 public void testXContentSerializationOneSignedLicense() throws Exception {
 License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
 LicensesMetaData licensesMetaData = new LicensesMetaData(license, null);
 XContentBuilder builder = XContentFactory.jsonBuilder();
 builder.startObject();
 builder.startObject("licenses");
 licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.endObject();
 builder.endObject();
 LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
 assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
 assertNull(licensesMetaDataFromXContent.getMostRecentTrialVersion());
 }

 public void testXContentSerializationOneSignedLicenseWithUsedTrial() throws Exception {
 License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
 LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
 XContentBuilder builder = XContentFactory.jsonBuilder();
 builder.startObject();
 builder.startObject("licenses");
 licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.endObject();
 builder.endObject();
 LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
 assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(license));
 assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
 }

 public void testLicenseMetadataParsingDoesNotSwallowOtherMetadata() throws Exception {
 new Licensing(Settings.EMPTY); // makes sure LicensePlugin is registered in Custom Metadata
 License license = TestUtils.generateSignedLicense(TimeValue.timeValueHours(2));
 LicensesMetaData licensesMetaData = new LicensesMetaData(license, Version.CURRENT);
 RepositoryMetaData repositoryMetaData = new RepositoryMetaData("repo", "fs", Settings.EMPTY);
 RepositoriesMetaData repositoriesMetaData = new RepositoriesMetaData(repositoryMetaData);
 final Metadata.Builder metaDataBuilder = Metadata.builder();
 if (randomBoolean()) { // random order of insertion
 metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);

```

```

 metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
 } else {
 metaDataBuilder.putCustom(repositoriesMetaData.getWriteableName(), repositoriesMetaData);
 metaDataBuilder.putCustom(licensesMetaData.getWriteableName(), licensesMetaData);
 }
 // serialize metadata
 XContentBuilder builder = XContentFactory.jsonBuilder();
 Params params = new
ToXContent.MapParams(Collections.singletonMap(MetaData.CONTEXT_MODE_PARAM,
MetaData.CONTEXT_MODE_GATEWAY));
 builder.startObject();
 builder = metaDataBuilder.build().toXContent(builder, params);
 builder.endObject();
 // deserialize metadata again
 MetaData metaData = MetaData.Builder.fromXContent(createParser(builder));
 // check that custom metadata still present
 assertThat(metaData.custom(licensesMetaData.getWriteableName()), notNullValue());
 assertThat(metaData.custom(repositoriesMetaData.getWriteableName()), notNullValue());
}

```

```

public void testXContentSerializationOneTrial() throws Exception {
 long issueDate = System.currentTimeMillis();
 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo("customer")
 .maxNodes(5)
 .issueDate(issueDate)
 .type(randomBoolean() ? "trial" : "basic")
 .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
 final License trialLicense = SelfGeneratedLicense.create(specBuilder);
 LicensesMetaData licensesMetaData = new LicensesMetaData(trialLicense, Version.CURRENT);
 XContentBuilder builder = XContentFactory.jsonBuilder();
 builder.startObject();
 builder.startObject("licenses");
 licensesMetaData.toXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.endObject();
 builder.endObject();
 LicensesMetaData licensesMetaDataFromXContent =
getLicensesMetaDataFromXContent(createParser(builder));
 assertThat(licensesMetaDataFromXContent.getLicense(), equalTo(trialLicense));
 assertEquals(licensesMetaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
}

```

```

public void testLicenseTombstoneFromXContext() throws Exception {
 final XContentBuilder builder = XContentFactory.jsonBuilder();
 builder.startObject();
 builder.startObject("licenses");
 builder.nullField("license");
}

```

```

 builder.endObject();
 builder.endObject();
 LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
 assertEquals(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
 }

 public void testLicenseTombstoneWithUsedTrialFromXContext() throws Exception {
 final XContentBuilder builder = XContentFactory.jsonBuilder();
 builder.startObject();
 builder.startObject("licenses");
 builder.nullField("license");
 builder.field("trial_license", Version.CURRENT.toString());
 builder.endObject();
 builder.endObject();
 LicensesMetaData metaDataFromXContent = getLicensesMetaDataFromXContent(createParser(builder));
 assertEquals(metaDataFromXContent.getLicense(), equalTo(LicensesMetaData.LICENSE_TOMBSTONE));
 assertEquals(metaDataFromXContent.getMostRecentTrialVersion(), Version.CURRENT);
 }

 private static LicensesMetaData getLicensesMetaDataFromXContent(XContentParser parser) throws Exception {
 parser.nextToken(); // consume null
 parser.nextToken(); // consume "licenses"
 LicensesMetaData licensesMetaDataFromXContent = LicensesMetaData.fromXContent(parser);
 parser.nextToken(); // consume endObject
 assertEquals(parser.nextToken(), nullValue());
 return licensesMetaDataFromXContent;
 }

 @Override
 protected NamedXContentRegistry xContentRegistry() {
 return new NamedXContentRegistry(Stream.concat(
 new Licensing(Settings.EMPTY).getNamedXContent().stream(),
 ClusterModule.getNamedXWriteables().stream()
).collect(Collectors.toList()));
 }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.settings.Settings;

```

```

import org.mockito.ArgumentCaptor;
import org.mockito.Mockito;

import java.util.UUID;

import static org.elasticsearch.license.TestUtils.dateMath;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.verify;
import static org.mockito.Mockito.when;

public class LicenseRegistrationTests extends AbstractLicenseServiceTestCase {

 public void testSelfGeneratedTrialLicense() throws Exception {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 setInitialState(null, licenseState, Settings.EMPTY, "trial");
 when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
 licenseService.start();

 ClusterState state = ClusterState.builder(new ClusterName("a")).build();
 ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
 verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
 ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
 LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
 assertNotNull(licenseMetaData);
 assertNotNull(licenseMetaData.getLicense());
 assertFalse(licenseMetaData.isEligibleForTrial());
 assertEquals("trial", licenseMetaData.getLicense().type());
 assertEquals(clock.millis() +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.millis(),
 licenseMetaData.getLicense().expiryDate());
 }

 public void testSelfGeneratedBasicLicense() throws Exception {
 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 setInitialState(null, licenseState, Settings.EMPTY, "basic");
 when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
 licenseService.start();

 ClusterState state = ClusterState.builder(new ClusterName("a")).build();
 ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
 verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
 ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
 LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
 assertNotNull(licenseMetaData);
 assertNotNull(licenseMetaData.getLicense());
 assertTrue(licenseMetaData.isEligibleForTrial());
 }
}

```

```

 assertEquals("basic", licenseMetaData.getLicense().type());
 assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
}

public void testNonSelfGeneratedBasicLicenseIsReplaced() throws Exception {
 long now = System.currentTimeMillis();
 String uid = UUID.randomUUID().toString();
 final License.Builder builder = License.builder()
 .uid(uid)
 .version(License.VERSION_CURRENT)
 .expiryDate(dateMath("now+2h", now))
 .startDate(now)
 .issueDate(now)
 .type("basic")
 .issuedTo("customer")
 .issuer("elasticsearch")
 .maxNodes(5);
 License license = TestUtils.generateSignedLicense(builder);

 XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
 setInitialState(license, licenseState, Settings.EMPTY);
 when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
 licenseService.start();

 Metadata.Builder mdBuilder = Metadata.builder();
 mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
 ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
 ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
 verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
 ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
 LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
 assertNotNull(licenseMetaData);
 assertNotNull(licenseMetaData.getLicense());
 assertTrue(licenseMetaData.isEligibleForTrial());
 assertEquals("basic", licenseMetaData.getLicense().type());
 assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
 assertEquals(uid, licenseMetaData.getLicense().uid());
}

public void testExpiredSelfGeneratedBasicLicenseIsExtended() throws Exception {
 long now = System.currentTimeMillis();
 String uid = UUID.randomUUID().toString();
 License.Builder builder = License.builder()
 .uid(uid)
 .issuedTo("name")

```

```

 .maxNodes(1000)
 .issueDate(dateMath("now-10h", now))
 .type("basic")
 .expiryDate(dateMath("now-2h", now));
License license = SelfGeneratedLicense.create(builder);

XPackLicenseState licenseState = new XPackLicenseState(Settings.EMPTY);
setInitialState(license, licenseState, Settings.EMPTY);
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(true);
licenseService.start();

MetaData.Builder mdBuilder = MetaData.builder();
mdBuilder.putCustom(LicensesMetaData.TYPE, new LicensesMetaData(license, null));
ClusterState state = ClusterState.builder(new ClusterName("a")).metaData(mdBuilder.build()).build();
ArgumentCaptor<ClusterStateUpdateTask> stateUpdater =
ArgumentCaptor.forClass(ClusterStateUpdateTask.class);
verify(clusterService, Mockito.times(1)).submitStateUpdateTask(any(), stateUpdater.capture());
ClusterState stateWithLicense = stateUpdater.getValue().execute(state);
LicensesMetaData licenseMetaData = stateWithLicense.metaData().custom(LicensesMetaData.TYPE);
assertNotNull(licenseMetaData);
assertNotNull(licenseMetaData.getLicense());
assertTrue(licenseMetaData.isEligibleForTrial());
assertEquals("basic", licenseMetaData.getLicense().type());
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
licenseMetaData.getLicense().expiryDate());
assertEquals(uid, licenseMetaData.getLicense().uid());
 }
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;
import java.util.UUID;

```

```

import static org.elasticsearch.license.CryptUtils.encrypt;
import static org.hamcrest.Matchers.equalTo;

public class SelfGeneratedLicenseTests extends ESTestCase {

 public void testBasic() throws Exception {
 long issueDate = System.currentTimeMillis();
 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo("customer")
 .maxNodes(5)
 .type(randomBoolean() ? "trial" : "basic")
 .issueDate(issueDate)
 .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
 License trialLicense = SelfGeneratedLicense.create(specBuilder);
 assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
 }

 public void testTampered() throws Exception {
 long issueDate = System.currentTimeMillis();
 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo("customer")
 .type(randomBoolean() ? "trial" : "basic")
 .maxNodes(5)
 .issueDate(issueDate)
 .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
 License trialLicense = SelfGeneratedLicense.create(specBuilder);
 final String originalSignature = trialLicense.signature();
 License tamperedLicense = License.builder().fromLicenseSpec(trialLicense, originalSignature)
 .expiryDate(System.currentTimeMillis() + TimeValue.timeValueHours(5).getMillis())
 .build();
 assertThat(SelfGeneratedLicense.verify(trialLicense), equalTo(true));
 assertThat(SelfGeneratedLicense.verify(tamperedLicense), equalTo(false));
 }

 public void testFromLx() throws Exception {
 long issueDate = System.currentTimeMillis();
 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo("customer")
 .type("subscription")
 .subscriptionType("trial")
 .issuer("elasticsearch")
 .feature("")
 .version(License.VERSION_START)

```



```

 .maxNodes(5)
 .issueDate(issueDate)
 .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis());
License pre20TrialLicense = specBuilder.build();
License license =
SelfGeneratedLicense.create(License.builder().fromPre20LicenseSpec(pre20TrialLicense).type("trial"));
 assertThat(SelfGeneratedLicense.verify(license), equalTo(true));
}

public void testTrialLicenseVerifyWithOlderVersion() throws Exception {
 long issueDate = System.currentTimeMillis();
 License.Builder specBuilder = License.builder()
 .issuedTo("customer")
 .maxNodes(5)
 .issueDate(issueDate)
 .expiryDate(issueDate + TimeValue.timeValueHours(2).getMillis())
 .feature("")
 .subscriptionType("trial")
 .version(1);
 License trialLicenseV1 = createTrialLicense(specBuilder);
 assertThat(SelfGeneratedLicense.verify(trialLicenseV1), equalTo(true));
}

private static License createTrialLicense(License.Builder specBuilder) {
 License spec = specBuilder
 .type(randomBoolean() ? "trial" : "basic")
 .issuer("elasticsearch")
 .uid(UUID.randomUUID().toString())
 .build();
 final String signature;
 try {
 XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
 spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
 byte[] encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
 byte[] bytes = new byte[4 + 4 + encrypt.length];
 ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
 byteBuffer.putInt(-spec.version())
 .putInt(encrypt.length)
 .put(encrypt);
 signature = Base64.getEncoder().encodeToString(bytes);
 } catch (IOException e) {
 throw new IllegalStateException(e);
 }
 return License.builder().fromLicenseSpec(spec, signature).build();
}
}

```

```

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionFuture;
import org.elasticsearch.common.bytes.ByteArray;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESSingleNodeTestCase;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;

import java.nio.charset.StandardCharsets;
import java.util.Collection;
import java.util.Collections;
import java.util.UUID;

import static org.elasticsearch.license.TestUtils.dateMath;
import static org.elasticsearch.license.TestUtils.generateExpiredNonBasicLicense;
import static org.elasticsearch.license.TestUtils.generateSignedLicense;
import static org.hamcrest.CoreMatchers.equalTo;
import static org.hamcrest.CoreMatchers.not;

public class LicensesTransportTests extends ESSingleNodeTestCase {

 @Override
 protected boolean resetNodeAfterTest() {
 return true;
 }

 @Override
 protected Collection<Class<? extends Plugin>> getPlugins() {
 return Collections.singletonList(LocalStateCompositeXPackPlugin.class);
 }

 @Override
 protected Settings nodeSettings() {
 Settings.Builder newSettings = Settings.builder();
 newSettings.put(super.nodeSettings());
 newSettings.put(XPackSettings.SECURITY_ENABLED.getKey(), false);
 // newSettings.put(XPackSettings.MONITORING_ENABLED.getKey(), false);
 // newSettings.put(XPackSettings.WATCHER_ENABLED.getKey(), false);
 }

```

```

 newSettings.put(Node.NODE_DATA_SETTING.getKey(), true);
 return newSettings.build();
 }

 public void testEmptyGetLicense() throws Exception {
 // basic license is added async, we should wait for it
 assertBusy(() -> {
 try {
 final ActionFuture<GetLicenseResponse> getLicenseFuture =
 new GetLicenseRequestBuilder(client().admin().cluster(), GetLicenseAction.INSTANCE).execute();
 final GetLicenseResponse getLicenseResponse;
 getLicenseResponse = getLicenseFuture.get();
 assertNotNull(getLicenseResponse.license());
 assertThat(getLicenseResponse.license().operationMode(), equalTo(License.OperationMode.BASIC));
 } catch (Exception e) {
 throw new RuntimeException("unexpected exception", e);
 }
 });
 }

 public void testPutLicense() throws Exception {
 License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

 // put license
 PutLicenseRequestBuilder putLicenseRequestBuilder =
 new PutLicenseRequestBuilder(client().admin().cluster(),
 PutLicenseAction.INSTANCE).setLicense(signedLicense)
 .setAcknowledge(true);
 PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
 assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

 // get and check license
 GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
 GetLicenseAction.INSTANCE).get();
 assertThat(getLicenseResponse.license(), equalTo(signedLicense));
 }

 public void testPutLicenseFromString() throws Exception {
 License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));
 String licenseString = TestUtils.dumpLicense(signedLicense);

 // put license source
 PutLicenseRequestBuilder putLicenseRequestBuilder =
 new PutLicenseRequestBuilder(client().admin().cluster(), PutLicenseAction.INSTANCE)
 .setLicense(new ByteArray(licenseString.getBytes(StandardCharsets.UTF_8)),
 XContentType.JSON)
 .setAcknowledge(true);
 }

```

```

PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));

// get and check license
GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
assertThat(getLicenseResponse.license(), equalTo(signedLicense));
}

public void testPutInvalidLicense() throws Exception {
 License signedLicense = generateSignedLicense(TimeValue.timeValueMinutes(2));

 // modify content of signed license
 License tamperedLicense = License.builder()
 .fromLicenseSpec(signedLicense, signedLicense.signature())
 .expiryDate(signedLicense.expiryDate() + 10 * 24 * 60 * 60 * 1000L)
 .validate()
 .build();

 PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
 builder.setLicense(tamperedLicense);

 // try to put license (should be invalid)
 final PutLicenseResponse putLicenseResponse = builder.get();
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));

 // try to get invalid license
 GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
 assertThat(getLicenseResponse.license(), not(tamperedLicense));
}

public void testPutBasicLicenseIsInvalid() throws Exception {
 License signedLicense = generateSignedLicense("basic", License.VERSION_CURRENT, -1,
TimeValue.timeValueMinutes(2));

 PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
 builder.setLicense(signedLicense);

 // try to put license (should be invalid)
 IllegalArgumentException iae = expectThrows(IllegalArgumentException.class, builder::get);
 assertEquals(iae.getMessage(), "Registering basic licenses is not allowed.");

 // try to get invalid license
 GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),

```

```

GetLicenseAction.INSTANCE).get();
 assertThat(getLicenseResponse.license(), not(signedLicense));
}

public void testPutExpiredLicense() throws Exception {
 License expiredLicense = generateExpiredNonBasicLicense();
 PutLicenseRequestBuilder builder = new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE);
 builder.setLicense(expiredLicense);
 PutLicenseResponse putLicenseResponse = builder.get();
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.EXPIRED));
 // get license should not return the expired license
 GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
 assertThat(getLicenseResponse.license(), not(expiredLicense));
}

public void testPutLicensesSimple() throws Exception {
 License goldSignedLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
 PutLicenseRequestBuilder putLicenseRequestBuilder =
 new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldSignedLicense)
 .setAcknowledge(true);
 PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
 GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
 assertThat(getLicenseResponse.license(), equalTo(goldSignedLicense));

 License platinumSignedLicense = generateSignedLicense("platinum", TimeValue.timeValueMinutes(2));
 putLicenseRequestBuilder.setLicense(platinumSignedLicense);
 putLicenseResponse = putLicenseRequestBuilder.get();
 assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
 getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
 assertThat(getLicenseResponse.license(), equalTo(platinumSignedLicense));
}

public void testRemoveLicensesSimple() throws Exception {
 License goldLicense = generateSignedLicense("gold", TimeValue.timeValueMinutes(5));
 PutLicenseRequestBuilder putLicenseRequestBuilder =
 new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(goldLicense)
 .setAcknowledge(true);
 PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
 assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
}

```

```

 GetLicenseResponse getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
 assertThat(getLicenseResponse.license(), equalTo(goldLicense));
 // delete all licenses
 DeleteLicenseRequestBuilder deleteLicenseRequestBuilder =
 new DeleteLicenseRequestBuilder(client().admin().cluster(), DeleteLicenseAction.INSTANCE);
 DeleteLicenseResponse deleteLicenseResponse = deleteLicenseRequestBuilder.get();
 assertThat(deleteLicenseResponse.isAcknowledged(), equalTo(true));
 // get licenses (expected no licenses)
 getLicenseResponse = new GetLicenseRequestBuilder(client().admin().cluster(),
GetLicenseAction.INSTANCE).get();
 assertNull(getLicenseResponse.license());
}

```

```

public void testLicenseIsRejectWhenStartDateLaterThanNow() throws Exception {

```

```

 long now = System.currentTimeMillis();
 final License.Builder builder = License.builder()
 .uid(UUID.randomUUID().toString())
 .version(License.VERSION_CURRENT)
 .expiryDate(dateMath("now+2h", now))
 .startDate(dateMath("now+1h", now))
 .issueDate(now)
 .type(License.OperationMode.TRIAL.toString())
 .issuedTo("customer")
 .issuer("elasticsearch")
 .maxNodes(5);
 License license = TestUtils.generateSignedLicense(builder);

```

```

 PutLicenseRequestBuilder putLicenseRequestBuilder =
 new PutLicenseRequestBuilder(client().admin().cluster(),
PutLicenseAction.INSTANCE).setLicense(license)
 .setAcknowledge(true);
 PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
 assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.INVALID));
}

```

```

public void testLicenseIsAcceptedWhenStartDateBeforeThanNow() throws Exception {

```

```

 long now = System.currentTimeMillis();
 final License.Builder builder = License.builder()
 .uid(UUID.randomUUID().toString())
 .version(License.VERSION_CURRENT)
 .expiryDate(dateMath("now+2h", now))
 .startDate(now)
 .issueDate(now)
 .type(License.OperationMode.TRIAL.toString())
 .issuedTo("customer")
 .issuer("elasticsearch")

```

```

 .maxNodes(5);
 License license = TestUtils.generateSignedLicense(builder);

 PutLicenseRequestBuilder putLicenseRequestBuilder =
 new PutLicenseRequestBuilder(client().admin().cluster(),
 PutLicenseAction.INSTANCE).setLicense(license)
 .setAcknowledge(true);
 PutLicenseResponse putLicenseResponse = putLicenseRequestBuilder.get();
 assertThat(putLicenseResponse.isAcknowledged(), equalTo(true));
 assertThat(putLicenseResponse.status(), equalTo(LicensesStatus.VALID));
 }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.transport.TransportAddress;
import org.elasticsearch.common.unit.TimeValue;

import java.net.InetAddress;

import static java.util.Collections.emptyMap;
import static java.util.Collections.emptySet;
import static org.hamcrest.Matchers.containsString;
import static org.mockito.Matchers.any;
import static org.mockito.Mockito.times;
import static org.mockito.Mockito.verify;

public class LicenseTLSTests extends AbstractLicenseServiceTestCase {

 private InetAddress inetAddress;

 public void testApplyLicenseInDevMode() throws Exception {
 License newLicense = TestUtils.generateSignedLicense(randomFrom("gold", "platinum"),
 TimeValue.timeValueHours(24L));
 PutLicenseRequest request = new PutLicenseRequest();
 request.acknowledge(true);
 request.license(newLicense);
 Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
 XPackLicenseState licenseState = new XPackLicenseState(settings);
 }
}

```

```

inetAddress = InetAddress.getLoopbackAddress();

setInitialState(null, licenseState, settings);
licenseService.start();
PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
licenseService.registerLicense(request, responseFuture);
verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));

inetAddress = TransportAddress.META_ADDRESS;
settings = Settings.builder()
 .put("xpack.security.enabled", true)
 .put("discovery.type", "single-node")
 .build();
licenseService.stop();
licenseState = new XPackLicenseState(settings);
setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

public void testApplyLicenseInProdMode() throws Exception {
 final String licenseType = randomFrom("GOLD", "PLATINUM");
 License newLicense = TestUtils.generateSignedLicense(licenseType, TimeValue.timeValueHours(24L));
 PutLicenseRequest request = new PutLicenseRequest();
 request.acknowledge(true);
 request.license(newLicense);
 Settings settings = Settings.builder().put("xpack.security.enabled", true).build();
 XPackLicenseState licenseState = new XPackLicenseState(settings);
 inetAddress = TransportAddress.META_ADDRESS;

 setInitialState(null, licenseState, settings);
 licenseService.start();
 PlainActionFuture<PutLicenseResponse> responseFuture = new PlainActionFuture<>();
 IllegalStateException e = expectThrows(IllegalStateException.class, () ->
licenseService.registerLicense(request, responseFuture));
 assertThat(e.getMessage(),
 containsString("Cannot install a [" + licenseType + "] license unless TLS is configured or security is
disabled"));

 settings = Settings.builder().put("xpack.security.enabled", false).build();
 licenseService.stop();
 licenseState = new XPackLicenseState(settings);
 setInitialState(null, licenseState, settings);
 licenseService.start();
 licenseService.registerLicense(request, responseFuture);
 verify(clusterService).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

```



```

settings = Settings.builder()
 .put("xpack.security.enabled", true)
 .put("xpack.security.transport.ssl.enabled", true)
 .build();
licenseService.stop();
licenseState = new XPackLicenseState(settings);
setInitialState(null, licenseState, settings);
licenseService.start();
licenseService.registerLicense(request, responseFuture);
verify(clusterService, times(2)).submitStateUpdateTask(any(String.class), any(ClusterStateUpdateTask.class));
}

@Override
protected DiscoveryNode getLocalNode() {
 return new DiscoveryNode("localnode", new TransportAddress(inetAddress, randomIntBetween(9300, 9399)),
 emptyMap(), emptySet(), Version.CURRENT);
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;

import java.nio.charset.StandardCharsets;
import java.util.Collections;
import java.util.Map;
import java.util.UUID;

import static org.hamcrest.core.IsEqual.equalTo;
import static org.hamcrest.core.IsNull.notNullValue;
import static org.hamcrest.core.IsNull.nullValue;

public class LicenseSerializationTests extends ESTestCase {
 public void testSimpleIssueExpiryDate() throws Exception {
 long now = System.currentTimeMillis();
 String issueDate = TestUtils.dateMathString("now", now);
 String expiryDate = TestUtils.dateMathString("now+10d/d", now);

```

```

String licenseSpecs = TestUtils.generateLicenseSpecString(new TestUtils.LicenseSpec(issueDate, expiryDate));
License generatedLicense = License.fromSource(new
ByteArray(licenseSpecs.getBytes(StandardCharsets.UTF_8)), XContentType.JSON);
assertThat(generatedLicense.issueDate(), equalTo(DateUtils.beginningOfDay(issueDate)));
assertThat(generatedLicense.expiryDate(), equalTo(DateUtils.endOfDay(expiryDate)));
}

public void testLicensesFields() throws Exception {
 TestUtils.LicenseSpec randomLicenseSpec =
TestUtils.generateRandomLicenseSpec(License.VERSION_START);
 String licenseSpecsSource = TestUtils.generateLicenseSpecString(randomLicenseSpec);
 final License fromSource =
 License.fromSource(new ByteArray(licenseSpecsSource.getBytes(StandardCharsets.UTF_8)),
XContentType.JSON);
 TestUtils.assertLicenseSpec(randomLicenseSpec, fromSource);
}

public void testLicenseRestView() throws Exception {
 long now = System.currentTimeMillis();
 String expiredLicenseExpiryDate = TestUtils.dateMathString("now-1d/d", now);
 String validLicenseIssueDate = TestUtils.dateMathString("now-10d/d", now);
 String invalidLicenseIssueDate = TestUtils.dateMathString("now+1d/d", now);
 String validLicenseExpiryDate = TestUtils.dateMathString("now+2d/d", now);

 License license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
expiredLicenseExpiryDate));
 XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
 builder.flush();
 Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType()).v2();

 // should have an extra status field, human readable issue_data and expiry_date
 assertThat(map.get("status"), notNullValue());
 assertThat(map.get("issue_date"), notNullValue());
 assertThat(map.get("expiry_date"), notNullValue());
 assertThat(map.get("status"), equalTo("expired"));
 builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.flush();
 map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
 assertThat(map.get("status"), nullValue());

 license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(validLicenseIssueDate,
validLicenseExpiryDate));
 builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, new

```

```

ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
 builder.flush();
 map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());

 // should have an extra status field, human readable issue_data and expiry_date
 assertThat(map.get("status"), notNullValue());
 assertThat(map.get("issue_date"), notNullValue());
 assertThat(map.get("expiry_date"), notNullValue());
 assertThat(map.get("status"), equalTo("active"));
 builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.flush();
 map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());
 assertThat(map.get("status"), nullValue());

 license = TestUtils.generateLicenses(new TestUtils.LicenseSpec(invalidLicenseIssueDate,
validLicenseExpiryDate));
 builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, new
ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
 builder.flush();
 map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());

 // should have an extra status field, human readable issue_data and expiry_date
 assertThat(map.get("status"), notNullValue());
 assertThat(map.get("issue_date"), notNullValue());
 assertThat(map.get("expiry_date"), notNullValue());
 assertThat(map.get("status"), equalTo("invalid"));
 builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.flush();
 map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType().v2());
 assertThat(map.get("status"), nullValue());
}

public void testLicenseRestViewNonExpiringBasic() throws Exception {
 long now = System.currentTimeMillis();

 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo("test")
 .maxNodes(1000)
 .issueDate(now)
 .type("basic")
 .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
 License license = SelfGeneratedLicense.create(specBuilder);
 XContentBuilder builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, new

```

```

ToXContent.MapParams(Collections.singletonMap(License.REST_VIEW_MODE, "true")));
 builder.flush();
 Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(builder), false,
builder.contentType()).v2();

 // should have an extra status field, human readable issue_data and no expiry_date
 assertThat(map.get("status"), notNullValue());
 assertThat(map.get("type"), equalTo("basic"));
 assertThat(map.get("issue_date"), notNullValue());
 assertThat(map.get("expiry_date"), nullValue());
 assertThat(map.get("expiry_date_in_millis"), nullValue());
 assertThat(map.get("status"), equalTo("active"));
 builder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(builder, ToXContent.EMPTY_PARAMS);
 builder.flush();
 map = XContentHelper.convertToMap(BytesReference.bytes(builder), false, builder.contentType()).v2();
 assertThat(map.get("status"), nullValue());
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.RestClient;
import org.elasticsearch.common.io.Streams;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.test.ESIntegTestCase;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.xpack.core.LocalStateCompositeXPackPlugin;
import org.elasticsearch.xpack.core.XPackClientPlugin;

import java.io.InputStreamReader;
import java.nio.charset.StandardCharsets;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.test.ESIntegTestCase.Scope.SUITE;

@ESIntegTestCase.ClusterScope(scope = SUITE)
public class StartBasicLicenseTests extends AbstractLicensesIntegrationTestCase {

```

```

@Override
protected Settings nodeSettings(int nodeOrdinal) {
 return Settings.builder()
 .put(super.nodeSettings(nodeOrdinal))
 .put("node.data", true)
 .put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(), "basic")
 .put(NetworkModule.HTTP_ENABLED.getKey(), true).build();
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
 return Arrays.asList(LocalStateCompositeXPackPlugin.class, Netty4Plugin.class);
}

@Override
protected Collection<Class<? extends Plugin>> transportClientPlugins() {
 return Arrays.asList(XPackClientPlugin.class, Netty4Plugin.class);
}

public void testStartBasicLicense() throws Exception {
 LicensingClient licensingClient = new LicensingClient(client());
 License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
 licensingClient.preparePutLicense(license).get();

 assertBusy(() -> {
 GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
 assertEquals("trial", getLicenseResponse.license().type());
 });

 // Testing that you can start a basic license when you have no license
 if (randomBoolean()) {
 licensingClient.prepareDeleteLicense().get();
 assertNull(licensingClient.prepareGetLicense().get().license());
 }

 RestClient restClient = getRestClient();
 Response response = restClient.performRequest("GET", "/_xpack/license/basic_status");
 String body = Streams.copyToString(new InputStreamReader(response.getEntity().getContent(),
StandardCharsets.UTF_8));
 assertEquals(200, response.getStatusLine().getStatusCode());
 assertEquals("{\"eligible_to_start_basic\":true}", body);

 Response response2 = restClient.performRequest("POST", "/_xpack/license/start_basic?acknowledge=true");
 String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
 assertEquals(200, response2.getStatusLine().getStatusCode());
}

```

```

assertTrue(body2.contains("\"acknowledged\":true"));
assertTrue(body2.contains("\"basic_was_started\":true"));

assertBusy(() -> {
 GetLicenseResponse currentLicense = licensingClient.prepareGetLicense().get();
 assertEquals("basic", currentLicense.license().type());
});

long expirationMillis = licensingClient.prepareGetLicense().get().license().expiryDate();
assertEquals(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS,
expirationMillis);

Response response3 = restClient.performRequest("GET", "/_xpack/license");
String body3 = Streams.copyToString(new InputStreamReader(response3.getEntity().getContent(),
StandardCharsets.UTF_8));
assertTrue(body3.contains("\"type\" : \"basic\""));
assertFalse(body3.contains("expiry_date"));
assertFalse(body3.contains("expiry_date_in_millis"));

Response response4 = restClient.performRequest("GET", "/_xpack/license/basic_status");
String body4 = Streams.copyToString(new InputStreamReader(response4.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(200, response3.getStatusLine().getStatusCode());
assertEquals("{\"eligible_to_start_basic\":false}", body4);

ResponseException ex = expectThrows(ResponseException.class,
 () -> restClient.performRequest("POST", "/_xpack/license/start_basic"));
Response response5 = ex.getResponse();
String body5 = Streams.copyToString(new InputStreamReader(response5.getEntity().getContent(),
StandardCharsets.UTF_8));
assertEquals(403, response5.getStatusLine().getStatusCode());
assertTrue(body5.contains("\"basic_was_started\":false"));
assertTrue(body5.contains("\"acknowledged\":true"));
assertTrue(body5.contains("\"error_message\": \"Operation failed: Current license is basic.\""));
}

public void testUnacknowledgedStartBasicLicense() throws Exception {
 LicensingClient licensingClient = new LicensingClient(client());
 License license = TestUtils.generateSignedLicense("trial", License.VERSION_CURRENT, -1,
TimeValue.timeValueHours(24));
 licensingClient.preparePutLicense(license).get();

 assertBusy(() -> {
 GetLicenseResponse getLicenseResponse = licensingClient.prepareGetLicense().get();
 assertEquals("trial", getLicenseResponse.license().type());
 });
}

```

```

 Response response2 = getRestClient().performRequest("POST", "/_xpack/license/start_basic");
 String body2 = Streams.copyToString(new InputStreamReader(response2.getEntity().getContent(),
StandardCharsets.UTF_8));
 assertEquals(200, response2.getStatusLine().getStatusCode());
 assertTrue(body2.contains("\"acknowledged\":false"));
 assertTrue(body2.contains("\"basic_was_started\":false"));
 assertTrue(body2.contains("\"error_message\": \"Operation failed: Needs acknowledgement.\""));
 assertTrue(body2.contains("\"message\": \"This license update requires acknowledgement. To acknowledge the
license, " +
 "please read the following messages and call /start_basic again, this time with the
\\\"acknowledge=true\\\""));
 }
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.BytesStreamOutput;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentHelper;
import org.elasticsearch.test.ESTestCase;

import java.io.IOException;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;

import static org.hamcrest.Matchers.equalTo;
import static org.hamcrest.Matchers.not;
import static org.hamcrest.Matchers.sameInstance;

public class PutLicenseResponseTests extends ESTestCase {
 @SuppressWarnings("unchecked")
 public void testSerialization() throws Exception {
 boolean acknowledged = randomBoolean();
 LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
 Map<String, String[]> ackMessages = randomAckMessages();

 PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);

```

```

XContentBuilder contentBuilder = XContentFactory.jsonBuilder();
response.toXContent(contentBuilder, ToXContent.EMPTY_PARAMS);

Map<String, Object> map = XContentHelper.convertToMap(BytesReference.bytes(contentBuilder), false,
 contentBuilder.contentType().v2());
assertThat(map.containsKey("acknowledged"), equalTo(true));
boolean actualAcknowledged = (boolean) map.get("acknowledged");
assertThat(actualAcknowledged, equalTo(acknowledged));

assertThat(map.containsKey("license_status"), equalTo(true));
String actualStatus = (String) map.get("license_status");
assertThat(actualStatus, equalTo(status.name().toLowerCase(Locale.ROOT)));

assertThat(map.containsKey("acknowledge"), equalTo(true));
Map<String, List<String>> actualAckMessages = (Map<String, List<String>>) map.get("acknowledge");
assertTrue(actualAckMessages.containsKey("message"));
actualAckMessages.remove("message");
assertThat(actualAckMessages.keySet(), equalTo(ackMessages.keySet()));
for (Map.Entry<String, List<String>> entry : actualAckMessages.entrySet()) {
 assertEquals(entry.getValue().toArray(), ackMessages.get(entry.getKey()));
}
}

public void testStreamSerialization() throws IOException {
 boolean acknowledged = randomBoolean();
 LicensesStatus status = randomFrom(LicensesStatus.VALID, LicensesStatus.INVALID,
LicensesStatus.EXPIRED);
 Map<String, String[]> ackMessages = randomAckMessages();

 // write the steam so that we can attempt to read it back
 ByteArrayOutputStream output = new ByteArrayOutputStream();

 PutLicenseResponse response = new PutLicenseResponse(acknowledged, status, "", ackMessages);
 // write it out
 response.writeTo(output);

 StreamInput input = output.bytes().streamInput();

 // read it back in
 response.readFrom(input);

 assertThat(response.isAcknowledged(), equalTo(acknowledged));
 assertThat(response.status(), equalTo(status));
 assertThat(response.acknowledgeMessages(), not(sameInstance(ackMessages)));
 assertThat(response.acknowledgeMessages().size(), equalTo(ackMessages.size()));

 for (String key : ackMessages.keySet()) {

```



```

 assertEquals(ackMessages.get(key), response.acknowledgeMessages().get(key));
 }
}

private static Map<String, String[]> randomAckMessages() {
 int nFeatures = randomIntBetween(1, 5);

 Map<String, String[]> ackMessages = new HashMap<>();

 for (int i = 0; i < nFeatures; i++) {
 String feature = randomAlphaOfLengthBetween(9, 15);
 int nMessages = randomIntBetween(1, 5);
 String[] messages = new String[nMessages];
 for (int j = 0; j < nMessages; j++) {
 messages[j] = randomAlphaOfLengthBetween(10, 30);
 }
 ackMessages.put(feature, messages);
 }

 return ackMessages;
}
}
/*
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterName;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlocks;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.env.Environment;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.watcher.watch.ClockMock;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Path;

```

```

import java.util.Arrays;

import static java.util.Collections.emptySet;
import static java.util.Collections.singletonMap;
import static org.mockito.Mockito.mock;
import static org.mockito.Mockito.when;

public abstract class AbstractLicenseServiceTestCase extends ESTestCase {

 protected LicenseService licenseService;
 protected ClusterService clusterService;
 protected ResourceWatcherService resourceWatcherService;
 protected ClockMock clock;
 protected DiscoveryNodes discoveryNodes;
 protected Environment environment;
 protected String licenseType;

 @Before
 public void init() throws Exception {
 clusterService = mock(ClusterService.class);
 clock = ClockMock.frozen();
 discoveryNodes = mock(DiscoveryNodes.class);
 resourceWatcherService = mock(ResourceWatcherService.class);
 environment = mock(Environment.class);
 }

 protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings) {
 setInitialState(license, licenseState, settings, randomBoolean() ? "trial" : "basic");
 }

 protected void setInitialState(License license, XPackLicenseState licenseState, Settings settings, String
selfGeneratedType) {
 Path tempDir = createTempDir();
 when(environment.configFile()).thenReturn(tempDir);
 licenseType = selfGeneratedType;
 settings =
Settings.builder().put(settings).put(LicenseService.SELF_GENERATED_LICENSE_TYPE.getKey(),
licenseType).build();
 licenseService = new LicenseService(settings, clusterService, clock, environment, resourceWatcherService,
licenseState);
 ClusterState state = mock(ClusterState.class);
 final ClusterBlocks noBlock = ClusterBlocks.builder().build();
 when(state.blocks()).thenReturn(noBlock);
 Metadata metaData = mock(Metadata.class);
 when(metaData.custom(LicensesMetaData.TYPE)).thenReturn(new LicensesMetaData(license, null));
 when(state.metaData()).thenReturn(metaData);
 final DiscoveryNode mockNode = getLocalNode();
 when(discoveryNodes.getMasterNode()).thenReturn(mockNode);

```

```

when(discoveryNodes.splitIterator()).thenReturn(Arrays.asList(mockNode).splitIterator());
when(discoveryNodes.isLocalNodeElectedMaster()).thenReturn(false);
when(state.nodes()).thenReturn(discoveryNodes);
when(state.getNodes()).thenReturn(discoveryNodes); // it is really ridiculous we have nodes() and getNodes()...
when(clusterService.state()).thenReturn(state);
when(clusterService.lifecycleState()).thenReturn(Lifecycle.State.STARTED);
when(clusterService.getClusterName()).thenReturn(new ClusterName("a"));
when(clusterService.localNode()).thenReturn(mockNode);
}

protected DiscoveryNode getLocalNode() {
 return new DiscoveryNode("b", buildNewFakeTransportAddress(),
singletonMap(XPackPlugin.XPACK_INSTALLED_NODE_ATTR, "true"),
 emptySet(), Version.CURRENT);
}

@After
public void tearDown() throws Exception {
 super.tearDown();
 licenseService.stop();
}
}
/*
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.function.Predicate;

/**
 * A permissions that is based on a general privilege that contains patterns of users that this
 * user can execute a request as
 */
public final class RunAsPermission {

 public static final RunAsPermission NONE = new RunAsPermission(Privilege.NONE);

 private final Predicate<String> predicate;

 RunAsPermission(Privilege privilege) {
 this.predicate = privilege.predicate();
 }

}

/**

```

```

 * Checks if this permission grants run as to the specified user
 */
 public boolean check(String username) {
 return predicate.test(username);
 }
}
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.util.set.Sets;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;

import java.util.ArrayList;
import java.util.Collections;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;

public final class Role {

 public static final Role EMPTY = Role.builder("__empty").build();

 private final String[] names;
 private final ClusterPermission cluster;
 private final IndicesPermission indices;
 private final RunAsPermission runAs;

 Role(String[] names, ClusterPermission cluster, IndicesPermission indices, RunAsPermission runAs) {
 this.names = names;
 this.cluster = Objects.requireNonNull(cluster);
 this.indices = Objects.requireNonNull(indices);
 this.runAs = Objects.requireNonNull(runAs);
 }

 public String[] names() {
 return names;
 }

```

```

}

public ClusterPermission cluster() {
 return cluster;
}

public IndicesPermission indices() {
 return indices;
}

public RunAsPermission runAs() {
 return runAs;
}

public static Builder builder(String... names) {
 return new Builder(names, null);
}

public static Builder builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
 return new Builder(names, fieldPermissionsCache);
}

public static Builder builder(RoleDescriptor rd, FieldPermissionsCache fieldPermissionsCache) {
 return new Builder(rd, fieldPermissionsCache);
}

/**
 * Returns whether at least one group encapsulated by this indices permissions is authorized to execute the
 * specified action with the requested indices/aliases. At the same time if field and/or document level security
 * is configured for any group also the allowed fields and role queries are resolved.
 */
public IndicesAccessControl authorize(String action, Set<String> requestedIndicesOrAliases, MetaData
metaData,
 FieldPermissionsCache fieldPermissionsCache) {
 Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = indices.authorize(
 action, requestedIndicesOrAliases, metaData, fieldPermissionsCache
);

 // At least one role / indices permission set need to match with all the requested indices/aliases:
 boolean granted = true;
 for (Map.Entry<String, IndicesAccessControl.IndexAccessControl> entry : indexPermissions.entrySet()) {
 if (!entry.getValue().isGranted()) {
 granted = false;
 break;
 }
 }
 return new IndicesAccessControl(granted, indexPermissions);
}

```

```

public static class Builder {

 private final String[] names;
 private ClusterPermission cluster = ClusterPermission.NONE;
 private RunAsPermission runAs = RunAsPermission.NONE;
 private List<IndicesPermission.Group> groups = new ArrayList<>();
 private FieldPermissionsCache fieldPermissionsCache = null;

 private Builder(String[] names, FieldPermissionsCache fieldPermissionsCache) {
 this.names = names;
 this.fieldPermissionsCache = fieldPermissionsCache;
 }

 private Builder(RoleDescriptor rd, @Nullable FieldPermissionsCache fieldPermissionsCache) {
 this.names = new String[] { rd.getName() };
 this.fieldPermissionsCache = fieldPermissionsCache;
 if (rd.getClusterPrivileges().length == 0) {
 cluster = ClusterPermission.NONE;
 } else {
 this.cluster(ClusterPrivilege.get(Sets.newHashSet(rd.getClusterPrivileges())));
 }
 groups.addAll(convertFromIndicesPrivileges(rd.getIndicesPrivileges(), fieldPermissionsCache));
 String[] rdRunAs = rd.getRunAs();
 if (rdRunAs != null && rdRunAs.length > 0) {
 this.runAs(new Privilege(Sets.newHashSet(rdRunAs), rdRunAs));
 }
 }

 public Builder cluster(ClusterPrivilege privilege) {
 cluster = new ClusterPermission(privilege);
 return this;
 }

 public Builder runAs(Privilege privilege) {
 runAs = new RunAsPermission(privilege);
 return this;
 }

 public Builder add(IndexPrivilege privilege, String... indices) {
 groups.add(new IndicesPermission.Group(privilege, FieldPermissions.DEFAULT, null, indices));
 return this;
 }

 public Builder add(FieldPermissions fieldPermissions, Set<BytesReference> query, IndexPrivilege privilege,
String... indices) {
 groups.add(new IndicesPermission.Group(privilege, fieldPermissions, query, indices));
 return this;
 }
}

```

```

 }

 public Role build() {
 IndicesPermission indices = groups.isEmpty() ? IndicesPermission.NONE :
 new IndicesPermission(groups.toArray(new IndicesPermission.Group[groups.size()]));
 return new Role(names, cluster, indices, runAs);
 }

 static List<IndicesPermission.Group> convertFromIndicesPrivileges(RoleDescriptor.IndicesPrivileges[]
indicesPrivileges,
 @Nullable FieldPermissionsCache fieldPermissionsCache) {
 List<IndicesPermission.Group> list = new ArrayList<>(indicesPrivileges.length);
 for (RoleDescriptor.IndicesPrivileges privilege : indicesPrivileges) {
 final FieldPermissions fieldPermissions;
 if (fieldPermissionsCache != null) {
 fieldPermissions = fieldPermissionsCache.getFieldPermissions(privilege.getGrantedFields(),
privilege.getDeniedFields());
 } else {
 fieldPermissions = new FieldPermissions(
 new FieldPermissionsDefinition(privilege.getGrantedFields(), privilege.getDeniedFields()));
 }
 final Set<BytesReference> query = privilege.getQuery() == null ? null :
Collections.singleton(privilege.getQuery());
 list.add(new IndicesPermission.Group(IndexPrivilege.get(Sets.newHashSet(privilege.getPrivileges())),
 fieldPermissions,
 query,
 privilege.getIndices()));

