



Cisco ASR 1001-X Router License Verification

This chapter provides information about verifying the Cisco IOS license level, viewing the Cisco ASR 1001-X Router license, and configuring the throughput level.

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Viewing the Cisco IOS License Level

Use the **show version** command to determine the Cisco IOS license level in the router. For example:

```
Router# show version
```

```
.  
. .  
. . .
```

```
License Level: advertenterprise
```

```
License Type: RightToUse
```

```
Next reload license Level: advertenterprise
```

```
. .
```

Table 1: show version Command Output Description

Field Name	Description
License Level: advertenterprise	Indicates the current Cisco IOS license code level.
License Type: RightToUse	Indicates whether you are utilizing a permanent (purchased) license, an evaluation 60-day license, or a Right-to-Use license that would indicate that the purchase of a license is required.
Next reload license Level: advertenterprise	Indicates the startup configuration definition that will be used for the next reload instance.

Use the **show running-config** command or the **show startup-config** command to view the license-level information. The following example displays sample output from the **show running-config** command:

```
Router# show running-config
```

```
.
.
.
```

```
license boot level adventerprise
```

```
.
.
```

Table 2: show running-config Command Output Description

Field Name	Description
license boot level adventerprise	Indicates the current requested Cisco IOS license level to boot.

Configuring the Throughput Level

The built-in embedded service processor of the Cisco ASR 1001-X Router supports throughputs of 2.5 Gbps (default), 5 Gbps, 10 Gbps, and 20 Gbps depending upon the software license.

You can upgrade the throughput of the ESP from 2.5 Gbps (default) to 5 Gbps, 10 Gbps, or 20 Gbps by applying a software-activated performance upgrade license and then reloading the router. You can upgrade the throughput of the ESP from any license level to another.

To determine the current throughput level of the ESP, run the **show platform hardware throughput level** command. The following example shows the output from this command after you apply the 20 Gbps performance upgrade license and reload the router:

```
Router# show platform hardware throughput level
The current throughput level is 2000000 kb/s
```

After the router is reloaded, the log messages at the router startup will display the license-level and throughput-level information, for example:

```
%IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Module name = asr1001x Next reboot
level = adventerprise and License = adventerprise
```

```
%IOSXE_THROUGHPUT-6-LEVEL: Throughput level has been set to 20000000 kbps
```

The following message will be displayed once every 24 hours if the traffic handled by the system-forwarding plane approaches or exceeds the configured throughput license level. The configured throughput level in this example is 20 Gbps:

1. Approached

```
Sep 9 14:54:56: %BW_LICENSE-4-THROUGHPUT_MAX_LEVEL: SIP0: cpp_ha: Average throughput
rate approached the licensed bandwidth of 2000000000 bps during 1 sampling periods in the last 24 hours,
sampling period is 300 seconds
```



Note This is a warning message and does not lead to any packet drop.

2. Exceeding 95% threshold

*May 24 09:42:41.687 EDT: %BW_LICENSE-5-THROUGHPUT_THRESHOLD_LEVEL: F0: cpp_ha: Average throughput rate exceeded 95 percent of licensed bandwidth 20000000000 bps 25 times, sample period 300 seconds, in last 24 hours



Note This is a warning message and does not lead to any packet drop.

3. Exceeded

*May 24 09:42:41.687 EDT: %BW_LICENSE-4-THROUGHPUT_MAX_LEVEL: F0: cpp_ha: Average throughput rate exceeded the total licensed bandwidth 20000000000 bps and dropped 8 times, sample period 300 seconds, in last 24 hours



Warning When this message is displayed, it is an indication that the router has started dropping packets.

For more information about the software-activated performance upgrade license, see the [Software Activation Configuration Guide, Cisco IOS XE Release 3S](#).

Viewing License Information

Use the **show license udi** command to determine the Universal Device Identifier (UDI) information of your chassis. This may be required at the time of purchasing a new license. The following example displays sample output from the **show license udi** command:

```
router# show license udi
```

```
SlotID PID SN UDI
```

```
-----
```

```
*6 ASR1001-X JAE17450EUZ ASR1001-X:JAE17450EUZ
```

```
router#
```

You can also determine the UDI information using the **show running-config** command, for example:

```
Router# show running-config
```

```
.
.
.
```

```
license udi pid ASR1001-X sn myroutersn123
```

Table 3: show running-config Command Output Description

Field Name	Description
license udi pid ASR1001-X sn myroutersn123	License identifier information (also displayed with the show license udi command).

Use the **show license all** command to display all the applicable licenses in both Primary License Storage and Built In License Storage.



Note Primary License Storage stores the currently purchased and installed licenses.

The following example displays sample output from the **show license all** command:

```
router# show license all
```

License Store: Primary License Storage

StoreIndex: 0 Feature: interface_10g Version: 1.0

License Type: Permanent

License State: Active, In Use

Lock type: Node locked

Vendor info: <UDI><PID>ASR1001-X</PID><SN>JAE17450EUZ</SN></UDI>

License Addition: Exclusive

License Generation version: 0x8100000

License Count: 2/0/0 (Active/In-use/Violation)