 }
 return list;
 }
}
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.common.cache.Cache;
import org.elasticsearch.common.cache.CacheBuilder;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Setting.Property;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;

```

```

import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.Collection;
import java.util.List;
import java.util.Optional;
import java.util.Set;
import java.util.concurrent.ExecutionException;
import java.util.function.Predicate;
import java.util.stream.Collectors;

import static org.elasticsearch.xpack.core.security.SecurityField.setting;

/**
 * A service for managing the caching of {@link FieldPermissions} as these may often need to be combined or
 * created and internally they
 * use an {@link org.apache.lucene.util.automaton.Automaton}, which can be costly to create once you account for
 * minimization
 */
public final class FieldPermissionsCache {

 public static final Setting<Long> CACHE_SIZE_SETTING = Setting.longSetting(
 setting("authz.store.roles.field_permissions.cache.max_size_in_bytes"), 100 * 1024 * 1024, -1L,
 Property.NodeScope);
 private final Cache<FieldPermissionsDefinition, FieldPermissions> cache;

 public FieldPermissionsCache(Settings settings) {
 this.cache = CacheBuilder.<FieldPermissionsDefinition, FieldPermissions>builder()
 .setMaximumWeight(CACHE_SIZE_SETTING.get(settings))
 .weigher((key, fieldPermissions) -> fieldPermissions.ramBytesUsed())
 .build();
 }

 /**
 * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
 * may come from the cache
 * or if it gets created, the instance will be cached
 */
 FieldPermissions getFieldPermissions(String[] granted, String[] denied) {
 return getFieldPermissions(new FieldPermissionsDefinition(granted, denied));
 }

 /**
 * Gets a {@link FieldPermissions} instance that corresponds to the granted and denied parameters. The instance
 * may come from the cache
 * or if it gets created, the instance will be cached
 */
 public FieldPermissions getFieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
 try {

```



```

 return cache.computeIfAbsent(fieldPermissionsDefinition,
 (key) -> new FieldPermissions(key, FieldPermissions.initializePermittedFieldsAutomaton(key)));
 } catch (ExecutionException e) {
 throw new ElasticsearchException("unable to compute field permissions", e);
 }
}

/**
 * Returns a field permissions object that corresponds to the merging of the given field permissions and caches the
instance if one was
 * not found in the cache.
 */
FieldPermissions getFieldPermissions(Collection<FieldPermissions> fieldPermissionsCollection) {
 Optional<FieldPermissions> allowAllFieldPermissions = fieldPermissionsCollection.stream()
 .filter(((Predicate<FieldPermissions>) (FieldPermissions::hasFieldLevelSecurity)).negate())
 .findFirst();
 return allowAllFieldPermissions.orElseGet(() -> {
 final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups = fieldPermissionsCollection.stream()
 .flatMap(fieldPermission ->
fieldPermission.getFieldPermissionsDefinition().getFieldGrantExcludeGroups().stream())
 .collect(Collectors.toSet());
 final FieldPermissionsDefinition combined = new FieldPermissionsDefinition(fieldGrantExcludeGroups);
 try {
 return cache.computeIfAbsent(combined, (key) -> {
 List<Automaton> automatonList = fieldPermissionsCollection.stream()
 .map(FieldPermissions::getIncludeAutomaton)
 .collect(Collectors.toList());
 return new FieldPermissions(key, Automatons.unionAndMinimize(automatonList));
 });
 } catch (ExecutionException e) {
 throw new ElasticsearchException("unable to compute field permissions", e);
 }
 });
}

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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.TooComplexToDetermineException;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.cluster.metadata.AliasOrIndex;
import org.elasticsearch.cluster.metadata.IndexMetaData;
import org.elasticsearch.cluster.metadata.MetaData;

```

```

import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.IndicesAccessControl;
import org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege;
import org.elasticsearch.xpack.core.security.support.Automatons;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.Iterator;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.Set;
import java.util.SortedMap;
import java.util.concurrent.ConcurrentHashMap;
import java.util.function.Function;
import java.util.function.Predicate;

import static java.util.Collections.unmodifiableMap;
import static java.util.Collections.unmodifiableSet;

/**
 * A permission that is based on privileges for index related actions executed
 * on specific indices
 */
public final class IndicesPermission implements Iterable<IndicesPermission.Group> {

 public static final IndicesPermission NONE = new IndicesPermission();

 private final Function<String, Predicate<String>> loadingFunction;

 private final ConcurrentHashMap<String, Predicate<String>> allowedIndicesMatchersForAction = new
 ConcurrentHashMap<>();

 private final Group[] groups;

 public IndicesPermission(Group... groups) {
 this.groups = groups;
 loadingFunction = (action) -> {
 List<String> indices = new ArrayList<>();
 for (Group group : groups) {
 if (group.actionMatcher.test(action)) {
 indices.addAll(Arrays.asList(group.indices));
 }
 }
 }
 }

```

```

 }
 return indexMatcher(indices);
};
}

static Predicate<String> indexMatcher(List<String> indices) {
 try {
 return Automaton.predicate(indices);
 } catch (TooComplexToDeterminizeException e) {
 Loggers.getLogger(IndicesPermission.class).debug("Index pattern automaton [{}] is too complex", indices);
 String description = Strings.collectionToCommaDelimitedString(indices);
 if (description.length() > 80) {
 description = Strings.cleanTruncate(description, 80) + "...";
 }
 throw new ElasticsearchSecurityException("The set of permitted index patterns [{}] is too complex to
evaluate", e, description);
 }
}

@Override
public Iterator<Group> iterator() {
 return Arrays.asList(groups).iterator();
}

public Group[] groups() {
 return groups;
}

/**
 * @return A predicate that will match all the indices that this permission
 * has the privilege for executing the given action on.
 */
public Predicate<String> allowedIndicesMatcher(String action) {
 return allowedIndicesMatchersForAction.computeIfAbsent(action, loadingFunction);
}

/**
 * Checks if the permission matches the provided action, without looking at indices.
 * To be used in very specific cases where indices actions need to be authorized regardless of their indices.
 * The usecase for this is composite actions that are initially only authorized based on the action name (indices are
not
 * checked on the coordinating node), and properly authorized later at the shard level checking their indices as
well.
 */
public boolean check(String action) {
 for (Group group : groups) {
 if (group.check(action)) {
 return true;
 }
 }
}

```

```

 }
 }
 return false;
}

public Automaton allowedActionsMatcher(String index) {
 List<Automaton> automatonList = new ArrayList<>();
 for (Group group : groups) {
 if (group.indexNameMatcher.test(index)) {
 automatonList.add(group.privilege.getAutomaton());
 }
 }
 return automatonList.isEmpty() ? Automaton.EMPTY : Automaton.unionAndMinimize(automatonList);
}

/**
 * Authorizes the provided action against the provided indices, given the current cluster metadata
 */
public Map<String, IndicesAccessControl.IndexAccessControl> authorize(String action, Set<String>
requestedIndicesOrAliases,
 Metadata metaData, FieldPermissionsCache fieldPermissionsCache) {
 // now... every index that is associated with the request, must be granted
 // by at least one indices permission group

 SortedMap<String, AliasOrIndex> allAliasesAndIndices = metaData.getAliasAndIndexLookup();
 Map<String, Set<FieldPermissions>> fieldPermissionsByIndex = new HashMap<>();
 Map<String, DocumentLevelPermissions> roleQueriesByIndex = new HashMap<>();
 Map<String, Boolean> grantedBuilder = new HashMap<>();

 for (String indexOrAlias : requestedIndicesOrAliases) {
 boolean granted = false;
 Set<String> concreteIndices = new HashSet<>();
 AliasOrIndex aliasOrIndex = allAliasesAndIndices.get(indexOrAlias);
 if (aliasOrIndex != null) {
 for (IndexMetaData indexMetaData : aliasOrIndex.getIndices()) {
 concreteIndices.add(indexMetaData.getIndex().getName());
 }
 }

 for (Group group : groups) {
 if (group.check(action, indexOrAlias)) {
 granted = true;
 for (String index : concreteIndices) {
 Set<FieldPermissions> fieldPermissions = fieldPermissionsByIndex.computeIfAbsent(index, (k) ->
new HashSet<>());
 fieldPermissionsByIndex.put(indexOrAlias, fieldPermissions);
 fieldPermissions.add(group.getFieldPermissions());
 DocumentLevelPermissions permissions =

```

```

 roleQueriesByIndex.computeIfAbsent(index, (k) -> new DocumentLevelPermissions());
roleQueriesByIndex.putIfAbsent(indexOrAlias, permissions);
if (group.hasQuery()) {
 permissions.addAll(group.getQuery());
} else {
 // if more than one permission matches for a concrete index here and if
 // a single permission doesn't have a role query then DLS will not be
 // applied even when other permissions do have a role query
 permissions.setAllowAll(true);
}
}
}
}

if (concreteIndices.isEmpty()) {
 grantedBuilder.put(indexOrAlias, granted);
} else {
 grantedBuilder.put(indexOrAlias, granted);
 for (String concreteIndex : concreteIndices) {
 grantedBuilder.put(concreteIndex, granted);
 }
}
}

Map<String, IndicesAccessControl.IndexAccessControl> indexPermissions = new HashMap<>();
for (Map.Entry<String, Boolean> entry : grantedBuilder.entrySet()) {
 String index = entry.getKey();
 DocumentLevelPermissions permissions = roleQueriesByIndex.get(index);
 final Set<BytesReference> roleQueries;
 if (permissions != null && permissions.isAllowAll() == false) {
 roleQueries = unmodifiableSet(permissions.queries);
 } else {
 roleQueries = null;
 }

 final FieldPermissions fieldPermissions;
 final Set<FieldPermissions> indexFieldPermissions = fieldPermissionsByIndex.get(index);
 if (indexFieldPermissions != null && indexFieldPermissions.isEmpty() == false) {
 fieldPermissions = indexFieldPermissions.size() == 1 ? indexFieldPermissions.iterator().next() :
 fieldPermissionsCache.getFieldPermissions(indexFieldPermissions);
 } else {
 fieldPermissions = FieldPermissions.DEFAULT;
 }
 indexPermissions.put(index, new IndicesAccessControl.IndexAccessControl(entry.getValue(),
fieldPermissions, roleQueries));
}
return unmodifiableMap(indexPermissions);
}

```

```

public static class Group {
 private final IndexPrivilege privilege;
 private final Predicate<String> actionMatcher;
 private final String[] indices;
 private final Predicate<String> indexNameMatcher;

 public FieldPermissions getFieldPermissions() {
 return fieldPermissions;
 }

 private final FieldPermissions fieldPermissions;
 private final Set<BytesReference> query;

 public Group(IndexPrivilege privilege, FieldPermissions fieldPermissions, @Nullable Set<BytesReference>
query, String... indices) {
 assert indices.length != 0;
 this.privilege = privilege;
 this.actionMatcher = privilege.predicate();
 this.indices = indices;
 this.indexNameMatcher = indexMatcher(Arrays.asList(indices));
 this.fieldPermissions = Objects.requireNonNull(fieldPermissions);
 this.query = query;
 }

 public IndexPrivilege privilege() {
 return privilege;
 }

 public String[] indices() {
 return indices;
 }

 @Nullable
 public Set<BytesReference> getQuery() {
 return query;
 }

 private boolean check(String action) {
 return actionMatcher.test(action);
 }

 private boolean check(String action, String index) {
 assert index != null;
 return check(action) && indexNameMatcher.test(index);
 }

 boolean hasQuery() {

```

```

 return query != null;
 }
}

private static class DocumentLevelPermissions {

 private Set<BytesReference> queries = null;
 private boolean allowAll = false;

 private void addAll(Set<BytesReference> query) {
 if (allowAll == false) {
 if (queries == null) {
 queries = new HashSet<>();
 }
 queries.addAll(query);
 }
 }

 private boolean isAllowAll() {
 return allowAll;
 }

 private void setAllowAll(boolean allowAll) {
 this.allowAll = allowAll;
 }
}
}
/*
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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.apache.lucene.index.DirectoryReader;
import org.apache.lucene.util.Accountable;
import org.apache.lucene.util.RamUsageEstimator;
import org.apache.lucene.util.automaton.Automata;
import org.apache.lucene.util.automaton.Automaton;
import org.apache.lucene.util.automaton.CharacterRunAutomaton;
import org.apache.lucene.util.automaton.MinimizationOperations;
import org.apache.lucene.util.automaton.Operations;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.regex.Regex;
import org.elasticsearch.index.mapper.AllFieldMapper;
import org.elasticsearch.xpack.core.security.authz.accesscontrol.FieldSubsetReader;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition.FieldGrantExcludeGroup;

```

```

import org.elasticsearch.xpack.core.security.support.Automatons;

import java.io.IOException;
import java.util.Arrays;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Set;
import java.util.stream.Collectors;

import static org.apache.lucene.util.automaton.Operations.subsetOf;

/**
 * Stores patterns to fields which access is granted or denied to and maintains an automaton that can be used to check
 * if permission is
 * allowed for a specific field.
 * Field permissions are configured via a list of strings that are patterns a field has to match. Two lists determine
 * whether or
 * not a field is granted access to:
 * 1. It has to match the patterns in grantedFieldsArray
 * 2. it must not match the patterns in deniedFieldsArray
 */
public final class FieldPermissions implements Accountable {

 public static final FieldPermissions DEFAULT = new FieldPermissions();

 private static final long BASE_FIELD_PERM_DEF_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldPermissionsDefinition(null, null));
 private static final long BASE_FIELD_GROUP_BYTES = RamUsageEstimator.shallowSizeOf(new
FieldGrantExcludeGroup(null, null));
 private static final long BASE_HASHSET_SIZE = RamUsageEstimator.shallowSizeOfInstance(HashSet.class);
 private static final long BASE_HASHSET_ENTRY_SIZE;
 static {
 HashMap<String, Object> map = new HashMap<>();
 map.put(FieldPermissions.class.getName(), new Object());
 long mapEntryShallowSize = RamUsageEstimator.shallowSizeOf(map.entrySet().iterator().next());
 // assume a load factor of 50%
 // for each entry, we need two object refs, one for the entry itself
 // and one for the free space that is due to the fact hash tables can
 // not be fully loaded
 BASE_HASHSET_ENTRY_SIZE = mapEntryShallowSize + 2 *
RamUsageEstimator.NUM_BYTES_OBJECT_REF;
 }

 private final FieldPermissionsDefinition fieldPermissionsDefinition;
 // an automaton that represents a union of one more sets of permitted and denied fields
 private final CharacterRunAutomaton permittedFieldsAutomaton;
 private final boolean permittedFieldsAutomatonIsTotal;

```



```

private final Automaton originalAutomaton;

private final long ramBytesUsed;

/** Constructor that does not enable field-level security: all fields are accepted. */
public FieldPermissions() {
 this(new FieldPermissionsDefinition(null, null), Automatons.MATCH_ALL);
}

/** Constructor that enables field-level security based on include/exclude rules. Exclude rules
 * have precedence over include rules. */
public FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition) {
 this(fieldPermissionsDefinition, initializePermittedFieldsAutomaton(fieldPermissionsDefinition));
}

/** Constructor that enables field-level security based on include/exclude rules. Exclude rules
 * have precedence over include rules. */
FieldPermissions(FieldPermissionsDefinition fieldPermissionsDefinition, Automaton permittedFieldsAutomaton)
{
 if (permittedFieldsAutomaton.isDeterministic() == false && permittedFieldsAutomaton.getNumStates() > 1) {
 // we only accept deterministic automata so that the CharacterRunAutomaton constructor
 // directly wraps the provided automaton
 throw new IllegalArgumentException("Only accepts deterministic automata");
 }
 this.fieldPermissionsDefinition = fieldPermissionsDefinition;
 this.originalAutomaton = permittedFieldsAutomaton;
 this.permittedFieldsAutomaton = new CharacterRunAutomaton(permittedFieldsAutomaton);
 // we cache the result of isTotal since this might be a costly operation
 this.permittedFieldsAutomatonIsTotal = Operations.isTotal(permittedFieldsAutomaton);

 long ramBytesUsed = BASE_FIELD_PERM_DEF_BYTES;

 for (FieldGrantExcludeGroup group : fieldPermissionsDefinition.getFieldGrantExcludeGroups()) {
 ramBytesUsed += BASE_FIELD_GROUP_BYTES + BASE_HASHSET_ENTRY_SIZE;
 if (group.getGrantedFields() != null) {
 ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getGrantedFields());
 }
 if (group.getExcludedFields() != null) {
 ramBytesUsed += RamUsageEstimator.shallowSizeOf(group.getExcludedFields());
 }
 }
 ramBytesUsed += permittedFieldsAutomaton.ramBytesUsed();
 ramBytesUsed += runAutomatonRamBytesUsed(permittedFieldsAutomaton);
 this.ramBytesUsed = ramBytesUsed;
}

/**
 * Return an estimation of the ram bytes used by a {@link CharacterRunAutomaton}

```

```

* that wraps the given automaton.
*/
private static long runAutomatonRamBytesUsed(Automaton a) {
 return a.getNumStates() * 5; // wild guess, better than 0
}

public static Automaton initializePermittedFieldsAutomaton(FieldPermissionsDefinition
fieldPermissionsDefinition) {
 Set<FieldGrantExcludeGroup> groups = fieldPermissionsDefinition.getFieldGrantExcludeGroups();
 assert groups.size() > 0 : "there must always be a single group for field inclusion/exclusion";
 List<Automaton> automatonList =
 groups.stream()
 .map(g -> FieldPermissions.initializePermittedFieldsAutomaton(g.getGrantedFields(),
g.getExcludedFields()))
 .collect(Collectors.toList());
 return Automatons.unionAndMinimize(automatonList);
}

private static Automaton initializePermittedFieldsAutomaton(final String[] grantedFields, final String[]
deniedFields) {
 Automaton grantedFieldsAutomaton;
 if (grantedFields == null || Arrays.stream(grantedFields).anyMatch(Regex::isMatchAllPattern)) {
 grantedFieldsAutomaton = Automatons.MATCH_ALL;
 } else {
 // an automaton that includes metadata fields, including join fields created by the _parent field such
 // as _parent#type
 Automaton metaFieldsAutomaton = Operations.concatenate(Automata.makeChar('_'),
Automata.makeAnyString());
 grantedFieldsAutomaton = Operations.union(Automatons.patterns(grantedFields), metaFieldsAutomaton);
 }

 Automaton deniedFieldsAutomaton;
 if (deniedFields == null || deniedFields.length == 0) {
 deniedFieldsAutomaton = Automatons.EMPTY;
 } else {
 deniedFieldsAutomaton = Automatons.patterns(deniedFields);
 }

 grantedFieldsAutomaton = MinimizationOperations.minimize(grantedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);
 deniedFieldsAutomaton = MinimizationOperations.minimize(deniedFieldsAutomaton,
Operations.DEFAULT_MAX_DETERMINIZED_STATES);

 if (subsetOf(deniedFieldsAutomaton, grantedFieldsAutomaton) == false) {
 throw new ElasticsearchSecurityException("Exceptions for field permissions must be a subset of the " +
 "granted fields but " + Strings.arrayToCommaDelimitedString(deniedFields) + " is not a subset of " +
 Strings.arrayToCommaDelimitedString(grantedFields));
 }
}

```

```

 if (!containsAllField(GrantedFields) && !containsAllField(DeniedFields)) {
 // It is not explicitly stated whether _all should be allowed/denied
 // In that case we automatically disable _all, unless all fields would match
 if (Operations.isTotal(GrantedFieldsAutomaton) && Operations.isEmpty(DeniedFieldsAutomaton)) {
 // all fields are accepted, so using _all is fine
 } else {
 DeniedFieldsAutomaton = Operations.union(DeniedFieldsAutomaton,
Automata.makeString(AllFieldMapper.NAME));
 }
 }

 GrantedFieldsAutomaton = Automata.minusAndMinimize(GrantedFieldsAutomaton,
DeniedFieldsAutomaton);
 return GrantedFieldsAutomaton;
}

private static boolean containsAllField(String[] fields) {
 return fields != null && Arrays.stream(fields).anyMatch(AllFieldMapper.NAME::equals);
}

/**
 * Returns true if this field permission policy allows access to the field and false if not.
 * fieldName can be a wildcard.
 */
public boolean grantsAccessTo(String fieldName) {
 return PermittedFieldsAutomatonIsTotal || PermittedFieldsAutomaton.run(fieldName);
}

FieldPermissionsDefinition getFieldPermissionsDefinition() {
 return fieldPermissionsDefinition;
}

/** Return whether field-level security is enabled, ie. whether any field might be filtered out. */
public boolean hasFieldLevelSecurity() {
 return PermittedFieldsAutomatonIsTotal == false;
}

/** Return a wrapped reader that only exposes allowed fields. */
public DirectoryReader filter(DirectoryReader reader) throws IOException {
 if (hasFieldLevelSecurity() == false) {
 return reader;
 }
 return FieldSubsetReader.wrap(reader, PermittedFieldsAutomaton);
}

// for testing only
Automaton getIncludeAutomaton() {

```

```

 return originalAutomaton;
 }

 @Override
 public boolean equals(Object o) {
 if (this == o) return true;
 if (o == null || getClass() != o.getClass()) return false;

 FieldPermissions that = (FieldPermissions) o;

 if (permittedFieldsAutomatonIsTotal != that.permittedFieldsAutomatonIsTotal) return false;
 return fieldPermissionsDefinition != null ?
 fieldPermissionsDefinition.equals(that.fieldPermissionsDefinition) : that.fieldPermissionsDefinition ==
null;
 }

 @Override
 public int hashCode() {
 int result = fieldPermissionsDefinition != null ? fieldPermissionsDefinition.hashCode() : 0;
 result = 31 * result + (permittedFieldsAutomatonIsTotal ? 1 : 0);
 return result;
 }

 @Override
 public long ramBytesUsed() {
 return ramBytesUsed;
 }
}

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 */
package org.elasticsearch.xpack.core.security.authz.permission;

import org.elasticsearch.xpack.core.security.authz.privilege.ClusterPrivilege;

import java.util.function.Predicate;

/**
 * A permission that is based on privileges for cluster wide actions
 */
public final class ClusterPermission {

 public static final ClusterPermission NONE = new ClusterPermission(ClusterPrivilege.NONE);

 private final ClusterPrivilege privilege;
 private final Predicate<String> predicate;

```

```

ClusterPermission(ClusterPrivilege privilege) {
 this.privilege = privilege;
 this.predicate = privilege.predicate();
}

public ClusterPrivilege privilege() {
 return privilege;
}

public boolean check(String action) {
 return predicate.test(action);
}
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.core.security.authz.permission;

import java.util.Arrays;
import java.util.Collections;
import java.util.Set;

/**
 * Represents the definition of a {@link FieldPermissions}. Field permissions are defined as a
 * collections of grant and exclude definitions where the exclude definition must be a subset of
 * the grant definition.
 */
public final class FieldPermissionsDefinition {

 private final Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups;

 public FieldPermissionsDefinition(String[] grant, String[] exclude) {
 this(Collections.singleton(new FieldGrantExcludeGroup(grant, exclude)));
 }

 public FieldPermissionsDefinition(Set<FieldGrantExcludeGroup> fieldGrantExcludeGroups) {
 this.fieldGrantExcludeGroups = Collections.unmodifiableSet(fieldGrantExcludeGroups);
 }

 public Set<FieldGrantExcludeGroup> getFieldGrantExcludeGroups() {
 return fieldGrantExcludeGroups;
 }

 @Override
 public boolean equals(Object o) {

```

```

if (this == o) return true;
if (o == null || getClass() != o.getClass()) return false;

FieldPermissionsDefinition that = (FieldPermissionsDefinition) o;

return fieldGrantExcludeGroups != null ?
 fieldGrantExcludeGroups.equals(that.fieldGrantExcludeGroups) :
 that.fieldGrantExcludeGroups == null;
}

@Override
public int hashCode() {
 return fieldGrantExcludeGroups != null ? fieldGrantExcludeGroups.hashCode() : 0;
}

public static final class FieldGrantExcludeGroup {
 private final String[] grantedFields;
 private final String[] excludedFields;

 public FieldGrantExcludeGroup(String[] grantedFields, String[] excludedFields) {
 this.grantedFields = grantedFields;
 this.excludedFields = excludedFields;
 }

 public String[] getGrantedFields() {
 return grantedFields;
 }

 public String[] getExcludedFields() {
 return excludedFields;
 }

 @Override
 public boolean equals(Object o) {
 if (this == o) return true;
 if (o == null || getClass() != o.getClass()) return false;

 FieldGrantExcludeGroup that = (FieldGrantExcludeGroup) o;

 if (!Arrays.equals(grantedFields, that.grantedFields)) return false;
 return Arrays.equals(excludedFields, that.excludedFields);
 }

 @Override
 public int hashCode() {
 int result = Arrays.hashCode(grantedFields);
 result = 31 * result + Arrays.hashCode(excludedFields);
 return result;
 }
}

```

```

 }
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseAction extends Action<GetLicenseRequest, GetLicenseResponse,
GetLicenseRequestBuilder> {

 public static final GetLicenseAction INSTANCE = new GetLicenseAction();
 public static final String NAME = "cluster:monitor/xpack/license/get";

 private GetLicenseAction() {
 super(NAME);
 }

 @Override
 public GetLicenseResponse newResponse() {
 return new GetLicenseResponse();
 }

 @Override
 public GetLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
 return new GetLicenseRequestBuilder(client, this);
 }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.cluster.AbstractNamedDiffable;
import org.elasticsearch.cluster.MergableCustomMetaData;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

```

```

import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.io.IOException;
import java.util.EnumSet;

/**
 * Contains metadata about registered licenses
 */
public class LicensesMetaData extends AbstractNamedDiffable<MetaData.Custom> implements
XPackPlugin.XPackMetaDataCustom,
 MergableCustomMetaData<LicensesMetaData> {

 public static final String TYPE = "licenses";

 /**
 * When license is explicitly removed by a user, LICENSE_TOMBSTONE
 * is used as a placeholder in the license metadata. This enables
 * us to distinguish between the scenario when a cluster never
 * had a license (null) and when a license was removed explicitly
 * (LICENSE_TOMBSTONE).
 * We rely on this to decide whether to generate a unsigned trial
 * license or not. we should only generate a license if no license
 * ever existed in the cluster state
 */
 public static final License LICENSE_TOMBSTONE = License.builder()
 .type("trial")
 .issuer("elasticsearch")
 .uid("TOMBSTONE")
 .issuedTo("")
 .maxNodes(0)
 .issueDate(0)
 .expiryDate(0)
 .build();

 private License license;

 // This field describes the version of x-pack for which this cluster has exercised a trial. If the field
 // is null, then no trial has been exercised. We keep the version to leave open the possibility that we
 // may eventually allow a cluster to exercise a trial every time they upgrade to a new major version.
 @Nullable
 private Version trialVersion;

 LicensesMetaData(License license, Version trialVersion) {
 this.license = license;
 this.trialVersion = trialVersion;
 }

```



```

}

public License getLicense() {
 return license;
}

boolean isEligibleForTrial() {
 if (trialVersion == null) {
 return true;
 }
 return Version.CURRENT.major > trialVersion.major;
}

Version getMostRecentTrialVersion() {
 return trialVersion;
}

@Override
public String toString() {
 return "LicensesMetaData{" +
 "license=" + license +
 ", trialVersion=" + trialVersion +
 '}';
}

@Override
public boolean equals(Object o) {
 if (this == o) return true;
 if (o == null || getClass() != o.getClass()) return false;

 LicensesMetaData that = (LicensesMetaData) o;

 if (license != null ? !license.equals(that.license) : that.license != null) return false;
 return trialVersion != null ? trialVersion.equals(that.trialVersion) : that.trialVersion == null;
}

@Override
public int hashCode() {
 int result = license != null ? license.hashCode() : 0;
 result = 31 * result + (trialVersion != null ? trialVersion.hashCode() : 0);
 return result;
}

@Override
public String getWriteableName() {
 return TYPE;
}

```

```

@Override
public Version getMinimalSupportedVersion() {
 return Version.CURRENT.minimumCompatibilityVersion();
}

@Override
public EnumSet<MetaData.XContentContext> context() {
 return EnumSet.of(MetaData.XContentContext.GATEWAY);
}

public static LicensesMetaData fromXContent(XContentParser parser) throws IOException {
 License license = LICENSE_TOMBSTONE;
 Version trialLicense = null;
 XContentParser.Token token;
 while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
 if (token == XContentParser.Token.FIELD_NAME) {
 String fieldName = parser.currentName();
 if (fieldName != null) {
 if (fieldName.equals(Fields.LICENSE)) {
 token = parser.nextToken();
 if (token == XContentParser.Token.START_OBJECT) {
 license = License.fromXContent(parser);
 } else if (token == XContentParser.Token.VALUE_NULL) {
 license = LICENSE_TOMBSTONE;
 }
 } else if (fieldName.equals(Fields.TRIAL_LICENSE)) {
 parser.nextToken();
 trialLicense = Version.fromString(parser.text());
 }
 }
 }
 }
 return new LicensesMetaData(license, trialLicense);
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
 if (license == LICENSE_TOMBSTONE) {
 builder.nullField(Fields.LICENSE);
 } else {
 builder.startObject(Fields.LICENSE);
 license.toInnerXContent(builder, params);
 builder.endObject();
 }
 if (trialVersion != null) {
 builder.field(Fields.TRIAL_LICENSE, trialVersion.toString());
 }
 return builder;
}

```

```

}

@Override
public void writeTo(StreamOutput streamOutput) throws IOException {
 if (license == LICENSE_TOMBSTONE) {
 streamOutput.writeBoolean(false); // no license
 } else {
 streamOutput.writeBoolean(true); // has a license
 license.writeTo(streamOutput);
 }
 if (streamOutput.getVersion().onOrAfter(Version.V_6_1_0)) {
 if (trialVersion == null) {
 streamOutput.writeBoolean(false);
 } else {
 streamOutput.writeBoolean(true);
 Version.writeVersion(trialVersion, streamOutput);
 }
 }
}

public LicensesMetaData(StreamInput streamInput) throws IOException {
 if (streamInput.readBoolean()) {
 license = License.readLicense(streamInput);
 } else {
 license = LICENSE_TOMBSTONE;
 }
 if (streamInput.getVersion().onOrAfter(Version.V_6_1_0)) {
 boolean hasExercisedTrial = streamInput.readBoolean();
 if (hasExercisedTrial) {
 this.trialVersion = Version.readVersion(streamInput);
 }
 }
}

public static NamedDiff<MetaData.Custom> readDiffFrom(StreamInput streamInput) throws IOException {
 return readDiffFrom(MetaData.Custom.class, TYPE, streamInput);
}

public static License extractLicense(LicensesMetaData licensesMetaData) {
 if (licensesMetaData != null) {
 License license = licensesMetaData.getLicense();
 if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
 return null;
 } else {
 return license;
 }
 }
 return null;
}

```

```

}

@Override
public LicensesMetaData merge(LicensesMetaData other) {
 if (other.license == null) {
 return this;
 } else if (license == null
 || OperationMode.compare(other.license.operationMode(), license.operationMode()) > 0) {
 return other;
 }
 return this;
}

private static final class Fields {
 private static final String LICENSE = "license";
 private static final String TRIAL_LICENSE = "trial_license";
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.action.RestToXContentListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestController.Method.DELETE;

public class RestDeleteLicenseAction extends XPackRestHandler {
 public RestDeleteLicenseAction(Settings settings, RestController controller) {
 super(settings);
 // @deprecated Remove deprecations in 6.0
 controller.registerWithDeprecatedHandler(DELETE, URI_BASE + "/license", this,
 DELETE, "/_license", deprecationLogger);

 // Remove _licenses support entirely in 6.0
 controller.registerAsDeprecatedHandler(DELETE, "/_licenses", this,
 "[DELETE /_licenses] is deprecated! Use " +
 "[DELETE /_xpack/license] instead.",
 deprecationLogger);
 }
}

```

```

 }

 @Override
 public String getName() {
 return "xpack_delete_license_action";
 }

 @Override
 public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
 IOException {
 DeleteLicenseRequest deleteLicenseRequest = new DeleteLicenseRequest();
 deleteLicenseRequest.timeout(request.paramAsTime("timeout", deleteLicenseRequest.timeout()));
 deleteLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
 deleteLicenseRequest.masterNodeTimeout()));

 return channel -> client.es().admin().cluster().execute(DeleteLicenseAction.INSTANCE, deleteLicenseRequest,
 new RestToXContentListener<>(channel));
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PutLicenseAction extends Action<PutLicenseRequest, PutLicenseResponse,
PutLicenseRequestBuilder> {

 public static final PutLicenseAction INSTANCE = new PutLicenseAction();
 public static final String NAME = "cluster:admin/xpack/license/put";

 private PutLicenseAction() {
 super(NAME);
 }

 @Override
 public PutLicenseResponse newResponse() {
 return new PutLicenseResponse();
 }

 @Override
 public PutLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
 return new PutLicenseRequestBuilder(client, this);
 }
}

```

```

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetBasicStatusRequest extends MasterNodeReadRequest<GetBasicStatusRequest> {

 public GetBasicStatusRequest() {
 }

 @Override
 public ActionRequestValidationException validate() {
 return null;
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetTrialStatusAction extends Action<GetTrialStatusRequest, GetTrialStatusResponse,
GetTrialStatusRequestBuilder> {

 public static final GetTrialStatusAction INSTANCE = new GetTrialStatusAction();
 public static final String NAME = "cluster:admin/xpack/license/trial_status";

 private GetTrialStatusAction() {
 super(NAME);
 }

 @Override
 public GetTrialStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
 return new GetTrialStatusRequestBuilder(client, this);
 }
}

```

```

@Override
public GetTrialStatusResponse newResponse() {
 return new GetTrialStatusResponse();
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetBasicStatusAction extends TransportMasterNodeReadAction<GetBasicStatusRequest,
GetBasicStatusResponse> {

 @Inject
 public TransportGetBasicStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,
 ThreadPool threadPool, ActionFilters actionFilters,
 IndexNameExpressionResolver indexNameExpressionResolver) {
 super(settings, GetBasicStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
 indexNameExpressionResolver, GetBasicStatusRequest::new);
 }

 @Override
 protected String executor() {
 return ThreadPool.Names.SAME;
 }

 @Override
 protected GetBasicStatusResponse newResponse() {
 return new GetBasicStatusResponse();
 }
}

```

```

@Override
protected void masterOperation(GetBasicStatusRequest request, ClusterState state,
 ActionListener<GetBasicStatusResponse> listener) throws Exception {
 LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
 if (licensesMetaData == null) {
 listener.onResponse(new GetBasicStatusResponse(true));
 } else {
 License license = licensesMetaData.getLicense();
 listener.onResponse(new GetBasicStatusResponse(license == null || license.type().equals("basic") == false));
 }
}

@Override
protected ClusterBlockException checkBlock(GetBasicStatusRequest request, ClusterState state) {
 return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartBasicAction extends TransportMasterNodeAction<PostStartBasicRequest,
 PostStartBasicResponse> {

 private final LicenseService licenseService;

 @Inject
 public TransportPostStartBasicAction(Settings settings, TransportService transportService, ClusterService
 clusterService,
 LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
 IndexNameExpressionResolver indexNameExpressionResolver) {

```



```

 super(settings, PostStartBasicAction.NAME, transportService, clusterService, threadPool, actionFilters,
 indexNameExpressionResolver, PostStartBasicRequest::new);
 this.licenseService = licenseService;
 }

 @Override
 protected String executor() {
 return ThreadPool.Names.SAME;
 }

 @Override
 protected PostStartBasicResponse newResponse() {
 return new PostStartBasicResponse();
 }

 @Override
 protected void masterOperation(PostStartBasicRequest request, ClusterState state,
 ActionListener<PostStartBasicResponse> listener) throws Exception {
 licenseService.startBasicLicense(request, listener);
 }

 @Override
 protected ClusterBlockException checkBlock(PostStartBasicRequest request, ClusterState state) {
 return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.GET;

```

```

public class RestGetTrialStatus extends XPackRestHandler {

 RestGetTrialStatus(Settings settings, RestController controller) {
 super(settings);
 controller.registerHandler(GET, URI_BASE + "/license/trial_status", this);
 }

 @Override
 protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
 {
 return channel -> client.licensing().prepareGetStartTrial().execute(
 new RestBuilderListener<GetTrialStatusResponse>(channel) {
 @Override
 public RestResponse buildResponse(GetTrialStatusResponse response, XContentBuilder builder) throws
 Exception {
 builder.startObject();
 builder.field("eligible_to_start_trial", response.isEligibleToStartTrial());
 builder.endObject();
 return new BytesRestResponse(RestStatus.OK, builder);
 }
 });
 }

 @Override
 public String getName() {
 return "xpack_trial_status_action";
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseAction extends Action<DeleteLicenseRequest, DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

 public static final DeleteLicenseAction INSTANCE = new DeleteLicenseAction();
 public static final String NAME = "cluster:admin/xpack/license/delete";

 private DeleteLicenseAction() {
 super(NAME);
 }
}

```

```

@Override
public DeleteLicenseResponse newResponse() {
 return new DeleteLicenseResponse();
}

@Override
public DeleteLicenseRequestBuilder newRequestBuilder(ElasticsearchClient client) {
 return new DeleteLicenseRequestBuilder(client, this);
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;
import org.elasticsearch.common.io.stream.StreamInput;

import java.io.IOException;

public class GetTrialStatusRequest extends MasterNodeReadRequest<GetTrialStatusRequest> {

 public GetTrialStatusRequest() {
 }

 @Override
 public ActionRequestValidationException validate() {
 return null;
 }
}
/*
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 */
package org.elasticsearch.license;

import org.apache.lucene.util.BytesRef;
import org.apache.lucene.util.BytesRefIterator;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.core.internal.io.Streams;

```

```

import java.io.ByteArrayOutputStream;
import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.security.InvalidKeyException;
import java.security.NoSuchAlgorithmException;
import java.security.Signature;
import java.security.SignatureException;
import java.util.Arrays;
import java.util.Base64;
import java.util.Collections;

/**
 * Responsible for verifying signed licenses
 */
public class LicenseVerifier {

 /**
 * verifies the license content with the signature using the packaged
 * public key
 * @param license to verify
 * @return true if valid, false otherwise
 */
 public static boolean verifyLicense(final License license, byte[] encryptedPublicKeyData) {
 byte[] signedContent = null;
 byte[] signatureHash = null;
 try {
 byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
 ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
 int version = byteBuffer.getInt();
 int magicLen = byteBuffer.getInt();
 byte[] magic = new byte[magicLen];
 byteBuffer.get(magic);
 int hashLen = byteBuffer.getInt();
 signatureHash = new byte[hashLen];
 byteBuffer.get(signatureHash);
 int signedContentLen = byteBuffer.getInt();
 signedContent = new byte[signedContentLen];
 byteBuffer.get(signedContent);
 XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
 license.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
 Signature rsa = Signature.getInstance("SHA512withRSA");
 rsa.initVerify(CryptUtils.readEncryptedPublicKey(encryptedPublicKeyData));
 BytesRefIterator iterator = BytesReference.bytes(contentBuilder).iterator();
 BytesRef ref;
 while((ref = iterator.next()) != null) {

```

```

 rsa.update(ref.bytes, ref.offset, ref.length);
 }
 return rsa.verify(signedContent)
 && Arrays.equals(Base64.getEncoder().encode(encryptedPublicKeyData), signatureHash);
} catch (IOException | NoSuchAlgorithmException | SignatureException | InvalidKeyException e) {
 throw new IllegalStateException(e);
} finally {
 Arrays.fill(encryptedPublicKeyData, (byte) 0);
 if (signedContent != null) {
 Arrays.fill(signedContent, (byte) 0);
 }
 if (signatureHash != null) {
 Arrays.fill(signatureHash, (byte) 0);
 }
}
}
}

```

```

public static boolean verifyLicense(final License license) {
 final byte[] publicKeyBytes;
 try (InputStream is = LicenseVerifier.class.getResourceAsStream("/public.key")) {
 ByteArrayOutputStream out = new ByteArrayOutputStream();
 Streams.copy(is, out);
 publicKeyBytes = out.toByteArray();
 } catch (IOException ex) {
 throw new IllegalStateException(ex);
 }
 return verifyLicense(license, publicKeyBytes);
}
}

```

```

/*

```

```

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*/

```

```

*/

```

```

package org.elasticsearch.license;

```

```

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;

```

```

import java.time.Clock;
import java.util.Collections;

```

```

import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicReference;

public class StartBasicClusterTask extends ClusterStateUpdateTask {

 private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.
To acknowledge the license, " +
 "please read the following messages and call /start_basic again, this time with the \"acknowledge=true\"
parameter:";

 private final Logger logger;
 private final String clusterName;
 private final PostStartBasicRequest request;
 private final ActionListener<PostStartBasicResponse> listener;
 private final Clock clock;
 private AtomicReference<Map<String, String[]>> ackMessages = new
AtomicReference<>(Collections.emptyMap());

 StartBasicClusterTask(Logger logger, String clusterName, Clock clock, PostStartBasicRequest request,
 ActionListener<PostStartBasicResponse> listener) {
 this.logger = logger;
 this.clusterName = clusterName;
 this.request = request;
 this.listener = listener;
 this.clock = clock;
 }

 @Override
 public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
 LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
 logger.debug("license prior to starting basic license: {}", oldLicensesMetaData);
 License oldLicense = LicensesMetaData.extractLicense(oldLicensesMetaData);
 Map<String, String[]> acknowledgeMessages = ackMessages.get();
 if (acknowledgeMessages.isEmpty() == false) {
 listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT, acknowledgeMessages,
 ACKNOWLEDGEMENT_HEADER));
 } else if (oldLicense != null && oldLicense.type().equals("basic")) {
 listener.onResponse(new
PostStartBasicResponse(PostStartBasicResponse.Status.ALREADY_USING_BASIC));
 } else {
 listener.onResponse(new PostStartBasicResponse(PostStartBasicResponse.Status.GENERATED_BASIC));
 }
 }

 @Override
 public ClusterState execute(ClusterState currentState) throws Exception {

```

```

XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
LicensesMetaData licensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);
License currentLicense = LicensesMetaData.extractLicense(licensesMetaData);
if (currentLicense == null || currentLicense.type().equals("basic") == false) {
 long issueDate = clock.millis();
 Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo(clusterName)
 .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
 .issueDate(issueDate)
 .type("basic")
 .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
 License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
 if (request.isAcknowledged() == false && currentLicense != null) {
 Map<String, String[]> ackMessages = LicenseService.getAckMessages(selfGeneratedLicense,
currentLicense);
 if (ackMessages.isEmpty() == false) {
 this.ackMessages.set(ackMessages);
 return currentState;
 }
 }
 Version trialVersion = null;
 if (licensesMetaData != null) {
 trialVersion = licensesMetaData.getMostRecentTrialVersion();
 }
 LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense, trialVersion);
 mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
 return ClusterState.builder(currentState).metaData(mdBuilder).build();
} else {
 return currentState;
}
}
}

```

```
@Override
```

```
public void onFailure(String source, @Nullable Exception e) {
 logger.error(new ParameterizedMessage("unexpected failure during [{ }]", source), e);
 listener.onFailure(e);
}
}

```

```
/*
```

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* or more contributor license agreements. Licensed under the Elastic License;
* you may not use this file except in compliance with the Elastic License.
*/
```

```
package org.elasticsearch.license;
```

```
import org.elasticsearch.common.Strings;
```

```

import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.monitoring.MonitoringField;

import java.util.Collections;
import java.util.LinkedHashMap;
import java.util.List;
import java.util.Map;
import java.util.Objects;
import java.util.concurrent.CopyOnWriteArrayList;
import java.util.function.BiFunction;

/**
 * A holder for the current state of the license for all xpack features.
 */
public class XPackLicenseState {

 /** Messages for each feature which are printed when the license expires. */
 static final Map<String, String[]> EXPIRATION_MESSAGES;
 static {
 Map<String, String[]> messages = new LinkedHashMap<>();
 messages.put(XPackField.SECURITY, new String[] {
 "Cluster health, cluster stats and indices stats operations are blocked",
 "All data operations (read and write) continue to work"
 });
 messages.put(XPackField.WATCHER, new String[] {
 "PUT / GET watch APIs are disabled, DELETE watch API continues to work",
 "Watches execute and write to the history",
 "The actions of the watches don't execute"
 });
 messages.put(XPackField.MONITORING, new String[] {
 "The agent will stop collecting cluster and indices metrics",
 "The agent will stop automatically cleaning indices older than [xpack.monitoring.history.duration]"
 });
 messages.put(XPackField.GRAPH, new String[] {
 "Graph explore APIs are disabled"
 });
 messages.put(XPackField.MACHINE_LEARNING, new String[] {
 "Machine learning APIs are disabled"
 });
 messages.put(XPackField.LOGSTASH, new String[] {
 "Logstash will continue to poll centrally-managed pipelines"
 });
 messages.put(XPackField.DEPRECATATION, new String[] {
 "Deprecation APIs are disabled"
 });
 }
}