License Priority: Medium

License Store: Built-In License Storage

StoreIndex: 0 Feature: adventerprise Version: 1.0

License Type: RightToUse

License State: Active, In Use

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: Low

StoreIndex: 1 Feature: advipservices Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Period used: 0 minute 0 second
Lock type: Non Node locked
Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
License Addition: Additive
License Generation version: 0x8200000
License Count: Non-Counted
License Priority: None
StoreIndex: 2 Feature: avc Version: 1.0
License Type: EvalRightToUse
License State: Active, Not in Use, EULA not accepted
Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Period used: 0 minute 0 second
Lock type: Non Node locked
Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
License Addition: Additive
License Generation version: 0x8200000
License Count: Non-Counted
License Priority: None
StoreIndex: 3 Feature: fwnat_red Version: 1.0
License Type: EvalRightToUse
License State: Active, Not in Use, EULA not accepted
Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Period used: 0 minute 0 second
Lock type: Non Node locked
Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
License Addition: Additive
License Generation version: 0x8200000
License Count: Non-Counted
License Priority: None
StoreIndex: 4 Feature: ipsec Version: 1.0

License Type: EvalRightToUse
License State: Active, Not in Use, EULA not accepted
Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Period used: 0 minute 0 second
Lock type: Non Node locked
Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
License Addition: Additive
License Generation version: 0x8200000
License Count: Non-Counted
License Priority: None
StoreIndex: 5 Feature: lawful_intr Version: 1.0
License Type: EvalRightToUse
License State: Active, Not in Use, EULA not accepted
Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Period used: 0 minute 0 second
Lock type: Non Node locked
Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
License Addition: Additive
License Generation version: 0x8200000
License Count: Non-Counted
License Priority: None
StoreIndex: 6 Feature: lisp Version: 1.0
License Type: EvalRightToUse
License State: Active, Not in Use, EULA not accepted
Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Period used: 0 minute 0 second
Lock type: Non Node locked
Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
License Addition: Additive
License Generation version: 0x8200000
License Count: Non-Counted

License Priority: None

StoreIndex: 7 Feature: otv Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 8 Feature: sw_redundancy Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 7 weeks 5 days

Period used: 5 days 2 hours

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: Low

StoreIndex: 9 Feature: throughput_5g Version: 1.0

License Type: RightToUse

License State: Active, In Use

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: Low

StoreIndex: 10 Feature: throughput_10g Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 11 Feature: throughput_20g Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 12 Feature: vpls Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted
 License Priority: None
 StoreIndex: 13 Feature: interface_10g Version: 1.0
 License Type: EvalRightToUse
 License State: Inactive
 Evaluation total period: 8 weeks 4 days
 Evaluation period left: 8 weeks 1 day
 Period used: 2 days 8 hours
 Lock type: Non Node locked
 Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
 License Addition: Additive
 License Generation version: 0x8200000
 License Count: 0/0 (In-use/Violation)
 License Priority: Low
 router#

Table 4: show license all Command Output Description

Field Name	Description
License Store: Primary License Storage	Primary license storage.
License Store: Built-In License Storage	Built-in license storage.

Per Port Counted License (10-GE Interfaces)

The 10-GE interfaces on the Cisco ASR 1001-X Router use a per port counted license, which has the following features:

- Count-based licenses will be used for 10-GE ports, 1 count per port.
- An End-User License Agreement (EULA) will be displayed for each port if there is no permanent license present to support these ports.
- The image carries 2-count 10-GE port EvalRTU (Evaluation) licenses. If the EvalRTU license expires, it becomes a Right-To-Use (RTU) license.
- The **no shut** command on a 10-GE interface requests one count of the license, and the In-use count increases by 1.
- The **shut** command on a 10-GE interface releases one count of the license, and the In-use count decreases by 1.

The following EvalRTU license example displays the EvalRTU licenses used on the 10-GE ports. A Permanent license would work similarly:

StoreIndex: 13 Feature: interface_10g Version: 1.0

License Type: EvalRightToUse
 License State: Inactive
 Evaluation total period: 8 weeks 4 days
 Evaluation period left: 8 weeks 1 day
 Period used: 2 days 8 hours
 Lock type: Non Node locked
 Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
 License Addition: Additive
 License Generation version: 0x8200000
License Count: 0/0 (In-use/Violation)
 License Priority: Low
 StoreIndex: 13 Feature: interface_10g Version: 1.0
 License Type: EvalRightToUse
 License State: Active, In Use
 Evaluation total period: 8 weeks 4 days
 Evaluation period left: 2 weeks 6 days
 Period used: 5 weeks 4 days
 Transition date: Jun 09 2014 05:14:47
 Lock type: Non Node locked
 Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>
 License Addition: Additive
 License Generation version: 0x8200000
License Count: 2/0 (In-use/Violation)
 License Priority: Low

Table 5: show license all Command Output Description

Field Name	Description
License Count: 0/0 (In-use/Violation)	No 10-GE ports in use for the evaluation license.
License Count: 2/0 (In-use/Violation)	Two 10-GE ports in use for the evaluation license (a EULA was accepted for each prior to use).

10-GE Interface Evaluation License Features

The following are the features of the 10-GE Interface Evaluation license:

- There is only one 60-Day Evaluation Period countdown timer for both 10-GE ports. The timer is initiated as soon as the first of the two ports is enabled.

- A EULA will be presented, and must be accepted, the first time you enable either of the two ports in order to utilize the requested port.
- When the 60-Day Evaluation Period expires, the license automatically changes to an RTU license. As with all other RTU licenses, there is no functionality disruption or accessibility concerns following this transition.
- There can be only one active interface_10g license. Either the Permanent License or the EvalRTU License can be Active, but not both.
- As with past license implementations, the Permanent license is of higher precedence than the built-in EvalRTU license. However, when the Permanent license does not have enough port-count (that is, when the user requests both built-in 10GE ports but the Permanent License only allows for one port), the license priority changes between the Permanent and Evaluation licenses. In this case, the Evaluation License becomes Active since it can accommodate both ports. The Permanent License will automatically become Active if and when its port-count meets the user's desired configuration.