```



```

 });
 messages.put(XPackField.UPGRADE, new String[] {
 "Upgrade API is disabled"
 });
 messages.put(XPackField.SQL, new String[] {
 "SQL support is disabled"
 });
 messages.put(XPackField.ROLLUP, new String[] {
 "Creating and Starting rollup jobs will no longer be allowed.",
 "Stopping/Deleting existing jobs, RollupCaps API and RollupSearch continue to function."
 });
 EXPIRATION_MESSAGES = Collections.unmodifiableMap(messages);
}

/**
 * Messages for each feature which are printed when the license type changes.
 * The value is a function taking the old and new license type, and returns the messages for that feature.
 */
static final Map<String, BiFunction<OperationMode, OperationMode, String[]>>
ACKNOWLEDGMENT_MESSAGES;
static {
 Map<String, BiFunction<OperationMode, OperationMode, String[]>> messages = new LinkedHashMap<>();
 messages.put(XPackField.SECURITY, XPackLicenseState::securityAcknowledgementMessages);
 messages.put(XPackField.WATCHER, XPackLicenseState::watcherAcknowledgementMessages);
 messages.put(XPackField.MONITORING, XPackLicenseState::monitoringAcknowledgementMessages);
 messages.put(XPackField.GRAPH, XPackLicenseState::graphAcknowledgementMessages);
 messages.put(XPackField.MACHINE_LEARNING,
XPackLicenseState::machineLearningAcknowledgementMessages);
 messages.put(XPackField.LOGSTASH, XPackLicenseState::logstashAcknowledgementMessages);
 messages.put(XPackField.SQL, XPackLicenseState::sqlAcknowledgementMessages);
 ACKNOWLEDGMENT_MESSAGES = Collections.unmodifiableMap(messages);
}

private static String[] securityAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
 switch (newMode) {
 case BASIC:
 switch (currentMode) {
 case TRIAL:
 case STANDARD:
 case GOLD:
 case PLATINUM:
 return new String[] {
 "The following X-Pack security functionality will be disabled: authentication, authorization, " +
 "ip filtering, and auditing. Please restart your node after applying the license.",
 "Field and document level access control will be disabled.",
 "Custom realms will be ignored."
 };
 }
 }
}

```

```

 }
 break;
case GOLD:
 switch (currentMode) {
 case BASIC:
 case STANDARD:
 // ^^ though technically it was already disabled, it's not bad to remind them
 case TRIAL:
 case PLATINUM:
 return new String[] {
 "Field and document level access control will be disabled.",
 "Custom realms will be ignored."
 };
 }
 }
 break;
case STANDARD:
 switch (currentMode) {
 case BASIC:
 // ^^ though technically it was already disabled, it's not bad to remind them
 case GOLD:
 case PLATINUM:
 case TRIAL:
 return new String[] {
 "Authentication will be limited to the native realms.",
 "IP filtering and auditing will be disabled.",
 "Field and document level access control will be disabled.",
 "Custom realms will be ignored."
 };
 }
 }
 return Strings.EMPTY_ARRAY;
}

private static String[] watcherAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
 switch (newMode) {
 case BASIC:
 switch (currentMode) {
 case TRIAL:
 case STANDARD:
 case GOLD:
 case PLATINUM:
 return new String[] { "Watcher will be disabled" };
 }
 }
 }
 return Strings.EMPTY_ARRAY;
}

```

```

private static String[] monitoringAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
 switch (newMode) {
 case BASIC:
 switch (currentMode) {
 case TRIAL:
 case STANDARD:
 case GOLD:
 case PLATINUM:
 return new String[] {
 LoggerMessageFormat.format(
 "Multi-cluster support is disabled for clusters with [{}] license. If you are\n" +
 "running multiple clusters, users won't be able to access the clusters with\n" +
 "[{}] licenses from within a single X-Pack Kibana instance. You will have to deploy a\n" +
 "separate and dedicated X-pack Kibana instance for each [{}] cluster you wish to monitor.",
 newMode, newMode, newMode),
 LoggerMessageFormat.format(
 "Automatic index cleanup is locked to {} days for clusters with [{}] license.",
 MonitoringField.HISTORY_DURATION.getDefault(Settings.EMPTY).days(), newMode)
 };
 }
 }
 break;
 }
 return Strings.EMPTY_ARRAY;
}

private static String[] graphAcknowledgementMessages(OperationMode currentMode, OperationMode newMode)
{
 switch (newMode) {
 case BASIC:
 case STANDARD:
 case GOLD:
 switch (currentMode) {
 case TRIAL:
 case PLATINUM:
 return new String[] { "Graph will be disabled" };
 }
 }
 break;
 }
 return Strings.EMPTY_ARRAY;
}

private static String[] machineLearningAcknowledgementMessages(OperationMode currentMode,
OperationMode newMode) {
 switch (newMode) {
 case BASIC:
 case STANDARD:

```

```

 case GOLD:
 switch (currentMode) {
 case TRIAL:
 case PLATINUM:
 return new String[] { "Machine learning will be disabled" };
 }
 break;
 }
 return Strings.EMPTY_ARRAY;
}

private static String[] logstashAcknowledgementMessages(OperationMode currentMode, OperationMode
newMode) {
 switch (newMode) {
 case BASIC:
 switch (currentMode) {
 case TRIAL:
 case STANDARD:
 case GOLD:
 case PLATINUM:
 return new String[] { "Logstash will no longer poll for centrally-managed pipelines" };
 }
 break;
 }
 return Strings.EMPTY_ARRAY;
}

private static String[] sqlAcknowledgementMessages(OperationMode currentMode, OperationMode newMode) {
 switch (newMode) {
 case BASIC:
 case STANDARD:
 case GOLD:
 switch (currentMode) {
 case TRIAL:
 case PLATINUM:
 return new String[] { "JDBC support will be disabled, but you can continue to use SQL CLI and
REST endpoint" };
 }
 break;
 }
 return Strings.EMPTY_ARRAY;
}

/** A wrapper for the license mode and state, to allow atomically swapping. */
private static class Status {

 /** The current "mode" of the license (ie license type). */
 final OperationMode mode;

```

```

 /** True if the license is active, or false if it is expired. */
 final boolean active;

 Status(OperationMode mode, boolean active) {
 this.mode = mode;
 this.active = active;
 }
}

private volatile Status status = new Status(OperationMode.TRIAL, true);
private final List<Runnable> listeners = new CopyOnWriteArrayList<>();
private final boolean isSecurityEnabled;
private final boolean isSecurityExplicitlyEnabled;

public XPackLicenseState(Settings settings) {
 this.isSecurityEnabled = XPackSettings.SECURITY_ENABLED.get(settings);
 // 6.0+ requires TLS for production licenses, so if TLS is enabled and security is enabled
 // we can interpret this as an explicit enabling of security if the security enabled
 // setting is not explicitly set
 this.isSecurityExplicitlyEnabled = isSecurityEnabled &&
 (settings.hasValue(XPackSettings.SECURITY_ENABLED.getKey()) ||
XPackSettings.TRANSPORT_SSL_ENABLED.get(settings));
}

/** Updates the current state of the license, which will change what features are available. */
void update(OperationMode mode, boolean active) {
 status = new Status(mode, active);
 listeners.forEach(Runnable::run);
}

/** Add a listener to be notified on license change */
public void addListener(Runnable runnable) {
 listeners.add(Objects.requireNonNull(runnable));
}

/** Remove a listener */
public void removeListener(Runnable runnable) {
 listeners.remove(runnable);
}

/** Return the current license type. */
public OperationMode getOperationMode() {
 return status.mode;
}

/** Return true if the license is currently within its time boundaries, false otherwise. */
public boolean isActive() {

```

```

 return status.active;
 }

/**
 * @return true if authentication and authorization should be enabled. this does not indicate what realms are
available
 * @see #allowedRealmType() for the enabled realms
 */
public boolean isAuthAllowed() {
 OperationMode mode = status.mode;
 return mode == OperationMode.STANDARD || mode == OperationMode.GOLD || mode ==
OperationMode.PLATINUM
 || mode == OperationMode.TRIAL;
}

/**
 * @return true if IP filtering should be enabled
 */
public boolean isIpFilteringAllowed() {
 OperationMode mode = status.mode;
 return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
 || mode == OperationMode.TRIAL;
}

/**
 * @return true if auditing should be enabled
 */
public boolean isAuditingAllowed() {
 OperationMode mode = status.mode;
 return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM
 || mode == OperationMode.TRIAL;
}

/**
 * Indicates whether the stats and health API calls should be allowed. If a license is expired and past the grace
 * period then we deny these calls.
 *
 * @return true if the license allows for the stats and health APIs to be used.
 */
public boolean isStatsAndHealthAllowed() {
 return status.active;
}

/**
 * Determine if Document Level Security (DLS) and Field Level Security (FLS) should be enabled.
 * <p>
 * DLS and FLS are only disabled when the mode is not:
 *

```

```

* {@link OperationMode#PLATINUM}
* {@link OperationMode#TRIAL}
*
* Note: This does not consider the state of the license so that Security does not suddenly leak
information!
*
* @return {@code true} to enable DLS and FLS. Otherwise {@code false}.
*/
public boolean isDocumentAndFieldLevelSecurityAllowed() {
 OperationMode mode = status.mode;
 return mode == OperationMode.TRIAL || mode == OperationMode.PLATINUM;
}

/** Classes of realms that may be available based on the license type. */
public enum AllowedRealmType {
 NONE,
 NATIVE,
 DEFAULT,
 ALL
}

/**
 * @return the type of realms that are enabled based on the license {@link OperationMode}
 */
public AllowedRealmType allowedRealmType() {
 switch (status.mode) {
 case PLATINUM:
 case TRIAL:
 return AllowedRealmType.ALL;
 case GOLD:
 return AllowedRealmType.DEFAULT;
 case STANDARD:
 return AllowedRealmType.NATIVE;
 default:
 return AllowedRealmType.NONE;
 }
}

/**
 * @return whether custom role providers are allowed based on the license {@link OperationMode}
 */
public boolean isCustomRoleProvidersAllowed() {
 final Status localStatus = status;
 return (localStatus.mode == OperationMode.PLATINUM || localStatus.mode == OperationMode.TRIAL)
 && localStatus.active;
}

/**

```

```

* Determine if Watcher is available based on the current license.
* <p>
* Watcher is available if the license is active (hasn't expired) and of one of the following types:
*
* { @link OperationMode#STANDARD}
* { @link OperationMode#PLATINUM}
* { @link OperationMode#GOLD}
* { @link OperationMode#TRIAL}
*
*
* @return { @code true } as long as the license is valid. Otherwise { @code false }.
*/
public boolean isWatcherAllowed() {
 // status is volatile, so a local variable is used for a consistent view
 Status localStatus = status;

 if (localStatus.active == false) {
 return false;
 }

 switch (localStatus.mode) {
 case TRIAL:
 case GOLD:
 case PLATINUM:
 case STANDARD:
 return true;
 default:
 return false;
 }
}

/**
* Monitoring is always available as long as there is a valid license
*
* @return true if the license is active
*/
public boolean isMonitoringAllowed() {
 return status.active;
}

/**
* Monitoring Cluster Alerts requires the equivalent license to use Watcher.
*
* @return { @link #isWatcherAllowed() }
* @see #isWatcherAllowed()
*/
public boolean isMonitoringClusterAlertsAllowed() {
 return isWatcherAllowed();
}

```



```

}

/**
 * Determine if the current license allows the retention of indices to be modified.
 * <p>
 * Only users with a non-{@link OperationMode#BASIC} license can update the retention period.
 * <p>
 * Note: This does not consider the state of the license so that any change is remembered for when
they fix their license.
 *
 * @return {@code true} if the user is allowed to modify the retention. Otherwise {@code false}.
 */
public boolean isUpdateRetentionAllowed() {
 final OperationMode mode = status.mode;
 return mode != OperationMode.BASIC && mode != OperationMode.MISSING;
}

/**
 * Determine if Graph Exploration should be enabled.
 * <p>
 * Exploration is only disabled when the license has expired or if the mode is not:
 *
 * {@link OperationMode#PLATINUM}
 * {@link OperationMode#TRIAL}
 *
 *
 * @return {@code true} as long as the license is valid. Otherwise {@code false}.
 */
public boolean isGraphAllowed() {
 // status is volatile
 Status localStatus = status;
 OperationMode operationMode = localStatus.mode;

 boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

 return licensed && localStatus.active;
}

/**
 * Determine if Machine Learning should be enabled.
 * <p>
 * Machine Learning is only disabled when the license has expired or if the
 * mode is not:
 *
 * {@link OperationMode#PLATINUM}
 * {@link OperationMode#TRIAL}
 *

```

```

*
* @return {@code true} as long as the license is valid. Otherwise
* {@code false}.
*/
public boolean isMachineLearningAllowed() {
 // status is volatile
 Status localStatus = status;
 OperationMode operationMode = localStatus.mode;

 boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

 return licensed && localStatus.active;
}

/**
 * Rollup is always available as long as there is a valid license
 *
 * @return true if the license is active
 */
public boolean isRollupAllowed() {
 return status.active;
}

/**
 * Logstash is allowed as long as there is an active license of type TRIAL, STANDARD, GOLD or PLATINUM
 * @return {@code true} as long as there is a valid license
 */
public boolean isLogstashAllowed() {
 Status localStatus = status;

 if (localStatus.active == false) {
 return false;
 }

 switch (localStatus.mode) {
 case TRIAL:
 case GOLD:
 case PLATINUM:
 case STANDARD:
 return true;
 default:
 return false;
 }
}

/**
 * Deprecation APIs are always allowed as long as there is an active license

```

```

* @return {@code true} as long as there is a valid license
*/
public boolean isDeprecationAllowed() {
 return status.active;
}

/**
 * Determine if Upgrade API should be enabled.
 * <p>
 * Upgrade API is not available in for all license types except {@link OperationMode#MISSING}
 *
 * @return {@code true} as long as the license is valid. Otherwise
 * {@code false}.
 */
public boolean isUpgradeAllowed() {
 // status is volatile
 Status localStatus = status;
 // Should work on all active licenses
 return localStatus.active;
}

/**
 * Determine if SQL support should be enabled.
 * <p>
 * SQL is available for all license types except {@link OperationMode#MISSING}
 */
public boolean isSqlAllowed() {
 return status.active;
}

/**
 * Determine if JDBC support should be enabled.
 * <p>
 * JDBC is available only in for {@link OperationMode#PLATINUM} and {@link OperationMode#TRIAL}
licences
 */
public boolean isJdbcAllowed() {
 // status is volatile
 Status localStatus = status;
 OperationMode operationMode = localStatus.mode;

 boolean licensed = operationMode == OperationMode.TRIAL || operationMode ==
OperationMode.PLATINUM;

 return licensed && localStatus.active;
}

public boolean isTrialLicense() {

```

```

 return status.mode == OperationMode.TRIAL;
 }

 public boolean isSecurityAvailable() {
 OperationMode mode = status.mode;
 return mode == OperationMode.GOLD || mode == OperationMode.PLATINUM || mode ==
OperationMode.STANDARD ||
 mode == OperationMode.TRIAL;
 }

 public boolean isSecurityEnabled() {
 final OperationMode mode = status.mode;
 return mode == OperationMode.TRIAL ? isSecurityExplicitlyEnabled : isSecurityEnabled;
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class DeleteLicenseResponse extends AcknowledgedResponse {

 DeleteLicenseResponse() {
 }

 DeleteLicenseResponse(boolean acknowledged) {
 super(acknowledged);
 }

 @Override
 public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 readAcknowledged(in);
 }

 @Override
 public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
 writeAcknowledged(out);
 }
}

```

```

}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.Strings;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

public class PutLicenseResponse extends AcknowledgedResponse {

 private LicensesStatus status;
 private Map<String, String[]> acknowledgeMessages;
 private String acknowledgeHeader;

 PutLicenseResponse() {
 }

 public PutLicenseResponse(boolean acknowledged, LicensesStatus status) {
 this(acknowledged, status, null, Collections.<String, String[]>emptyMap());
 }

 public PutLicenseResponse(boolean acknowledged, LicensesStatus status, String acknowledgeHeader,
 Map<String, String[]> acknowledgeMessages) {
 super(acknowledged);
 this.status = status;
 this.acknowledgeHeader = acknowledgeHeader;
 this.acknowledgeMessages = acknowledgeMessages;
 }

 public LicensesStatus status() {
 return status;
 }

 public Map<String, String[]> acknowledgeMessages() {
 return acknowledgeMessages;
 }
}

```

```

public String acknowledgeHeader() {
 return acknowledgeHeader;
}

```

@Override

```

public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 readAcknowledged(in);
 status = LicensesStatus.fromId(in.readVInt());
 acknowledgeHeader = in.readOptionalString();
 int size = in.readVInt();
 Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
 for (int i = 0; i < size; i++) {
 String feature = in.readString();
 int nMessages = in.readVInt();
 String[] messages = new String[nMessages];
 for (int j = 0; j < nMessages; j++) {
 messages[j] = in.readString();
 }
 acknowledgeMessages.put(feature, messages);
 }
 this.acknowledgeMessages = acknowledgeMessages;
}

```

@Override

```

public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
 writeAcknowledged(out);
 out.writeVInt(status.id());
 out.writeOptionalString(acknowledgeHeader);
 out.writeVInt(acknowledgeMessages.size());
 for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
 out.writeString(entry.getKey());
 out.writeVInt(entry.getValue().length);
 for (String message : entry.getValue()) {
 out.writeString(message);
 }
 }
}

```

@Override

```

protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
 switch (status) {
 case VALID:
 builder.field("license_status", "valid");
 break;
 case INVALID:

```

```

 builder.field("license_status", "invalid");
 break;
 case EXPIRED:
 builder.field("license_status", "expired");
 break;
 default:
 throw new IllegalArgumentException("unknown status [" + status + "] found");
 }
 if (!acknowledgeMessages.isEmpty()) {
 builder.startObject("acknowledge");
 builder.field("message", acknowledgeHeader);
 for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
 builder.startArray(entry.getKey());
 for (String message : entry.getValue()) {
 builder.value(message);
 }
 builder.endArray();
 }
 builder.endObject();
 }
}

@Override
public String toString() {
 return Strings.toString(this, true, true);
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartTrialRequestBuilder extends ActionRequestBuilder<PostStartTrialRequest,
 PostStartTrialResponse, PostStartTrialRequestBuilder> {

 PostStartTrialRequestBuilder(ElasticsearchClient client, PostStartTrialAction action) {
 super(client, action, new PostStartTrialRequest());
 }

 public PostStartTrialRequestBuilder setAcknowledge(boolean acknowledge) {
 request.acknowledge(acknowledge);
 return this;
 }
}

```

```

}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportDeleteLicenseAction extends TransportMasterNodeAction<DeleteLicenseRequest,
DeleteLicenseResponse> {

 private final LicenseService licenseService;

 @Inject
 public TransportDeleteLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
 LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
 IndexNameExpressionResolver indexNameExpressionResolver) {
 super(settings, DeleteLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
 indexNameExpressionResolver, DeleteLicenseRequest::new);
 this.licenseService = licenseService;
 }

 @Override
 protected String executor() {
 return ThreadPool.Names.MANAGEMENT;
 }

 @Override
 protected DeleteLicenseResponse newResponse() {
 return new DeleteLicenseResponse();
 }
}

```



```

@Override
protected ClusterBlockException checkBlock(DeleteLicenseRequest request, ClusterState state) {
 return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

@Override
protected void masterOperation(final DeleteLicenseRequest request, ClusterState state, final
ActionListener<DeleteLicenseResponse>
 listener) throws ElasticsearchException {
 licenseService.removeLicense(request, new ActionListener<ClusterStateUpdateResponse>() {
 @Override
 public void onResponse(ClusterStateUpdateResponse clusterStateUpdateResponse) {
 listener.onResponse(new DeleteLicenseResponse(clusterStateUpdateResponse.isAcknowledged()));
 }

 @Override
 public void onFailure(Exception e) {
 listener.onFailure(e);
 }
 });
}
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.apache.lucene.util.BytesRef;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.watcher.FileChangesListener;
import org.elasticsearch.watcher.FileWatcher;
import org.elasticsearch.watcher.ResourceWatcherService;

import java.io.IOException;
import java.nio.charset.StandardCharsets;
import java.nio.file.Files;
import java.nio.file.Path;
import java.util.concurrent.atomic.AtomicBoolean;

/**
 * File based watcher for license { @link OperationMode }

```

```

* Watches for changes in <code>licenseModePath</code>, use
* {@link #getCurrentOperationMode()} to access the latest mode
*
* In case of failure to read a valid operation mode from <code>licenseModePath</code>,
* the operation mode will default to PLATINUM
*/
public final class OperationModeFileWatcher implements FileChangeListener {
 private final ResourceWatcherService resourceWatcherService;
 private final Path licenseModePath;
 private final AtomicBoolean initialized = new AtomicBoolean();
 private final OperationMode defaultOperationMode = OperationMode.PLATINUM;
 private volatile OperationMode currentOperationMode = defaultOperationMode;
 private final Logger logger;
 private final Runnable onChange;

 public OperationModeFileWatcher(ResourceWatcherService resourceWatcherService, Path licenseModePath,
 Logger logger, Runnable onChange) {
 this.resourceWatcherService = resourceWatcherService;
 this.licenseModePath = licenseModePath;
 this.logger = logger;
 this.onChange = onChange;
 }

 public void init() {
 if (initialized.compareAndSet(false, true)) {
 final FileWatcher watcher = new FileWatcher(licenseModePath);
 watcher.addListener(this);
 try {
 resourceWatcherService.add(watcher, ResourceWatcherService.Frequency.HIGH);
 if (Files.exists(licenseModePath)) {
 onChange(licenseModePath);
 }
 } catch (IOException e) {
 logger.error("couldn't initialize watching license mode file", e);
 }
 }
 }

 /**
 * Returns the current operation mode based on license mode file.
 * Defaults to {@link OperationMode#PLATINUM}
 */
 public OperationMode getCurrentOperationMode() {
 return currentOperationMode;
 }

 @Override
 public void onFileInit(Path file) {

```

```

 onChange(file);
}

@Override
public void onFileCreated(Path file) {
 onChange(file);
}

@Override
public void onFileDeleted(Path file) {
 onChange(file);
}

@Override
public void onFileChanged(Path file) {
 onChange(file);
}

private synchronized void onChange(Path file) {
 if (file.equals(licenseModePath)) {
 OperationMode newOperationMode = defaultOperationMode;
 try {
 if (Files.exists(licenseModePath)
 && Files.isReadable(licenseModePath)) {
 final byte[] content;
 try {
 content = Files.readAllBytes(licenseModePath);
 } catch (IOException e) {
 logger.error(
 (Supplier<?>) () -> new ParameterizedMessage(
 "couldn't read operation mode from [{}]", licenseModePath.toAbsolutePath()), e);
 return;
 }
 // this UTF-8 conversion is much pickier than java String
 final String operationMode = new BytesRef(content).utf8ToString();
 try {
 newOperationMode = OperationMode.resolve(operationMode);
 } catch (IllegalArgumentException e) {
 logger.error(
 (Supplier<?>) () -> new ParameterizedMessage(
 "invalid operation mode in [{}]", licenseModePath.toAbsolutePath()), e);
 return;
 }
 }
 } finally {
 // set this after the fact to prevent that we are jumping back and forth first setting to default and then
 // reading the
 // actual op mode resetting it.

```

```

 this.currentOperationMode = newOperationMode;
 }
 onChange.run();
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetTrialStatusRequestBuilder extends ActionRequestBuilder<GetTrialStatusRequest,
 GetTrialStatusResponse, GetTrialStatusRequestBuilder> {

 GetTrialStatusRequestBuilder(ElasticsearchClient client, GetTrialStatusAction action) {
 super(client, action, new GetTrialStatusRequest());
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.ValidateActions;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentType;

import java.io.IOException;

public class PutLicenseRequest extends AcknowledgedRequest<PutLicenseRequest> {

 private License license;
 private boolean acknowledge = false;

 public PutLicenseRequest() {
}

```

```

@Override
public ActionRequestValidationException validate() {
 return (license == null) ? ValidateActions.addValidationError("license is missing", null) : null;
}

/**
 * Parses license from json format to an instance of { @link License }
 *
 * @param licenseDefinition licenses definition
 * @param xContentType the content type of the license
 */
public PutLicenseRequest license(BytesReference licenseDefinition, XContentType xContentType) {
 try {
 return license(License.fromSource(licenseDefinition, xContentType));
 } catch (IOException e) {
 throw new IllegalArgumentException("failed to parse license source", e);
 }
}

public PutLicenseRequest license(License license) {
 this.license = license;
 return this;
}

public License license() {
 return license;
}

public PutLicenseRequest acknowledge(boolean acknowledge) {
 this.acknowledge = acknowledge;
 return this;
}

public boolean acknowledged() {
 return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 license = License.readLicense(in);
 acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
}

```

```

 license.writeTo(out);
 out.writeBoolean(acknowledge);
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

import java.io.IOException;
import java.nio.ByteBuffer;
import java.util.Base64;
import java.util.Collections;

import static org.elasticsearch.license.CryptUtils.decrypt;
import static org.elasticsearch.license.CryptUtils.encrypt;

class SelfGeneratedLicense {

 public static License create(License.Builder specBuilder) {
 License spec = specBuilder
 .issuer("elasticsearch")
 .version(License.VERSION_CURRENT)
 .build();
 final String signature;
 try {
 XContentBuilder contentBuilder = XContentFactory.contentBuilder(XContentType.JSON);
 spec.toXContent(contentBuilder, new
ToXContent.MapParams(Collections.singletonMap(License.LICENSE_SPEC_VIEW_MODE, "true")));
 byte[] encrypt = encrypt(BytesReference.toBytes(BytesReference.bytes(contentBuilder)));
 byte[] bytes = new byte[4 + 4 + encrypt.length];
 ByteBuffer byteBuffer = ByteBuffer.wrap(bytes);
 // always generate license version -VERSION_CURRENT
 byteBuffer.putInt(-License.VERSION_CURRENT)
 .putInt(encrypt.length)
 .put(encrypt);
 signature = Base64.getEncoder().encodeToString(bytes);

```

```

 } catch (IOException e) {
 throw new IllegalStateException(e);
 }
 return License.builder().fromLicenseSpec(spec, signature).build();
}

public static boolean verify(final License license) {
 try {
 byte[] signatureBytes = Base64.getDecoder().decode(license.signature());
 ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
 int version = byteBuffer.getInt();
 int contentLen = byteBuffer.getInt();
 byte[] content = new byte[contentLen];
 byteBuffer.get(content);
 final License expectedLicense;
 // EMPTY is safe here because we don't call namedObject
 try (XContentParser parser = XContentFactory.xContent(XContentType.JSON)
 .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE,
decrypt(content))) {
 parser.nextToken();
 expectedLicense = License.builder().fromLicenseSpec(License.fromXContent(parser),
 license.signature().version(-version).build());
 }
 return license.equals(expectedLicense);
 } catch (IOException e) {
 throw new IllegalStateException(e);
 }
}

public static boolean validSelfGeneratedType(String type) {
 return "basic".equals(type) || "trial".equals(type);
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;

```

```

import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.Map;

import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartTrialLicense extends XPackRestHandler {

 RestPostStartTrialLicense(Settings settings, RestController controller) {
 super(settings);
 controller.registerHandler(POST, URI_BASE + "/license/start_trial", this);
 }

 @Override
 protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
 {
 PostStartTrialRequest startTrialRequest = new PostStartTrialRequest();
 startTrialRequest.setType(request.param("type", "trial"));
 startTrialRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
 return channel -> client.licensing().postStartTrial(startTrialRequest,
 new RestBuilderListener<PostStartTrialResponse>(channel) {
 @Override
 public RestResponse buildResponse(PostStartTrialResponse response, XContentBuilder builder) throws
 Exception {
 PostStartTrialResponse.Status status = response.getStatus();
 builder.startObject();
 builder.field("acknowledged", startTrialRequest.isAcknowledged());
 if (status.isTrialStarted()) {
 builder.field("trial_was_started", true);
 builder.field("type", startTrialRequest.getType());
 } else {
 builder.field("trial_was_started", false);
 builder.field("error_message", status.getErrorMessage());
 }

 Map<String, String[]> acknowledgementMessages = response.getAcknowledgementMessages();
 if (acknowledgementMessages.isEmpty() == false) {
 builder.startObject("acknowledge");
 builder.field("message", response.getAcknowledgementMessage());
 for (Map.Entry<String, String[]> entry : acknowledgementMessages.entrySet()) {
 builder.startArray(entry.getKey());
 for (String message : entry.getValue()) {
 builder.value(message);
 }
 builder.endArray();
 }
 builder.endObject();
 }
 }
 }
);
 }
}

```



```

 }
 builder.endObject();
 return new BytesRestResponse(status.getRestStatus(), builder);
 }
});
}

@Override
public String getName() {
 return "xpack_upgrade_to_trial_action";
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetLicenseAction extends TransportMasterNodeReadAction<GetLicenseRequest,
GetLicenseResponse> {

 private final LicenseService licenseService;

 @Inject
 public TransportGetLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
 LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
 IndexNameExpressionResolver indexNameExpressionResolver) {
 super(settings, GetLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver,
 GetLicenseRequest::new);
 this.licenseService = licenseService;
 }
}

```

```

@Override
protected String executor() {
 return ThreadPool.Names.MANAGEMENT;
}

@Override
protected GetLicenseResponse newResponse() {
 return new GetLicenseResponse();
}

@Override
protected ClusterBlockException checkBlock(GetLicenseRequest request, ClusterState state) {
 return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
}

@Override
protected void masterOperation(final GetLicenseRequest request, ClusterState state,
 final ActionListener<GetLicenseResponse> listener) throws ElasticsearchException {
 listener.onResponse(new GetLicenseResponse(licenseService.getLicense()));
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.POST;

public class RestPostStartBasicLicense extends XPackRestHandler {

 RestPostStartBasicLicense(Settings settings, RestController controller) {
 super(settings);
 }

```

```

 controller.registerHandler(POST, URI_BASE + "/license/start_basic", this);
 }

 @Override
 protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
 {
 PostStartBasicRequest startBasicRequest = new PostStartBasicRequest();
 startBasicRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
 startBasicRequest.timeout(request.paramAsTime("timeout", startBasicRequest.timeout()));
 startBasicRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
startBasicRequest.masterNodeTimeout()));
 return channel -> client.licensing().postStartBasic(startBasicRequest, new
RestBuilderListener<PostStartBasicResponse>(channel) {
 @Override
 public RestResponse buildResponse(PostStartBasicResponse response, XContentBuilder builder) throws
Exception {
 PostStartBasicResponse.Status status = response.getStatus();
 response.toXContent(builder, ToXContent.EMPTY_PARAMS);
 return new BytesRestResponse(status.getRestStatus(), builder);
 }
 });
 }

 @Override
 public String getName() {
 return "xpack_start_basic_action";
 }
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import java.io.IOException;
import java.io.InputStream;
import java.nio.ByteBuffer;
import java.util.ArrayList;
import java.util.Base64;
import java.util.Comparator;
import java.util.List;
import java.util.Locale;

import org.apache.lucene.util.CollectionUtil;
import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.Strings;

```

```

import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.LoggingDeprecationHandler;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.common.xcontent.XContentFactory;
import org.elasticsearch.common.xcontent.XContentParser;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Data structure for license. Use { @link Builder} to build a license.
 * Provides serialization/deserialization & validation methods for license object
 */
public class License implements ToXContentObject {
 public static final int VERSION_START = 1;
 public static final int VERSION_NO_FEATURE_TYPE = 2;
 public static final int VERSION_START_DATE = 3;
 public static final int VERSION_CURRENT = VERSION_START_DATE;

 /**
 * XContent param name to deserialize license(s) with
 * an additional <code>status</code> field, indicating whether a
 * particular license is 'active' or 'expired' and no signature
 * and in a human readable format
 */
 public static final String REST_VIEW_MODE = "rest_view";
 /**
 * XContent param name to deserialize license(s) with
 * no signature
 */
 public static final String LICENSE_SPEC_VIEW_MODE = "license_spec_view";
 /**
 * XContent param name to deserialize licenses according
 * to a specific license version
 */
 public static final String LICENSE_VERSION_MODE = "license_version";

 public static final Comparator<License> LATEST_ISSUE_DATE_FIRST =
 Comparator.comparing(License::issueDate).reversed();

 private final int version;
 private final String uid;
 private final String issuer;
 private final String issuedTo;
 private final long issueDate;

```

```

private final String type;
private final String subscriptionType;
private final String feature;
private final String signature;
private final long expiryDate;
private final long startDate;
private final int maxNodes;
private final OperationMode operationMode;

/**
 * Decouples operation mode of a license from the license type value.
 * <p>
 * Note: The mode indicates features that should be made available, but it does not indicate whether the license is
active!
 *
 * The id byte is used for ordering operation modes (used for merging license md in tribe node)
 */
public enum OperationMode {
 MISSING((byte) 0),
 TRIAL((byte) 1),
 BASIC((byte) 2),
 STANDARD((byte) 3),
 GOLD((byte) 4),
 PLATINUM((byte) 5);

 private final byte id;

 OperationMode(byte id) {
 this.id = id;
 }

 /** Returns non-zero positive number when <code>opMode1</code> is greater than <code>opMode2</code>
 */
 public static int compare(OperationMode opMode1, OperationMode opMode2) {
 return Integer.compare(opMode1.id, opMode2.id);
 }

 public static OperationMode resolve(String type) {
 switch (type.toLowerCase(Locale.ROOT)) {
 case "missing":
 return MISSING;
 case "trial":
 case "none": // bwc for 1.x subscription_type field
 case "dev": // bwc for 1.x subscription_type field
 case "development": // bwc for 1.x subscription_type field
 return TRIAL;
 case "basic":
 return BASIC;
 }
 }
}

```

```

 case "standard":
 return STANDARD;
 case "silver":
 case "gold":
 return GOLD;
 case "platinum":
 case "cloud_internal":
 case "internal": // bwc for 1.x subscription_type field
 return PLATINUM;
 default:
 throw new IllegalArgumentException("unknown type [" + type + "]");
 }
}
}

private License(int version, String uid, String issuer, String issuedTo, long issueDate, String type,
 String subscriptionType, String feature, String signature, long expiryDate, int maxNodes, long startDate)
{
 this.version = version;
 this.uid = uid;
 this.issuer = issuer;
 this.issuedTo = issuedTo;
 this.issueDate = issueDate;
 this.type = type;
 this.subscriptionType = subscriptionType;
 this.feature = feature;
 this.signature = signature;
 // We will validate that only a basic license can have the
 BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
 // in the validate() method.
 if (expiryDate == -1) {
 this.expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
 } else {
 this.expiryDate = expiryDate;
 }
 this.maxNodes = maxNodes;
 this.startDate = startDate;
 if (version == VERSION_START) {
 // in 1.x: the acceptable values for 'subscription_type': none | dev | silver | gold | platinum
 this.operationMode = OperationMode.resolve(subscriptionType);
 } else {
 // in 2.x: the acceptable values for 'type': trial | basic | silver | dev | gold | platinum
 this.operationMode = OperationMode.resolve(type);
 }
 validate();
}

/**

```

```

* @return version of the license
*/
public int version() {
 return version;
}

/**
* @return a unique identifier for a license
*/
public String uid() {
 return uid;
}

/**
* @return type of the license [trial, subscription, internal]
*/
public String type() {
 return type;
}

/**
* @return the issueDate in milliseconds
*/
public long issueDate() {
 return issueDate;
}

/**
* @return the startDate in milliseconds
*/
public long startDate() {
 return startDate;
}

/**
* @return the expiry date in milliseconds
*/
public long expiryDate() {
 return expiryDate;
}

/**
* @return the maximum number of nodes this license has been issued for
*/
public int maxNodes() {
 return maxNodes;
}

```

```

/**
 * @return a string representing the entity this licenses has been issued to
 */
public String issuedTo() {
 return issuedTo;
}

/**
 * @return a string representing the entity responsible for issuing this license (internal)
 */
public String issuer() {
 return issuer;
}

/**
 * @return a string representing the signature of the license used for license verification
 */
public String signature() {
 return signature;
}

/**
 * @return the operation mode of the license as computed from the license type or from
 * the license mode file
 */
public OperationMode operationMode() {
 synchronized (this) {
 if (canReadOperationModeFromFile() && operationModeFileWatcher != null) {
 return operationModeFileWatcher.getCurrentOperationMode();
 }
 }
 return operationMode;
}

private boolean canReadOperationModeFromFile() {
 return type.equals("cloud_internal");
}

private volatile OperationModeFileWatcher operationModeFileWatcher;

/**
 * Sets the operation mode file watcher for the license and initializes the
 * file watcher when the license type allows to override operation mode from file
 */
public synchronized void setOperationModeFileWatcher(final OperationModeFileWatcher
operationModeFileWatcher) {
 this.operationModeFileWatcher = operationModeFileWatcher;
 if (canReadOperationModeFromFile()) {

```



```

 this.operationModeFileWatcher.init();
 }
}

/**
 * Removes operation mode file watcher, so unused license objects can be gc'ed
 */
public synchronized void removeOperationModeFileWatcher() {
 this.operationModeFileWatcher = null;
}

/**
 * @return the current license's status
 */
public Status status() {
 long now = System.currentTimeMillis();
 if (issueDate > now) {
 return Status.INVALID;
 } else if (expiryDate < now) {
 return Status.EXPIRED;
 }
 return Status.ACTIVE;
}

private void validate() {
 if (issuer == null) {
 throw new IllegalStateException("issuer can not be null");
 } else if (issuedTo == null) {
 throw new IllegalStateException("issuedTo can not be null");
 } else if (issueDate == -1) {
 throw new IllegalStateException("issueDate has to be set");
 } else if (type == null) {
 throw new IllegalStateException("type can not be null");
 } else if (subscriptionType == null && version == VERSION_START) {
 throw new IllegalStateException("subscriptionType can not be null");
 } else if (uid == null) {
 throw new IllegalStateException("uid can not be null");
 } else if (feature == null && version == VERSION_START) {
 throw new IllegalStateException("feature can not be null");
 } else if (maxNodes == -1) {
 throw new IllegalStateException("maxNodes has to be set");
 } else if (expiryDate == -1) {
 throw new IllegalStateException("expiryDate has to be set");
 } else if (expiryDate == LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS
&& "basic".equals(type) == false) {
 throw new IllegalStateException("only basic licenses are allowed to have no expiration");
 }
}
}

```

```

public static License readLicense(StreamInput in) throws IOException {
 int version = in.readVInt(); // Version for future extensibility
 if (version > VERSION_CURRENT) {
 throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
elasticsearch-license" +
 " plugin");
 }
 Builder builder = builder();
 builder.version(version);
 builder.uid(in.readString());
 builder.type(in.readString());
 if (version == VERSION_START) {
 builder.subscriptionType(in.readString());
 }
 builder.issueDate(in.readLong());
 if (version == VERSION_START) {
 builder.feature(in.readString());
 }
 builder.expiryDate(in.readLong());
 builder.maxNodes(in.readInt());
 builder.issuedTo(in.readString());
 builder.issuer(in.readString());
 builder.signature(in.readOptionalString());
 if (version >= VERSION_START_DATE) {
 builder.startDate(in.readLong());
 }
 return builder.build();
}

```

```

public void writeTo(StreamOutput out) throws IOException {
 out.writeVInt(version);
 out.writeString(uid);
 out.writeString(type);
 if (version == VERSION_START) {
 out.writeString(subscriptionType);
 }
 out.writeLong(issueDate);
 if (version == VERSION_START) {
 out.writeString(feature);
 }
 out.writeLong(expiryDate);
 out.writeInt(maxNodes);
 out.writeString(issuedTo);
 out.writeString(issuer);
 out.writeOptionalString(signature);
 if (version >= VERSION_START_DATE) {
 out.writeLong(startDate);
 }
}

```

```

 }
}

@Override
public String toString() {
 try {
 final XContentBuilder builder = XContentFactory.jsonBuilder();
 toXContent(builder, ToXContent.EMPTY_PARAMS);
 return Strings.toString(builder);
 } catch (IOException e) {
 return "";
 }
}

@Override
public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
 builder.startObject();
 toInnerXContent(builder, params);
 builder.endObject();
 return builder;
}

public XContentBuilder toInnerXContent(XContentBuilder builder, Params params) throws IOException {
 boolean licenseSpecMode = params.paramAsBoolean(LICENSE_SPEC_VIEW_MODE, false);
 boolean restViewMode = params.paramAsBoolean(REST_VIEW_MODE, false);
 boolean previouslyHumanReadable = builder.humanReadable();
 if (licenseSpecMode && restViewMode) {
 throw new IllegalArgumentException("can have either " + REST_VIEW_MODE + " or " +
LICENSE_SPEC_VIEW_MODE);
 } else if (restViewMode) {
 if (!previouslyHumanReadable) {
 builder.humanReadable(true);
 }
 }
 final int version;
 if (params.param(LICENSE_VERSION_MODE) != null && restViewMode) {
 version = Integer.parseInt(params.param(LICENSE_VERSION_MODE));
 } else {
 version = this.version;
 }
 if (restViewMode) {
 builder.field(Fields.STATUS, status().label());
 }
 builder.field(Fields.UID, uid);
 builder.field(Fields.TYPE, type);
 if (version == VERSION_START) {
 builder.field(Fields.SUBSCRIPTION_TYPE, subscriptionType);
 }
}

```

```

builder.timeField(Fields.ISSUE_DATE_IN_MILLIS, Fields.ISSUE_DATE, issueDate);
if (version == VERSION_START) {
 builder.field(Fields.FEATURE, feature);
}

if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
 builder.timeField(Fields.EXPIRY_DATE_IN_MILLIS, Fields.EXPIRY_DATE, expiryDate);
}
builder.field(Fields.MAX_NODES, maxNodes);
builder.field(Fields.ISSUED_TO, issuedTo);
builder.field(Fields.ISSUER, issuer);
if (!licenseSpecMode && !restViewMode && signature != null) {
 builder.field(Fields.SIGNATURE, signature);
}
if (restViewMode) {
 builder.humanReadable(previouslyHumanReadable);
}
if (version >= VERSION_START_DATE) {
 builder.timeField(Fields.START_DATE_IN_MILLIS, Fields.START_DATE, startDate);
}
return builder;
}

public static License fromXContent(XContentParser parser) throws IOException {
 Builder builder = new Builder();
 XContentParser.Token token;
 while ((token = parser.nextToken()) != XContentParser.Token.END_OBJECT) {
 if (token == XContentParser.Token.FIELD_NAME) {
 String currentFieldName = parser.currentName();
 token = parser.nextToken();
 if (token.isValue()) {
 if (Fields.UID.equals(currentFieldName)) {
 builder.uid(parser.text());
 } else if (Fields.TYPE.equals(currentFieldName)) {
 builder.type(parser.text());
 } else if (Fields.SUBSCRIPTION_TYPE.equals(currentFieldName)) {
 builder.subscriptionType(parser.text());
 } else if (Fields.ISSUE_DATE.equals(currentFieldName)) {
 builder.issueDate(parseDate(parser, "issue", false));
 } else if (Fields.ISSUE_DATE_IN_MILLIS.equals(currentFieldName)) {
 builder.issueDate(parser.longValue());
 } else if (Fields.FEATURE.equals(currentFieldName)) {
 builder.feature(parser.text());
 } else if (Fields.EXPIRY_DATE.equals(currentFieldName)) {
 builder.expiryDate(parseDate(parser, "expiration", true));
 } else if (Fields.EXPIRY_DATE_IN_MILLIS.equals(currentFieldName)) {
 builder.expiryDate(parser.longValue());
 } else if (Fields.START_DATE.equals(currentFieldName)) {

```

```

 builder.startDate(parseDate(parser, "start", false));
 } else if (Fields.START_DATE_IN_MILLIS.equals(currentFieldName)) {
 builder.startDate(parser.longValue());
 } else if (Fields.MAX_NODES.equals(currentFieldName)) {
 builder.maxNodes(parser.intValue());
 } else if (Fields.ISSUED_TO.equals(currentFieldName)) {
 builder.issuedTo(parser.text());
 } else if (Fields.ISSUER.equals(currentFieldName)) {
 builder.issuer(parser.text());
 } else if (Fields.SIGNATURE.equals(currentFieldName)) {
 builder.signature(parser.text());
 } else if (Fields.VERSION.equals(currentFieldName)) {
 builder.version(parser.intValue());
 }
 // Ignore unknown elements - might be new version of license
} else if (token == XContentParser.Token.START_ARRAY) {
 // It was probably created by newer version - ignoring
 parser.skipChildren();
} else if (token == XContentParser.Token.START_OBJECT) {
 // It was probably created by newer version - ignoring
 parser.skipChildren();
}
}
}
// not a license spec
if (builder.signature != null) {
 byte[] signatureBytes = Base64.getDecoder().decode(builder.signature);
 ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
 int version = byteBuffer.getInt();
 // we take the absolute version, because negative versions
 // mean that the license was generated by the cluster (see TrialLicense)
 // and positive version means that the license was signed
 if (version < 0) {
 version *= -1;
 }
 if (version == 0) {
 throw new ElasticsearchException("malformed signature for license [" + builder.uid + "]);
 } else if (version > VERSION_CURRENT) {
 throw new ElasticsearchException("Unknown license version found, please upgrade all nodes to the latest
" +
 "elasticsearch-license plugin");
 }
 // signature version is the source of truth
 builder.version(version);
}
return builder.build();
}

```

```

/**
 * Returns true if the license was auto-generated (by license plugin),
 * false otherwise
 */
public static boolean isAutoGeneratedLicense(String signature) {
 try {
 byte[] signatureBytes = Base64.getDecoder().decode(signature);
 ByteBuffer byteBuffer = ByteBuffer.wrap(signatureBytes);
 return byteBuffer.getInt() < 0;
 } catch (IllegalArgumentException e) {
 throw new IllegalStateException(e);
 }
}

public static License fromSource(BytesReference bytes, XContentType xContentType) throws IOException {
 if (bytes == null || bytes.length() == 0) {
 throw new ElasticsearchParseException("failed to parse license - no content provided");
 }
 if (xContentType == null) {
 throw new ElasticsearchParseException("failed to parse license - no content-type provided");
 }
 // EMPTY is safe here because we don't call namedObject
 try (InputStream byteStream = bytes.streamInput();
 XContentParser parser = xContentType.xContent()
 .createParser(NamedXContentRegistry.EMPTY, LoggingDeprecationHandler.INSTANCE, byteStream))
 {
 License license = null;
 if (parser.nextToken() == XContentParser.Token.START_OBJECT) {
 if (parser.nextToken() == XContentParser.Token.FIELD_NAME) {
 String currentFieldName = parser.currentName();
 if (Fields.LICENSES.equals(currentFieldName)) {
 final List<License> pre20Licenses = new ArrayList<>();
 if (parser.nextToken() == XContentParser.Token.START_ARRAY) {
 while (parser.nextToken() != XContentParser.Token.END_ARRAY) {
 pre20Licenses.add(License.fromXContent(parser));
 }
 // take the latest issued unexpired license
 CollectionUtil.timSort(pre20Licenses, LATEST_ISSUE_DATE_FIRST);
 long now = System.currentTimeMillis();
 for (License oldLicense : pre20Licenses) {
 if (oldLicense.expiryDate() > now) {
 license = oldLicense;
 break;
 }
 }
 }
 if (license == null && !pre20Licenses.isEmpty()) {
 license = pre20Licenses.get(0);
 }
 }
 }
 }
 }
}

```

```

 } else {
 throw new ElasticsearchParseException("failed to parse licenses expected an array of licenses");
 }
 } else if (Fields.LICENSE.equals(currentFieldName)) {
 license = License.fromXContent(parser);
 }
 // Ignore all other fields - might be created with new version
} else {
 throw new ElasticsearchParseException("failed to parse licenses expected field");
}
} else {
 throw new ElasticsearchParseException("failed to parse licenses expected start object");
}
return license;
}
}

```

@Override

```

public boolean equals(Object o) {
 if (this == o) return true;
 if (o == null || getClass() != o.getClass()) return false;

 License license = (License) o;

 if (issueDate != license.issueDate) return false;
 if (expiryDate != license.expiryDate) return false;
 if (startDate != license.startDate) return false;
 if (maxNodes != license.maxNodes) return false;
 if (version != license.version) return false;
 if (uid != null ? !uid.equals(license.uid) : license.uid != null) return false;
 if (issuer != null ? !issuer.equals(license.issuer) : license.issuer != null) return false;
 if (issuedTo != null ? !issuedTo.equals(license.issuedTo) : license.issuedTo != null) return false;
 if (type != null ? !type.equals(license.type) : license.type != null) return false;
 if (subscriptionType != null ? !subscriptionType.equals(license.subscriptionType) : license.subscriptionType !=
null)
 return false;
 if (feature != null ? !feature.equals(license.feature) : license.feature != null) return false;
 return !(signature != null ? !signature.equals(license.signature) : license.signature != null);
}

```

@Override

```

public int hashCode() {
 int result = uid != null ? uid.hashCode() : 0;
 result = 31 * result + (issuer != null ? issuer.hashCode() : 0);
 result = 31 * result + (issuedTo != null ? issuedTo.hashCode() : 0);
 result = 31 * result + (int) (issueDate ^ (issueDate >>> 32));
 result = 31 * result + (type != null ? type.hashCode() : 0);
}

```

```

result = 31 * result + (subscriptionType != null ? subscriptionType.hashCode() : 0);
result = 31 * result + (feature != null ? feature.hashCode() : 0);
result = 31 * result + (signature != null ? signature.hashCode() : 0);
result = 31 * result + (int) (expiryDate ^ (expiryDate >>> 32));
result = 31 * result + (int) (startDate ^ (startDate >>> 32));
result = 31 * result + maxNodes;
result = 31 * result + version;
return result;
}

public static final class Fields {
 public static final String STATUS = "status";
 public static final String UID = "uid";
 public static final String TYPE = "type";
 public static final String SUBSCRIPTION_TYPE = "subscription_type";
 public static final String ISSUE_DATE_IN_MILLIS = "issue_date_in_millis";
 public static final String ISSUE_DATE = "issue_date";
 public static final String FEATURE = "feature";
 public static final String EXPIRY_DATE_IN_MILLIS = "expiry_date_in_millis";
 public static final String EXPIRY_DATE = "expiry_date";
 public static final String START_DATE_IN_MILLIS = "start_date_in_millis";
 public static final String START_DATE = "start_date";
 public static final String MAX_NODES = "max_nodes";
 public static final String ISSUED_TO = "issued_to";
 public static final String ISSUER = "issuer";
 public static final String VERSION = "version";
 public static final String SIGNATURE = "signature";

 public static final String LICENSES = "licenses";
 public static final String LICENSE = "license";

}

private static long parseDate(XContentParser parser, String description, boolean endOfDay) throws
IOException {
 if (parser.currentToken() == XContentParser.Token.VALUE_NUMBER) {
 return parser.longValue();
 } else {
 try {
 if (endOfDay) {
 return DateUtils.endOfDay(parser.text());
 } else {
 return DateUtils.beginningOfDay(parser.text());
 }
 } catch (IllegalArgumentException ex) {
 throw new ElasticsearchParseException("invalid " + description + " date format " + parser.text());
 }
 }
}

```



```

}

public static Builder builder() {
 return new Builder();
}

public static class Builder {
 private int version = License.VERSION_CURRENT;
 private String uid;
 private String issuer;
 private String issuedTo;
 private long issueDate = -1;
 private String type;
 private String subscriptionType;
 private String feature;
 private String signature;
 private long expiryDate = -1;
 private long startDate = -1;
 private int maxNodes = -1;

 public Builder uid(String uid) {
 this.uid = uid;
 return this;
 }

 public Builder version(int version) {
 this.version = version;
 return this;
 }

 public Builder issuer(String issuer) {
 this.issuer = issuer;
 return this;
 }

 public Builder issuedTo(String issuedTo) {
 this.issuedTo = issuedTo;
 return this;
 }

 public Builder issueDate(long issueDate) {
 this.issueDate = issueDate;
 return this;
 }

 public Builder type(String type) {
 this.type = type;
 return this;
 }
}

```

```

 }

 public Builder subscriptionType(String subscriptionType) {
 this.subscriptionType = subscriptionType;
 return this;
 }

 public Builder feature(String feature) {
 this.feature = feature;
 return this;
 }

 public Builder expiryDate(long expiryDate) {
 this.expiryDate = expiryDate;
 return this;
 }

 public Builder maxNodes(int maxNodes) {
 this.maxNodes = maxNodes;
 return this;
 }

 public Builder signature(String signature) {
 if (signature != null) {
 this.signature = signature;
 }
 return this;
 }

 public Builder startDate(long startDate) {
 this.startDate = startDate;
 return this;
 }

 public Builder fromLicenseSpec(License license, String signature) {
 return uid(license.uid())
 .version(license.version())
 .issuedTo(license.issuedTo())
 .issueDate(license.issueDate())
 .startDate(license.startDate())
 .type(license.type())
 .subscriptionType(license.subscriptionType)
 .feature(license.feature)
 .maxNodes(license.maxNodes())
 .expiryDate(license.expiryDate())
 .issuer(license.issuer())
 .signature(signature);
 }
}

```

```

/**
 * Returns a builder that converts pre 2.0 licenses
 * to the new license format
 */
public Builder fromPre20LicenseSpec(License pre20License) {
 return uid(pre20License.uid())
 .issuedTo(pre20License.issuedTo())
 .issueDate(pre20License.issueDate())
 .maxNodes(pre20License.maxNodes())
 .expiryDate(pre20License.expiryDate());
}

public License build() {
 return new License(version, uid, issuer, issuedTo, issueDate, type,
 subscriptionType, feature, signature, expiryDate, maxNodes, startDate);
}

public Builder validate() {
 if (issuer == null) {
 throw new IllegalStateException("issuer can not be null");
 } else if (issuedTo == null) {
 throw new IllegalStateException("issuedTo can not be null");
 } else if (issueDate == -1) {
 throw new IllegalStateException("issueDate has to be set");
 } else if (type == null) {
 throw new IllegalStateException("type can not be null");
 } else if (uid == null) {
 throw new IllegalStateException("uid can not be null");
 } else if (signature == null) {
 throw new IllegalStateException("signature can not be null");
 } else if (maxNodes == -1) {
 throw new IllegalStateException("maxNodes has to be set");
 } else if (expiryDate == -1) {
 throw new IllegalStateException("expiryDate has to be set");
 }
 return this;
}

public enum Status {

 ACTIVE("active"),
 INVALID("invalid"),
 EXPIRED("expired");

 private final String label;
}

```

```

Status(String label) {
 this.label = label;
}

public String label() {
 return label;
}

public void writeTo(StreamOutput out) throws IOException {
 out.writeString(label);
}

public static Status readFrom(StreamInput in) throws IOException {
 String value = in.readString();
 switch (value) {
 case "active":
 return ACTIVE;
 case "invalid":
 return INVALID;
 case "expired":
 return EXPIRED;
 default:
 throw new IllegalArgumentException("unknown license status [" + value + "]");
 }
}

/**
 * Returns <code>>true</code> iff the license is a production license
 */
public boolean isProductionLicense() {
 switch (operationMode()) {
 case MISSING:
 case TRIAL:
 case BASIC:
 return false;
 case STANDARD:
 case GOLD:
 case PLATINUM:
 return true;
 default:
 throw new AssertionError("unknown operation mode: " + operationMode());
 }
}

/**
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```

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\*/

```
package org.elasticsearch.license;
```

```
import org.elasticsearch.common.settings.Settings;
```

```
import org.elasticsearch.rest.RestController;
```

```
import org.elasticsearch.rest.RestController;
```

```
import org.elasticsearch.rest.action.RestToXContentListener;
```

```
import org.elasticsearch.xpack.core.XPackClient;
```

```
import org.elasticsearch.xpack.core.rest.XPackRestHandler;
```

```
import java.io.IOException;
```

```
import static org.elasticsearch.rest.RestController.Method.POST;
```

```
import static org.elasticsearch.rest.RestController.Method.PUT;
```

```
public class RestPutLicenseAction extends XPackRestHandler {
```

```
 public RestPutLicenseAction(Settings settings, RestController controller) {
```

```
 super(settings);
```

```
 // @deprecated Remove deprecations in 6.0
```

```
 controller.registerWithDeprecatedHandler(POST, URI_BASE + "/license", this,
 POST, "/_license", deprecationLogger);
```

```
 controller.registerWithDeprecatedHandler(PUT, URI_BASE + "/license", this,
 PUT, "/_license", deprecationLogger);
```

```
 // Remove _licenses support entirely in 6.0
```

```
 controller.registerAsDeprecatedHandler(POST, "/_licenses", this,
 "[POST /_licenses] is deprecated! Use " +
 "[POST /_xpack/license] instead.",
 deprecationLogger);
```

```
 controller.registerAsDeprecatedHandler(PUT, "/_licenses", this,
 "[PUT /_licenses] is deprecated! Use " +
 "[PUT /_xpack/license] instead.",
 deprecationLogger);
```

```
 }
```

```
 @Override
```

```
 public String getName() {
```

```
 return "xpack_put_license_action";
```

```
 }
```

```
 @Override
```

```
 public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
 IOException {
```

```
 if (request.hasContent() == false) {
```

```
 throw new IllegalArgumentException("The license must be provided in the request body");
```

```
 }
```

```

PutLicenseRequest putLicenseRequest = new PutLicenseRequest();
putLicenseRequest.license(request.content(), request.getXContentType());
putLicenseRequest.acknowledge(request.paramAsBoolean("acknowledge", false));
putLicenseRequest.timeout(request.paramAsTime("timeout", putLicenseRequest.timeout()));
putLicenseRequest.masterNodeTimeout(request.paramAsTime("master_timeout",
putLicenseRequest.masterNodeTimeout()));

if ("basic".equals(putLicenseRequest.license().type())) {
 throw new IllegalArgumentException("Installing basic licenses is no longer allowed. Use the POST " +
 "_xpack/license/start_basic API to install a basic license that does not expire.");
}

return channel -> client.es().admin().cluster().execute(PutLicenseAction.INSTANCE, putLicenseRequest,
 new RestToXContentListener<>(channel));
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class GetLicenseResponse extends ActionResponse {

 private License license;

 GetLicenseResponse() {
 }

 GetLicenseResponse(License license) {
 this.license = license;
 }

 public License license() {
 return license;
 }

 @Override
 public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 if (in.readBoolean()) {

```

```

 license = License.readLicense(in);
 }
}

@Override
public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
 if (license == null) {
 out.writeBoolean(false);
 } else {
 out.writeBoolean(true);
 license.writeTo(out);
 }
}

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.MasterNodeReadOperationRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class GetLicenseRequestBuilder extends MasterNodeReadOperationRequestBuilder<GetLicenseRequest,
GetLicenseResponse,
 GetLicenseRequestBuilder> {

 public GetLicenseRequestBuilder(ElasticsearchClient client) {
 this(client, GetLicenseAction.INSTANCE);
 }

 /**
 * Creates new get licenses request builder
 *
 * @param client elasticsearch client
 */
 public GetLicenseRequestBuilder(ElasticsearchClient client, GetLicenseAction action) {
 super(client, action, new GetLicenseRequest());
 }
}
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 */

```

```

package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeReadRequest;

public class GetLicenseRequest extends MasterNodeReadRequest<GetLicenseRequest> {

 public GetLicenseRequest() {
 }

 @Override
 public ActionRequestValidationException validate() {
 return null;
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPostStartTrialAction extends TransportMasterNodeAction<PostStartTrialRequest,
PostStartTrialResponse> {

 private final LicenseService licenseService;

 @Inject
 public TransportPostStartTrialAction(Settings settings, TransportService transportService, ClusterService
clusterService,

 LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
 IndexNameExpressionResolver indexNameExpressionResolver) {
 super(settings, PostStartTrialAction.NAME, transportService, clusterService, threadPool, actionFilters,
 indexNameExpressionResolver, PostStartTrialRequest::new);
 }
}

```



```

 this.licenseService = licenseService;
 }

 @Override
 protected String executor() {
 return ThreadPool.Names.SAME;
 }

 @Override
 protected PostStartTrialResponse newResponse() {
 return new PostStartTrialResponse();
 }

 @Override
 protected void masterOperation(PostStartTrialRequest request, ClusterState state,
 ActionListener<PostStartTrialResponse> listener) throws Exception {
 licenseService.startTrialLicense(request, listener);
 }

 @Override
 protected ClusterBlockException checkBlock(PostStartTrialRequest request, ClusterState state) {
 return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.ToXContent;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;
import java.util.HashMap;
import java.util.Map;

import static org.elasticsearch.rest.RestRequest.Method.GET;

```

```

import static org.elasticsearch.rest.RestStatus.NOT_FOUND;
import static org.elasticsearch.rest.RestStatus.OK;

public class RestGetLicenseAction extends XPackRestHandler {

 @Inject
 public RestGetLicenseAction(Settings settings, RestController controller) {
 super(settings);
 // @deprecated Remove deprecations in 6.0
 controller.registerWithDeprecatedHandler(GET, URI_BASE + "/license", this,
 GET, "_license", deprecationLogger);

 // Remove _licenses support entirely in 6.0
 controller.registerAsDeprecatedHandler(GET, "_licenses", this,
 "[GET /_licenses] is deprecated! Use " +
 "[GET /_xpack/license] instead.",
 deprecationLogger);
 }

 @Override
 public String getName() {
 return "xpack_get_license_action";
 }

 /**
 * There will be only one license displayed per feature, the selected license will have the latest expiry_date
 * out of all other licenses for the feature.
 * <p>
 * The licenses are sorted by latest issue_date
 */
 @Override
 public RestChannelConsumer doPrepareRequest(final RestRequest request, final XPackClient client) throws
 IOException {
 final Map<String, String> overrideParams = new HashMap<>(2);
 overrideParams.put(License.REST_VIEW_MODE, "true");
 overrideParams.put(License.LICENSE_VERSION_MODE, String.valueOf(License.VERSION_CURRENT));
 final ToXContent.Params params = new ToXContent.DelegatingMapParams(overrideParams, request);
 GetLicenseRequest getLicenseRequest = new GetLicenseRequest();
 getLicenseRequest.local(request.paramAsBoolean("local", getLicenseRequest.local()));
 return channel -> client.es().admin().cluster().execute(GetLicenseAction.INSTANCE, getLicenseRequest,
 new RestBuilderListener<GetLicenseResponse>(channel) {
 @Override
 public RestResponse buildResponse(GetLicenseResponse response, XContentBuilder builder) throws
 Exception {
 // Default to pretty printing, but allow ?pretty=false to disable
 if (!request.hasParam("pretty")) {
 builder.prettyPrint().IfAtEnd();
 }
 }
 }
);
 }
}

```

```

 boolean hasLicense = response.license() != null;
 builder.startObject();
 if (hasLicense) {
 builder.startObject("license");
 response.license().toInnerXContent(builder, params);
 builder.endObject();
 }
 builder.endObject();
 return new BytesRestResponse(hasLicense ? OK : NOT_FOUND, builder);
 }
}

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.common.bytes.BytesReference;
import org.elasticsearch.common.xcontent.XContentType;

/**
 * Register license request builder
 */
public class PutLicenseRequestBuilder extends AcknowledgedRequestBuilder<PutLicenseRequest,
PutLicenseResponse, PutLicenseRequestBuilder> {

 public PutLicenseRequestBuilder(ElasticsearchClient client) {
 this(client, PutLicenseAction.INSTANCE);
 }

 /**
 * Constructs register license request
 *
 * @param client elasticsearch client
 */
 public PutLicenseRequestBuilder(ElasticsearchClient client, PutLicenseAction action) {
 super(client, action, new PutLicenseRequest());
 }

 /**
 * Sets the license
 *

```

```

* @param license license
* @return this builder
*/
public PutLicenseRequestBuilder setLicense(License license) {
 request.license(license);
 return this;
}

public PutLicenseRequestBuilder setLicense(BytesReference licenseSource, XContentType xContentType) {
 request.license(licenseSource, xContentType);
 return this;
}

public PutLicenseRequestBuilder setAcknowledge(boolean acknowledge) {
 request.acknowledge(acknowledge);
 return this;
}
}
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*/
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class GetBasicStatusAction extends Action<GetBasicStatusRequest, GetBasicStatusResponse,
GetBasicStatusRequestBuilder> {

 public static final GetBasicStatusAction INSTANCE = new GetBasicStatusAction();
 public static final String NAME = "cluster:admin/xpack/license/basic_status";

 private GetBasicStatusAction() {
 super(NAME);
 }

 @Override
 public GetBasicStatusRequestBuilder newRequestBuilder(ElasticsearchClient client) {
 return new GetBasicStatusRequestBuilder(client, this);
 }

 @Override
 public GetBasicStatusResponse newResponse() {
 return new GetBasicStatusResponse();
 }
}

```

```

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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.rest.RestStatus;

public class LicenseUtils {

 public static final String EXPIRED_FEATURE_METADATA = "es.license.expired.feature";

 /**
 * Exception to be thrown when a feature action requires a valid license, but license
 * has expired
 *
 * <code>feature</code> accessible through { @link #EXPIRED_FEATURE_METADATA } in the
 * exception's rest header
 */
 public static ElasticsearchSecurityException newComplianceException(String feature) {
 ElasticsearchSecurityException e = new ElasticsearchSecurityException("current license is non-compliant for
[{}]",
 RestStatus.FORBIDDEN, feature);
 e.addMetadata(EXPIRED_FEATURE_METADATA, feature);
 return e;
 }

 /**
 * Checks if a given { @link ElasticsearchSecurityException } refers to a feature that
 * requires a valid license, but the license has expired.
 */
 public static boolean isLicenseExpiredException(ElasticsearchSecurityException exception) {
 return (exception != null) && (exception.getMetadata(EXPIRED_FEATURE_METADATA) != null);
 }

 public static boolean licenseNeedsExtended(License license) {
 return "basic".equals(license.type()) && license.expiryDate() !=
LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
 }
}
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 */
package org.elasticsearch.license;

```

```

import org.elasticsearch.action.ActionRequest;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.cluster.NamedDiff;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNodes;
import org.elasticsearch.common.ParseField;
import org.elasticsearch.common.io.stream.NamedWriteableRegistry;
import org.elasticsearch.common.settings.ClusterSettings;
import org.elasticsearch.common.settings.IndexScopedSettings;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.settings.SettingsFilter;
import org.elasticsearch.common.xcontent.NamedXContentRegistry;
import org.elasticsearch.plugins.ActionPlugin;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestController;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.function.Supplier;

import static org.elasticsearch.xpack.core.XPackClientActionPlugin.isTribeNode;
import static org.elasticsearch.xpack.core.XPackPlugin.transportClientMode;

public class Licensing implements ActionPlugin {

 public static final String NAME = "license";
 protected final Settings settings;
 private final boolean isTransportClient;
 private final boolean isTribeNode;

 // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
 to this file
 // are also carried out in XPackClientPlugin.java
 public List<NamedWriteableRegistry.Entry> getNamedWriteables() {
 List<NamedWriteableRegistry.Entry> entries = new ArrayList<>();
 entries.add(new NamedWriteableRegistry.Entry(MetaData.Custom.class, LicensesMetaData.TYPE,
LicensesMetaData::new));
 entries.add(new NamedWriteableRegistry.Entry(NamedDiff.class, LicensesMetaData.TYPE,
LicensesMetaData::readDiffFrom));
 return entries;
 }

 // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits

```

to this file

```
// are also carried out in XPackClientPlugin.java
public List<NamedXContentRegistry.Entry> getNamedXContent() {
 List<NamedXContentRegistry.Entry> entries = new ArrayList<>();
 // Metadata
 entries.add(new NamedXContentRegistry.Entry(MetaData.Custom.class, new
ParseField(LicensesMetaData.TYPE),
 LicensesMetaData::fromXContent));
 return entries;
}

public Licensing(Settings settings) {
 this.settings = settings;
 isTransportClient = transportClientMode(settings);
 isTribeNode = isTribeNode(settings);
}

@Override
public List<ActionHandler<? extends ActionRequest, ? extends ActionResponse>> getActions() {
 if (isTribeNode) {
 return Collections.singletonList(new ActionHandler<>(GetLicenseAction.INSTANCE,
TransportGetLicenseAction.class));
 }
 return Arrays.asList(new ActionHandler<>(PutLicenseAction.INSTANCE, TransportPutLicenseAction.class),
 new ActionHandler<>(GetLicenseAction.INSTANCE, TransportGetLicenseAction.class),
 new ActionHandler<>(DeleteLicenseAction.INSTANCE, TransportDeleteLicenseAction.class),
 new ActionHandler<>(PostStartTrialAction.INSTANCE, TransportPostStartTrialAction.class),
 new ActionHandler<>(GetTrialStatusAction.INSTANCE, TransportGetTrialStatusAction.class),
 new ActionHandler<>(PostStartBasicAction.INSTANCE, TransportPostStartBasicAction.class),
 new ActionHandler<>(GetBasicStatusAction.INSTANCE, TransportGetBasicStatusAction.class));
}

@Override
public List<RestHandler> getRestHandlers(Settings settings, RestController restController, ClusterSettings
clusterSettings,
 IndexScopedSettings indexScopedSettings, SettingsFilter settingsFilter, IndexNameExpressionResolver
indexNameExpressionResolver,
 Supplier<DiscoveryNodes> nodesInCluster) {
 List<RestHandler> handlers = new ArrayList<>();
 handlers.add(new RestGetLicenseAction(settings, restController));
 if (false == isTribeNode) {
 handlers.add(new RestPutLicenseAction(settings, restController));
 handlers.add(new RestDeleteLicenseAction(settings, restController));
 handlers.add(new RestGetTrialStatus(settings, restController));
 handlers.add(new RestGetBasicStatus(settings, restController));
 handlers.add(new RestPostStartTrialLicense(settings, restController));
 handlers.add(new RestPostStartBasicLicense(settings, restController));
 }
}
```

```

 return handlers;
 }

 // Until this is moved out to its own plugin (its currently in XPackPlugin.java, we need to make sure that any edits
 // to this file
 // are also carried out in XPackClientPlugin.java
 public List<Setting<?>> getSettings() {
 // TODO convert this wildcard to a real setting
 return Collections.singletonList(Setting.groupSetting("license.", Setting.Property.NodeScope));
 }

}

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 */
package org.elasticsearch.license;

import javax.crypto.BadPaddingException;
import javax.crypto.Cipher;
import javax.crypto.IllegalBlockSizeException;
import javax.crypto.NoSuchPaddingException;
import javax.crypto.SecretKey;
import javax.crypto.SecretKeyFactory;
import javax.crypto.spec.PBEKeySpec;
import javax.crypto.spec.SecretKeySpec;
import java.nio.charset.StandardCharsets;
import java.security.InvalidKeyException;
import java.security.KeyFactory;
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;
import java.security.PrivateKey;
import java.security.PublicKey;
import java.security.SecureRandom;
import java.security.spec.InvalidKeySpecException;
import java.security.spec.PKCS8EncodedKeySpec;
import java.security.spec.X509EncodedKeySpec;
import java.util.Base64;

public class CryptUtils {
 private static final int minimumPadding = 20;
 private static final byte[] salt = {
 (byte) 0xA9, (byte) 0xA2, (byte) 0xB5, (byte) 0xDE,
 (byte) 0x2A, (byte) 0x8A, (byte) 0x9A, (byte) 0xE6
 };
 private static final int iterationCount = 1024;

```



```

private static final int aesKeyLength = 128;
private static final String keyAlgorithm = "RSA";
private static final String passHashAlgorithm = "SHA-512";
private static final String DEFAULT_PASS_PHRASE = "elasticsearch-license";

private static final SecureRandom random = new SecureRandom();

/**
 * Read encrypted private key file content with default pass phrase
 */
public static PrivateKey readEncryptedPrivateKey(byte[] fileContents) {
 try {
 return readEncryptedPrivateKey(fileContents, hashPassPhrase(DEFAULT_PASS_PHRASE));
 } catch (NoSuchAlgorithmException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Read encrypted public key file content with default pass phrase
 */
public static PublicKey readEncryptedPublicKey(byte[] fileContents) {
 try {
 return readEncryptedPublicKey(fileContents, hashPassPhrase(DEFAULT_PASS_PHRASE));
 } catch (NoSuchAlgorithmException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Returns encrypted public key file content with default pass phrase
 */
public static byte[] writeEncryptedPublicKey(PublicKey publicKey) {
 try {
 return writeEncryptedPublicKey(publicKey, hashPassPhrase(DEFAULT_PASS_PHRASE));
 } catch (NoSuchAlgorithmException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Returns encrypted private key file content with default pass phrase
 */
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey) {
 try {
 return writeEncryptedPrivateKey(privateKey, hashPassPhrase(DEFAULT_PASS_PHRASE));
 } catch (NoSuchAlgorithmException e) {
 throw new IllegalStateException(e);
 }
}

```

```

 }
}

/**
 * Read encrypted private key file content with provided <code>passPhrase</code>
 */
public static PrivateKey readEncryptedPrivateKey(byte[] fileContents, char[] passPhrase) {
 PKCS8EncodedKeySpec privateKeySpec = new PKCS8EncodedKeySpec(decrypt(fileContents, passPhrase));
 try {
 return KeyFactory.getInstance(keyAlgorithm).generatePrivate(privateKeySpec);
 } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Read encrypted public key file content with provided <code>passPhrase</code>
 */
public static PublicKey readEncryptedPublicKey(byte[] fileContents, char[] passPhrase) {
 X509EncodedKeySpec publicKeySpec = new X509EncodedKeySpec(decrypt(fileContents, passPhrase));
 try {
 return KeyFactory.getInstance(CryptUtils.keyAlgorithm).generatePublic(publicKeySpec);
 } catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Returns encrypted public key file content with provided <code>passPhrase</code>
 */
public static byte[] writeEncryptedPublicKey(PublicKey publicKey, char[] passPhrase) {
 X509EncodedKeySpec encodedKeySpec = new X509EncodedKeySpec(publicKey.getEncoded());
 return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

/**
 * Returns encrypted private key file content with provided <code>passPhrase</code>
 */
public static byte[] writeEncryptedPrivateKey(PrivateKey privateKey, char[] passPhrase) {
 PKCS8EncodedKeySpec encodedKeySpec = new PKCS8EncodedKeySpec(privateKey.getEncoded());
 return encrypt(encodedKeySpec.getEncoded(), passPhrase);
}

/**
 * Encrypts provided <code>data</code> with <code>DEFAULT_PASS_PHRASE</code>
 */
public static byte[] encrypt(byte[] data) {
 try {

```

```

 return encrypt(data, hashPassPhrase(DEFAULT_PASS_PHRASE));
 } catch (NoSuchAlgorithmException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Decrypts provided <code>encryptedData</code> with <code>DEFAULT_PASS_PHRASE</code>
 */
public static byte[] decrypt(byte[] encryptedData) {
 try {
 return decrypt(encryptedData, hashPassPhrase(DEFAULT_PASS_PHRASE));
 } catch (NoSuchAlgorithmException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Encrypts provided <code>data</code> with <code>passPhrase</code>
 */
public static byte[] encrypt(byte[] data, char[] passPhrase) {
 try {
 final Cipher encryptionCipher = getEncryptionCipher(getSecretKey(passPhrase));
 return encryptionCipher.doFinal(pad(data, minimumPadding));
 } catch (InvalidKeySpecException | IllegalBlockSizeException | BadPaddingException e) {
 throw new IllegalStateException(e);
 }
}

/**
 * Decrypts provided <code>encryptedData</code> with <code>passPhrase</code>
 */
private static byte[] decrypt(byte[] encryptedData, char[] passPhrase) {
 try {
 final Cipher cipher = getDecryptionCipher(getSecretKey(passPhrase));
 return unPad(cipher.doFinal(encryptedData));
 } catch (IllegalBlockSizeException | BadPaddingException | InvalidKeySpecException e) {
 throw new IllegalStateException(e);
 }
}

private static SecretKey getSecretKey(char[] passPhrase) throws InvalidKeySpecException {
 try {
 PBEKeySpec keySpec = new PBEKeySpec(passPhrase, salt, iterationCount, aesKeyLength);

 byte[] shortKey = SecretKeyFactory.getInstance("PBESWithSHA1AndDESede").
 generateSecret(keySpec).getEncoded();
 }
}

```

```

byte[] intermediaryKey = new byte[aesKeyLength / 8];
for (int i = 0, j = 0; i < aesKeyLength / 8; i++) {
 intermediaryKey[i] = shortKey[j];
 if (++j == shortKey.length)
 j = 0;
}

return new SecretKeySpec(intermediaryKey, "AES");
} catch (NoSuchAlgorithmException | InvalidKeySpecException e) {
 throw new IllegalStateException(e);
}
}

private static Cipher getEncryptionCipher(SecretKey secretKey) {
 return getCipher(Cipher.ENCRYPT_MODE, secretKey);
}

private static Cipher getDecryptionCipher(SecretKey secretKey) {
 return getCipher(Cipher.DECRYPT_MODE, secretKey);
}

private static Cipher getCipher(int mode, SecretKey secretKey) {
 try {
 Cipher cipher = Cipher.getInstance(secretKey.getAlgorithm());
 cipher.init(mode, secretKey, random);
 return cipher;
 } catch (NoSuchAlgorithmException | InvalidKeyException | NoSuchPaddingException e) {
 throw new IllegalStateException(e);
 }
}

private static byte[] pad(byte[] bytes, int length) {
 if (bytes.length >= length) {
 byte[] out = new byte[bytes.length + 1];
 System.arraycopy(bytes, 0, out, 0, bytes.length);
 out[bytes.length] = (byte) 1;
 return out;
 }

 byte[] out = new byte[length + 1];

 int i = 0;
 for (; i < bytes.length; i++)
 out[i] = bytes[i];

 int padded = length - i;

```

```

// fill the rest with random bytes
byte[] fill = new byte[padded - 1];
random.nextBytes(fill);
System.arraycopy(fill, 0, out, i, padded - 1);

out[length] = (byte) (padded + 1);

return out;
}

private static byte[] unPad(byte[] bytes) {
 int padded = (int) bytes[bytes.length - 1];
 int targetLength = bytes.length - padded;

 byte[] out = new byte[targetLength];

 System.arraycopy(bytes, 0, out, 0, targetLength);

 return out;
}

private static char[] hashPassPhrase(String passPhrase) throws NoSuchAlgorithmException {
 final byte[] passBytes = passPhrase.getBytes(StandardCharsets.UTF_8);
 final byte[] digest = MessageDigest.getInstance(passHashAlgorithm).digest(passBytes);
 return Base64.getEncoder().encodeToString(digest).toCharArray();
}
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

class PostStartTrialResponse extends ActionResponse {

 // Nodes Prior to 6.3 did not have NEED_ACKNOWLEDGEMENT as part of status

```

```

enum Pre63Status {
 UPGRADED_TO_TRIAL,
 TRIAL_ALREADY_ACTIVATED;
}
enum Status {
 UPGRADED_TO_TRIAL(true, null, RestStatus.OK),
 TRIAL_ALREADY_ACTIVATED(false, "Operation failed: Trial was already activated.",
RestStatus.FORBIDDEN),
 NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

private final boolean isTrialStarted;

private final String errorMessage;
private final RestStatus restStatus;
Status(boolean isTrialStarted, String errorMessage, RestStatus restStatus) {
 this.isTrialStarted = isTrialStarted;
 this.errorMessage = errorMessage;
 this.restStatus = restStatus;
}

boolean isTrialStarted() {
 return isTrialStarted;
}

String getErrorMessage() {
 return errorMessage;
}

RestStatus getRestStatus() {
 return restStatus;
}
}

private Status status;
private Map<String, String[]> acknowledgeMessages;
private String acknowledgeMessage;

PostStartTrialResponse() {
}

PostStartTrialResponse(Status status) {
 this(status, Collections.emptyMap(), null);
}

PostStartTrialResponse(Status status, Map<String, String[]> acknowledgeMessages, String acknowledgeMessage)
{
 this.status = status;
}

```

```

 this.acknowledgeMessages = acknowledgeMessages;
 this.acknowledgeMessage = acknowledgeMessage;
 }

 public Status getStatus() {
 return status;
 }

 @Override
 public void readFrom(StreamInput in) throws IOException {
 status = in.readEnum(Status.class);
 if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
 acknowledgeMessage = in.readOptionalString();
 int size = in.readVInt();
 Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
 for (int i = 0; i < size; i++) {
 String feature = in.readString();
 int nMessages = in.readVInt();
 String[] messages = new String[nMessages];
 for (int j = 0; j < nMessages; j++) {
 messages[j] = in.readString();
 }
 acknowledgeMessages.put(feature, messages);
 }
 this.acknowledgeMessages = acknowledgeMessages;
 } else {
 this.acknowledgeMessages = Collections.emptyMap();
 }
 }

 @Override
 public void writeTo(StreamOutput out) throws IOException {
 Version version = Version.V_6_3_0;
 if (out.getVersion().onOrAfter(version)) {
 out.writeEnum(status);
 out.writeOptionalString(acknowledgeMessage);
 out.writeVInt(acknowledgeMessages.size());
 for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
 out.writeString(entry.getKey());
 out.writeVInt(entry.getValue().length);
 for (String message : entry.getValue()) {
 out.writeString(message);
 }
 }
 } else {
 if (status == Status.UPGRADED_TO_TRIAL) {
 out.writeEnum(Pre63Status.UPGRADED_TO_TRIAL);
 } else if (status == Status.TRIAL_ALREADY_ACTIVATED) {

```

```

 out.writeEnum(Pre63Status.TRIAL_ALREADY_ACTIVATED);
 } else {
 throw new IllegalArgumentException("Starting trial on node with version [" + Version.CURRENT + "]
requires " +
 "acknowledgement parameter.");
 }
}

Map<String, String[]> getAcknowledgementMessages() {
 return acknowledgeMessages;
}

String getAcknowledgementMessage() {
 return acknowledgeMessage;
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.io.stream.Writeable;
import org.elasticsearch.common.xcontent.ToXContentObject;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.xpack.core.XPackBuild;

import java.io.IOException;
import java.util.ArrayList;
import java.util.Collections;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.stream.Collectors;

public class XPackInfoResponse extends ActionResponse {

 @Nullable private BuildInfo buildInfo;
 @Nullable private LicenseInfo licenseInfo;

```



```

@Nullable private FeatureSetsInfo featureSetsInfo;

public XPackInfoResponse() {}

public XPackInfoResponse(@Nullable BuildInfo buildInfo, @Nullable LicenseInfo licenseInfo, @Nullable
FeatureSetsInfo featureSetsInfo) {
 this.buildInfo = buildInfo;
 this.licenseInfo = licenseInfo;
 this.featureSetsInfo = featureSetsInfo;
}

/**
 * @return The build info (incl. build hash and timestamp)
 */
public BuildInfo getBuildInfo() {
 return buildInfo;
}

/**
 * @return The current license info (incl. UID, type/mode. status and expiry date). May return {@code null}
when no
 * license is currently installed.
 */
public LicenseInfo getLicenseInfo() {
 return licenseInfo;
}

/**
 * @return The current status of the feature sets in X-Pack. Feature sets describe the features available/enabled in
X-Pack.
 */
public FeatureSetsInfo getFeatureSetsInfo() {
 return featureSetsInfo;
}

@Override
public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
 out.writeOptionalWriteable(buildInfo);
 out.writeOptionalWriteable(licenseInfo);
 out.writeOptionalWriteable(featureSetsInfo);
}

@Override
public void readFrom(StreamInput in) throws IOException {
 this.buildInfo = in.readOptionalWriteable(BuildInfo::new);
 this.licenseInfo = in.readOptionalWriteable(LicenseInfo::new);
 this.featureSetsInfo = in.readOptionalWriteable(FeatureSetsInfo::new);
}

```

```

}

public static class LicenseInfo implements ToXContentObject, Writable {

 private final String uid;
 private final String type;
 private final String mode;
 private final long expiryDate;
 private final License.Status status;

 public LicenseInfo(License license) {
 this(license.uid(), license.type(), license.operationMode().name().toLowerCase(Locale.ROOT),
 license.status(), license.expiryDate());
 }

 public LicenseInfo(StreamInput in) throws IOException {
 this(in.readString(), in.readString(), in.readString(), License.Status.readFrom(in), in.readLong());
 }

 public LicenseInfo(String uid, String type, String mode, License.Status status, long expiryDate) {
 this.uid = uid;
 this.type = type;
 this.mode = mode;
 this.status = status;
 this.expiryDate = expiryDate;
 }

 public String getUid() {
 return uid;
 }

 public String getType() {
 return type;
 }

 public String getMode() {
 return mode;
 }

 public long getExpiryDate() {
 return expiryDate;
 }

 public License.Status getStatus() {
 return status;
 }

 @Override

```

```

public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
 builder.startObject()
 .field("uid", uid)
 .field("type", type)
 .field("mode", mode)
 .field("status", status.label());
 if (expiryDate != LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {
 builder.timeField("expiry_date_in_millis", "expiry_date", expiryDate);
 }
 return builder.endObject();
}

public void writeTo(StreamOutput out) throws IOException {
 out.writeString(uid);
 out.writeString(type);
 out.writeString(mode);
 status.writeTo(out);
 out.writeLong(expiryDate);
}
}

public static class BuildInfo implements ToXContentObject, Writable {

 private final String hash;
 private final String timestamp;

 public BuildInfo(XPackBuild build) {
 this(build.shortHash(), build.date());
 }

 public BuildInfo(StreamInput input) throws IOException {
 this(input.readString(), input.readString());
 }

 public BuildInfo(String hash, String timestamp) {
 this.hash = hash;
 this.timestamp = timestamp;
 }

 public String getHash() {
 return hash;
 }

 public String getTimestamp() {
 return timestamp;
 }

 @Override

```

```

public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
 return builder.startObject()
 .field("hash", hash)
 .field("date", timestamp)
 .endObject();
}

public void writeTo(StreamOutput output) throws IOException {
 output.writeString(hash);
 output.writeString(timestamp);
}
}

public static class FeatureSetsInfo implements ToXContentObject, Writeable {

 private final Map<String, FeatureSet> featureSets;

 public FeatureSetsInfo(StreamInput in) throws IOException {
 int size = in.readVInt();
 Map<String, FeatureSet> featureSets = new HashMap<>(size);
 for (int i = 0; i < size; i++) {
 FeatureSet featureSet = new FeatureSet(in);
 featureSets.put(featureSet.name, featureSet);
 }
 this.featureSets = Collections.unmodifiableMap(featureSets);
 }

 public FeatureSetsInfo(Set<FeatureSet> featureSets) {
 Map<String, FeatureSet> map = new HashMap<>(featureSets.size());
 for (FeatureSet featureSet : featureSets) {
 map.put(featureSet.name, featureSet);
 }
 this.featureSets = Collections.unmodifiableMap(map);
 }

 public Map<String, FeatureSet> getFeatureSets() {
 return featureSets;
 }

 @Override
 public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
 builder.startObject();
 List<String> names = new
ArrayList<>(this.featureSets.keySet()).stream().sorted().collect(Collectors.toList());
 for (String name : names) {
 builder.field(name, featureSets.get(name), params);
 }
 return builder.endObject();
 }
}

```

```

}

public void writeTo(StreamOutput out) throws IOException {
 out.writeVInt(featureSets.size());
 for (FeatureSet featureSet : featureSets.values()) {
 featureSet.writeTo(out);
 }
}

public static class FeatureSet implements ToXContentObject, Writable {

 private final String name;
 @Nullable private final String description;
 private final boolean available;
 private final boolean enabled;
 @Nullable private final Map<String, Object> nativeCodeInfo;

 public FeatureSet(StreamInput in) throws IOException {
 this(in.readString(), in.readOptionalString(), in.readBoolean(), in.readBoolean(),
 in.getVersion().onOrAfter(Version.V_5_4_0) ? in.readMap() : null);
 }

 public FeatureSet(String name, @Nullable String description, boolean available, boolean enabled,
 @Nullable Map<String, Object> nativeCodeInfo) {
 this.name = name;
 this.description = description;
 this.available = available;
 this.enabled = enabled;
 this.nativeCodeInfo = nativeCodeInfo;
 }

 public String name() {
 return name;
 }

 @Nullable
 public String description() {
 return description;
 }

 public boolean available() {
 return available;
 }

 public boolean enabled() {
 return enabled;
 }
}

```

```

@Nullable
public Map<String, Object> nativeCodeInfo() {
 return nativeCodeInfo;
}

public XContentBuilder toXContent(XContentBuilder builder, Params params) throws IOException {
 builder.startObject();
 if (description != null) {
 builder.field("description", description);
 }
 builder.field("available", available);
 builder.field("enabled", enabled);
 if (nativeCodeInfo != null) {
 builder.field("native_code_info", nativeCodeInfo);
 }
 return builder.endObject();
}

public void writeTo(StreamOutput out) throws IOException {
 out.writeString(name);
 out.writeOptionalString(description);
 out.writeBoolean(available);
 out.writeBoolean(enabled);
 if (out.getVersion().onOrAfter(Version.V_5_4_0)) {
 out.writeMap(nativeCodeInfo);
 }
}

}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartBasicAction extends Action<PostStartBasicRequest, PostStartBasicResponse,
PostStartBasicRequestBuilder> {

 public static final PostStartBasicAction INSTANCE = new PostStartBasicAction();
 public static final String NAME = "cluster:admin/xpack/license/start_basic";

 private PostStartBasicAction() {

```

```

 super(NAME);
}

@Override
public PostStartBasicRequestBuilder newRequestBuilder(ElasticsearchClient client) {
 return new PostStartBasicRequestBuilder(client, this);
}

@Override
public PostStartBasicResponse newResponse() {
 return new PostStartBasicResponse();
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class GetBasicStatusRequestBuilder extends ActionRequestBuilder<GetBasicStatusRequest,
GetBasicStatusResponse,
 GetBasicStatusRequestBuilder> {

 GetBasicStatusRequestBuilder(ElasticsearchClient client, GetBasicStatusAction action) {
 super(client, action, new GetBasicStatusRequest());
 }
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.Version;
import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.MasterNodeRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartTrialRequest extends MasterNodeRequest<PostStartTrialRequest> {

```

```

private boolean acknowledge = false;
private String type;

@Override
public ActionRequestValidationException validate() {
 return null;
}

public PostStartTrialRequest setType(String type) {
 this.type = type;
 return this;
}

public String getType() {
 return type;
}

public PostStartTrialRequest acknowledge(boolean acknowledge) {
 this.acknowledge = acknowledge;
 return this;
}

public boolean isAcknowledged() {
 return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 if (in.getVersion().onOrAfter(Version.V_6_3_0)) {
 type = in.readString();
 acknowledge = in.readBoolean();
 } else {
 type = "trial";
 acknowledge = true;
 }
}

@Override
public void writeTo(StreamOutput out) throws IOException {
 Version version = Version.V_6_3_0;
 if (out.getVersion().onOrAfter(version)) {
 super.writeTo(out);
 out.writeString(type);
 out.writeBoolean(acknowledge);
 } else {
 if ("trial".equals(type) == false) {
 throw new IllegalArgumentException("All nodes in cluster must be version [" + version

```



```
 + "]" or newer to start trial with a different type than 'trial'. Attempting to write to " +
 "a node with version [" + out.getVersion() + "] with trial type [" + type + "].");
 } else if (acknowledged == false) {
 throw new IllegalArgumentException("Request must be acknowledged to send to a node with a version " +
 "prior to [" + version + "]. Attempting to send request to node with version [" + out.getVersion() + "] "
+
 "without acknowledgement.");
 } else {
 super.writeTo(out);
 }
}
}
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeReadAction;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportGetTrialStatusAction extends TransportMasterNodeReadAction<GetTrialStatusRequest,
GetTrialStatusResponse> {

 @Inject
 public TransportGetTrialStatusAction(Settings settings, TransportService transportService, ClusterService
clusterService,
 ThreadPool threadPool, ActionFilters actionFilters,
 IndexNameExpressionResolver indexNameExpressionResolver) {
 super(settings, GetTrialStatusAction.NAME, transportService, clusterService, threadPool, actionFilters,
 indexNameExpressionResolver, GetTrialStatusRequest::new);
 }

 @Override
 protected String executor() {
 return ThreadPool.Names.SAME;
 }
}
```

```

 }

 @Override
 protected GetTrialStatusResponse newResponse() {
 return new GetTrialStatusResponse();
 }

 @Override
 protected void masterOperation(GetTrialStatusRequest request, ClusterState state,
 ActionListener<GetTrialStatusResponse> listener) throws Exception {
 LicensesMetaData licensesMetaData = state.metaData().custom(LicensesMetaData.TYPE);
 listener.onResponse(new GetTrialStatusResponse(licensesMetaData == null ||
licensesMetaData.isEligibleForTrial()));
 }

 @Override
 protected ClusterBlockException checkBlock(GetTrialStatusRequest request, ClusterState state) {
 return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_READ);
 }
}
/*
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.AckedClusterStateUpdateTask;
import org.elasticsearch.cluster.ClusterChangedEvent;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateListener;
import org.elasticsearch.cluster.ack.ClusterStateUpdateResponse;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.node.DiscoveryNode;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.component.AbstractLifecycleComponent;
import org.elasticsearch.common.component.Lifecycle;
import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.settings.Setting;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.discovery.DiscoveryModule;

```

```

import org.elasticsearch.env.Environment;
import org.elasticsearch.gateway.GatewayService;
import org.elasticsearch.watcher.ResourceWatcherService;
import org.elasticsearch.xpack.core.XPackPlugin;
import org.elasticsearch.xpack.core.XPackSettings;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.time.Clock;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.HashMap;
import java.util.HashSet;
import java.util.List;
import java.util.Locale;
import java.util.Map;
import java.util.Set;
import java.util.concurrent.atomic.AtomicReference;

/**
 * Service responsible for managing { @link LicensesMetaData}.
 * <p>
 * On the master node, the service handles updating the cluster state when a new license is registered.
 * It also listens on all nodes for cluster state updates, and updates { @link XPackLicenseState } when
 * the license changes are detected in the cluster state.
 */
public class LicenseService extends AbstractLifecycleComponent implements ClusterStateListener,
SchedulerEngine.Listener {

 public static final Setting<String> SELF_GENERATED_LICENSE_TYPE = new
Setting<>("xpack.license.self_generated.type",
 (s) -> "basic", (s) -> {
 if (SelfGeneratedLicense.validSelfGeneratedType(s)) {
 return s;
 } else {
 throw new IllegalArgumentException("Illegal self generated license type [" + s + "]. Must be trial or basic.");
 }
 }, Setting.Property.NodeScope);

 // pkg private for tests
 static final TimeValue NON_BASIC_SELF_GENERATED_LICENSE_DURATION =
TimeValue.timeValueHours(30 * 24);

 static final Set<String> VALID_TRIAL_TYPES = new HashSet<>(Arrays.asList("trial", "platinum", "gold"));

/**
 * Duration of grace period after a license has expired
 */

```

```

static final TimeValue GRACE_PERIOD_DURATION = days(7);

public static final long BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS =
Long.MAX_VALUE - days(365).millis();

private final ClusterService clusterService;

/**
 * The xpack feature state to update when license changes are made.
 */
private final XPackLicenseState licenseState;

/**
 * Currently active license
 */
private final AtomicReference<License> currentLicense = new AtomicReference<>();
private SchedulerEngine scheduler;
private final Clock clock;

/**
 * File watcher for operation mode changes
 */
private final OperationModeFileWatcher operationModeFileWatcher;

/**
 * Callbacks to notify relative to license expiry
 */
private List<ExpirationCallback> expirationCallbacks = new ArrayList<>();

/**
 * Max number of nodes licensed by generated trial license
 */
static final int SELF_GENERATED_LICENSE_MAX_NODES = 1000;

public static final String LICENSE_JOB = "licenseJob";

private static final FormatDateTimeFormatter DATE_FORMATTER = Joda.forPattern("EEEE, MMMMM dd,
yyyy", Locale.ROOT);

private static final String ACKNOWLEDGEMENT_HEADER = "This license update requires acknowledgement.
To acknowledge the license, " +
 "please read the following messages and update the license again, this time with the \"acknowledge=true\"
parameter:";

public LicenseService(Settings settings, ClusterService clusterService, Clock clock, Environment env,
 ResourceWatcherService resourceWatcherService, XPackLicenseState licenseState) {
 super(settings);
 this.clusterService = clusterService;

```

```

this.clock = clock;
this.scheduler = new SchedulerEngine(clock);
this.licenseState = licenseState;
this.operationModeFileWatcher = new OperationModeFileWatcher(resourceWatcherService,
 XPackPlugin.resolveConfigFile(env, "license_mode"), logger, () -> updateLicenseState(getLicense()));
this.scheduler.register(this);
populateExpirationCallbacks();
}

private void logExpirationWarning(long expirationMillis, boolean expired) {
 String expiredMsg = expired ? "expired" : "will expire";
 String general = LoggerMessageFormat.format(null, "License [{}] on [{}].\n" +
 "# If you have a new license, please update it. Otherwise, please reach out to\n" +
 "# your support contact.\n" +
 "# ", expiredMsg, DATE_FORMATTER.printer().print(expirationMillis));
 if (expired) {
 general = general.toUpperCase(Locale.ROOT);
 }
 StringBuilder builder = new StringBuilder(general);
 builder.append(System.lineSeparator());
 if (expired) {
 builder.append("# COMMERCIAL PLUGINS OPERATING WITH REDUCED FUNCTIONALITY");
 } else {
 builder.append("# Commercial plugins operate with reduced functionality on license expiration:");
 }
 XPackLicenseState.EXPIRATION_MESSAGES.forEach((feature, messages) -> {
 if (messages.length > 0) {
 builder.append(System.lineSeparator());
 builder.append("# - ");
 builder.append(feature);
 for (String message : messages) {
 builder.append(System.lineSeparator());
 builder.append("# - ");
 builder.append(message);
 }
 }
 });
 logger.warn("{} ", builder);
}

private void populateExpirationCallbacks() {
 expirationCallbacks.add(new ExpirationCallback.Pre(days(7), days(25), days(1)) {
 @Override
 public void on(License license) {
 logExpirationWarning(license.expiryDate(), false);
 }
 });
 expirationCallbacks.add(new ExpirationCallback.Pre(days(0), days(7), TimeValue.timeValueMinutes(10)) {

```

```

@Override
public void on(License license) {
 logExpirationWarning(license.expiryDate(), false);
}
});
expirationCallbacks.add(new ExpirationCallback.Post(days(0), null, TimeValue.timeValueMinutes(10)) {
 @Override
 public void on(License license) {
 // logged when grace period begins
 logExpirationWarning(license.expiryDate(), true);
 }
});
}

/**
 * Registers new license in the cluster
 * Master only operation. Installs a new license on the master provided it is VALID
 */
public void registerLicense(final PutLicenseRequest request, final ActionListener<PutLicenseResponse> listener)
{
 final License newLicense = request.license();
 final long now = clock.millis();
 if (!LicenseVerifier.verifyLicense(newLicense) || newLicense.issueDate() > now || newLicense.startDate() >
now) {
 listener.onResponse(new PutLicenseResponse(true, LicensesStatus.INVALID));
 } else if (newLicense.type().equals("basic")) {
 listener.onFailure(new IllegalArgumentException("Registering basic licenses is not allowed."));
 } else if (newLicense.expiryDate() < now) {
 listener.onResponse(new PutLicenseResponse(true, LicensesStatus.EXPIRED));
 } else {
 if (!request.acknowledged()) {
 // TODO: ack messages should be generated on the master, since another node's cluster state may be
behind...
 final License currentLicense = getLicense();
 if (currentLicense != null) {
 Map<String, String[]> acknowledgeMessages = getAckMessages(newLicense, currentLicense);
 if (acknowledgeMessages.isEmpty() == false) {
 // needs acknowledgement
 listener.onResponse(new PutLicenseResponse(false, LicensesStatus.VALID,
ACKNOWLEDGEMENT_HEADER,
 acknowledgeMessages));
 }
 }
 }
 }

 if (newLicense.isProductionLicense()
 && XPackSettings.SECURITY_ENABLED.get(settings)

```

```

 && XPackSettings.TRANSPORT_SSL_ENABLED.get(settings) == false
 && isProductionMode(settings, clusterService.localNode()) {
// security is on but TLS is not configured we gonna fail the entire request and throw an exception
throw new IllegalStateException("Cannot install a [" + newLicense.operationMode() +
 "] license unless TLS is configured or security is disabled");
// TODO we should really validate that all nodes have xpack installed and are consistently configured but
this
// should happen on a different level and not in this code
} else {
clusterService.submitStateUpdateTask("register license [" + newLicense.uid() + "]", new
AckedClusterStateUpdateTask<PutLicenseResponse>(request, listener) {
 @Override
 protected PutLicenseResponse newResponse(boolean acknowledged) {
 return new PutLicenseResponse(acknowledged, LicensesStatus.VALID);
 }

 @Override
 public ClusterState execute(ClusterState currentState) throws Exception {
 XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
 Metadata currentMetadata = currentState.metadata();
 LicensesMetadata licensesMetadata = currentMetadata.custom(LicensesMetadata.TYPE);
 Version trialVersion = null;
 if (licensesMetadata != null) {
 trialVersion = licensesMetadata.getMostRecentTrialVersion();
 }
 Metadata.Builder mdBuilder = Metadata.builder(currentMetadata);
 mdBuilder.putCustom(LicensesMetadata.TYPE, new LicensesMetadata(newLicense,
trialVersion));
 return ClusterState.builder(currentState).metadata(mdBuilder).build();
 }
});
}
}
}

public static Map<String, String[]> getAckMessages(License newLicense, License currentLicense) {
 Map<String, String[]> acknowledgeMessages = new HashMap<>();
 if (!License.isAutoGeneratedLicense(currentLicense.signature()) // current license is not auto-generated
 && currentLicense.issueDate() > newLicense.issueDate()) { // and has a later issue date
 acknowledgeMessages.put("license", new String[]{
 "The new license is older than the currently installed license. " +
 "Are you sure you want to override the current license?" });
 }
 XPackLicenseState.ACKNOWLEDGMENT_MESSAGES.forEach((feature, ackMessages) -> {
 String[] messages = ackMessages.apply(currentLicense.operationMode(), newLicense.operationMode());
 if (messages.length > 0) {
 acknowledgeMessages.put(feature, messages);
 }
 });
}

```

```

 });
 return acknowledgeMessages;
}

private static TimeValue days(int days) {
 return TimeValue.timeValueHours(days * 24);
}

@Override
public void triggered(SchedulerEngine.Event event) {
 final LicensesMetaData licensesMetaData =
clusterService.state().metaData().custom(LicensesMetaData.TYPE);
 if (licensesMetaData != null) {
 final License license = licensesMetaData.getLicense();
 if (event.getJobName().equals(LICENSE_JOB)) {
 updateLicenseState(license);
 } else if (event.getJobName().startsWith(ExpirationCallback.EXPIRATION_JOB_PREFIX)) {
 expirationCallbacks.stream()
 .filter(expirationCallback -> expirationCallback.getId().equals(event.getJobName()))
 .forEach(expirationCallback -> expirationCallback.on(license));
 }
 }
}

/**
 * Remove license from the cluster state metadata
 */
public void removeLicense(final DeleteLicenseRequest request, final
ActionListener<ClusterStateUpdateResponse> listener) {
 clusterService.submitStateUpdateTask("delete license",
 new AckedClusterStateUpdateTask<ClusterStateUpdateResponse>(request, listener) {
 @Override
 protected ClusterStateUpdateResponse newResponse(boolean acknowledged) {
 return new ClusterStateUpdateResponse(acknowledged);
 }
 }

 @Override
 public ClusterState execute(ClusterState currentState) throws Exception {
 Metadata metaData = currentState.metaData();
 final LicensesMetaData currentLicenses = metaData.custom(LicensesMetaData.TYPE);
 if (currentLicenses.getLicense() != LicensesMetaData.LICENSE_TOMBSTONE) {
 Metadata.Builder mdBuilder = Metadata.builder(currentState.metaData());
 LicensesMetaData newMetadata = new
LicensesMetaData(LicensesMetaData.LICENSE_TOMBSTONE,
 currentLicenses.getMostRecentTrialVersion());
 mdBuilder.putCustom(LicensesMetaData.TYPE, newMetadata);
 return ClusterState.builder(currentState).metaData(mdBuilder).build();
 }
 }
}

```



```

 } else {
 return currentState;
 }
 }
});
}

public License getLicense() {
 final License license = getLicense(clusterService.state().metaData());
 return license == LicensesMetaData.LICENSE_TOMBSTONE ? null : license;
}

void startTrialLicense(PostStartTrialRequest request, final ActionListener<PostStartTrialResponse> listener) {
 if (VALID_TRIAL_TYPES.contains(request.getType()) == false) {
 throw new IllegalArgumentException("Cannot start trial of type [" + request.getType() + "]. Valid trial types
are "
 + VALID_TRIAL_TYPES + ".");
 }
 StartTrialClusterTask task = new StartTrialClusterTask(logger, clusterService.getClusterName().value(), clock,
request, listener);
 clusterService.submitStateUpdateTask("started trial license", task);
}

void startBasicLicense(PostStartBasicRequest request, final ActionListener<PostStartBasicResponse> listener) {
 StartBasicClusterTask task = new StartBasicClusterTask(logger, clusterService.getClusterName().value(),
clock, request, listener);
 clusterService.submitStateUpdateTask("start basic license", task);
}

/**
 * Master-only operation to generate a one-time global self generated license.
 * The self generated license is only generated and stored if the current cluster state metadata
 * has no existing license. If the cluster currently has a basic license that has an expiration date,
 * a new basic license with no expiration date is generated.
 */
private void registerOrUpdateSelfGeneratedLicense() {
 clusterService.submitStateUpdateTask("maybe generate license for cluster",
 new StartupSelfGeneratedLicenseTask(settings, clock, clusterService));
}

@Override
protected void doStart() throws ElasticsearchException {
 clusterService.addListener(this);
 scheduler.start(Collections.emptyList());
 logger.debug("initializing license state");
 if (clusterService.lifecycleState() == Lifecycle.State.STARTED) {
 final ClusterState clusterState = clusterService.state();
 if (clusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK) == false

```

```

 &&
 clusterState.nodes().getMasterNode() != null &&
XPackPlugin.isReadyForXPackCustomMetadata(clusterState)) {
 final LicensesMetaData currentMetaData = clusterState.metaData().custom(LicensesMetaData.TYPE);
 boolean noLicense = currentMetaData == null || currentMetaData.getLicense() == null;
 if (clusterState.getNodes().isLocalNodeElectedMaster() &&
 (noLicense || LicenseUtils.licenseNeedsExtended(currentMetaData.getLicense()))) {
 // triggers a cluster changed event eventually notifying the current licensee
 registerOrUpdateSelfGeneratedLicense();
 }
}
}
}

@Override
protected void doStop() throws ElasticsearchException {
 clusterService.removeListener(this);
 scheduler.stop();
 // clear current license
 currentLicense.set(null);
}

@Override
protected void doClose() throws ElasticsearchException {
}

/**
 * When there is no global block on {@link
org.elasticsearch.gateway.GatewayService#STATE_NOT_RECOVERED_BLOCK}
 * notify licensees and issue auto-generated license if no license has been installed/issued yet.
 */
@Override
public void clusterChanged(ClusterChangedEvent event) {
 final ClusterState previousClusterState = event.previousState();
 final ClusterState currentClusterState = event.state();
 if (!currentClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)) {
 if (XPackPlugin.isReadyForXPackCustomMetadata(currentClusterState) == false) {
 logger.debug("cannot add license to cluster as the following nodes might not understand the license
metadata: {}",
 () -> XPackPlugin.nodesNotReadyForXPackCustomMetadata(currentClusterState));
 return;
 }

 final LicensesMetaData prevLicensesMetaData =
previousClusterState.getMetaData().custom(LicensesMetaData.TYPE);
 final LicensesMetaData currentLicensesMetaData =
currentClusterState.getMetaData().custom(LicensesMetaData.TYPE);
 if (logger.isDebugEnabled()) {

```

```

 logger.debug("previous [{}]", prevLicensesMetaData);
 logger.debug("current [{}]", currentLicensesMetaData);
 }
 // notify all interested plugins
 if (previousClusterState.blocks().hasGlobalBlock(GatewayService.STATE_NOT_RECOVERED_BLOCK)
 || prevLicensesMetaData == null) {
 if (currentLicensesMetaData != null) {
 onUpdate(currentLicensesMetaData);
 }
 } else if (!prevLicensesMetaData.equals(currentLicensesMetaData)) {
 onUpdate(currentLicensesMetaData);
 }

 License currentLicense = null;
 boolean noLicenseInPrevMetadata = prevLicensesMetaData == null || prevLicensesMetaData.getLicense()
 == null;
 if (noLicenseInPrevMetadata == false) {
 currentLicense = prevLicensesMetaData.getLicense();
 }
 boolean noLicenseInCurrentMetadata = (currentLicensesMetaData == null ||
currentLicensesMetaData.getLicense() == null);
 if (noLicenseInCurrentMetadata == false) {
 currentLicense = currentLicensesMetaData.getLicense();
 }

 boolean noLicense = noLicenseInPrevMetadata && noLicenseInCurrentMetadata;
 // auto-generate license if no licenses ever existed or if the current license is basic and
 // needs extended. this will trigger a subsequent cluster changed event
 if (currentClusterState.getNodes().isLocalNodeElectedMaster()
 && (noLicense || LicenseUtils.licenseNeedsExtended(currentLicense))) {
 registerOrUpdateSelfGeneratedLicense();
 }
} else if (logger.isDebugEnabled()) {
 logger.debug("skipped license notifications reason: [{}]",
GatewayService.STATE_NOT_RECOVERED_BLOCK);
}
}

protected void updateLicenseState(final License license) {
 if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
 // implies license has been explicitly deleted
 licenseState.update(License.OperationMode.MISSING, false);
 return;
 }
 if (license != null) {
 long time = clock.millis();
 boolean active;
 if (license.expiryDate() == BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS) {

```

```

 active = true;
 } else {
 // We subtract the grace period from the current time to avoid overflowing on an expiration
 // date that is near Long.MAX_VALUE
 active = time >= license.issueDate() && time - GRACE_PERIOD_DURATION.getMillis() <
license.expiryDate();
 }
 licenseState.update(license.operationMode(), active);

 if (active) {
 if (time < license.expiryDate()) {
 logger.debug("license [{}] - valid", license.uid());
 } else {
 logger.warn("license [{}] - grace", license.uid());
 }
 } else {
 logger.warn("license [{}] - expired", license.uid());
 }
}

/**
 * Notifies registered licensees of license state change and/or new active license
 * based on the license in <code>currentLicensesMetaData</code>.
 * Additionally schedules license expiry notifications and event callbacks
 * relative to the current license's expiry
 */
private void onUpdate(final LicensesMetaData currentLicensesMetaData) {
 final License license = getLicense(currentLicensesMetaData);
 // license can be null if the trial license is yet to be auto-generated
 // in this case, it is a no-op
 if (license != null) {
 final License previousLicense = currentLicense.get();
 if (license.equals(previousLicense) == false) {
 currentLicense.set(license);
 license.setOperationModeFileWatcher(operationModeFileWatcher);
 scheduler.add(new SchedulerEngine.Job(LICENSE_JOB, nextLicenseCheck(license)));
 for (ExpirationCallback expirationCallback : expirationCallbacks) {
 scheduler.add(new SchedulerEngine.Job(expirationCallback.getId(),
 (startTime, now) ->
 expirationCallback.nextScheduledTimeForExpiry(license.expiryDate(), startTime, now)));
 }
 if (previousLicense != null) {
 // remove operationModeFileWatcher to gc the old license object
 previousLicense.removeOperationModeFileWatcher();
 }
 logger.info("license [{}] mode [{}] - valid", license.uid(),
 license.operationMode().name().toLowerCase(Locale.ROOT));
 }
 }
}

```

```

 }
 updateLicenseState(license);
}
}

// pkg private for tests
static SchedulerEngine.Schedule nextLicenseCheck(License license) {
 return (startTime, time) -> {
 if (time < license.issueDate()) {
 // when we encounter a license with a future issue date
 // which can happen with autogenerated license,
 // we want to schedule a notification on the license issue date
 // so the license is notified once it is valid
 // see https://github.com/elastic/x-plugins/issues/983
 return license.issueDate();
 } else if (time < license.expiryDate()) {
 return license.expiryDate();
 } else if (time < license.expiryDate() + GRACE_PERIOD_DURATION.getMillis()) {
 return license.expiryDate() + GRACE_PERIOD_DURATION.getMillis();
 }
 return -1; // license is expired, no need to check again
 };
}

public static License getLicense(final MetaData metaData) {
 final LicensesMetaData licensesMetaData = metaData.custom(LicensesMetaData.TYPE);
 return getLicense(licensesMetaData);
}

static License getLicense(final LicensesMetaData metaData) {
 if (metaData != null) {
 License license = metaData.getLicense();
 if (license == LicensesMetaData.LICENSE_TOMBSTONE) {
 return license;
 } else if (license != null) {
 boolean autoGeneratedLicense = License.isAutoGeneratedLicense(license.signature());
 if ((autoGeneratedLicense && SelfGeneratedLicense.verify(license))
 || (!autoGeneratedLicense && LicenseVerifier.verifyLicense(license))) {
 return license;
 }
 }
 }
 return null;
}

private static boolean isProductionMode(Settings settings, DiscoveryNode localNode) {
 final boolean singleNodeDisco = "single-
node".equals(DiscoveryModule.DISCOVERY_TYPE_SETTING.get(settings));
}

```

```

 return singleNodeDisco == false && isBoundToLoopback(localNode) == false;
}

private static boolean isBoundToLoopback(DiscoveryNode localNode) {
 return localNode.getAddress().address().getAddress().isLoopbackAddress();
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.Action;
import org.elasticsearch.client.ElasticsearchClient;

public class PostStartTrialAction extends Action<PostStartTrialRequest, PostStartTrialResponse,
PostStartTrialRequestBuilder> {

 public static final PostStartTrialAction INSTANCE = new PostStartTrialAction();
 public static final String NAME = "cluster:admin/xpack/license/start_trial";

 private PostStartTrialAction() {
 super(NAME);
 }

 @Override
 public PostStartTrialRequestBuilder newRequestBuilder(ElasticsearchClient client) {
 return new PostStartTrialRequestBuilder(client, this);
 }

 @Override
 public PostStartTrialResponse newResponse() {
 return new PostStartTrialResponse();
 }
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionListener;
import org.elasticsearch.client.ElasticsearchClient;
import org.elasticsearch.rest.action.RestBuilderListener;

```

```

public class LicensingClient {

 private final ElasticsearchClient client;

 public LicensingClient(ElasticsearchClient client) {
 this.client = client;
 }

 public PutLicenseRequestBuilder preparePutLicense(License license) {
 return new PutLicenseRequestBuilder(client).setLicense(license);
 }

 public void putLicense(PutLicenseRequest request, ActionListener<PutLicenseResponse> listener) {
 client.execute(PutLicenseAction.INSTANCE, request, listener);
 }

 public GetLicenseRequestBuilder prepareGetLicense() {
 return new GetLicenseRequestBuilder(client);
 }

 public void getLicense(GetLicenseRequest request, ActionListener<GetLicenseResponse> listener) {
 client.execute(GetLicenseAction.INSTANCE, request, listener);
 }

 public DeleteLicenseRequestBuilder prepareDeleteLicense() {
 return new DeleteLicenseRequestBuilder(client);
 }

 public void deleteLicense(DeleteLicenseRequest request, ActionListener<DeleteLicenseResponse> listener) {
 client.execute(DeleteLicenseAction.INSTANCE, request, listener);
 }

 public PostStartTrialRequestBuilder preparePostStartTrial() {
 return new PostStartTrialRequestBuilder(client, PostStartTrialAction.INSTANCE);
 }

 public GetTrialStatusRequestBuilder prepareGetStartTrial() {
 return new GetTrialStatusRequestBuilder(client, GetTrialStatusAction.INSTANCE);
 }

 public void postStartTrial(PostStartTrialRequest request, ActionListener<PostStartTrialResponse> listener) {
 client.execute(PostStartTrialAction.INSTANCE, request, listener);
 }

 public void postStartBasic(PostStartBasicRequest request, ActionListener<PostStartBasicResponse> listener) {
 client.execute(PostStartBasicAction.INSTANCE, request, listener);
 }
}

```

```

public PostStartBasicRequestBuilder preparePostStartBasic() {
 return new PostStartBasicRequestBuilder(client, PostStartBasicAction.INSTANCE);
}

public GetBasicStatusRequestBuilder prepareGetStartBasic() {
 return new GetBasicStatusRequestBuilder(client, GetBasicStatusAction.INSTANCE);
}
}
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.BytesRestResponse;
import org.elasticsearch.rest.RestController;
import org.elasticsearch.rest.RestRequest;
import org.elasticsearch.rest.RestResponse;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.rest.action.RestBuilderListener;
import org.elasticsearch.xpack.core.XPackClient;
import org.elasticsearch.xpack.core.rest.XPackRestHandler;

import java.io.IOException;

import static org.elasticsearch.rest.RestRequest.Method.GET;

public class RestGetBasicStatus extends XPackRestHandler {

 RestGetBasicStatus(Settings settings, RestController controller) {
 super(settings);
 controller.registerHandler(GET, URI_BASE + "/license/basic_status", this);
 }

 @Override
 protected RestChannelConsumer doPrepareRequest(RestRequest request, XPackClient client) throws IOException
 {
 return channel -> client.licensing().prepareGetStartBasic().execute(
 new RestBuilderListener<GetBasicStatusResponse>(channel) {
 @Override
 public RestResponse buildResponse(GetBasicStatusResponse response, XContentBuilder builder)
 throws Exception {
 builder.startObject();
 builder.field("eligible_to_start_basic", response.isEligibleToStartBasic());
 builder.endObject();
 }
 }
);
 }
}

```



```

 return new BytesRestResponse(RestStatus.OK, builder);
 }
});
}

@Override
public String getName() {
 return "xpack_basic_status_action";
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class DeleteLicenseRequest extends AcknowledgedRequest<DeleteLicenseRequest> {

 public DeleteLicenseRequest() {
 }

 @Override
 public ActionRequestValidationException validate() {
 return null;
 }

 @Override
 public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 }

 @Override
 public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
 }
}
/*
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```

```

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*/
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.apache.logging.log4j.util.Supplier;
import org.elasticsearch.Version;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.MetaData;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.common.logging.Loggers;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.UUID;

public class StartupSelfGeneratedLicenseTask extends ClusterStateUpdateTask {

 /**
 * Max number of nodes licensed by generated trial license
 */
 private int selfGeneratedLicenseMaxNodes = 1000;

 private final Settings settings;
 private final Clock clock;
 private final ClusterService clusterService;
 private final Logger logger;

 public StartupSelfGeneratedLicenseTask(Settings settings, Clock clock, ClusterService clusterService) {
 this.settings = settings;
 this.clock = clock;
 this.clusterService = clusterService;
 this.logger = Loggers.getLogger(getClass(), settings);
 }

 @Override
 public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
 LicensesMetaData licensesMetaData = newState.metaData().custom(LicensesMetaData.TYPE);
 if (logger.isDebugEnabled()) {
 logger.debug("registered self generated license: {}", licensesMetaData);
 }
 }

 @Override

```

```

public ClusterState execute(ClusterState currentState) throws Exception {
 XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
 final MetaData metaData = currentState.metaData();
 final LicensesMetaData currentLicensesMetaData = metaData.custom(LicensesMetaData.TYPE);
 // do not generate a license if any license is present
 if (currentLicensesMetaData == null) {
 String type = LicenseService.SELF_GENERATED_LICENSE_TYPE.get(settings);
 if (SelfGeneratedLicense.validSelfGeneratedType(type) == false) {
 throw new IllegalArgumentException("Illegal self generated license type [" + type +
 "]. Must be trial or basic.");
 }

 return updateWithLicense(currentState, type);
 } else if (LicenseUtils.licenseNeedsExtended(currentLicensesMetaData.getLicense())) {
 return extendBasic(currentState, currentLicensesMetaData);
 } else {
 return currentState;
 }
}

@Override
public void onFailure(String source, @Nullable Exception e) {
 logger.error((Supplier<?>) () -> new ParameterizedMessage("unexpected failure during [{}]", source), e);
}

private ClusterState extendBasic(ClusterState currentState, LicensesMetaData currentLicenseMetadata) {
 License license = currentLicenseMetadata.getLicense();
 MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
 LicensesMetaData newLicenseMetadata = createBasicLicenseFromExistingLicense(currentLicenseMetadata);
 mdBuilder.putCustom(LicensesMetaData.TYPE, newLicenseMetadata);
 logger.info("Existing basic license has an expiration. Basic licenses no longer expire." +
 "Regenerating license.\n\nOld license:\n { }\n\n New license:\n{ }", license,
newLicenseMetadata.getLicense());
 return ClusterState.builder(currentState).metaData(mdBuilder).build();
}

private LicensesMetaData createBasicLicenseFromExistingLicense(LicensesMetaData currentLicenseMetadata) {
 License currentLicense = currentLicenseMetadata.getLicense();
 License.Builder specBuilder = License.builder()
 .uid(currentLicense.uid())
 .issuedTo(currentLicense.issuedTo())
 .maxNodes(selfGeneratedLicenseMaxNodes)
 .issueDate(currentLicense.issueDate())
 .type("basic")
 .expiryDate(LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS);
 License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
 Version trialVersion = currentLicenseMetadata.getMostRecentTrialVersion();
 return new LicensesMetaData(selfGeneratedLicense, trialVersion);
}

```

```

}

private ClusterState updateWithLicense(ClusterState currentState, String type) {
 long issueDate = clock.millis();
 Metadata.Builder mdBuilder = Metadata.builder(currentState.metadata());
 long expiryDate;
 if ("basic".equals(type)) {
 expiryDate = LicenseService.BASIC_SELF_GENERATED_LICENSE_EXPIRATION_MILLIS;
 } else {
 expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();
 }
 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo(clusterService.getClusterName().value())
 .maxNodes(selfGeneratedLicenseMaxNodes)
 .issueDate(issueDate)
 .type(type)
 .expiryDate(expiryDate);
 License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
 LicensesMetadata licensesMetadata;
 if ("trial".equals(type)) {
 licensesMetadata = new LicensesMetadata(selfGeneratedLicense, Version.CURRENT);
 } else {
 licensesMetadata = new LicensesMetadata(selfGeneratedLicense, null);
 }
 mdBuilder.putCustom(LicensesMetadata.TYPE, licensesMetadata);
 return ClusterState.builder(currentState).metadata(mdBuilder).build();
}
}
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;
import org.elasticsearch.common.xcontent.XContentBuilder;
import org.elasticsearch.rest.RestStatus;

import java.io.IOException;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;

```

```

import static org.elasticsearch.license.PostStartBasicResponse.Status.NEED_ACKNOWLEDGEMENT;

class PostStartBasicResponse extends AcknowledgedResponse {

 private Map<String, String[]> acknowledgeMessages;
 private String acknowledgeMessage;

 enum Status {
 GENERATED_BASIC(true, null, RestStatus.OK),
 ALREADY_USING_BASIC(false, "Operation failed: Current license is basic.", RestStatus.FORBIDDEN),
 NEED_ACKNOWLEDGEMENT(false, "Operation failed: Needs acknowledgement.", RestStatus.OK);

 private final boolean isBasicStarted;
 private final String errorMessage;
 private final RestStatus restStatus;

 Status(boolean isBasicStarted, String errorMessage, RestStatus restStatus) {
 this.isBasicStarted = isBasicStarted;
 this.errorMessage = errorMessage;
 this.restStatus = restStatus;
 }

 boolean isBasicStarted() {
 return isBasicStarted;
 }

 String getErrorMessage() {
 return errorMessage;
 }

 RestStatus getRestStatus() {
 return restStatus;
 }
 }

 private Status status;

 PostStartBasicResponse() {
 }

 PostStartBasicResponse(Status status) {
 this(status, Collections.emptyMap(), null);
 }

 PostStartBasicResponse(Status status, Map<String, String[]> acknowledgeMessages, String
acknowledgeMessage) {
 super(status != NEED_ACKNOWLEDGEMENT);
 this.status = status;
 }

```

```

 this.acknowledgeMessages = acknowledgeMessages;
 this.acknowledgeMessage = acknowledgeMessage;
 }

 public Status getStatus() {
 return status;
 }

 @Override
 public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 readAcknowledged(in);
 status = in.readEnum(Status.class);
 acknowledgeMessage = in.readOptionalString();
 int size = in.readVInt();
 Map<String, String[]> acknowledgeMessages = new HashMap<>(size);
 for (int i = 0; i < size; i++) {
 String feature = in.readString();
 int nMessages = in.readVInt();
 String[] messages = new String[nMessages];
 for (int j = 0; j < nMessages; j++) {
 messages[j] = in.readString();
 }
 acknowledgeMessages.put(feature, messages);
 }
 this.acknowledgeMessages = acknowledgeMessages;
 }

 @Override
 public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
 writeAcknowledged(out);
 out.writeEnum(status);
 out.writeOptionalString(acknowledgeMessage);
 out.writeVInt(acknowledgeMessages.size());
 for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
 out.writeString(entry.getKey());
 out.writeVInt(entry.getValue().length);
 for (String message : entry.getValue()) {
 out.writeString(message);
 }
 }
 }

 @Override
 protected void addCustomFields(XContentBuilder builder, Params params) throws IOException {
 if (status.isBasicStarted()) {
 builder.field("basic_was_started", true);
 }
 }

```

```

 } else {
 builder.field("basic_was_started", false);
 builder.field("error_message", status.getErrorMessage());
 }
 if (acknowledgeMessages.isEmpty() == false) {
 builder.startObject("acknowledge");
 builder.field("message", acknowledgeMessage);
 for (Map.Entry<String, String[]> entry : acknowledgeMessages.entrySet()) {
 builder.startArray(entry.getKey());
 for (String message : entry.getValue()) {
 builder.value(message);
 }
 builder.endArray();
 }
 builder.endObject();
 }
}
}
}
/*
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 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.joda.FormatDateTimeFormatter;
import org.elasticsearch.common.joda.Joda;
import org.joda.time.MutableDateTime;
import org.joda.time.format.DateTimeFormatter;
import org.joda.time.format.ISODateTimeFormat;

public class DateUtils {

 private static final FormatDateTimeFormatter formatDateOnlyFormatter = Joda.forPattern("yyyy-MM-dd");

 private static final DateTimeFormatter dateOnlyFormatter = formatDateOnlyFormatter.parser().withZoneUTC();

 private static final DateTimeFormatter dateTimeFormatter = ISODateTimeFormat.dateTime().withZoneUTC();

 public static long endOfDay(String date) {
 try {
 // Try parsing using complete date/time format
 return dateTimeFormatter.parseDateTime(date).getMillis();
 } catch (IllegalArgumentException ex) {
 // Fall back to the date only format
 MutableDateTime dateTime = dateOnlyFormatter.parseMutableDateTime(date);
 dateTime.millisOfDay().set(dateTime.millisOfDay().getMaximumValue());
 return dateTime.getMillis();
 }
 }
}

```

```

 }
}

public static long beginningOfTheDay(String date) {
 try {
 // Try parsing using complete date/time format
 return dateTimeFormatter.parseDateTime(date).getMillis();
 } catch (IllegalArgumentException ex) {
 // Fall back to the date only format
 return dateOnlyFormatter.parseDateTime(date).getMillis();
 }
}
}
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.support.master.AcknowledgedRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

public class DeleteLicenseRequestBuilder extends AcknowledgedRequestBuilder<DeleteLicenseRequest,
DeleteLicenseResponse,
DeleteLicenseRequestBuilder> {

 public DeleteLicenseRequestBuilder(ElasticsearchClient client) {
 this(client, DeleteLicenseAction.INSTANCE);
 }

 /**
 * Creates new get licenses request builder
 *
 * @param client elasticsearch client
 */
 public DeleteLicenseRequestBuilder(ElasticsearchClient client, DeleteLicenseAction action) {
 super(client, action, new DeleteLicenseRequest());
 }
}
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 */
package org.elasticsearch.license;

```



```

public enum LicensesStatus {
 VALID((byte) 0),
 INVALID((byte) 1),
 EXPIRED((byte) 2);

 private final byte id;

 LicensesStatus(byte id) {
 this.id = id;
 }

 public int id() {
 return id;
 }

 public static LicensesStatus fromId(int id) {
 if (id == 0) {
 return VALID;
 } else if (id == 1) {
 return INVALID;
 } else if (id == 2) {
 return EXPIRED;
 } else {
 throw new IllegalStateException("no valid LicensesStatus for id=" + id);
 }
 }
}
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 */

/**
 * Licensing for xpack.
 *
 * A {@link org.elasticsearch.license.License} is a signed set of json properties that determine what features
 * are available in a running cluster. Licenses are registered through a
 * {@link org.elasticsearch.license.PutLicenseRequest}. This action is handled by the master node, which places
 * the signed license into the cluster state. Each node listens for cluster state updates via the
 * {@link org.elasticsearch.license.LicenseService}, and updates its local copy of the license when it detects
 * changes in the cluster state.
 *
 * The logic for which features are available given the current license is handled by
 * {@link org.elasticsearch.license.XPackLicenseState}, which is updated by the
 * {@link org.elasticsearch.license.LicenseService} when the license changes.
 */
package org.elasticsearch.license;

```

```

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 */
package org.elasticsearch.license;

import org.elasticsearch.ElasticsearchException;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.action.support.ActionFilters;
import org.elasticsearch.action.support.master.TransportMasterNodeAction;
import org.elasticsearch.cluster.service.ClusterService;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.block.ClusterBlockException;
import org.elasticsearch.cluster.block.ClusterBlockLevel;
import org.elasticsearch.cluster.metadata.IndexNameExpressionResolver;
import org.elasticsearch.common.inject.Inject;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.threadpool.ThreadPool;
import org.elasticsearch.transport.TransportService;

public class TransportPutLicenseAction extends TransportMasterNodeAction<PutLicenseRequest,
PutLicenseResponse> {

 private final LicenseService licenseService;

 @Inject
 public TransportPutLicenseAction(Settings settings, TransportService transportService, ClusterService
clusterService,
 LicenseService licenseService, ThreadPool threadPool, ActionFilters actionFilters,
 IndexNameExpressionResolver indexNameExpressionResolver) {
 super(settings, PutLicenseAction.NAME, transportService, clusterService, threadPool, actionFilters,
indexNameExpressionResolver,
 PutLicenseRequest::new);
 this.licenseService = licenseService;
 }

 @Override
 protected String executor() {
 return ThreadPool.Names.MANAGEMENT;
 }

 @Override
 protected PutLicenseResponse newResponse() {
 return new PutLicenseResponse();
 }

 @Override

```

```

protected ClusterBlockException checkBlock(PutLicenseRequest request, ClusterState state) {
 return state.blocks().globalBlockedException(ClusterBlockLevel.METADATA_WRITE);
}

@Override
protected void masterOperation(final PutLicenseRequest request, ClusterState state, final
ActionListener<PutLicenseResponse>
 listener) throws ElasticsearchException {
 licenseService.registerLicense(request, listener);
}

}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestBuilder;
import org.elasticsearch.client.ElasticsearchClient;

class PostStartBasicRequestBuilder extends ActionRequestBuilder<PostStartBasicRequest,
 PostStartBasicResponse, PostStartBasicRequestBuilder> {

 PostStartBasicRequestBuilder(ElasticsearchClient client, PostStartBasicAction action) {
 super(client, action, new PostStartBasicRequest());
 }

 public PostStartBasicRequestBuilder setAcknowledge(boolean acknowledge) {
 request.acknowledge(acknowledge);
 return this;
 }
}
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 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetTrialStatusResponse extends ActionResponse {

```

```

private boolean eligibleToStartTrial;

GetTrialStatusResponse() {
}

GetTrialStatusResponse(boolean eligibleToStartTrial) {
 this.eligibleToStartTrial = eligibleToStartTrial;
}

boolean isEligibleToStartTrial() {
 return eligibleToStartTrial;
}

@Override
public void readFrom(StreamInput in) throws IOException {
 eligibleToStartTrial = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
 out.writeBoolean(eligibleToStartTrial);
}
}
/*
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 */
package org.elasticsearch.license;

import org.apache.logging.log4j.Logger;
import org.apache.logging.log4j.message.ParameterizedMessage;
import org.elasticsearch.Version;
import org.elasticsearch.action.ActionListener;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.cluster.ClusterStateUpdateTask;
import org.elasticsearch.cluster.metadata.Metadata;
import org.elasticsearch.common.Nullable;
import org.elasticsearch.xpack.core.XPackPlugin;

import java.time.Clock;
import java.util.Collections;
import java.util.HashMap;
import java.util.Map;
import java.util.UUID;
import java.util.concurrent.atomic.AtomicBoolean;
import java.util.concurrent.atomic.AtomicReference;

```

```

public class StartTrialClusterTask extends ClusterStateUpdateTask {

 private static final String ACKNOWLEDGEMENT_HEADER = "This API initiates a free 30-day trial for all
 platinum features. " +
 "By starting this trial, you agree that it is subject to the terms and conditions at" +
 " https://www.elastic.co/legal/trial_license/. To begin your free trial, call /start_trial again and specify " +
 "the \"acknowledge=true\" parameter.";

 private static final Map<String, String[]> ACK_MESSAGES = Collections.singletonMap("security",
 new String[] { "With a trial license, X-Pack security features are available, but are not enabled by default." });

 private final Logger logger;
 private final String clusterName;
 private final PostStartTrialRequest request;
 private final ActionListener<PostStartTrialResponse> listener;
 private final Clock clock;

 StartTrialClusterTask(Logger logger, String clusterName, Clock clock, PostStartTrialRequest request,
 ActionListener<PostStartTrialResponse> listener) {
 this.logger = logger;
 this.clusterName = clusterName;
 this.request = request;
 this.listener = listener;
 this.clock = clock;
 }

 @Override
 public void clusterStateProcessed(String source, ClusterState oldState, ClusterState newState) {
 LicensesMetaData oldLicensesMetaData = oldState.metaData().custom(LicensesMetaData.TYPE);
 logger.debug("started self generated trial license: {}", oldLicensesMetaData);

 if (request.isAcknowledged() == false) {
 listener.onResponse(new
 PostStartTrialResponse(PostStartTrialResponse.Status.NEED_ACKNOWLEDGEMENT,
 ACK_MESSAGES, ACKNOWLEDGEMENT_HEADER));
 } else if (oldLicensesMetaData == null || oldLicensesMetaData.isEligibleForTrial()) {
 listener.onResponse(new PostStartTrialResponse(PostStartTrialResponse.Status.UPGRADED_TO_TRIAL));
 } else {
 listener.onResponse(new
 PostStartTrialResponse(PostStartTrialResponse.Status.TRIAL_ALREADY_ACTIVATED));
 }
 }

 @Override
 public ClusterState execute(ClusterState currentState) throws Exception {
 XPackPlugin.checkReadyForXPackCustomMetadata(currentState);
 LicensesMetaData currentLicensesMetaData = currentState.metaData().custom(LicensesMetaData.TYPE);
 }
}

```

```

if (request.isAcknowledged() == false) {
 return currentState;
} else if (currentLicensesMetaData == null || currentLicensesMetaData.isEligibleForTrial()) {
 long issueDate = clock.millis();
 MetaData.Builder mdBuilder = MetaData.builder(currentState.metaData());
 long expiryDate = issueDate +
LicenseService.NON_BASIC_SELF_GENERATED_LICENSE_DURATION.getMillis();

 License.Builder specBuilder = License.builder()
 .uid(UUID.randomUUID().toString())
 .issuedTo(clusterName)
 .maxNodes(LicenseService.SELF_GENERATED_LICENSE_MAX_NODES)
 .issueDate(issueDate)
 .type(request.getType())
 .expiryDate(expiryDate);
 License selfGeneratedLicense = SelfGeneratedLicense.create(specBuilder);
 LicensesMetaData newLicensesMetaData = new LicensesMetaData(selfGeneratedLicense,
Version.CURRENT);
 mdBuilder.putCustom(LicensesMetaData.TYPE, newLicensesMetaData);
 return ClusterState.builder(currentState).metaData(mdBuilder).build();
} else {
 return currentState;
}
}

@Override
public void onFailure(String source, @Nullable Exception e) {
 logger.error(new ParameterizedMessage("unexpected failure during [{ }]", source), e);
 listener.onFailure(e);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionRequestValidationException;
import org.elasticsearch.action.support.master.AcknowledgedRequest;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

public class PostStartBasicRequest extends AcknowledgedRequest<PostStartBasicRequest> {

```

```

private boolean acknowledge = false;

@Override
public ActionRequestValidationException validate() {
 return null;
}

public PostStartBasicRequest acknowledge(boolean acknowledge) {
 this.acknowledge = acknowledge;
 return this;
}

public boolean isAcknowledged() {
 return acknowledge;
}

@Override
public void readFrom(StreamInput in) throws IOException {
 super.readFrom(in);
 acknowledge = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
 super.writeTo(out);
 out.writeBoolean(acknowledge);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.action.ActionResponse;
import org.elasticsearch.common.io.stream.StreamInput;
import org.elasticsearch.common.io.stream.StreamOutput;

import java.io.IOException;

class GetBasicStatusResponse extends ActionResponse {

 private boolean eligibleToStartBasic;

 GetBasicStatusResponse() {
 }
}

```

```

GetBasicStatusResponse(boolean eligibleToStartBasic) {
 this.eligibleToStartBasic = eligibleToStartBasic;
}

boolean isEligibleToStartBasic() {
 return eligibleToStartBasic;
}

@Override
public void readFrom(StreamInput in) throws IOException {
 eligibleToStartBasic = in.readBoolean();
}

@Override
public void writeTo(StreamOutput out) throws IOException {
 out.writeBoolean(eligibleToStartBasic);
}
}
/*
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 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.elasticsearch.common.logging.LoggerMessageFormat;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.xpack.core.scheduler.SchedulerEngine;

import java.util.UUID;

abstract class ExpirationCallback {

 static final String EXPIRATION_JOB_PREFIX = ".license_expiration_job_";

 public enum Orientation {PRE, POST}

 /**
 * Callback that is triggered every <code>frequency</code> when
 * current time is between <code>max</code> and <code>min</code>
 * before license expiry.
 */
 public abstract static class Pre extends ExpirationCallback {

 /**
 * Callback schedule prior to license expiry
 *
 * @param min latest relative time to execute before license expiry

```



```

 * @param max earliest relative time to execute before license expiry
 * @param frequency interval between execution
 */
 Pre(TimeValue min, TimeValue max, TimeValue frequency) {
 super(Orientation.PRE, min, max, frequency);
 }
}

/**
 * Callback that is triggered every <code>frequency</code> when
 * current time is between <code>min</code> and <code>max</code>
 * after license expiry.
 */
public abstract static class Post extends ExpirationCallback {

 /**
 * Callback schedule after license expiry
 *
 * @param min earliest relative time to execute after license expiry
 * @param max latest relative time to execute after license expiry
 * @param frequency interval between execution
 */
 Post(TimeValue min, TimeValue max, TimeValue frequency) {
 super(Orientation.POST, min, max, frequency);
 }
}

private final String id;
private final Orientation orientation;
private final long min;
private final long max;
private final long frequency;

private ExpirationCallback(Orientation orientation, TimeValue min, TimeValue max, TimeValue frequency) {
 this.orientation = orientation;
 this.min = (min == null) ? 0 : min.getMillis();
 this.max = (max == null) ? Long.MAX_VALUE : max.getMillis();
 this.frequency = frequency.getMillis();
 this.id = String.join("", EXPIRATION_JOB_PREFIX, UUID.randomUUID().toString());
}

public final String getId() {
 return id;
}

public final long getFrequency() {
 return frequency;
}
}

```

```

/**
 * Calculates the delay for the next trigger time. When <code>now</code> is in a
 * valid time bracket with respect to <code>expirationDate</code>, the delay is 0.
 * When <code>now</code> is before the time bracket, than delay to the start of the
 * time bracket and when <code>now</code> is passed the valid time bracket, the delay
 * is <code>null</code>
 * @param expirationDate license expiry date in milliseconds
 * @param now current time in milliseconds
 * @return time delay
 */
final TimeValue delay(long expirationDate, long now) {
 final TimeValue delay;
 switch (orientation) {
 case PRE:
 if (expirationDate >= now) {
 // license not yet expired
 long preExpiryDuration = expirationDate - now;
 if (preExpiryDuration > max) {
 // license duration is longer than maximum duration, delay it to the first match time
 delay = TimeValue.timeValueMillis(preExpiryDuration - max);
 } else if (preExpiryDuration <= max && preExpiryDuration >= min) {
 // no delay in valid time bracket
 delay = TimeValue.timeValueMillis(0);
 } else {
 // passed last match time
 delay = null;
 }
 } else {
 // invalid after license expiry
 delay = null;
 }
 break;
 case POST:
 if (expirationDate >= now) {
 // license not yet expired, delay it to the first match time
 delay = TimeValue.timeValueMillis(expirationDate - now + min);
 } else {
 // license has expired
 long expiredDuration = now - expirationDate;
 if (expiredDuration < min) {
 // license expiry duration is shorter than minimum duration, delay it to the first match time
 delay = TimeValue.timeValueMillis(min - expiredDuration);
 } else if (expiredDuration >= min && expiredDuration <= max) {
 // no delay in valid time bracket
 delay = TimeValue.timeValueMillis(0);
 } else {
 // passed last match time

```

```

 delay = null;
 }
}
break;
default:
 throw new IllegalStateException("orientation [" + orientation + "] unknown");
}
return delay;
}

/**
 * {@link SchedulerEngine.Schedule#nextScheduledTimeAfter(long, long)} with respect to
 * license expiry date
 */
public final long nextScheduledTimeForExpiry(long expiryDate, long startTime, long time) {
 TimeValue delay = delay(expiryDate, time);
 if (delay != null) {
 long delayInMillis = delay.getMillis();
 if (delayInMillis == 0L) {
 if (startTime == time) {
 // initial trigger and in time bracket, schedule immediately
 return time;
 } else {
 // in time bracket, add frequency
 return time + frequency;
 }
 } else {
 // not in time bracket
 return time + delayInMillis;
 }
 }
 return -1;
}

/**
 * Code to execute when the expiry callback is triggered in a valid
 * time bracket
 * @param license license to operate on
 */
public abstract void on(License license);

public final String toString() {
 return LoggerMessageFormat.format(null, "ExpirationCallback:(orientation [{}], min [{}], max [{}], freq
[{}])",
 orientation.name(), TimeValue.timeValueMillis(min), TimeValue.timeValueMillis(max),
 TimeValue.timeValueMillis(frequency));
}
}

```

```

{
 "metadata": {
 "name": "X-Pack Monitoring: License Expiration",
 "xpack": {
 "link": "license",
 "expires_days": [60, 30, 14, 7],
 "severity": 0,
 "alert_index": ".monitoring-alerts-6",
 "cluster_uuid": "${monitoring.watch.cluster_uuid}",
 "type": "monitoring",
 "version_created": 6020099,
 "watch": "${monitoring.watch.id}"
 }
 },
 "trigger": {
 "schedule": {
 "interval": "1m"
 }
 },
 "input": {
 "chain": {
 "inputs": [
 {
 "check": {
 "search": {
 "request": {
 "indices": [
 ".monitoring-es-*"
],
 "body": {
 "size": 1,
 "sort": [
 {
 "timestamp": {
 "order": "desc"
 }
]
 }
],
 "_source": [
 "license.*"
],
 "query": {
 "bool": {
 "filter": [
 {
 "term": {
 "cluster_uuid": "{{ctx.metadata.xpack.cluster_uuid}}"
 }
]
]
 }
 }
 }
 }
]
 }
 }
 }
}

```

```

 },
 {
 "term": {
 "type": "cluster_stats"
 }
 },
 {
 "range": {
 "timestamp": {
 "gte": "now-2m"
 }
 }
 }
]
}
}
}
}
},
{
 "alert": {
 "search": {
 "request": {
 "indices": [
 ".monitoring-alerts-6"
],
 "body": {
 "size": 1,
 "terminate_after": 1,
 "query": {
 "bool": {
 "filter": {
 "term": {
 "_id": "{{ctx.watch_id}}"
 }
 }
 }
 },
 "sort": [
 { "timestamp": { "order": "desc" } }
]
 }
 }
 }
 }
},

```

```

{
 "kibana_settings": {
 "search": {
 "request": {
 "indices": [
 ".monitoring-kibana-6-*"
],
 "body": {
 "size": 1,
 "query": {
 "bool": {
 "filter": {
 "term": {
 "type": "kibana_settings"
 }
 }
 }
 },
 "sort": [
 {
 "timestamp": {
 "order": "desc"
 }
 }
]
 }
 }
 }
 },
 "condition": {
 "script": {
 "source": "if (ctx.payload.check.hits.total == 0) {return false;}def license =
ctx.payload.check.hits.hits[0]._source.license;if (license == null) {return false;}ctx.vars.fails_check = false;Instant
expiry = Instant.ofEpochMilli(license.expiry_date_in_millis);ctx.vars.expiry = expiry;if (license.status != 'active')
{ctx.vars.expired = true;ctx.vars.fails_check = true;ctx.metadata.xpack.severity = 2001;} else {Instant now =
Instant.ofEpochMilli(new Date().getTime());ctx.vars.now = now;for (int i = ctx.metadata.xpack.expires_days.length
- 1;i > -1;--i) {if (license.type == 'trial' && i < 2) {break;}Instant fromNow =
now.plusSeconds(ctx.metadata.xpack.expires_days[i] * 24 * 60 * 60);if (fromNow.isAfter(expiry))
{ctx.vars.fails_check = true;ctx.metadata.xpack.severity = i * 1000;break;}} }ctx.vars.not_resolved =
(ctx.payload.alert.hits.total == 1 && ctx.payload.alert.hits.hits[0]._source.resolved_timestamp ==
null);ctx.vars.update = ctx.vars.fails_check || ctx.vars.not_resolved;"
 }
 },
 "transform": {

```

```

"script": {
 "source": "ctx.vars.email_recipient = (ctx.payload.kibana_settings.hits.total > 0) ?
ctx.payload.kibana_settings.hits.hits[0]._source.kibana_settings.xpack.default_admin_email : null;ctx.vars.is_new =
ctx.vars.fails_check && !ctx.vars.not_resolved;ctx.vars.is_resolved = !ctx.vars.fails_check &&
ctx.vars.not_resolved;def alertMessage = null;if (ctx.vars.fails_check) { alertMessage = 'Update your license.';} if
(ctx.vars.not_resolved) { ctx.payload = ctx.payload.alert.hits.hits[0]._source;ctx.payload.metadata =
ctx.metadata.xpack;if (ctx.vars.fails_check == false) { ctx.payload.resolved_timestamp = ctx.execution_time;} }
else { ctx.payload = ['timestamp': ctx.execution_time, 'prefix': 'This cluster\\'s license is going to expire in
{{#relativeTime}}metadata.time{{/relativeTime}} at {{#absoluteTime}}metadata.time{{/absoluteTime}}.',
'message': alertMessage, 'metadata': ctx.metadata.xpack];} if (ctx.vars.fails_check) { ctx.payload.metadata.time =
ctx.vars.expiry.toString();} ctx.payload.update_timestamp = ctx.execution_time;return ctx.payload;"
}
},
"actions": {
 "add_to_alerts_index": {
 "index": {
 "index": ".monitoring-alerts-6",
 "doc_type": "doc",
 "doc_id": "${monitoring.watch.unique_id}"
 }
 },
 "send_email_to_admin": {
 "condition": {
 "script": "return ctx.vars.email_recipient != null && (ctx.vars.is_new || ctx.vars.is_resolved)"
 },
 "email": {
 "to": "X-Pack Admin <{{ ctx.vars.email_recipient }}>",
 "from": "X-Pack Admin <{{ ctx.vars.email_recipient }}>",
 "subject":
"[[{{#ctx.vars.is_new}}NEW{{/ctx.vars.is_new}}]{{#ctx.vars.is_resolved}}RESOLVED{{/ctx.vars.is_resolved}}]
[{{ ctx.metadata.name }}]",
 "body": {
 "text": "[{{#ctx.vars.is_resolved}}This cluster alert has been resolved: {{/ctx.vars.is_resolved}} This cluster's
license [{{#ctx.vars.is_new}}]is going to expire on
[{{ ctx.payload.metadata.time }}]{{/ctx.vars.is_new}}]{{#ctx.vars.is_resolved}}was going to
expire[{{ ctx.payload.metadata.time }}]{{/ctx.vars.is_resolved}}.
[{{#ctx.vars.is_new}}]{{ ctx.payload.message }}]{{/ctx.vars.is_new}}]"
 }
 }
 }
}
}
}
/*
*
* Apache License
* Version 2.0, January 2004
* http://www.apache.org/licenses/
*
* TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

```

\*  
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\*  
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\*  
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\* the copyright owner that is granting the License.  
\*  
\* "Legal Entity" shall mean the union of the acting entity and all  
\* other entities that control, are controlled by, or are under common  
\* control with that entity. For the purposes of this definition,  
\* "control" means (i) the power, direct or indirect, to cause the  
\* direction or management of such entity, whether by contract or  
\* otherwise, or (ii) ownership of fifty percent (50%) or more of the  
\* outstanding shares, or (iii) beneficial ownership of such entity.  
\*  
\* "You" (or "Your") shall mean an individual or Legal Entity  
\* exercising permissions granted by this License.  
\*  
\* "Source" form shall mean the preferred form for making modifications,  
\* including but not limited to software source code, documentation  
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\*

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\*/

```
package org.elasticsearch.license;
```

```
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.support.PlainActionFuture;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.ClusterState;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.unit.TimeValue;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.license.License.OperationMode;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.ml.action.CloseJobAction;
import org.elasticsearch.xpack.core.ml.action.DeleteDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.DeleteJobAction;
import org.elasticsearch.xpack.core.ml.action.GetDatafeedsStatsAction;
import org.elasticsearch.xpack.core.ml.action.GetJobsStatsAction;
import org.elasticsearch.xpack.core.ml.action.OpenJobAction;
import org.elasticsearch.xpack.core.ml.action.PutDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.PutJobAction;
import org.elasticsearch.xpack.core.ml.action.StartDatafeedAction;
import org.elasticsearch.xpack.core.ml.action.StopDatafeedAction;
import org.elasticsearch.xpack.core.ml.client.MachineLearningClient;
import org.elasticsearch.xpack.core.ml.datafeed.DatafeedState;
import org.elasticsearch.xpack.core.ml.job.config.JobState;
import org.elasticsearch.persistent.PersistentTasksCustomMetaData;
import org.elasticsearch.xpack.ml.LocalStateMachineLearning;
import org.elasticsearch.xpack.ml.support.BaseMlIntegTestCase;
import org.junit.Before;

import java.util.Collections;

import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;
```

```

@TestLogging("org.elasticsearch.xpack.ml.action:DEBUG")
public class MachineLearningLicensingTests extends BaseMIIIntegTestCase {

 @Before
 public void resetLicensing() {
 enableLicensing();

 ensureStableCluster(1);
 ensureYellow();
 }

 public void testMachineLearningPutJobActionRestricted() throws Exception {
 String jobId = "testmachinelearningputjobactionrestricted";
 // Pick a license that does not allow machine learning
 License.OperationMode mode = randomInvalidLicenseType();
 enableLicensing(mode);
 assertMLAllowed(false);
 // test that license restricted apis do not work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
 client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
 listener.actionGet();
 fail("put job action should not be enabled!");
 } catch (ElasticsearchSecurityException e) {
 assertThat(e.status(), is(RestStatus.FORBIDDEN));
 assertThat(e.getMessage(), containsString("non-compliant"));
 assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
 hasItem(XPackField.MACHINE_LEARNING));
 }

 // Pick a license that does allow machine learning
 mode = randomValidLicenseType();
 enableLicensing(mode);
 assertMLAllowed(true);
 // test that license restricted apis do now work
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
 client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 PlainActionFuture<PutJobAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), listener);
 PutJobAction.Response response = listener.actionGet();
 assertNotNull(response);
 }
 }
}

```

```

public void testMachineLearningOpenJobActionRestricted() throws Exception {
 String jobId = "testmachinelearningopenjobactionrestricted";
 assertMLAllowed(true);
 // test that license restricted apis do now work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response response = putJobListener.actionGet();
 assertNotNull(response);
 }

 // Pick a license that does not allow machine learning
 License.OperationMode mode = randomInvalidLicenseType();
 enableLicensing(mode);
 assertMLAllowed(false);
 // test that license restricted apis do not work
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
 listener.actionGet();
 fail("open job action should not be enabled!");
 } catch (ElasticsearchSecurityException e) {
 assertThat(e.status(), is(RestStatus.FORBIDDEN));
 assertThat(e.getMessage(), containsString("non-compliant"));
 assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
 }

 // Pick a license that does allow machine learning
 mode = randomValidLicenseType();
 enableLicensing(mode);
 assertMLAllowed(true);

 // now that the license is invalid, the job should get closed:
 assertBusy(() -> {
 JobState jobState = getJobStats(jobId).getState();
 assertEquals(JobState.CLOSED, jobState);
 });

 // test that license restricted apis do now work
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress

```

```

 });
 PlainActionFuture<OpenJobAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), listener);
 OpenJobAction.Response response = listener.actionGet();
 assertNotNull(response);
 }
}

public void testMachineLearningPutDatafeedActionRestricted() throws Exception {
 String jobId = "testmachinelearningputdatafeedactionrestricted";
 String datafeedId = jobId + "-datafeed";
 assertMLAllowed(true);
 // test that license restricted apis do now work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
 client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 });
 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response putJobResponse = putJobListener.actionGet();
 assertNotNull(putJobResponse);
}

// Pick a license that does not allow machine learning
License.OperationMode mode = randomInvalidLicenseType();
enableLicensing(mode);
assertMLAllowed(false);
// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
 client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
});
 PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putDatafeed(
 new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);
 listener.actionGet();
 fail("put datafeed action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
 assertThat(e.status(), is(RestStatus.FORBIDDEN));
 assertThat(e.getMessage(), containsString("non-compliant"));
 assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);

```

```

// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 PlainActionFuture<PutDatafeedAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putDatafeed(
 new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId, Collections.singletonList(jobId))),
listener);
 PutDatafeedAction.Response response = listener.actionGet();
 assertNotNull(response);
}
}

public void testAutoCloseJobWithDatafeed() throws Exception {
 String jobId = "testautoclosejobwithdatafeed";
 String datafeedId = jobId + "-datafeed";
 assertMLAllowed(true);
 String datafeedIndex = jobId + "-data";
 prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
 XContentType.JSON).get();
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 // put job
 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response putJobResponse = putJobListener.actionGet();
 assertNotNull(putJobResponse);
 // put datafeed
 PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putDatafeed(
 new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
 Collections.singletonList(datafeedIndex))), putDatafeedListener);
 PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
 assertNotNull(putDatafeedResponse);
 // open job
 PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
 OpenJobAction.Response openJobResponse = openJobListener.actionGet();
 assertNotNull(openJobResponse);
 // start datafeed
 PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
 listener.actionGet();
 }
}

```



```

if (randomBoolean()) {
 enableLicensing(randomInvalidLicenseType());
} else {
 disableLicensing();
}
assertMLAllowed(false);

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy(() -> {
 JobState jobState = getJobStats(jobId).getState();
 assertEquals(JobState.CLOSED, jobState);

 DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
 assertEquals(DatafeedState.STOPPED, datafeedState);

 ClusterState state = client().admin().cluster().prepareState().get().getState();
 PersistentTasksCustomMetadata tasks = state.metaData().custom(PersistentTasksCustomMetadata.TYPE);
 assertEquals(0, tasks.taskMap().size());
});

enableLicensing(randomValidLicenseType());
assertMLAllowed(true);

try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 // open job
 PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
 OpenJobAction.Response openJobResponse = openJobListener.actionGet();
 assertNotNull(openJobResponse);
 // start datafeed
 PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
 listener.actionGet();
}

assertBusy(() -> {
 JobState jobState = getJobStats(jobId).getState();
 assertEquals(JobState.OPENED, jobState);

 DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
 assertEquals(DatafeedState.STARTED, datafeedState);

 ClusterState state = client().admin().cluster().prepareState().get().getState();
 PersistentTasksCustomMetadata tasks = state.metaData().custom(PersistentTasksCustomMetadata.TYPE);
 assertEquals(2, tasks.taskMap().size());
}

```

```

});

if (randomBoolean()) {
 enableLicensing(randomInvalidLicenseType());
} else {
 disableLicensing();
}
}
assertMLAllowed(false);

// now that the license is invalid, the job should be closed and datafeed stopped:
assertBusy(() -> {
 JobState jobState = getJobStats(jobId).getState();
 assertEquals(JobState.CLOSED, jobState);

 DatafeedState datafeedState = getDatafeedStats(datafeedId).getDatafeedState();
 assertEquals(DatafeedState.STOPPED, datafeedState);

 ClusterState state = client().admin().cluster().prepareState().get().getState();
 PersistentTasksCustomMetaData tasks = state.metaData().custom(PersistentTasksCustomMetaData.TYPE);
 assertEquals(0, tasks.taskMap().size());
});
}

public void testMachineLearningStartDatafeedActionRestricted() throws Exception {
 String jobId = "testmachinelearningstartdatafeedactionrestricted";
 String datafeedId = jobId + "-datafeed";
 assertMLAllowed(true);
 String datafeedIndex = jobId + "-data";
 prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\"properties\":{\"time\":{\"type\":\"date\"}}}}",
 XContentType.JSON).get();
 // test that license restricted apis do now work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
 client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 }

 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response putJobResponse = putJobListener.actionGet();
 assertNotNull(putJobResponse);

 PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putDatafeed(
 new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
 Collections.singletonList(datafeedIndex))), putDatafeedListener);
 PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
 assertNotNull(putDatafeedResponse);

 PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
 OpenJobAction.Response openJobResponse = openJobListener.actionGet();
}

```

```

 assertNotNull(openJobResponse);
}

// Pick a license that does not allow machine learning
License.OperationMode mode = randomInvalidLicenseType();
enableLicensing(mode);
assertMLAllowed(false);

// now that the license is invalid, the job should get closed:
assertBusy() -> {
 JobState jobState = getJobStats(jobId).getState();
 assertEquals(JobState.CLOSED, jobState);
 ClusterState state = client().admin().cluster().prepareState().get().getState();
 PersistentTasksCustomMetadata tasks = state.metaData().custom(PersistentTasksCustomMetadata.TYPE);
 assertEquals(0, tasks.taskMap().size());
});

// test that license restricted apis do not work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
 listener.actionGet();
 fail("start datafeed action should not be enabled!");
} catch (ElasticsearchSecurityException e) {
 assertThat(e.status(), is(RestStatus.FORBIDDEN));
 assertThat(e.getMessage(), containsString("non-compliant"));
 assertThat(e.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.MACHINE_LEARNING));
}

// Pick a license that does allow machine learning
mode = randomValidLicenseType();
enableLicensing(mode);
assertMLAllowed(true);

// test that license restricted apis do now work
try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 // re-open job now that the license is valid again
 PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
 OpenJobAction.Response openJobResponse = openJobListener.actionGet();
 assertNotNull(openJobResponse);

 PlainActionFuture<StartDatafeedAction.Response> listener = PlainActionFuture.newFuture();

```

```

 new MachineLearningClient(client).startDatafeed(new StartDatafeedAction.Request(datafeedId, 0L),
listener);
 StartDatafeedAction.Response response = listener.actionGet();
 assertNotNull(response);
 }
}

public void testMachineLearningStopDatafeedActionNotRestricted() throws Exception {
 String jobId = "testmachinelearningstopdatafeedactionnotrestricted";
 String datafeedId = jobId + "-datafeed";
 assertMLAllowed(true);
 String datafeedIndex = jobId + "-data";
 prepareCreate(datafeedIndex).addMapping("type", "{\"type\":{\\"properties\\":{\\"time\\":{\\"type\\":\\"date\\"}}}}",
 XContentType.JSON).get();
 // test that license restricted apis do now work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response putJobResponse = putJobListener.actionGet();
 assertNotNull(putJobResponse);
 PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putDatafeed(
 new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
 Collections.singletonList(datafeedIndex))), putDatafeedListener);
 PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
 assertNotNull(putDatafeedResponse);
 PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
 OpenJobAction.Response openJobResponse = openJobListener.actionGet();
 assertNotNull(openJobResponse);
 PlainActionFuture<StartDatafeedAction.Response> startDatafeedListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).startDatafeed(
 new StartDatafeedAction.Request(datafeedId, 0L), startDatafeedListener);
 StartDatafeedAction.Response startDatafeedResponse = startDatafeedListener.actionGet();
 assertNotNull(startDatafeedResponse);
 }

 boolean invalidLicense = randomBoolean();
 if (invalidLicense) {
 enableLicensing(randomInvalidLicenseType());
 } else {
 enableLicensing(randomValidLicenseType());
 }

 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {

```

```

client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
PlainActionFuture<StopDatafeedAction.Response> listener = PlainActionFuture.newFuture();
new MachineLearningClient(client).stopDatafeed(new StopDatafeedAction.Request(datafeedId), listener);
if (invalidLicense) {
 // the stop datafeed due to invalid license happens async, so check if the datafeed turns into stopped state:
 assertBusy(() -> {
 GetDatafeedsStatsAction.Response response =
 new MachineLearningClient(client)
 .getDatafeedsStats(new GetDatafeedsStatsAction.Request(datafeedId)).actionGet();
 assertEquals(DatafeedState.STOPPED, response.getResponse().results().get(0).getDatafeedState());
 });
} else {
 listener.actionGet();
}

if (invalidLicense) {
 // the close due to invalid license happens async, so check if the job turns into closed state:
 assertBusy(() -> {
 GetJobsStatsAction.Response response =
 new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
 assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
 });
}
}

public void testMachineLearningCloseJobActionNotRestricted() throws Exception {
 String jobId = "testmachinelearningclosejobactionnotrestricted";
 assertMLAllowed(true);
 // test that license restricted apis do now work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());

 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response putJobResponse = putJobListener.actionGet();
 assertNotNull(putJobResponse);

 PlainActionFuture<OpenJobAction.Response> openJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).openJob(new OpenJobAction.Request(jobId), openJobListener);
 OpenJobAction.Response openJobResponse = openJobListener.actionGet();
 assertNotNull(openJobResponse);
 }

 boolean invalidLicense = randomBoolean();
 if (invalidLicense) {

```

```

 enableLicensing(randomInvalidLicenseType());
 } else {
 enableLicensing(randomValidLicenseType());
 }

 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 PlainActionFuture<CloseJobAction.Response> listener = PlainActionFuture.newFuture();
 CloseJobAction.Request request = new CloseJobAction.Request(jobId);
 request.setCloseTimeout(TimeValue.timeValueSeconds(20));
 if (invalidLicense) {
 // the close due to invalid license happens async, so check if the job turns into closed state:
 assertBusy(() -> {
 GetJobsStatsAction.Response response =
 new MachineLearningClient(client).getJobsStats(new
GetJobsStatsAction.Request(jobId)).actionGet();
 assertEquals(JobState.CLOSED, response.getResponse().results().get(0).getState());
 });
 } else {
 new MachineLearningClient(client).closeJob(request, listener);
 listener.actionGet();
 }
 }
}

public void testMachineLearningDeleteJobActionNotRestricted() throws Exception {
 String jobId = "testmachinelearningclosejobactionnotrestricted";
 assertMLAllowed(true);
 // test that license restricted apis do now work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response putJobResponse = putJobListener.actionGet();
 assertNotNull(putJobResponse);
 }

 // Pick a random license
 License.OperationMode mode = randomLicenseType();
 enableLicensing(mode);

 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 PlainActionFuture<DeleteJobAction.Response> listener = PlainActionFuture.newFuture();

```

```

 new MachineLearningClient(client).deleteJob(new DeleteJobAction.Request(jobId), listener);
 listener.actionGet();
 }
}

public void testMachineLearningDeleteDatafeedActionNotRestricted() throws Exception {
 String jobId = "testmachinelearningdeletedatafeedactionnotrestricted";
 String datafeedId = jobId + "-datafeed";
 assertMLAllowed(true);
 // test that license restricted apis do now work
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
 client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 PlainActionFuture<PutJobAction.Response> putJobListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putJob(new PutJobAction.Request(createJob(jobId)), putJobListener);
 PutJobAction.Response putJobResponse = putJobListener.actionGet();
 assertNotNull(putJobResponse);
 PlainActionFuture<PutDatafeedAction.Response> putDatafeedListener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).putDatafeed(
 new PutDatafeedAction.Request(createDatafeed(datafeedId, jobId,
 Collections.singletonList(jobId))), putDatafeedListener);
 PutDatafeedAction.Response putDatafeedResponse = putDatafeedListener.actionGet();
 assertNotNull(putDatafeedResponse);
 }

 // Pick a random license
 License.OperationMode mode = randomLicenseType();
 enableLicensing(mode);

 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateMachineLearning.class)) {
 client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress());
 PlainActionFuture<DeleteDatafeedAction.Response> listener = PlainActionFuture.newFuture();
 new MachineLearningClient(client).deleteDatafeed(new DeleteDatafeedAction.Request(datafeedId,
listener);
 listener.actionGet();
 }
}

private static OperationMode randomInvalidLicenseType() {
 return randomFrom(License.OperationMode.GOLD, License.OperationMode.STANDARD,
License.OperationMode.BASIC);
}

private static OperationMode randomValidLicenseType() {
 return randomFrom(License.OperationMode.TRIAL, License.OperationMode.PLATINUM);
}

```

```

private static OperationMode randomLicenseType() {
 return randomFrom(License.OperationMode.values());
}

private static void assertMLAllowed(boolean expected) {
 for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
 assertEquals(licenseState.isMachineLearningAllowed(), expected);
 }
}

public static void disableLicensing() {
 disableLicensing(randomValidLicenseType());
}

public static void disableLicensing(License.OperationMode operationMode) {
 for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
 licenseState.update(operationMode, false);
 }
}

public static void enableLicensing() {
 enableLicensing(randomValidLicenseType());
}

public static void enableLicensing(License.OperationMode operationMode) {
 for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
 licenseState.update(operationMode, true);
 }
}
}
}

teardown:
- do:
 xpack.license.post:
 acknowledge: true
 body: |
 {"licenses":[{"uid":"894371dc-9t49-4997-93cb-
8o2e3r7fa6a8","type":"trial","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1916956799999,"max
_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0FWH0T9njItjQ2qammAAABmC
9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXM
vRFk4d3JTZEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0IDalZCS095M
XRGn1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwxv0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZH
BEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQa
VB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1q
bVNQS2lxOHN5bUeRZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQ
c3FWOTgzZ3ZUCXmVqkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNke9PQAAAQBzhvoza0
trrxhUZ1QbaTsKTna9C5KVQ6pv8yg1pnsBpZXCl8kX1SrgoFn1bXq61IvJwfw5qnmYNiH3hRhTO9EyaCBqaLk8

```



```
NXZQ6TrRkQSpEnnBwAYUkZeKXsIuBoOk4B4mzwC/r8aMAkzrTiEBtBbog+57cSaU9y37Gkdd+1jXCQrxP+jO
EUf7gnXWZvE6oeRroLvCt1fYn09k0CF8kKTbrPTSjC6igZR3uvTHyee74XQ9PRavvHax73T4UOEdQZX/P1ibS
QIWkbBRD5YQ1POYVjTayoltTnWLMxfEcAkkATJZLhpBEHST7kZWjrTS6J1dCREJc7a8Vsj/78HXvOIy"]}]
```

---

"Installing and getting license works":

```
current license version
```

```
- do:
```

```
 xpack.license.post:
```

```
 acknowledge: true
```

```
 body: |
```

```
 {"licenses":[{"uid":"894371dc-9t49-4997-93cb-
802e3r7fa6a8","type":"trial","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1916956799999,"max
_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature":"AAAAAgAAAA0FWH0T9njItjQ2qammAAABmC
9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXM
vRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095M
XRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwx0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZH
BEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pSOEhQa
VB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2VE1q
bVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6ldMbmMzSGtQ
c3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAABZhvza0
trrxhUZ1QbaTsKTna9C5KVQ6pv8yg1pnsBpZXC18kX1SrgoFn1bXq61IvJwfw5qnmYniH3hRhTO9EyaCBqaLk8
NXZQ6TrRkQSpEnnBwAYUkZeKXsIuBoOk4B4mzwC/r8aMAkzrTiEBtBbog+57cSaU9y37Gkdd+1jXCQrxP+jO
EUf7gnXWZvE6oeRroLvCt1fYn09k0CF8kKTbrPTSjC6igZR3uvTHyee74XQ9PRavvHax73T4UOEdQZX/P1ibS
QIWkbBRD5YQ1POYVjTayoltTnWLMxfEcAkkATJZLhpBEHST7kZWjrTS6J1dCREJc7a8Vsj/78HXvOIy"]}]
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
 xpack.license.get: { }
```

```
a license object has 11 attributes
```

```
- length: { license: 11 }
```

```
bwc for licenses format
```

```
- do:
```

```
 xpack.license.post:
```

```
 acknowledge: true
```

```
 body: |
```

```
 {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"gold","issue_date_in_millis":1411948800000,"expiry_date_in_millis":1914278399999,"ma
x_nodes":1,"issued_to":"issued_to","issuer":"issuer","signature":"AAAAAwAAAA2T3vqdBbBetKQaBgxipAAAB
mC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2M
XMvRFk4d3JTZEEx3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS09
5MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwx0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEph
ZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUm14MXNuL0pSOE
hQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MwK2K055c28zSmRnVkF1b2JSQkFLV2VXUmVHNDZ2R3o2V
E1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6ldMbmMzS
```

```
GtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQB7pG
FYgawfLm9zzT80LvcLHjy1t/v2uSzCQWKdXXhrwSy4WrAH2uK/+PEiQ7aEpW5erLsyJ5KLA6OEZJDaP7r+mj
OPuLt0++15j4DMn7ybMzOPHXWbc6LETE3+pp0GZPyOmwsDkZSRUegTtciR2R6z+mdnGrhOYm80y08KvW
whdU/DHw41MK7ePo6tq73Nz49y9IDgt9fxA0t4ggEBPbnTDDbVQ25AjauY8sa0M5eg9rDDRayw1KamYWwrra8
PIGX+2YjhtUeQhmlCPdlxc9wECJ7/knPss5bI3ZoXQR3fyXhjcXNnHEIsblqLrMCal3pLxs7II+KPYMa2ZYL/am4
P"]}]}
```

```
- match: { license_status: "valid" }
```

```
- do:
 xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
license version: 1.x
```

```
- do:
 xpack.license.post:
 acknowledge: true
 body: |
 {"licenses":[{"uid":"893361dc-9749-4997-93cb-
802e3d7fa4a8","type":"subscription","subscription_type":"gold","issue_date_in_millis":1411948800000,"feature":"
shield","expiry_date_in_millis":1914278399999,"max_nodes":1,"issued_to":"issuedTo","issuer":"issuer","signature
":"AAAAAQAAAA0LVAYwWpSH94cyXr4zAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVo
MVZwUzRxVklPSmkxakxZdW5IMlhITHNoN1N2MXMvRFk4d3JTZEx3R3RRZ0pzU3lobWJKZnQvSEFva0pp
THBkWkprZWZSQi9iNmRQNkw1SlpLN0lDalZCS095MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeG
wxboU0MXZ0dDJHSERiZTVLOHNzSDBYwNpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNi
WktNWGM5TUhQV2plaUo4Q1JOUmI4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K
055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUEErZlNIWkZSVmZIWEtaSU9w
TTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2
bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAAQA4qsc/URRZVdFoLwgy9dqybYEQWLW8YLkiAyPV5XHHH
dtk+dtZiepiNEDkUXhSX2waVJlsNRF8/4kqplDfwNoD2TUM8fTgiIfiSiZYGDTGST+yW/5eAveEU5J5v1liBN27b
wkqL+V4YAa0Tcm7NKKwjScWKAHiTU3vF8chPkGfCHE0kQgVwPC9RE82pTw0s6/uR4PFLGNFfqPM0uiE5n
ucfVrtj89JQiO/KA/7ZyFbo7VTNXxZQt7T7rZWBCP9KIjptXzcWuk08Q5S+rSoJNYbFo3HGKtrCVsRz/55rceNtd
wKKXu1IwnSeir4I1/KLduQTtFLy0+1th87VS8T88UT"]}]}
```

```
- match: { license_status: "valid" }
```

```
- do:
 xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
multiple licenses version: 1.x
```

```
- do:
 xpack.license.post:
 acknowledge: true
 body: |
 {"licenses":[{"uid":"893361dc-9749-4997-93cb-
```

```
802e3d7fa4a8", "type": "internal", "subscription_type": "none", "issue_date_in_millis": 1411948800000, "feature": "shield", "expiry_date_in_millis": 1440892799999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAQA AAAA04Q4ky3rFyyWLFkytEAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMihlTHNoN1N2MXMvRfK4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkVwKprZWZSQi9iNmRQNkw1SlpLN0iDalZCS095MXRGN1IIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpZephZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAQbXmVUmN4h2E4R4TQMijahTxQj4LPQO4f1M79UxX/XkDIGcH+J5pRHx08OtTRPsFL1IED+h+PIXx307Vo+PNDsOxrWvoYZeYBKOLA03ny9vhQga+52jYhMxIuFrT9xbcSCSNpMhGojgOIPU2WgiopVdVcimo1+Gk8VtkIPB1wPwFzfOjOnPgp/Icx3WYpfkeAUUOyWUYiFIBAE4bnz84iF+XwLKBgYk6aHF25ECBtdb/Uruhcm9+jEFpOIEUtCouvvk9C+NJZ4OickV4xPRgaRG2x9PONH8ZN0QGhGYhJGbisoxuDMlSlyVxqxfMu3n/r7/jdsEJSjAlSrLDOu6H"}, {"uid": "893361dc-9749-4997-93cb-
```

```
802e3dofh7aa", "type": "internal", "subscription_type": "none", "issue_date_in_millis": 1443484800000, "feature": "watcher", "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAQA AAAA0Sc90guRIaQEmgLvMnAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMihlTHNoN1N2MXMvRfK4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkVwKprZWZSQi9iNmRQNkw1SlpLN0iDalZCS095MXRGN1IIZlpYcVVTtnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpZephZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZiWEtaSU9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUcXMvQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAQCQ94dju0pnDZR3Uuypi0ic3aQJ+nvVqe+U8u79Dga5n1qLjcHDh7HvIBJEkF+tnVPlo/PXV/x7BZSwVY1PVERit+6rYix1yHEgqwxmx/VdRICjCaZM6tk0Ob4dZCPv6Ebn2Mmk89KHC/PwiLPqF6QfV/Pkpa8k2A3ORJmvYSDvXhe6tCs8dq4ebrsFxqrZjwWh5CZSpzqqZBFXIngDv2N0hHhpGlueRszD0JJ5dfEL5ZA1DDOrgO9OJvejSHyRqe1L5QRUNdXPVfS+EAG0Dd1cNdJ/sMpYCPnVjwb6iq2/Ygm3cuztsXVBY7ij4WnoP3ce7Zjs9TwHn+IqzftC6"}]}]
```

```
- match: { license_status: "valid" }
```

```
- do:
```

```
 xpack.license.get: { }
```

```
- length: { license: 11 }
```

```
- match: { license.uid: "893361dc-9749-4997-93cb-802e3dofh7aa" }
```

```

```

```
"Should throw 404 after license deletion":
```

```
- do:
```

```
 xpack.license.delete: { }
```

```
- match: { acknowledged: true }
```

```
- do:
```

```
 xpack.license.get: { }
```

```
 catch: missing
```

```

```

"Should install a feature type license":

```
VERSION_NO_FEATURE_TYPE license version
- do:
 xpack.license.post:
 acknowledge: true
 body: |
 {"license": {"uid": "893361dc-9749-4997-93cb-802e3d7fa4a8", "type": "gold", "issue_date_in_millis": 1411948800000, "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issued_to", "issuer": "issuer", "signature": "AAAAAgAAAA3U8+YmnmvWC+CWsV/mRAAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0IDalZCS095MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWETA9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUCXmVQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAQBe8GfzDm6T537Iuuvejtb3xK5dvg0K5NQapv+rczWcQFxcCuzbF8plkgetP1aAGZP4uRESQPMIOCSx4d0UqqAm9f7GbBQ3I93P+PogInPFeEH9NvOmaAQovmxVM9SE6DsDqlX4cXSO+bgWpXPTd2LmpoQc1fXd6BZ8GeuyYpVHVkP9hVU0tAYjw6HzYOE7+zuO1oJYOxElqy66AnIfkvHrvni+flym3tE7tDTgsDRaz7W3iBhaqiSntEqabEkvHdPHQdSR99XGaEvnHO1paK01/35iZF6OXHsF7CCj+558GRXiVxzueOe7TsGSS8g7YjZwV9bRCyU7oB4B/nidgI"}}

- match: { license_status: "valid" }

- do:
 xpack.license.get: { }

- length: { license: 11 }

```

"Cannot start basic":

```
- do:
 catch: bad_request
 xpack.license.post:
 acknowledge: true
 body: |
 {"license": {"uid": "893361dc-9749-4997-93cb-802e3d7fa4a8", "type": "basic", "issue_date_in_millis": 1411948800000, "expiry_date_in_millis": 1914278399999, "max_nodes": 1, "issued_to": "issuedTo", "issuer": "issuer", "signature": "AAAAAgAAAA0IKPZ0a7aZquUltho/AAABmC9ZN0hjZDBGYnVyRXpCOW5Bb3FjZDAxOWpSbTVoMVZwUzRxVk1PSmkxakxZdW5IMlhlTHNoN1N2MXMvRFk4d3JTZE3R3RRZ0pzU3lobWJKZnQvSEFva0ppTHBkWkprZWZSQi9iNmRQNkw1SlpLN0IDalZCS095MXRGN1IIZlpYcVVTnFrcTE2dzhJZmZrdFQrN3JQeGwxb0U0MXZ0dDJHSERiZTVLOHNzSDBYwnpoZEphZHBEZjUrTVBxRENNSXNsWWJjZllaODdzVmEzUjNiWktNWGM5TUhQV2plaUo4Q1JOUml4MXNuL0pSOEhQaVB2azhmUk9QVzhFeTFoM1Q0RnJXSG53MWk2K055c28zSmRnVkf1b2JSQkFLV2VXUmVHNDZ2R3o2VE1qbVNQS2lxOHN5bUErZINIWkZSVmZIWETA9wTTJENDVvT1NCYklacUYyK2FwRW9xa0t6dldMbmMzSGtQc3FWOTgzZ3ZUCXmVQkt2RUZwMFJnZzlvL2d2bDRWUzh6UG5pdENGWFRreXNKNkE9PQAAQAALuQ44S3IG6SzolcXVJ6Z4CIXORDrYQ+wdLCEey0XdujTslAOj+k+vNgo6wauc7Uswi01esHu4lb5IgpvKy7RRCbh5bj/z2
```

```
ubu2qMJqopp9BQyD7VQjVfqmG6seUMJwJ1a5Avvm9r41YPSPerii3bKK2e1l6jK6N8ibCvnTyY/XkYGCJrBWT
SJePDbg6ErbyodrZ37x1StLbPwCNAkmweyHjDJnvYnbeZZO7A3NmubXZjW7Ttf8/YwQyE00PqMcl7fVPY3hk
KpAeHf8aaJbqkKYbqZuER3EWJX7ZvLVb1dNdNg8aXRn7YrkQcYwWgptYQpfV+D7yEJ4j5muAEoler"}}
```

```
- match: { error.root_cause.0.reason: 'Installing basic licenses is no longer allowed. Use the POST
/_xpack/license/start_basic API to install a basic license that does not expire.' }
```

```

```

```
"Should fail gracefully when body content is not provided":
```

```
- do:
```

```
 catch: bad_request
 xpack.license.post:
 acknowledge: true
```

```
- match: { error.root_cause.0.reason: 'The license must be provided in the request body' }
```

```

```

```
"Current license is trial means not eligible to start trial":
```

```
- do:
```

```
 xpack.license.get_trial_status: { }
```

```
- match: { eligible_to_start_trial: false }
```

```
- do:
```

```
 xpack.license.post_start_basic:
 acknowledge: true
```

```
- match: { basic_was_started: true }
```

```
- do:
```

```
 xpack.license.get_trial_status: { }
```

```
- match: { eligible_to_start_trial: false }
```

```
- do:
```

```
 catch: forbidden
 xpack.license.post_start_trial:
 acknowledge: true
```

```
- match: { trial_was_started: false }
```

```
- match: { error_message: "Operation failed: Trial was already activated." }
```

```

```

```
"Trial license cannot be basic":
```

```
- do:
```

```
 catch: bad_request
 xpack.license.post_start_trial:
 type: "basic"
 acknowledge: true
```

```

"Can start basic license if do not already have basic":
- do:
 xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: true }

- do:
 xpack.license.post_start_basic:
 acknowledge: true

- match: { basic_was_started: true }
- match: { acknowledged: true }

- do:
 xpack.license.get_basic_status: {}

- match: { eligible_to_start_basic: false }

- do:
 catch: forbidden
 xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: true }
- match: { error_message: "Operation failed: Current license is basic." }

"Must acknowledge to start basic":
- do:
 xpack.license.post_start_basic: {}

- match: { basic_was_started: false }
- match: { acknowledged: false }
- match: { error_message: "Operation failed: Needs acknowledgement." }
{
 "xpack.license.delete": {
 "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
 "methods": ["DELETE"],
 "url": {
 "path": "/_xpack/license",
 "paths": ["/_xpack/license"],
 "parts": {}
 },
 "body": null
 }
}
{
 "xpack.license.get": {

```

```

"documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
"methods": ["GET"],
"url": {
 "path": "/_xpack/license",
 "paths": ["/_xpack/license"],
 "parts" : {
 },
 "params": {
 "local": {
 "type" : "boolean",
 "description" : "Return local information, do not retrieve the state from master node (default: false)"
 }
 }
},
"body": null
}
}
{
 "xpack.license.post_start_basic": {
 "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
 "methods": ["POST"],
 "url": {
 "path": "/_xpack/license/start_basic",
 "paths": ["/_xpack/license/start_basic"],
 "parts" : {
 },
 "params": {
 "acknowledge": {
 "type" : "boolean",
 "description" : "whether the user has acknowledged acknowledge messages (default: false)"
 }
 }
 },
 "body": null
 }
}
{
 "xpack.license.get_trial_status": {
 "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
 "methods": ["GET"],
 "url": {
 "path": "/_xpack/license/trial_status",
 "paths": ["/_xpack/license/trial_status"],
 "parts" : {
 },
 "params": {
 }
 },
 },

```

```

"body": null
}
}
{
"xpack.license.post": {
 "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
 "methods": ["PUT", "POST"],
 "url": {
 "path": "/_xpack/license",
 "paths": ["/_xpack/license"],
 "parts": {
 },
 "params": {
 "acknowledge": {
 "type": "boolean",
 "description": "whether the user has acknowledged acknowledge messages (default: false)"
 }
 }
 },
 "body": {
 "description": "licenses to be installed"
 }
}
}
{
"xpack.license.post_start_trial": {
 "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
 "methods": ["POST"],
 "url": {
 "path": "/_xpack/license/start_trial",
 "paths": ["/_xpack/license/start_trial"],
 "parts": {
 },
 "params": {
 "type": {
 "type": "string",
 "description": "The type of trial license to generate (default: \"trial\")"
 },
 "acknowledge": {
 "type": "boolean",
 "description": "whether the user has acknowledged acknowledge messages (default: false)"
 }
 }
 },
 "body": null
}
}
}

```



```
{
 "xpack.license.get_basic_status": {
 "documentation": "https://www.elastic.co/guide/en/x-pack/current/license-management.html",
 "methods": ["GET"],
 "url": {
 "path": "/_xpack/license/basic_status",
 "paths": ["/_xpack/license/basic_status"],
 "parts": {
 },
 "params": {
 }
 },
 "body": null
 }
}
```

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Dropwizard

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This product includes software developed by Coda Hale and Yammer, Inc.

Apache Log4j SLF4J Binding

Copyright 1999-2017 The Apache Software Foundation

This product includes software developed at  
The Apache Software Foundation (<http://www.apache.org/>).

Apache XML Security for Java

This product includes software developed at  
The Apache Software Foundation (<http://www.apache.org/>).

```
<!DOCTYPE html>
<html lang="en">
 <head>
 <meta charset="utf-8">
 <link rel="dns-prefetch" href="https://assets-cdn.github.com">
 <link rel="dns-prefetch" href="https://avatars0.githubusercontent.com">
 <link rel="dns-prefetch" href="https://avatars1.githubusercontent.com">
 <link rel="dns-prefetch" href="https://avatars2.githubusercontent.com">
 <link rel="dns-prefetch" href="https://avatars3.githubusercontent.com">
 <link rel="dns-prefetch" href="https://github-cloud.s3.amazonaws.com">
 <link rel="dns-prefetch" href="https://user-images.githubusercontent.com/">

 <link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/frameworks-
2d2d4c150f7000385741c6b992b302689ecd172246c6428904e0813be9bceca6.css" media="all" rel="stylesheet" />
 <link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/github-
0522ae8d3b3bdc841d2f91f90efd5f1fd9040d910905674cd134ced43a6dfea6.css" media="all" rel="stylesheet" />

 <link crossorigin="anonymous" href="https://assets-cdn.github.com/assets/site-
cfab053e93f0e27f4c63d4ff6b7957bd25f711667fe678e747f8a4d88c47b38d.css" media="all" rel="stylesheet" />

 <meta name="viewport" content="width=device-width">

 <title>cryptacular/NOTICE at master · vt-middleware/cryptacular · GitHub</title>
 <link rel="search" type="application/opensearchdescription+xml" href="/opensearch.xml" title="GitHub">
 <link rel="fluid-icon" href="https://github.com/fluidicon.png" title="GitHub">
 <meta property="fb:app_id" content="1401488693436528">

 <meta content="https://avatars7.githubusercontent.com/u/6122907?v=4&s=400" property="og:image" /><meta
content="GitHub" property="og:site_name" /><meta content="object" property="og:type" /><meta content="vt-
middleware/cryptacular" property="og:title" /><meta content="https://github.com/vt-middleware/cryptacular"
property="og:url" /><meta content="cryptacular - The friendly complement to the BouncyCastle crypto API for
Java." property="og:description" />
```

```
<link rel="assets" href="https://assets-cdn.github.com/">

<meta name="pjax-timeout" content="1000">

<meta name="request-id" content="E0E4:26F16:12A5AE6:1D11801:596C7978" data-pjax-transient>

<meta name="selected-link" value="repo_source" data-pjax-transient>

<meta name="google-site-verification" content="KT5gs8h0wvaagLKA Vwq8bbeNwnZZK1r1XQysX3xurLU">
<meta name="google-site-verification" content="ZzhVyeFwb7w3e0-uOTltm8Jsck2F5StVihD0exw2fsA">
 <meta name="google-analytics" content="UA-3769691-2">

<meta content="collector.githubapp.com" name="octolytics-host" /><meta content="github" name="octolytics-app-
id" /><meta content="https://collector.githubapp.com/github-external/browser_event" name="octolytics-event-url"
/><meta content="E0E4:26F16:12A5AE6:1D11801:596C7978" name="octolytics-dimension-request_id" /><meta
content="sea" name="octolytics-dimension-region_edge" /><meta content="iad" name="octolytics-dimension-
region_render" />
<meta content="/<user-name>/<repo-name>/blob/show" data-pjax-transient="true" name="analytics-location" />

<meta class="js-ga-set" name="dimension1" content="Logged Out">

 <meta name="hostname" content="github.com">
<meta name="user-login" content="">

 <meta name="expected-hostname" content="github.com">
 <meta name="js-proxy-site-detection-payload"
content="N2ZhMjk0NTA4MjI1NmZhYTViNzY5MjZmFkOWY2NGFkNmMxYzcyMGVhNzAzZGQxMGMzZ
mJhZDQ3YWZiZTI0OHx7InJlbW90ZV9hZGRyZXNzIjoiMTEwLjIwLjIyMC4xMzUiLCJyZXF1ZXN0X2lkIjoiR
TBFNDoyNkYxNjoxMkE1QUU2OjFEMTE4MDE6NTk2Qzc5NzgiLCJ0aW1lc3RhbXAiOiJlMDAyODEyMDgsI
mhvc3QiOiJnaXRodWIuY29tIn0=">

<meta name="html-safe-nonce" content="5aa226b80a18dc40894e1d405e4eb31cfca7d616">

<meta http-equiv="x-pjax-version" content="f682644ce1bb9629b9d9d9bedf64801b">

 <link href="https://github.com/vt-middlewares/cryptacular/commits/master.atom" rel="alternate" title="Recent
Commits to cryptacular:master" type="application/atom+xml">

 <meta name="description" content="cryptacular - The friendly complement to the BouncyCastle crypto API for
```

Java.">

```
<meta name="go-import" content="github.com/vt-middleware/cryptacular git https://github.com/vt-middleware/cryptacular.git">
```

```
<meta content="6122907" name="octolytics-dimension-user_id" /><meta content="vt-middleware" name="octolytics-dimension-user_login" /><meta content="15714989" name="octolytics-dimension-repository_id" /><meta content="vt-middleware/cryptacular" name="octolytics-dimension-repository_nwo" /><meta content="true" name="octolytics-dimension-repository_public" /><meta content="false" name="octolytics-dimension-repository_is_fork" /><meta content="15714989" name="octolytics-dimension-repository_network_root_id" /><meta content="vt-middleware/cryptacular" name="octolytics-dimension-repository_network_root_nwo" /><meta content="false" name="octolytics-dimension-repository_explore_github_marketplace_ci_cta_shown" />
```

```
<link rel="canonical" href="https://github.com/vt-middleware/cryptacular/blob/master/NOTICE" data-pjax-transient>
```

```
<meta name="browser-stats-url" content="https://api.github.com/_private/browser/stats">
```

```
<meta name="browser-errors-url" content="https://api.github.com/_private/browser/errors">
```

```
<link rel="mask-icon" href="https://assets-cdn.github.com/pinned-octocat.svg" color="#000000">
```

```
<link rel="icon" type="image/x-icon" href="https://assets-cdn.github.com/favicon.ico">
```

```
<meta name="theme-color" content="#1e2327">
```

```
</head>
```

```
<body class="logged-out env-production page-blob">
```

```
<div class="position-relative js-header-wrapper ">
```

```
Skip to content
```

```
<div id="js-pjax-loader-bar" class="pjax-loader-bar"><div class="progress"></div></div>
```

```
<header class="site-header js-details-container Details" role="banner">
```

```
<div class="site-nav-container">
```

```
<a class="header-logo-invertocat" href="https://github.com/" aria-label="Homepage" data-ga-click="(Logged out)
Header, go to homepage, icon:logo-wordmark">
 <svg aria-hidden="true" class="octicon octicon-mark-github" height="32" version="1.1" viewBox="0 0 16 16"
width="32"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59 4.07 5.55-.17 5.55-.38 0
.19-.01-.82-.01-1.49-2.01 3.7-2.53-.49-2.69-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53 6.3-.01 1.08 5.8
1.23 8.2 7.2 1.21 1.87 8.7 2.33 6.6 0.7-.52 2.8-.87 5.1-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87 3.1-1.59 8.2-2.15-.08-.2-.36-
1.02 0.8-2.12 0 0 .67-.21 2.2 8.2 6.4-.18 1.32-.27 2-.27 6.8 0 1.36 0.9 2.27 1.53-1.04 2.2-.82 2.2-.82 4.4 1.1 1.6 1.92 0.8
2.12 5.1 5.6 8.2 1.27 8.2 2.15 0 3.07-1.87 3.75-3.65 3.95 2.9 2.5 5.4 7.3 5.4 1.48 0 1.07-.01 1.93-.01 2.2 0
.21 1.5 4.6 5.5 3.8 8.0 13 8.0 13 0 0 0 16 8c0-4.42-3.58-8-8-8z"/></svg>

```

```
<button class="btn-link float-right site-header-toggle js-details-target" type="button" aria-label="Toggle
navigation" aria-expanded="false">
 <svg aria-hidden="true" class="octicon octicon-three-bars" height="24" version="1.1" viewBox="0 0 12 16"
width="18"><path fill-rule="evenodd" d="M11.41 9H.59C0 9 0 8.59 0 8c0-.59 0-1 .59-1H11.4c.59 0 .59 4.1 5.9 1 0
.59 0 1-.59 1h.01zm0-4H.59C0 5 0 4.59 0 4c0-.59 0-1 .59-1H11.4c.59 0 .59 4.1 5.9 1 0 .59 0 1-.59 1h.01zM.59
11H11.4c.59 0 .59 4.1 5.9 1 0 .59 0 1-.59 1H.59C0 13 0 12.59 0 12c0-.59 0-1 .59-1z"/></svg>
</button>
```

```
<div class="site-header-menu">
 <nav class="site-header-nav">
 <a href="/features" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:features" data-selected-links="/features /features/code-review /features/project-management
/features/integrations /features">
 Features

 <a href="/business" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:business" data-selected-links="/business /business/security /business/customers /business">
 Business

 <a href="/explore" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:explore" data-selected-links="/explore /trending /trending/developers /stars /integrations
/integrations/feature/code /integrations/feature/collaborate /integrations/feature/ship showcases showcases_search
showcases_landing /explore">
 Explore

 <a href="/marketplace" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav
menu - item:marketplace" data-selected-links="/marketplace">
 Marketplace

 <a href="/pricing" class="js-selected-navigation-item nav-item" data-ga-click="Header, click, Nav menu -
item:pricing" data-selected-links="/pricing /pricing/developer /pricing/team /pricing/business-hosted
/pricing/business-enterprise /pricing">
 Pricing

 </nav>
```

```
<div class="site-header-actions">
 <div class="header-search scoped-search site-scoped-search js-site-search" role="search">
 <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="/vt-
middleware/cryptacular/search" class="js-site-search-form" data-scoped-search-url="/vt-
middleware/cryptacular/search" data-unscooped-search-url="/search" method="get"><div
style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden" value="✓" /></div>
```

```

<label class="form-control header-search-wrapper js-chromeless-input-container">
 This
repository
 <input type="text"
 class="form-control header-search-input js-site-search-focus js-site-search-field is-clearable"
 data-hotkey="s"
 name="q"
 value=""
 placeholder="Search"
 aria-label="Search this repository"
 data-unscoed-placeholder="Search GitHub"
 data-scoped-placeholder="Search"
 autocapitalize="off">
 <input type="hidden" class="js-site-search-type-field" name="type" >
</label>
</form></div>

```

```

 <a class="text-bold site-header-link" href="/login?return_to=%2Fvt-
middleware%2Fcryptacular%2Fblob%2Fmaster%2FNOTICE" data-ga-click="(Logged out) Header, clicked Sign
in, text:sign-in">Sign in
 or
 <a class="text-bold site-header-link" href="/join?source=header-repo" data-ga-click="(Logged out) Header,
clicked Sign up, text:sign-up">Sign up
</div>
</div>
</div>
</header>

```

```
</div>
```

```
<div id="start-of-content" class="show-on-focus"></div>
```

```

<div id="js-flash-container">
</div>

```

```

<div role="main">
 <div itemscope itemtype="http://schema.org/SoftwareSourceCode">
 <div id="js-repo-pjax-container" data-pjax-container>

```

```
<div class="pagehead repohead instapaper_ignore readability-menu experiment-repo-nav">
 <div class="container repohead-details-container">

 <ul class="pagehead-actions">

 <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
 class="btn btn-sm btn-with-count tooltiped tooltiped-n"
 aria-label="You must be signed in to watch a repository" rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-eye" height="16" version="1.1" viewBox="0 0 16 16"
 width="16"><path fill-rule="evenodd" d="M8.06 2C3 2 0 8 8 8s3 6 8.06 6C13 14 16 8 16 8s-3-6-7.94-6z" data-bbox="151 228 228 278"/>
 Watch

 <a class="social-count" href="/vt-middleware/cryptacular/watchers"
 aria-label="9 users are watching this repository">
 9

 <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
 class="btn btn-sm btn-with-count tooltiped tooltiped-n"
 aria-label="You must be signed in to star a repository" rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-star" height="16" version="1.1" viewBox="0 0 14 16"
 width="14"><path fill-rule="evenodd" d="M14 6l-4.9-.64L7 1 4.9 5.36 0 6l3.6 3.26L2.67 14 7 11.67 11.33 14l-.93-4.74z" data-bbox="151 514 258 564"/>
 Star

 <a class="social-count js-social-count" href="/vt-middleware/cryptacular/stargazers"
 aria-label="15 users starred this repository">
 15

 <a href="/login?return_to=%2Fvt-middleware%2Fcryptacular"
 class="btn btn-sm btn-with-count tooltiped tooltiped-n"
 aria-label="You must be signed in to fork a repository" rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-repo-forked" height="16" version="1.1" viewBox="0 0 10 16"
 width="10"><path fill-rule="evenodd" d="M8 1a1.993 1.993 0 0 0 1 3.72V6L5 8 3 6V4.72A1.993 1.993 0 0 0 2 1a1.993 1.993 0 0 0 1 3.72V6.513 3v1.78A1.993 1.993 0 0 0 5 15a1.993 1.993 0 0 0 1 3.72V9.513 3V4.72A1.993 1.993 0 0 0 8 1z" data-bbox="151 834 228 900"/>

 </div>
</div>
```

```

.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>
 Fork

<a href="/vt-middleware/cryptacular/network" class="social-count"
 aria-label="1 user forked this repository">
 1

 <h1 class="public ">
 <svg aria-hidden="true" class="octicon octicon-repo" height="16" version="1.1" viewBox="0 0 12 16"
 width="12"><path fill-rule="evenodd" d="M4 9H3V8h1v1zm0-3H3v1h1V6zm0-2H3v1h1V4zm0-
 2H3v1h1V2zm8-1v12c0 .55-.45 1-1 1H6v2l-1.5-1.5L3 16v-2H1c-.55 0-1-.45-1-1V1c0-.55.45-1 1-1h10c.55 0 1 .45
 1 1zm-1 10H1v2h2v-1h3v1h5v-2zm0-10H2v9h9V1z"/></svg>
 vt-
 middleware<!--
 --><!--
 --><strong itemprop="name"><a href="/vt-middleware/cryptacular" data-pjax="#js-repo-pjax-
 container">cryptacular

</h1>

</div>
<div class="container">

<nav class="reponav js-repo-nav js-sidenav-container-pjax"
 itemscope
 itemtype="http://schema.org/BreadcrumbList"
 role="navigation"
 data-pjax="#js-repo-pjax-container">

 <a href="/vt-middleware/cryptacular" class="js-selected-navigation-item selected reponav-item" data-hotkey="g
 c" data-selected-links="repo_source repo_downloads repo_commits repo_releases repo_tags repo_branches /vt-
 middleware/cryptacular" itemprop="url">
 <svg aria-hidden="true" class="octicon octicon-code" height="16" version="1.1" viewBox="0 0 14 16"
 width="14"><path fill-rule="evenodd" d="M9.5 3L8 4.5 11.5 8 8 11.5 9.5 13 14 8 9.5 3zm-5 0L0 8l4.5 5L6 11.5
 2.5 8 6 4.5 4.5 3z"/></svg>
 Code
 <meta itemprop="position" content="1">

 <a href="/vt-middleware/cryptacular/issues" class="js-selected-navigation-item reponav-item" data-hotkey="g i"
 data-selected-links="repo_issues repo_labels repo_milestones /vt-middleware/cryptacular/issues" itemprop="url">
 <svg aria-hidden="true" class="octicon octicon-issue-opened" height="16" version="1.1" viewBox="0 0 14 16"

```



```

width="14"><path fill-rule="evenodd" d="M7 2.3c3.14 0 5.7 2.56 5.7 5.7s-2.56 5.7-5.7 5.7A5.71 5.71 0 0 1 1.3
8c0-3.14 2.56-5.7 5.7-5.7zM7 1C3.14 1 0 4.14 0 8s3.14 7 7 7-3.14 7-7-3.14-7-7zm1 3H6v5h2V4zm0
6H6v2h2v-2z"/></svg>
 Issues
 4
 <meta itemprop="position" content="2">

 <a href="/vt-middleware/cryptacular/pulls" class="js-selected-navigation-item reponav-item" data-hotkey="g p"
data-selected-links="repo_pulls /vt-middleware/cryptacular/pulls" itemprop="url">
 <svg aria-hidden="true" class="octicon octicon-git-pull-request" height="16" version="1.1" viewBox="0 0 12
16" width="12"><path fill-rule="evenodd" d="M11 11.28V5c-.03-.78-.34-1.47-.94-2.06C9.46 2.35 8.78 2.03 8
2H7V0L4 3l3 3V4h1c.27.02.48.11.69.31.21.2.34.23.42.31.69v6.28A1.993 1.993 0 0 0 10 15a1.993 1.993 0 0 0 1-
3.72zm-1 2.92c-.66 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2zM4 3c0-1.11-
.89-2-2-2a1.993 1.993 0 0 0-1 3.72v6.56A1.993 1.993 0 0 0 2 15a1.993 1.993 0 0 0 1-3.72V4.72c.59-.34 1-.98 1-
1.72zm-.8 10c0 .66-.55 1.2-1.2 1.2-.65 0-1.2-.55-1.2-1.2 0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2zM2 4.2C1.34 4.2.8
3.65.8 3c0-.65.55-1.2 1.2-1.2.65 0 1.2.55 1.2 1.2 0 .65-.55 1.2-1.2 1.2z"/></svg>
 Pull requests
 1
 <meta itemprop="position" content="3">

 <a href="/vt-middleware/cryptacular/projects" class="js-selected-navigation-item reponav-item" data-selected-
links="repo_projects new_repo_project repo_project /vt-middleware/cryptacular/projects">
 <svg aria-hidden="true" class="octicon octicon-project" height="16" version="1.1" viewBox="0 0 15 16"
width="15"><path fill-rule="evenodd" d="M10 12h3V2h-3v10zm-4-2h3V2H6v8zm-4 4h3V2H2v12zm-1
1h13V1H1v14zM14 0H1a1 1 0 0 0-1 1v14a1 1 0 0 0 1 1h13a1 1 0 0 0 1-1V1a1 1 0 0 0-1-1z"/></svg>
 Projects
 0

<div class="reponav-dropdown js-menu-container">
 <button type="button" class="btn-link reponav-item reponav-dropdown js-menu-target " data-no-toggle aria-
expanded="false" aria-haspopup="true">
 Insights
 <svg aria-hidden="true" class="octicon octicon-triangle-down v-align-middle text-gray" height="11"
version="1.1" viewBox="0 0 12 16" width="8"><path fill-rule="evenodd" d="M0 5l6 6 6-6z"/></svg>
 </button>
 <div class="dropdown-menu-content js-menu-content">
 <div class="dropdown-menu dropdown-menu-sw">

 <svg aria-hidden="true" class="octicon octicon-pulse" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M11.5 8L8.8 5.4 6.6 8.5 5.5 1.6 2.38 8H0v2h3.6l9-1.8.9 5.4L9 8.5l1.6
1.5H14V8z"/></svg>
 Pulse

 </div>
 </div>

```

```


 <svg aria-hidden="true" class="octicon octicon-graph" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M16 14v1H0V0h1v14h15zM5 13H3V8h2v5zm4 0H7V3h2v10zm4 0h-
2V6h2v7z"/></svg>
 Graphs

 </div>
</div>
</nav>

</div>
</div>

<div class="container new-discussion-timeline experiment-repo-nav">
 <div class="repository-content">

 <a href="/vt-middlewre/cryptacular/blob/c26911e3cd28497ce9daa3ce682e09cb2d1d8688/NOTICE" class="d-
none js-permalink-shortcut" data-hotkey="y">Permalink

 <!-- blob contrib key: blob_contributors:v21:f5054b9e46039e0ad937c69e6151b7d4 -->

 <div class="file-navigation js-zeroclipboard-container">

<div class="select-menu branch-select-menu js-menu-container js-select-menu float-left">
 <button class=" btn btn-sm select-menu-button js-menu-target css-truncate" data-hotkey="w"

 type="button" aria-label="Switch branches or tags" aria-expanded="false" aria-haspopup="true">
 <i>Branch:</i>
 master
 </button>

<div class="select-menu-modal-holder js-menu-content js-navigation-container" data-pjax>

 <div class="select-menu-modal">
 <div class="select-menu-header">
 <svg aria-label="Close" class="octicon octicon-x js-menu-close" height="16" role="img" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M7.48 8l3.75-1.48 1.48L6 9.48l-3.75 3.75-
1.48-1.48L4.52 8 .77 4.25l1.48-1.48L6 5.52l3.75-3.75 1.48 1.48z"/></svg>
 Switch branches/tags
 </div>

 <div class="select-menu-filters">
 <div class="select-menu-text-filter">
 <input type="text" aria-label="Filter branches/tags" id="context-commitish-filter-field" class="form-control
js-filterable-field js-navigation-enable" placeholder="Filter branches/tags">
 </div>

```

```

<div class="select-menu-tabs">

 <li class="select-menu-tab">
 Branches

 <li class="select-menu-tab">
 Tags

</div>
</div>

```

```

<div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="branches" role="menu">

```

```

<div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

```

```

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middleware/cryptacular/blob/ISSUE-31+32/NOTICE"
 data-name="ISSUE-31+32"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 ISSUE-31+32

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middleware/cryptacular/blob/gh-pages/NOTICE"
 data-name="gh-pages"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 gh-pages

 <a class="select-menu-item js-navigation-item js-navigation-open selected"
 href="/vt-middleware/cryptacular/blob/master/NOTICE"
 data-name="master"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"

```

```

viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 master

<a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middlewre/cryptacular/blob/v1.1/NOTICE"
 data-name="v1.1"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.1

</div>

<div class="select-menu-no-results">Nothing to show</div>
</div>

<div class="select-menu-list select-menu-tab-bucket js-select-menu-tab-bucket" data-tab-filter="tags">
 <div data-filterable-for="context-commitish-filter-field" data-filterable-type="substring">

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middlewre/cryptacular/tree/v1.2.1/NOTICE"
 data-name="v1.2.1"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.2.1

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middlewre/cryptacular/tree/v1.2.0/NOTICE"
 data-name="v1.2.0"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.2.0

 <a class="select-menu-item js-navigation-item js-navigation-open "

```

```

href="/vt-middleware/cryptacular/tree/v1.1.2/NOTICE"
data-name="v1.1.2"
data-skip-pjax="true"
rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.1.2

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.1.1/NOTICE"
data-name="v1.1.1"
data-skip-pjax="true"
rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.1.1

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.1.0/NOTICE"
data-name="v1.1.0"
data-skip-pjax="true"
rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.1.0

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.0/NOTICE"
data-name="v1.0"
data-skip-pjax="true"
rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.0

<a class="select-menu-item js-navigation-item js-navigation-open "
href="/vt-middleware/cryptacular/tree/v1.0-RC6/NOTICE"
data-name="v1.0-RC6"
data-skip-pjax="true"
rel="nofollow">

```

```

 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.0-RC6

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middleware/cryptacular/tree/v1.0-RC4/NOTICE"
 data-name="v1.0-RC4"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.0-RC4

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middleware/cryptacular/tree/v1.0-RC3/NOTICE"
 data-name="v1.0-RC3"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.0-RC3

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middleware/cryptacular/tree/v1.0-RC2/NOTICE"
 data-name="v1.0-RC2"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.0-RC2

 <a class="select-menu-item js-navigation-item js-navigation-open "
 href="/vt-middleware/cryptacular/tree/v1.0-RC1/NOTICE"
 data-name="v1.0-RC1"
 data-skip-pjax="true"
 rel="nofollow">
 <svg aria-hidden="true" class="octicon octicon-check select-menu-item-icon" height="16" version="1.1"
viewBox="0 0 12 16" width="12"><path fill-rule="evenodd" d="M12 5l-8 8-4-4 1.5-1.5L4 10l6.5-6.5z"/></svg>

 v1.0-RC1


```

```


</div>

<div class="select-menu-no-results">Nothing to show</div>
</div>

</div>
</div>
</div>

<div class="BtnGroup float-right">
 <a href="/vt-middleware/cryptacular/find/master"
 class="js-pjax-capture-input btn btn-sm BtnGroup-item"
 data-pjax
 data-hotkey="t">
 Find file

 <button aria-label="Copy file path to clipboard" class="js-zeroclipboard btn btn-sm BtnGroup-item tooltiped
 tooltiped-s" data-copied-hint="Copied!" type="button">Copy path</button>
</div>
<div class="breadcrumb js-zeroclipboard-target">
 <a href="/vt-
 middleware/cryptacular">cryptacular<strong
 class="final-path">NOTICE
</div>
</div>

<div class="commit-tease">

 <a class="commit-tease-sha" href="/vt-
 middleware/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1" data-pjax>
 6dd6f19

 <relative-time datetime="2017-07-06T22:28:36Z">Jul 7, 2017</relative-time>

</div>

 dfish3r
 <a href="/vt-middleware/cryptacular/commit/6dd6f199ac3ecc3b4c5aef9e04be3bbe265a30a1"
 class="message" data-pjax="true" title="Update year in notice.">Update year in notice.
</div>

<div class="commit-tease-contributors">
 <button type="button" class="btn-link muted-link contributors-toggle" data-facebox="#blob_contributors_box">

```

```

 1
 contributor
 </button>

</div>

<div id="blob_contributors_box" style="display:none">
 <h2 class="facebox-header" data-facebox-id="facebox-header">Users who have contributed to this file</h2>
 <ul class="facebox-user-list" data-facebox-id="facebox-description">
 <li class="facebox-user-list-item">

 dfish3r

</div>
</div>

<div class="file">
 <div class="file-header">
<div class="file-actions">

 <div class="BtnGroup">
 <a href="/vt-middleware/cryptacular/raw/master/NOTICE" class="btn btn-sm BtnGroup-item" id="raw-
url">Raw
 <a href="/vt-middleware/cryptacular/blame/master/NOTICE" class="btn btn-sm js-update-url-with-hash
BtnGroup-item" data-hotkey="b">Blame
 <a href="/vt-middleware/cryptacular/commits/master/NOTICE" class="btn btn-sm BtnGroup-item"
rel="nofollow">History
 </div>

 <button type="button" class="btn-octicon disabled tooltiped tooltiped-nw"
 aria-label="You must be signed in to make or propose changes">
 <svg aria-hidden="true" class="octicon octicon-pencil" height="16" version="1.1" viewBox="0 0 14 16"
width="14"><path fill-rule="evenodd" d="M0 12v3h3l8-8-3-3-8 8zm3 2H1v-2h1v1h1v1zm10.3-9.3L12 6 9 3l1.3-
1.3a.996.996 0 0 1 1.41 0l1.59 1.59c.39.39.39 1.02 0 1.41z"/></svg>
 </button>
 <button type="button" class="btn-octicon btn-octicon-danger disabled tooltiped tooltiped-nw"
 aria-label="You must be signed in to make or propose changes">
 <svg aria-hidden="true" class="octicon octicon-trashcan" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M11 2H9c0-.55-.45-1-1-1H5c-.55 0-1 .45-1 1H2c-.55 0-1 .45-1 1v1c0
.55.45 1 1 1v9c0 .55.45 1 1 1h7c.55 0 1-.45 1-1V5c.55 0 1-.45 1-1V3c0-.55-.45-1-1-1zm-1
12H3V5h1v8h1V5h1v8h1V5h1v9zm1-10H2V3h9v1z"/></svg>
 </button>
</div>

<div class="file-info">

```



```

7 lines (5 sloc)

165 Bytes
</div>
</div>

<div itemprop="text" class="blob-wrapper data type-text">
 <table class="highlight tab-size js-file-line-container" data-tab-size="8">
 <tr>
 <td id="L1" class="blob-num js-line-number" data-line-number="1"></td>
 <td id="LC1" class="blob-code blob-code-inner js-file-line">Cryptacular Java Library</td>
 </tr>
 <tr>
 <td id="L2" class="blob-num js-line-number" data-line-number="2"></td>
 <td id="LC2" class="blob-code blob-code-inner js-file-line">Copyright (C) 2003-2017 Virginia Tech.</td>
 </tr>
 <tr>
 <td id="L3" class="blob-num js-line-number" data-line-number="3"></td>
 <td id="LC3" class="blob-code blob-code-inner js-file-line">All rights reserved.</td>
 </tr>
 <tr>
 <td id="L4" class="blob-num js-line-number" data-line-number="4"></td>
 <td id="LC4" class="blob-code blob-code-inner js-file-line">
</td>
 </tr>
 <tr>
 <td id="L5" class="blob-num js-line-number" data-line-number="5"></td>
 <td id="LC5" class="blob-code blob-code-inner js-file-line">This product includes software developed at</td>
 </tr>
 <tr>
 <td id="L6" class="blob-num js-line-number" data-line-number="6"></td>
 <td id="LC6" class="blob-code blob-code-inner js-file-line">Virginia Tech (http://www.vt.edu).</td>
 </tr>
 </table>

</div>

</div>

<button type="button" data-facebox="#jump-to-line" data-facebox-class="linejump" data-hotkey="l" class="d-
none">Jump to Line</button>
<div id="jump-to-line" style="display:none">
 <!-- "" --><!-- </textarea></xmp> --></option></form><form accept-charset="UTF-8" action="" class="js-jump-
to-line-form" method="get"><div style="margin:0;padding:0;display:inline"><input name="utf8" type="hidden"
value="✓" /></div>

```

```
<input class="form-control linejump-input js-jump-to-line-field" type="text" placeholder="Jump to line…"
aria-label="Jump to line" autofocus>
 <button type="submit" class="btn">Go</button>
</form> </div>
```

```
</div>
<div class="modal-backdrop js-touch-events"></div>
</div>
```

```
</div>
</div>
```

```
</div>
```

```
<div class="container site-footer-container">
 <div class="site-footer " role="contentinfo">
 <ul class="site-footer-links float-right">
 Contact
GitHub
 API
 Training
 Shop
 Blog
 About

```

```

 <svg aria-hidden="true" class="octicon octicon-mark-github" height="24" version="1.1" viewBox="0 0 16 16"
width="24"><path fill-rule="evenodd" d="M8 0C3.58 0 0 3.58 0 8c0 3.54 2.29 6.53 5.47 7.59 4.07 5.5-17.55-.38 0-
.19-.01-.82-.01-1.49-.2.01-1.37-2.53-.49-2.69-.94-.09-.23-.48-.94-.82-1.13-.28-.15-.68-.52-.01-.53 6.3-.01 1.08 5.8
1.23 8.2 7.2 1.21 1.87 8.7 2.33 6.6 0.7-.52 2.8-.87 5.1-1.07-1.78-.2-3.64-.89-3.64-3.95 0-.87 3.1-1.59 8.2-2.15-.08-.2-.36-
1.02 0.8-2.12 0 0 .67-.21 2.2 8.2 6.4-.18 1.32-.27 2-.27 6.8 0 1.36 0.9 2.27 1.53-1.04 2.2-.82 2.2-.82 4.4 1.1 1.6 1.92 0.8
2.12 5.1 5.6 8.2 1.27 8.2 2.15 0 3.07-1.87 3.75-3.65 3.95 2.9 2.5 5.4 7.3 5.4 1.48 0 1.07-.01 1.93-.01 2.2 0
.21 1.5 4.6 5.5 3.8 8.0 13 8.0 13 0 0 16 8c0-4.42-3.58-8-8z"/></svg>
```

```

<ul class="site-footer-links">
 © 2017 GitHub, Inc.
 Terms
 <a href="https://github.com/site/privacy" data-ga-click="Footer, go to privacy,
text:privacy">Privacy
 <a href="https://github.com/security" data-ga-click="Footer, go to security,
text:security">Security
 Status
 Help

</div>
```

```

</div>

<div id="ajax-error-message" class="ajax-error-message flash flash-error">
 <svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-.
.18.69 0 1 .19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52zM8.995 13h-2v-2h2v2zm0-3h-
2V6h2v4z"/></svg>
 <button type="button" class="flash-close js-flash-close js-ajax-error-dismiss" aria-label="Dismiss error">
 <svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M7.48 8l3.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8 .77
4.25l1.48-1.48L6 6.52l3.75-3.75 1.48 1.48z"/></svg>
 </button>
 You can't perform that action at this time.
</div>

<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/compat-
91f98c37fc84eac24836eec2567e9912742094369a04c4eba6e3cd1fa18902d9.js"></script>
<script crossorigin="anonymous" src="https://assets-cdn.github.com/assets/frameworks-
f84bb87b149685d1e6c6f057ee324f2cd496e677f5a359a8b5db853313bb83e6.js"></script>

<script async="async" crossorigin="anonymous" src="https://assets-cdn.github.com/assets/github-
13fa3aa50ac8f9fa9a7d198f0cd13b0905775d39446ad076d17d8f74a998438a.js"></script>

<div class="js-stale-session-flash stale-session-flash flash flash-warn flash-banner d-none">
 <svg aria-hidden="true" class="octicon octicon-alert" height="16" version="1.1" viewBox="0 0 16 16"
width="16"><path fill-rule="evenodd" d="M8.865 1.52c-.18-.31-.51-.5-.87-.5s-.69.19-.87.5L2.75 13.5c-.18.31-.
.18.69 0 1 .19.31.52.5.87.5h13.7c.36 0 .69-.19.86-.5.17-.31.18-.69.01-1L8.865 1.52zM8.995 13h-2v-2h2v2zm0-3h-
2V6h2v4z"/></svg>
 You signed in with another tab or window. Reload to refresh
your session.
 You signed out in another tab or window. Reload to refresh
your session.
</div>
<div class="facebox" id="facebox" style="display:none;">
<div class="facebox-popup">
 <div class="facebox-content" role="dialog" aria-labelledby="facebox-header" aria-describedby="facebox-
description">
 </div>
 <button type="button" class="facebox-close js-facebox-close" aria-label="Close modal">
 <svg aria-hidden="true" class="octicon octicon-x" height="16" version="1.1" viewBox="0 0 12 16"
width="12"><path fill-rule="evenodd" d="M7.48 8l3.75 3.75-1.48 1.48L6 9.48l-3.75 3.75-1.48-1.48L4.52 8 .77
4.25l1.48-1.48L6 6.52l3.75-3.75 1.48 1.48z"/></svg>

```

```

 </button>
</div>
</div>

</body>
</html>
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.action.get.GetAction;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.permission.Role;
import org.elasticsearch.xpack.core.security.authz.privilege.Privilege;
import org.junit.Before;

import java.util.function.Predicate;

import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.MONITOR;
import static org.elasticsearch.xpack.core.security.authz.privilege.IndexPrivilege.READ;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

public class PermissionTests extends ESTestCase {
 private Role permission;

 @Before
 public void init() {
 Role.Builder builder = Role.builder("test");
 builder.add(MONITOR, "test_*", "/foo.*");
 builder.add(READ, "baz_*foo", "/fool.*bar");
 builder.add(MONITOR, "/bar.*");
 permission = builder.build();
 }

 public void testAllowedIndicesMatcherAction() throws Exception {
 testAllowedIndicesMatcher(permission.indices().allowedIndicesMatcher(GetAction.NAME));
 }

 public void testAllowedIndicesMatcherActionCaching() throws Exception {
 Predicate<String> matcher1 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
 Predicate<String> matcher2 = permission.indices().allowedIndicesMatcher(GetAction.NAME);
 assertThat(matcher1, is(matcher2));
 }
}

```

```

public void testBuildEmptyRole() {
 Role.Builder permission = Role.builder(new String[] { "some_role" });
 Role role = permission.build();
 assertThat(role, notNullValue());
 assertThat(role.cluster(), notNullValue());
 assertThat(role.indices(), notNullValue());
 assertThat(role.runAs(), notNullValue());
}

public void testRunAs() {
 Role permission = Role.builder("some_role")
 .runAs(new Privilege("name", "user1", "run*"))
 .build();
 assertThat(permission.runAs().check("user1"), is(true));
 assertThat(permission.runAs().check("user"), is(false));
 assertThat(permission.runAs().check("run" + randomAlphaOfLengthBetween(1, 10)), is(true));
}

// "baz_*foo", "/fool.*bar/"
private void testAllowedIndicesMatcher(Predicate<String> indicesMatcher) {
 assertThat(indicesMatcher.test("foobar"), is(false));
 assertThat(indicesMatcher.test("fool"), is(false));
 assertThat(indicesMatcher.test("fool2bar"), is(true));
 assertThat(indicesMatcher.test("baz_foo"), is(true));
 assertThat(indicesMatcher.test("barbapapa"), is(false));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.xpack.security.authz.permission;

import org.elasticsearch.ElasticsearchParseException;
import org.elasticsearch.common.bytes.BytesArray;
import org.elasticsearch.common.xcontent.XContentType;
import org.elasticsearch.test.ESTestCase;
import org.elasticsearch.xpack.core.security.authz.RoleDescriptor;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissions;
import org.elasticsearch.xpack.core.security.authz.permission.FieldPermissionsDefinition;

import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collections;
import java.util.List;
import java.util.concurrent.CountDownLatch;

```

```

import java.util.concurrent.atomic.AtomicReferenceArray;

import static org.hamcrest.Matchers.containsString;

public class FieldPermissionsTests extends ESTestCase {

 public void testParseFieldPermissions() throws Exception {
 String q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
 \"field_security\": { \" +
 \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"], \" +
 \"except\": [\"f3\", \"f4\"] \" +
 \"}}}]";
 RoleDescriptor rd =
 RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
 assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
 new String[] { "f1", "f2", "f3", "f4" });
 assertEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),
 new String[] { "f3", "f4" });

 q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
 \"field_security\": { \" +
 \"except\": [\"f3\", \"f4\"], \" +
 \"grant\": [\"f1\", \"f2\", \"f3\", \"f4\"] \" +
 \"}}}]";
 rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
 assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
 new String[] { "f1", "f2", "f3", "f4" });
 assertEquals(rd.getIndicesPrivileges()[0].getDeniedFields(),
 new String[] { "f3", "f4" });

 q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
 \"field_security\": { \" +
 \"grant\": [\"f1\", \"f2\"] \" +
 \"}}}]";
 rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
 assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
 new String[] { "f1", "f2" });
 assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

 q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
 \"field_security\": { \" +
 \"grant\": [] \" +
 \"}}}]";
 rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
 assertEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
 assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

 q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +

```

```

 "\"field_security\": {\" +
 "\"except\": [],\" +
 "\"grant\": []\" +
 \"}}}\"";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertArrayEquals(rd.getIndicesPrivileges()[0].getDeniedFields(), new String[] {});

final String exceptWithoutGrant = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": \" +
 \" [\"p3\", \"field_security\": {\" +
 "\"except\": [\"f1\"]\" +
 \"}}}\"";
ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(exceptWithoutGrant), false,
 XContentType.JSON));
assertThat(e.getDetailedMessage(),
 containsString("failed to parse indices privileges for role [test]. field_security\"
 + \" requires grant if except is given"));

final String grantNull = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\",\" +
 \" \"field_security\": {\" +
 "\"grant\": null\" +
 \"}}}\"";
e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(grantNull), false,
 XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges for\" +
 \" role [test]. grant must not be null."));

final String exceptNull = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": \" +
 \" [\"p3\", \"field_security\": {\" +
 "\"grant\": [\"*\"]\",\" +
 "\"except\": null\" +
 \"}}}\"";
e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(exceptNull), false,
 XContentType.JSON));
assertThat(e.getDetailedMessage(),
 containsString("failed to parse indices privileges for role [test]. except must\" +
 \" not be null."));

final String exceptGrantNull = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": \" +
 \" [\"p3\", \"field_security\": {\" +
 "\"grant\": null,\" +
 "\"except\": null\" +
 \"}}}\"";
e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(exceptGrantNull), false,

```

```

 XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges " +
 "for role [test]. grant must not be null."));

final String bothFieldsMissing = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": \" +
 \"[\"p3\", \"field_security\": {\" +
 \"}}]}";
e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(bothFieldsMissing), false,
 XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("failed to parse indices privileges " +
 "for role [test]. \"field_security\" must not be empty."));

// try with two indices and mix order a little
q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\", \" +
 \"field_security\": {\" +
 \"grant\": []\" +
 \"}},\" +
 \"{\"names\": \"idx3\", \"n\" +
 \"field_security\": {\"n\" +
 \"grant\": [\"*\"]\", \"n\" +
 \"except\": [\"f2\"]}],\" +
 \"privileges\": [\"p3\"]}]}";
rd = RoleDescriptor.parse("test", new ByteArray(q), false, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[] {});
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
assertArrayEquals(rd.getIndicesPrivileges()[1].getGrantedFields(), new String[] {"*"});
assertArrayEquals(rd.getIndicesPrivileges()[1].getDeniedFields(), new String[] {"f2"});
}

// test old syntax for field permissions
public void testBWCFIELDPermissions() throws Exception {
 String q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\", \" +
 \"fields\": [\"f1\", \"f2\"]\" +
 \"}}]";
 RoleDescriptor rd = RoleDescriptor.parse("test", new ByteArray(q), true,
 XContentType.JSON);
 assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(),
 new String[]{"f1", "f2"});
 assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());

 final String failingQuery = q;
 ElasticsearchParseException e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(failingQuery), false,
 XContentType.JSON));
 assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
 \"changed for field permissions in role [test]\" +
 \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));
}

```



```

q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
 \"fields\": []\" +
 \"}]}";
rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
assertArrayEquals(rd.getIndicesPrivileges()[0].getGrantedFields(), new String[{}]);
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
final String failingQuery2 = q;
e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(failingQuery2), false,
 XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
 \"changed for field permissions in role [test]\" +
 \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));

q = "{\"indices\": [{\"names\": \"idx2\", \"privileges\": [\"p3\"], \" +
 \"fields\": null\" +
 \"}]}";
rd = RoleDescriptor.parse("test", new ByteArray(q), true, XContentType.JSON);
assertNull(rd.getIndicesPrivileges()[0].getGrantedFields());
assertNull(rd.getIndicesPrivileges()[0].getDeniedFields());
final String failingQuery3 = q;
e = expectThrows(ElasticsearchParseException.class,
 () -> RoleDescriptor.parse("test", new ByteArray(failingQuery3), false,
 XContentType.JSON));
assertThat(e.getDetailedMessage(), containsString("[\"fields\": [...]] format has \" +
 \"changed for field permissions in role [test]\" +
 \", use [\"field_security\": {\"grant\":[...],\"except\":[...]}] instead"));
}

public void testFieldPermissionsHashCodeThreadSafe() throws Exception {
 final int numThreads = scaledRandomIntBetween(4, 16);
 final FieldPermissions fieldPermissions =new FieldPermissions(
 new FieldPermissionsDefinition(new String[] { "*" }, new String[] { "foo" }));
 final CountdownLatch latch = new CountdownLatch(numThreads + 1);
 final AtomicReferenceArray<Integer> hashCodes = new AtomicReferenceArray<>(numThreads);
 List<Thread> threads = new ArrayList<>(numThreads);
 for (int i = 0; i < numThreads; i++) {
 final int threadNum = i;
 threads.add(new Thread() -> {
 latch.countDown();
 try {
 latch.await();
 } catch (InterruptedException e) {
 Thread.currentThread().interrupt();
 }
 });
 final int hashCode = fieldPermissions.hashCode();
 hashCodes.set(threadNum, hashCode);
 }
}

```

```

 });
}

for (Thread thread : threads) {
 thread.start();
}
latch.countDown();
for (Thread thread : threads) {
 thread.join();
}

final int hashCode = fieldPermissions.hashCode();
for (int i = 0; i < numThreads; i++) {
 assertEquals((Integer) hashCode, hashCodes.get(i));
}
}

public void testAllFieldIsAutomaticallyExcludedIfNotExplicitlyGranted() throws Exception {
 final FieldPermissions fieldPermissions = new FieldPermissions(
 new FieldPermissionsDefinition(new String[] { "_a*" }, new String[0]));
 assertTrue(fieldPermissions.grantsAccessTo("_animal"));
 assertFalse(fieldPermissions.grantsAccessTo("_all"));
}

public void testAllFieldIsNotExcludedIfExplicitlyGranted() throws Exception {
 final String[] grant = { "foo", "bar", "baz", "_all" };
 Collections.shuffle(Arrays.asList(grant), random());

 final FieldPermissions fieldPermissions = new FieldPermissions(
 new FieldPermissionsDefinition(grant, new String[0]));

 assertTrue(fieldPermissions.grantsAccessTo("_all"));
 assertTrue(fieldPermissions.grantsAccessTo("foo"));
 assertTrue(fieldPermissions.grantsAccessTo("bar"));
 assertTrue(fieldPermissions.grantsAccessTo("baz"));
 assertFalse(fieldPermissions.grantsAccessTo(randomAlphaOfLengthBetween(5, 8)));
}
}
/*
 * Copyright Elasticsearch B.V. and/or licensed to Elasticsearch B.V. under one
 * or more contributor license agreements. Licensed under the Elastic License;
 * you may not use this file except in compliance with the Elastic License.
 */
package org.elasticsearch.license;

import org.apache.http.message.BasicHeader;
import org.elasticsearch.ElasticsearchSecurityException;
import org.elasticsearch.action.DocWriteResponse;

```

```

import org.elasticsearch.action.admin.cluster.health.ClusterHealthResponse;
import org.elasticsearch.action.admin.cluster.node.stats.NodesStatsResponse;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsIndices;
import org.elasticsearch.action.admin.cluster.stats.ClusterStatsResponse;
import org.elasticsearch.action.admin.indices.stats.IndicesStatsResponse;
import org.elasticsearch.action.index.IndexResponse;
import org.elasticsearch.client.Client;
import org.elasticsearch.client.Response;
import org.elasticsearch.client.ResponseException;
import org.elasticsearch.client.transport.NoNodeAvailableException;
import org.elasticsearch.client.transport.TransportClient;
import org.elasticsearch.cluster.routing.ShardRoutingState;
import org.elasticsearch.common.network.NetworkModule;
import org.elasticsearch.common.settings.SecureString;
import org.elasticsearch.common.settings.Settings;
import org.elasticsearch.common.util.concurrent.ThreadContext;
import org.elasticsearch.discovery.DiscoveryModule;
import org.elasticsearch.node.MockNode;
import org.elasticsearch.node.Node;
import org.elasticsearch.plugins.Plugin;
import org.elasticsearch.rest.RestStatus;
import org.elasticsearch.test.SecurityIntegTestCase;
import org.elasticsearch.test.SecuritySettingsSource;
import org.elasticsearch.test.SecuritySettingsSourceField;
import org.elasticsearch.test.discovery.TestZenDiscovery;
import org.elasticsearch.test.junit.annotations.TestLogging;
import org.elasticsearch.transport.Netty4Plugin;
import org.elasticsearch.transport.Transport;
import org.elasticsearch.xpack.core.TestXPackTransportClient;
import org.elasticsearch.xpack.core.XPackField;
import org.elasticsearch.xpack.core.security.SecurityField;
import org.elasticsearch.xpack.core.security.action.user.GetUsersResponse;
import org.elasticsearch.xpack.core.security.authc.support.UsernamePasswordToken;
import org.elasticsearch.xpack.core.security.client.SecurityClient;
import org.elasticsearch.xpack.security.LocalStateSecurity;
import org.junit.After;
import org.junit.Before;

import java.nio.file.Files;
import java.nio.file.Path;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.Collection;

import static org.elasticsearch.common.xcontent.XContentFactory.jsonBuilder;
import static org.elasticsearch.test.hamcrest.ElasticsearchAssertions.assertNoFailures;
import static org.hamcrest.Matchers.containsString;
import static org.hamcrest.Matchers.greaterThanOrEqualTo;

```

```

import static org.hamcrest.Matchers.hasItem;
import static org.hamcrest.Matchers.is;
import static org.hamcrest.Matchers.notNullValue;

@TestLogging("org.elasticsearch.cluster.service:TRACE,org.elasticsearch.discovery.zen:TRACE,org.elasticsearch.
action.search:TRACE," +
 "org.elasticsearch.search:TRACE")
public class LicensingTests extends SecurityIntegTestCase {
 public static final String ROLES =
 SecuritySettingsSource.TEST_ROLE + "\n" +
 " cluster: [all]\n" +
 " indices:\n" +
 " - names: '*'\n" +
 " privileges: [manage]\n" +
 " - names: '.*'\n" +
 " privileges: [write]\n" +
 " - names: 'test'\n" +
 " privileges: [read]\n" +
 " - names: 'test1'\n" +
 " privileges: [read]\n" +
 "\n" +
 "role_a:\n" +
 " indices:\n" +
 " - names: 'a'\n" +
 " privileges: [all]\n" +
 "\n" +
 "role_b:\n" +
 " indices:\n" +
 " - names: 'b'\n" +
 " privileges: [all]\n";

 public static final String USERS =
 SecuritySettingsSource.CONFIG_STANDARD_USER +
 "user_a:{plain}passwd\n" +
 "user_b:{plain}passwd\n";

 public static final String USERS_ROLES =
 SecuritySettingsSource.CONFIG_STANDARD_USER_ROLES +
 "role_a:user_a,user_b\n" +
 "role_b:user_b\n";

 @Override
 protected String configRoles() {
 return ROLES;
 }

 @Override
 protected String configUsers() {

```

```

 return USERS;
}

@Override
protected String configUsersRoles() {
 return USERS_ROLES;
}

@Override
public Settings nodeSettings(int nodeOrdinal) {
 return Settings.builder().put(super.nodeSettings(nodeOrdinal))
 .put(NetworkModule.HTTP_ENABLED.getKey(), true)
 .put(TestZenDiscovery.USE_MOCK_PINGS.getKey(), false)
 .build();
}

@Override
protected Collection<Class<? extends Plugin>> nodePlugins() {
 ArrayList<Class<? extends Plugin>> plugins = new ArrayList<>(super.nodePlugins());
 plugins.add(Netty4Plugin.class); // for http
 return plugins;
}

@Override
protected int maxNumberOfNodes() {
 return super.maxNumberOfNodes() + 1;
}

@Before
public void resetLicensing() {
 enableLicensing();
}

@After
public void cleanupSecurityIndex() {
 deleteSecurityIndex();
}

public void testEnableDisableBehaviour() throws Exception {
 IndexResponse indexResponse = index("test", "type", jsonBuilder()
 .startObject()
 .field("name", "value")
 .endObject());
 assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

 indexResponse = index("test1", "type", jsonBuilder()
 .startObject()

```

```

 .field("name", "value1")
 .endObject());
assertEquals(DocWriteResponse.Result.CREATED, indexResponse.getResult());

refresh();
// wait for all replicas to be started (to make sure that there are no more cluster state updates when we disable
licensing)
assertBusy(() -> assertTrue(client().admin().cluster().prepareState().get().getState().routingTable()
 .shardsWithState(ShardRoutingState.INITIALIZING).isEmpty()));

Client client = internalCluster().transportClient();

disableLicensing();

assertElasticsearchSecurityException(() -> client.admin().indices().prepareStats().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareClusterStats().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareHealth().get());
assertElasticsearchSecurityException(() -> client.admin().cluster().prepareNodesStats().get());

enableLicensing(randomFrom(License.OperationMode.values()));

IndicesStatsResponse indicesStatsResponse = client.admin().indices().prepareStats().get();
assertNoFailures(indicesStatsResponse);

ClusterStatsResponse clusterStatsNodeResponse = client.admin().cluster().prepareClusterStats().get();
assertThat(clusterStatsNodeResponse, notNullValue());
ClusterStatsIndices indices = clusterStatsNodeResponse.getIndicesStats();
assertThat(indices, notNullValue());
assertThat(indices.getIndexCount(), greaterThanOrEqualTo(2));

ClusterHealthResponse clusterIndexHealth = client.admin().cluster().prepareHealth().get();
assertThat(clusterIndexHealth, notNullValue());

NodesStatsResponse nodeStats = client.admin().cluster().prepareNodesStats().get();
assertThat(nodeStats, notNullValue());
}

public void testRestAuthenticationByLicenseType() throws Exception {
 Response response = getRestClient().performRequest("GET", "");
 // the default of the licensing tests is basic
 assertThat(response.getStatusLine().getStatusCode(), is(200));
 ResponseException e = expectThrows(ResponseException.class,
 () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
 assertThat(e.getResponse().getStatusLine().getStatusCode(), is(403));

 // generate a new license with a mode that enables auth
 License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
 License.OperationMode.TRIAL,

```

```

 License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
enableLicensing(mode);
e = expectThrows(ResponseException.class, () -> getRestClient().performRequest("GET", "/"));
assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));
e = expectThrows(ResponseException.class,
 () -> getRestClient().performRequest("GET", "/_xpack/security/_authenticate"));
assertThat(e.getResponse().getStatusLine().getStatusCode(), is(401));

final String basicAuthValue =
UsernamePasswordToken.basicAuthHeaderValue(SecuritySettingsSource.TEST_USER_NAME,
 new SecureString(SecuritySettingsSourceField.TEST_PASSWORD.toCharArray()));
response = getRestClient().performRequest("GET", "/", new BasicHeader("Authorization", basicAuthValue));
assertThat(response.getStatusLine().getStatusCode(), is(200));
response = getRestClient().performRequest("GET", "/_xpack/security/_authenticate",
 new BasicHeader("Authorization", basicAuthValue));
assertThat(response.getStatusLine().getStatusCode(), is(200));

}

public void testSecurityActionsByLicenseType() throws Exception {
 // security actions should not work!
 Settings settings = internalCluster().transportClient().settings();
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 new SecurityClient(client).prepareGetUsers().get();
 fail("security actions should not be enabled!");
 } catch (ElasticsearchSecurityException e) {
 assertThat(e.status(), is(RestStatus.FORBIDDEN));
 assertThat(e.getMessage(), containsString("non-compliant"));
 }

 // enable a license that enables security
 License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
 License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
enableLicensing(mode);
 // security actions should not work!
 try (TransportClient client = new TestXPackTransportClient(settings, LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 GetUsersResponse response = new SecurityClient(client).prepareGetUsers().get();
 assertNotNull(response);
 }
}

public void testTransportClientAuthenticationByLicenseType() throws Exception {
 Settings.Builder builder = Settings.builder()

```

```

 .put(internalCluster().transportClient().settings());
// remove user info
builder.remove(SecurityField.USER_SETTING.getKey());
builder.remove(ThreadContext.PREFIX + "." + UsernamePasswordToken.BASIC_AUTH_HEADER);

// basic has no auth
try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 assertGreenClusterState(client);
}

// enable a license that enables security
License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.TRIAL,
 License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
enableLicensing(mode);

try (TransportClient client = new TestXPackTransportClient(builder.build(), LocalStateSecurity.class)) {
client.addTransportAddress(internalCluster().getDataNodeInstance(Transport.class).boundAddress().publishAddress
());
 client.admin().cluster().prepareHealth().get();
 fail("should not have been able to connect to a node!");
} catch (NoNodeAvailableException e) {
 // expected
}
}

public void testNodeJoinWithoutSecurityExplicitlyEnabled() throws Exception {
 License.OperationMode mode = randomFrom(License.OperationMode.GOLD,
License.OperationMode.PLATINUM, License.OperationMode.STANDARD);
 enableLicensing(mode);
 ensureGreen();

 Path home = createTempDir();
 Path conf = home.resolve("config");
 Files.createDirectories(conf);
 Settings nodeSettings = Settings.builder()
 .put(nodeSettings(maxNumberOfNodes() - 1).filter(s -> "xpack.security.enabled".equals(s) == false))
 .put("node.name", "my-test-node")
 .put("network.host", "localhost")
 .put("cluster.name", internalCluster().getClusterName())
 .put("discovery.zen.minimum_master_nodes",
 internalCluster().getInstance(Settings.class).get("discovery.zen.minimum_master_nodes"))
 .put("path.home", home)
 .put(TestZenDiscovery.USE MOCK PINGS.getKey(), false)
 .put(DiscoveryModule.DISCOVERY_TYPE_SETTING.getKey(), "test-zen")
 .put(DiscoveryModule.DISCOVERY_HOSTS_PROVIDER_SETTING.getKey(), "test-zen")

```



```

 .build();
 Collection<Class<? extends Plugin>> mockPlugins = Arrays.asList(LocalStateSecurity.class,
TestZenDiscovery.TestPlugin.class);
 try (Node node = new MockNode(nodeSettings, mockPlugins)) {
 node.start();
 ensureStableCluster(cluster().size() + 1);
 }
 }

 private static void assertElasticsearchSecurityException(ThrowingRunnable runnable) {
 ElasticsearchSecurityException ee = expectThrows(ElasticsearchSecurityException.class, runnable);
 assertThat(ee.getMetadata(LicenseUtils.EXPIRED_FEATURE_METADATA),
hasItem(XPackField.SECURITY));
 assertThat(ee.status(), is(RestStatus.FORBIDDEN));
 }

 public static void disableLicensing() {
 disableLicensing(License.OperationMode.BASIC);
 }

 public static void disableLicensing(License.OperationMode operationMode) {
 for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
 licenseState.update(operationMode, false);
 }
 }

 public static void enableLicensing() {
 enableLicensing(License.OperationMode.BASIC);
 }

 public static void enableLicensing(License.OperationMode operationMode) {
 for (XPackLicenseState licenseState : internalCluster().getInstances(XPackLicenseState.class)) {
 licenseState.update(operationMode, true);
 }
 }
}

```

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[role="xpack"]

[testenv="basic"]

[[delete-license]]

=== Delete License API

This API enables you to delete licensing information.

[float]

==== Request

`DELETE /\_xpack/license`

[float]

==== Description

When your license expires, {xpack} operates in a degraded mode. For more

information, see [{xpack-ref}/license-expiration.html](#)[License Expiration].

[float]

==== Authorization

You must have `manage` cluster privileges to use this API.`

For more information, see

[{xpack-ref}/security-privileges.html](#)[Security Privileges].

[float]

==== Examples

The following example queries the info API:

[source,js]

```

DELETE _xpack/license

```

```
// CONSOLE
```

```
// TEST[skip:license testing issues]
```

When the license is successfully deleted, the API returns the following response:

[source,js]

```

{
 "acknowledged": true
}

```

```
// NOTCONSOLE
```

```
[role="xpack"]
```

```
[testenv="basic"]
```

```
[[get-license]]
```

```
=== Get License API
```

This API enables you to retrieve licensing information.

[float]

==== Request

```
`GET /_xpack/license`
```

[float]

==== Description

This API returns information about the type of license, when it was issued, and when it expires, for example.

For more information about the different types of licenses, see

<https://www.elastic.co/subscriptions>.

[float]

==== Query Parameters

``local`::`

(boolean) Specifies whether to retrieve local information. The default value is ``false``, which means the information is retrieved from the master node.

[float]

==== Authorization

You must have ``monitor`` cluster privileges to use this API.

For more information, see

[{xpack-ref}/security-privileges.html](#)[Security Privileges].

[float]

==== Examples

The following example provides information about a basic license:

[source,js]

```

GET _xpack/license

// CONSOLE
```

[source,js]

```

{
 "license" : {
 "status" : "active",
 "uid" : "cbff45e7-c553-41f7-ae4f-9205eabd80xx",
 "type" : "basic",
 "issue_date" : "2018-02-22T23:12:05.550Z",
 "issue_date_in_millis" : 1519341125550,
 "max_nodes" : 1000,
 "issued_to" : "test",
 "issuer" : "elasticsearch",
 "start_date_in_millis" : -1
 }
}

// TESTRESPONSE[s/"cbff45e7-c553-41f7-ae4f-9205eabd80xx"/$body.license.uid/]
// TESTRESPONSE[s/"basic"/$body.license.type/]
```

```
// TESTRESPONSE[s/"2018-02-22T23:12:05.550Z"/$body.license.issue_date/]
// TESTRESPONSE[s/1519341125550/$body.license.issue_date_in_millis/]
// TESTRESPONSE[s/1000/$body.license.max_nodes/]
// TESTRESPONSE[s/"test"/$body.license.issued_to/]
// TESTRESPONSE[s/"elasticsearch"/$body.license.issuer/]
[role="xpack"]
[testenv="basic"]
[[update-license]]
=== Update License API
```

This API enables you to update your license.

```
[float]
==== Request
```

```
`PUT _xpack/license`
```

```
[float]
==== Description
```

You can update your license at runtime without shutting down your nodes. License updates take effect immediately. If the license you are installing does not support all of the features that were available with your previous license, however, you are notified in the response. You must then re-submit the API request with the ``acknowledge`` parameter set to ``true``.

For more information about the different types of licenses, see <https://www.elastic.co/subscriptions>.

```
[float]
==== Query Parameters
```

```
`acknowledge`::
(boolean) Specifies whether you acknowledge the license changes. The default value is `false`.
```

```
[float]
==== Request Body
```

```
`licenses`::
(array) A sequence of one or more JSON documents containing the license information.
```

```
[float]
==== Authorization
```

If `{security}` is enabled, you need ``manage`` cluster privileges to install the

license.

If {security} is enabled and you are installing a gold or platinum license, you must enable TLS on the transport networking layer before you install the license. See <<configuring-tls>>.

[float]

==== Examples

The following example updates to a basic license:

[source,js]

```

POST _xpack/license
{
 "licenses": [
 {
 "uid": "893361dc-9749-4997-93cb-802e3d7fa4xx",
 "type": "basic",
 "issue_date_in_millis": 1411948800000,
 "expiry_date_in_millis": 1914278399999,
 "max_nodes": 1,
 "issued_to": "issuedTo",
 "issuer": "issuer",
 "signature": "xx"
 }
]
}
```

```

// CONSOLE
// TEST[skip:license testing issues]
```

NOTE: These values are invalid; you must substitute the appropriate content from your license file.

You can alternatively use a `curl` command, for example:

[source,js]  
[source,shell]

```

curl -XPUT -u <user> 'http://<host>:<port>/_xpack/license' -H "Content-Type: application/json" -d @license.json

```

```
// NOTCONSOLE
```

On Windows machine, use the following command:

[source,shell]

```
gc .\license.json | Invoke-WebRequest -uri http://<host>:<port>/_xpack/license -Credential elastic -Method Put -
ContentType "application/json"
```

-----

In these examples,

- \* ``<user>`` is a user ID with the appropriate authority.
- \* ``<host>`` is the hostname of the {es} node (`localhost` if executing locally)
- \* ``<port>`` is the http port (defaults to `9200`)
- \* `license.json` is the license JSON file

NOTE: If your {es} node has SSL enabled on the HTTP interface, you must start your URL with `https://`

If you previously had a license with more features than the basic license, you receive the following response:

[source.js]

```

{
 "acknowledged": false,
 "license_status": "valid",
 "acknowledge": {
 "message": ""This license update requires acknowledgement. To acknowledge the license, please read the
following messages and update the license again, this time with the "acknowledge=true" parameter:""",
 "watcher": [
 "Watcher will be disabled"
],
 "logstash": [
 "Logstash will no longer poll for centrally-managed pipelines"
],
 "security": [
 "The following X-Pack security functionality will be disabled: ..."]
 }
}
```

-----

```
// NOTCONSOLE
```

To complete the update, you must re-submit the API request and set the `acknowledge` parameter to `true`. For example:

[source.js]

```

POST _xpack/license?acknowledge=true
{
 "licenses": [
 {
```



```

 "uid":"893361dc-9749-4997-93cb-802e3d7fa4xx",
 "type":"basic",
 "issue_date_in_millis":1411948800000,
 "expiry_date_in_millis":1914278399999,
 "max_nodes":1,
 "issued_to":"issuedTo",
 "issuer":"issuer",
 "signature":"xx"
 }
]
}

```

```

// CONSOLE
// TEST[skip:license testing issues]

```

Alternatively:

```
[source,sh]
```

```

curl -XPUT -u elastic 'http://<host>:<port>/_xpack/license?acknowledge=true' -H "Content-Type: application/json"
-d @license.json

```

```

// NOTCONSOLE

```

For more information about the features that are disabled when you downgrade your license, see [{xpack-ref}/license-expiration.html](#) [License Expiration].

```

[role="xpack"]
[[license-settings]]
=== {xpack} License Settings
++++
<titleabbrev>License Settings</titleabbrev>
++++

```

You can configure this licensing setting in the `elasticsearch.yml` file.

For more information, see

[{xpack-ref}/license-management.html](#) [`{xpack}` License Management].

```
`xpack.license.self_generated.type`::
```

Set to `basic` (default) to enable basic `{xpack}` features. +

+

--

If set to `trial`, the self-generated license gives access only to all the features of a x-pack for 30 days. You can later downgrade the cluster to a basic license if needed.

--

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```
// -----
// Transitive dependencies of this project determined from the
// maven pom organized by organization.
// -----
```

Apache Extras for Apache log4j.

From: 'an unknown organization'

- geronimo-jms\_1.1\_spec org.apache.geronimo.specs:geronimo-jms\_1.1\_spec:jar:1.0

From: 'Apache Software Foundation' (<http://www.apache.org>)

- Apache Log4j (<http://logging.apache.org/log4j/1.2/>) log4j:log4j:bundle:1.2.17

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#### ## Overview ##

[YAML](<http://yaml.org>) is a data serialization format designed for human readability and interaction with scripting languages.

SnakeYAML is a YAML processor for the Java Virtual Machine.

#### ## SnakeYAML features ##

- \* a **complete** [YAML 1.1 processor](<http://yaml.org/spec/1.1/current.html>). In particular, SnakeYAML can parse all examples from the specification.
- \* Unicode support including UTF-8/UTF-16 input/output.
- \* high-level API for serializing and deserializing native Java objects.
- \* support for all types from the [YAML types repository](<http://yaml.org/type/index.html>).
- \* relatively sensible error messages.

#### ## Info ##

- \* [Changes](<https://bitbucket.org/asomov/snakeyaml/wiki/Changes>)
- \* [Documentation](<https://bitbucket.org/asomov/snakeyaml/wiki/Documentation>)

#### ## Contribute ##

- \* Mercurial DVCS is used to dance with the [source code](<https://bitbucket.org/asomov/snakeyaml/src>).
- \* If you find a bug in SnakeYAML, please [file a bug report](<https://bitbucket.org/asomov/snakeyaml/issues?status=new&status=open>).
- \* You may discuss SnakeYAML at [the mailing list](<http://groups.google.com/group/snakeyaml-core>).

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## 1.48 html-webpack-plugin 2.29.0

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.  
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.  
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ISO C9x compliantstdint.h for Microsoft Visual Studio

Based on ISO/IEC 9899:TC2 Committee draft (May 6, 2005) WG14/N1124

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## 1.74 python-dateutil 2.7.5

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## 1.76 python-xml\_test\_script 3.3.5

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## 1.79 raf 3.4.0

## 1.80 rc-calendar 9.6.2

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## 1.95 requests 2.15.1

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""""

This module uses ctypes to bind a whole bunch of functions and constants from SecureTransport. The goal here is to provide the low-level API to SecureTransport. These are essentially the C-level functions and constants, and they're pretty gross to work with.

This code is a bastardised version of the code found in Will Bond's oscrypto library. An enormous debt is owed to him for blazing this trail for us. For

that reason, this code should be considered to be covered both by urllib3's license and by oscrypto's:

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"""

```
from __future__ import absolute_import

import platform
from ctypes.util import find_library
from ctypes import (
    c_void_p, c_int32, c_char_p, c_size_t, c_byte, c_uint32, c_ulong, c_long,
    c_bool
)
from ctypes import CDLL, POINTER, CFUNCTYPE

security_path = find_library('Security')
if not security_path:
    raise ImportError("The library Security could not be found")

core_foundation_path = find_library('CoreFoundation')
if not core_foundation_path:
    raise ImportError("The library CoreFoundation could not be found")

version = platform.mac_ver()[0]
version_info = tuple(map(int, version.split('.')))
if version_info < (10, 8):
    raise OSError(
```

```
'Only OS X 10.8 and newer are supported, not %s.%s' % (  
    version_info[0], version_info[1]  
)  
)
```

```
Security = CDLL(security_path, use_errno=True)
```

```
CoreFoundation = CDLL(core_foundation_path, use_errno=True)
```

```
Boolean = c_bool
```

```
CFIndex = c_long
```

```
CFStringEncoding = c_uint32
```

```
CFData = c_void_p
```

```
CFString = c_void_p
```

```
CFArray = c_void_p
```

```
CFMutableArray = c_void_p
```

```
CFDictionary = c_void_p
```

```
CFError = c_void_p
```

```
CFTType = c_void_p
```

```
CFTTypeID = c_ulong
```

```
CFTTypeRef = POINTER(CFTType)
```

```
CFAllocatorRef = c_void_p
```

```
OSStatus = c_int32
```

```
CFDataRef = POINTER(CFData)
```

```
CFStringRef = POINTER(CFString)
```

```
CFArrayRef = POINTER(CFArray)
```

```
CFMutableArrayRef = POINTER(CFMutableArray)
```

```
CFDictionaryRef = POINTER(CFDictionary)
```

```
CFArrayCallBacks = c_void_p
```

```
CFDictionaryKeyCallBacks = c_void_p
```

```
CFDictionaryValueCallBacks = c_void_p
```

```
SecCertificateRef = POINTER(c_void_p)
```

```
SecExternalFormat = c_uint32
```

```
SecExternalItemType = c_uint32
```

```
SecIdentityRef = POINTER(c_void_p)
```

```
SecItemImportExportFlags = c_uint32
```

```
SecItemImportExportKeyParameters = c_void_p
```

```
SecKeychainRef = POINTER(c_void_p)
```

```
SSLProtocol = c_uint32
```

```
SSLCipherSuite = c_uint32
```

```
SSLContextRef = POINTER(c_void_p)
```

```
SecTrustRef = POINTER(c_void_p)
```

```
SSLConnectionRef = c_uint32
```

```
SecTrustResultType = c_uint32
```

```
SecTrustOptionFlags = c_uint32
```

```
SSLProtocolSide = c_uint32
SSLConnectionType = c_uint32
SSLSessionOption = c_uint32
```

try:

```
Security.SecItemImport.argtypes = [
    CFDataRef,
    CFStringRef,
    POINTER(SecExternalFormat),
    POINTER(SecExternalItemType),
    SecItemImportExportFlags,
    POINTER(SecItemImportExportKeyParameters),
    SecKeychainRef,
    POINTER(CFArrayRef),
]
Security.SecItemImport.restype = OSStatus

Security.SecCertificateGetTypeID.argtypes = []
Security.SecCertificateGetTypeID.restype = CFTTypeID

Security.SecIdentityGetTypeID.argtypes = []
Security.SecIdentityGetTypeID.restype = CFTTypeID

Security.SecKeyGetTypeID.argtypes = []
Security.SecKeyGetTypeID.restype = CFTTypeID

Security.SecCertificateCreateWithData.argtypes = [
    CFAllocatorRef,
    CFDataRef
]
Security.SecCertificateCreateWithData.restype = SecCertificateRef

Security.SecCertificateCopyData.argtypes = [
    SecCertificateRef
]
Security.SecCertificateCopyData.restype = CFDataRef

Security.SecCopyErrorMessageString.argtypes = [
    OSStatus,
    c_void_p
]
Security.SecCopyErrorMessageString.restype = CFStringRef

Security.SecIdentityCreateWithCertificate.argtypes = [
    CFTypesRef,
    SecCertificateRef,
    POINTER(SecIdentityRef)
```

```

]
Security.SecIdentityCreateWithCertificate.restype = OSStatus

Security.SecKeychainCreate.argtypes = [
    c_char_p,
    c_uint32,
    c_void_p,
    Boolean,
    c_void_p,
    POINTER(SecKeychainRef)
]
Security.SecKeychainCreate.restype = OSStatus

Security.SecKeychainDelete.argtypes = [
    SecKeychainRef
]
Security.SecKeychainDelete.restype = OSStatus

Security.SecPKCS12Import.argtypes = [
    CFDataRef,
    CFDictionaryRef,
    POINTER(CFArrayRef)
]
Security.SecPKCS12Import.restype = OSStatus

SSLReadFunc = CFUNCTYPE(OSStatus, SSLConnectionRef, c_void_p, POINTER(c_size_t))
SSLWriteFunc = CFUNCTYPE(OSStatus, SSLConnectionRef, POINTER(c_byte), POINTER(c_size_t))

Security.SSLSetIOFuncs.argtypes = [
    SSLContextRef,
    SSLReadFunc,
    SSLWriteFunc
]
Security.SSLSetIOFuncs.restype = OSStatus

Security.SSLSetPeerID.argtypes = [
    SSLContextRef,
    c_char_p,
    c_size_t
]
Security.SSLSetPeerID.restype = OSStatus

Security.SSLSetCertificate.argtypes = [
    SSLContextRef,
    CFArrayRef
]
Security.SSLSetCertificate.restype = OSStatus

```



```
Security.SSLSetCertificateAuthorities.argtypes = [  
    SSLContextRef,  
    CFTypeRef,  
    Boolean  
]  
Security.SSLSetCertificateAuthorities.restype = OSStatus
```

```
Security.SSLSetConnection.argtypes = [  
    SSLContextRef,  
    SSLConnectionRef  
]  
Security.SSLSetConnection.restype = OSStatus
```

```
Security.SSLSetPeerDomainName.argtypes = [  
    SSLContextRef,  
    c_char_p,  
    c_size_t  
]  
Security.SSLSetPeerDomainName.restype = OSStatus
```

```
Security.SSLHandshake.argtypes = [  
    SSLContextRef  
]  
Security.SSLHandshake.restype = OSStatus
```

```
Security.SSLRead.argtypes = [  
    SSLContextRef,  
    c_char_p,  
    c_size_t,  
    POINTER(c_size_t)  
]  
Security.SSLRead.restype = OSStatus
```

```
Security.SSLWrite.argtypes = [  
    SSLContextRef,  
    c_char_p,  
    c_size_t,  
    POINTER(c_size_t)  
]  
Security.SSLWrite.restype = OSStatus
```

```
Security.SSLClose.argtypes = [  
    SSLContextRef  
]  
Security.SSLClose.restype = OSStatus
```

```
Security.SSLGetNumberSupportedCiphers.argtypes = [  
    SSLContextRef,
```

```
    POINTER(c_size_t)
]
Security.SSLGetNumberSupportedCiphers.restype = OSStatus
```

```
Security.SSLGetSupportedCiphers.argtypes = [
    SSLContextRef,
    POINTER(SSLCipherSuite),
    POINTER(c_size_t)
]
Security.SSLGetSupportedCiphers.restype = OSStatus
```

```
Security.SSLSetEnabledCiphers.argtypes = [
    SSLContextRef,
    POINTER(SSLCipherSuite),
    c_size_t
]
Security.SSLSetEnabledCiphers.restype = OSStatus
```

```
Security.SSLGetNumberEnabledCiphers.argtype = [
    SSLContextRef,
    POINTER(c_size_t)
]
Security.SSLGetNumberEnabledCiphers.restype = OSStatus
```

```
Security.SSLGetEnabledCiphers.argtypes = [
    SSLContextRef,
    POINTER(SSLCipherSuite),
    POINTER(c_size_t)
]
Security.SSLGetEnabledCiphers.restype = OSStatus
```

```
Security.SSLGetNegotiatedCipher.argtypes = [
    SSLContextRef,
    POINTER(SSLCipherSuite)
]
Security.SSLGetNegotiatedCipher.restype = OSStatus
```

```
Security.SSLGetNegotiatedProtocolVersion.argtypes = [
    SSLContextRef,
    POINTER(SSLProtocol)
]
Security.SSLGetNegotiatedProtocolVersion.restype = OSStatus
```

```
Security.SSLCopyPeerTrust.argtypes = [
    SSLContextRef,
    POINTER(SecTrustRef)
]
Security.SSLCopyPeerTrust.restype = OSStatus
```

```

Security.SecTrustSetAnchorCertificates.argtypes = [
    SecTrustRef,
    CFArrayRef
]
Security.SecTrustSetAnchorCertificates.restype = OSStatus

Security.SecTrustSetAnchorCertificatesOnly.argtypes = [
    SecTrustRef,
    Boolean
]
Security.SecTrustSetAnchorCertificatesOnly.restype = OSStatus

Security.SecTrustEvaluate.argtypes = [
    SecTrustRef,
    POINTER(SecTrustResultType)
]
Security.SecTrustEvaluate.restype = OSStatus

Security.SecTrustGetCertificateCount.argtypes = [
    SecTrustRef
]
Security.SecTrustGetCertificateCount.restype = CFIndex

Security.SecTrustGetCertificateAtIndex.argtypes = [
    SecTrustRef,
    CFIndex
]
Security.SecTrustGetCertificateAtIndex.restype = SecCertificateRef

Security.SSLCreateContext.argtypes = [
    CFAllocatorRef,
    SSLProtocolSide,
    SSLConnectionType
]
Security.SSLCreateContext.restype = SSLContextRef

Security.SSLSetSessionOption.argtypes = [
    SSLContextRef,
    SSLSessionOption,
    Boolean
]
Security.SSLSetSessionOption.restype = OSStatus

Security.SSLSetProtocolVersionMin.argtypes = [
    SSLContextRef,
    SSLProtocol
]

```

```

Security.SSLSetProtocolVersionMin.restype = OSStatus

Security.SSLSetProtocolVersionMax.argtypes = [
    SSLContextRef,
    SSLProtocol
]
Security.SSLSetProtocolVersionMax.restype = OSStatus

Security.SecCopyErrorMessageString.argtypes = [
    OSStatus,
    c_void_p
]
Security.SecCopyErrorMessageString.restype = CFStringRef

Security.SSLReadFunc = SSLReadFunc
Security.SSLWriteFunc = SSLWriteFunc
Security.SSLContextRef = SSLContextRef
Security.SSLProtocol = SSLProtocol
Security.SSLCipherSuite = SSLCipherSuite
Security.SecIdentityRef = SecIdentityRef
Security.SecKeychainRef = SecKeychainRef
Security.SecTrustRef = SecTrustRef
Security.SecTrustResultType = SecTrustResultType
Security.SecExternalFormat = SecExternalFormat
Security.OSStatus = OSStatus

Security.kSecImportExportPassphrase = CFStringRef.in_dll(
    Security, 'kSecImportExportPassphrase'
)
Security.kSecImportItemIdentity = CFStringRef.in_dll(
    Security, 'kSecImportItemIdentity'
)

# CoreFoundation time!
CoreFoundation.CFRetain.argtypes = [
    CFTypeRef
]
CoreFoundation.CFRetain.restype = CFTypeRef

CoreFoundation.CFRelease.argtypes = [
    CFTypeRef
]
CoreFoundation.CFRelease.restype = None

CoreFoundation.CFGetTypeID.argtypes = [
    CFTypeRef
]
CoreFoundation.CFGetTypeID.restype = CFTypeID

```

```
CoreFoundation.CFStringCreateWithCString.argtypes = [  
    CFAllocatorRef,  
    c_char_p,  
    CFStringEncoding  
]  
CoreFoundation.CFStringCreateWithCString.restype = CFStringRef
```

```
CoreFoundation.CFStringGetCStringPtr.argtypes = [  
    CFStringRef,  
    CFStringEncoding  
]  
CoreFoundation.CFStringGetCStringPtr.restype = c_char_p
```

```
CoreFoundation.CFStringGetCString.argtypes = [  
    CFStringRef,  
    c_char_p,  
    CFIndex,  
    CFStringEncoding  
]  
CoreFoundation.CFStringGetCString.restype = c_bool
```

```
CoreFoundation.CFDataCreate.argtypes = [  
    CFAllocatorRef,  
    c_char_p,  
    CFIndex  
]  
CoreFoundation.CFDataCreate.restype = CFDataRef
```

```
CoreFoundation.CFDataGetLength.argtypes = [  
    CFDataRef  
]  
CoreFoundation.CFDataGetLength.restype = CFIndex
```

```
CoreFoundation.CFDataGetBytePtr.argtypes = [  
    CFDataRef  
]  
CoreFoundation.CFDataGetBytePtr.restype = c_void_p
```

```
CoreFoundation.CFDictionaryCreate.argtypes = [  
    CFAllocatorRef,  
    POINTER(CFStringRef),  
    POINTER(CFStringRef),  
    CFIndex,  
    CFDictionaryKeyCallbacks,  
    CFDictionaryValueCallbacks  
]  
CoreFoundation.CFDictionaryCreate.restype = CFDictionaryRef
```

```

CoreFoundation.CFDictionaryGetValue.argtypes = [
    CFDictionaryRef,
    CFTypeRef
]
CoreFoundation.CFDictionaryGetValue.restype = CFTypeRef

CoreFoundation.CFArrayCreate.argtypes = [
    CFAllocatorRef,
    POINTER(CFTypeRef),
    CFIndex,
    CFArrayCallBacks,
]
CoreFoundation.CFArrayCreate.restype = CFArrayRef

CoreFoundation.CFArrayCreateMutable.argtypes = [
    CFAllocatorRef,
    CFIndex,
    CFArrayCallBacks
]
CoreFoundation.CFArrayCreateMutable.restype = CFMutableArrayRef

CoreFoundation.CFArrayAppendValue.argtypes = [
    CFMutableArrayRef,
    c_void_p
]
CoreFoundation.CFArrayAppendValue.restype = None

CoreFoundation.CFArrayGetCount.argtypes = [
    CFArrayRef
]
CoreFoundation.CFArrayGetCount.restype = CFIndex

CoreFoundation.CFArrayGetValueAtIndex.argtypes = [
    CFArrayRef,
    CFIndex
]
CoreFoundation.CFArrayGetValueAtIndex.restype = c_void_p

CoreFoundation.kCFAllocatorDefault = CFAllocatorRef.in_dll(
    CoreFoundation, 'kCFAllocatorDefault'
)
CoreFoundation.kCFTypeArrayCallBacks = c_void_p.in_dll(CoreFoundation, 'kCFTypeArrayCallBacks')
CoreFoundation.kCFTypeDictionaryKeyCallBacks = c_void_p.in_dll(
    CoreFoundation, 'kCFTypeDictionaryKeyCallBacks'
)
CoreFoundation.kCFTypeDictionaryValueCallBacks = c_void_p.in_dll(
    CoreFoundation, 'kCFTypeDictionaryValueCallBacks'
)

```

```

)

CoreFoundation.CFTypeRef = CFTypeRef
CoreFoundation.CFArrayRef = CFArrayRef
CoreFoundation.CFStringRef = CFStringRef
CoreFoundation.CFDictionaryRef = CFDictionaryRef

except (AttributeError):
    raise ImportError('Error initializing ctypes')

class CFConst(object):
    """
    A class object that acts as essentially a namespace for CoreFoundation
    constants.
    """
    kCFStringEncodingUTF8 = CFStringEncoding(0x08000100)

class SecurityConst(object):
    """
    A class object that acts as essentially a namespace for Security constants.
    """
    kSSLSessionOptionBreakOnServerAuth = 0

    kSSLProtocol2 = 1
    kSSLProtocol3 = 2
    kTLSProtocol1 = 4
    kTLSProtocol11 = 7
    kTLSProtocol12 = 8

    kSSLClientSide = 1
    kSSLStreamType = 0

    kSecFormatPEMSequence = 10

    kSecTrustResultInvalid = 0
    kSecTrustResultProceed = 1
    # This gap is present on purpose: this was kSecTrustResultConfirm, which
    # is deprecated.
    kSecTrustResultDeny = 3
    kSecTrustResultUnspecified = 4
    kSecTrustResultRecoverableTrustFailure = 5
    kSecTrustResultFatalTrustFailure = 6
    kSecTrustResultOtherError = 7

    errSSLProtocol = -9800
    errSSLWouldBlock = -9803

```

errSSLClosedGraceful = -9805  
errSSLClosedNoNotify = -9816  
errSSLClosedAbort = -9806  
  
errSSLXCertChainInvalid = -9807  
errSSLCrypto = -9809  
errSSLInternal = -9810  
errSSLCertExpired = -9814  
errSSLCertNotYetValid = -9815  
errSSLUnknownRootCert = -9812  
errSSLNoRootCert = -9813  
errSSLHostNameMismatch = -9843  
errSSLPeerHandshakeFail = -9824  
errSSLPeerUserCancelled = -9839  
errSSLWeakPeerEphemeralDHKey = -9850  
errSSLServerAuthCompleted = -9841  
errSSLRecordOverflow = -9847  
  
errSecVerifyFailed = -67808  
errSecNoTrustSettings = -25263  
errSecItemNotFound = -25300  
errSecInvalidTrustSettings = -25262

# Cipher suites. We only pick the ones our default cipher string allows.

TLS\_ECDHE\_ECDSA\_WITH\_AES\_256\_GCM\_SHA384 = 0xC02C  
TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 = 0xC030  
TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 = 0xC02B  
TLS\_ECDHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256 = 0xC02F  
TLS\_DHE\_DSS\_WITH\_AES\_256\_GCM\_SHA384 = 0x00A3  
TLS\_DHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 = 0x009F  
TLS\_DHE\_DSS\_WITH\_AES\_128\_GCM\_SHA256 = 0x00A2  
TLS\_DHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256 = 0x009E  
TLS\_ECDHE\_ECDSA\_WITH\_AES\_256\_CBC\_SHA384 = 0xC024  
TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 = 0xC028  
TLS\_ECDHE\_ECDSA\_WITH\_AES\_256\_CBC\_SHA = 0xC00A  
TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA = 0xC014  
TLS\_DHE\_RSA\_WITH\_AES\_256\_CBC\_SHA256 = 0x006B  
TLS\_DHE\_DSS\_WITH\_AES\_256\_CBC\_SHA256 = 0x006A  
TLS\_DHE\_RSA\_WITH\_AES\_256\_CBC\_SHA = 0x0039  
TLS\_DHE\_DSS\_WITH\_AES\_256\_CBC\_SHA = 0x0038  
TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_CBC\_SHA256 = 0xC023  
TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA256 = 0xC027  
TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_CBC\_SHA = 0xC009  
TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA = 0xC013  
TLS\_DHE\_RSA\_WITH\_AES\_128\_CBC\_SHA256 = 0x0067  
TLS\_DHE\_DSS\_WITH\_AES\_128\_CBC\_SHA256 = 0x0040  
TLS\_DHE\_RSA\_WITH\_AES\_128\_CBC\_SHA = 0x0033  
TLS\_DHE\_DSS\_WITH\_AES\_128\_CBC\_SHA = 0x0032



TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 = 0x009D  
TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256 = 0x009C  
TLS\_RSA\_WITH\_AES\_256\_CBC\_SHA256 = 0x003D  
TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA256 = 0x003C  
TLS\_RSA\_WITH\_AES\_256\_CBC\_SHA = 0x0035  
TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA = 0x002F

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## 1.104 spring-boot-starter-data-redis 2.0.4

## 1.105 spring-boot-starter-log4j2

## 2.0.4.RELEASE

# 1.106 spring-boot-starter-web 2.0.4.RELEASE

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# Contributions to the urllib3 project

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In chronological order:

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  - \* Stop buffering entire deflate-encoded responses.
  
- \* Tuukka Mustonen <tuukka.mustonen@gmail.com>

\* Add counter for status\_forcelist retries.

\* [Your name or handle] <[email or website]>

\* [Brief summary of your changes]

## 1.113 urllib3 1.23

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- \* Mike Miller <github@mikeage.net>
- \* Logging improvements to include the HTTP(S) port when opening a new connection
  
- \* Ioannis Tziakos <mail@itziakos.gr>
- \* Fix ``util.selectors.\_fileobj\_to\_fd`` to accept ``long``.
- \* Update appveyor tox setup to use the 64bit python.
  
- \* Akamai (through Jesse Shapiro) <jshapiro@akamai.com>
- \* Ongoing maintenance
  
- \* Dominique Leuenberger <dimstar@opensuse.org>
- \* Minor fixes in the test suite
  
- \* Will Bond <will@wbond.net>
- \* Add Python 2.6 support to ``contrib.securetransport``
  
- \* Aleksei Alekseev <alekseev.yeskela@gmail.com>
- \* using auth info for socks proxy
  
- \* Chris Wilcox <git@crwilcox.com>
- \* Improve contribution guide
- \* Add ``HTTPResponse.geturl`` method to provide ``urllib2.urlopen().geturl()`` behavior
  
- \* [Your name or handle] <[email or website]>
- \* [Brief summary of your changes]

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Aesthetica Icon Set, version 2.0

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Information

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This icon set contains 181 quality icons in the following formats:

Transparent PNG

16 x 16 px

24 x 24 px

32 x 32 px

48 x 48 px

128 x 128 px

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