在Cisco Unified Communications Manager(CUCM)上配置SSO并对其进行故障排除

目录

简介

本文档介绍Cisco Unified Communications Manager(CUCM)中的单点登录(SSO)功能、配置步骤、故障排除提示、示例日志分析以及其他信息的资源。

先决条件

要求

为了理解本文档，思科建议了解一些SSO术语：

- 安全断言标记语言(SAML) — 用于在各方之间交换身份验证和授权数据的开放标准
- 服务提供商(SP)- SP是托管服务的实体。在本文档中，CUCM是服务提供商
- 身份提供程序(IdP)- IdP是对客户端凭据进行身份验证的实体。身份验证对SP完全透明，因此凭据可以是智能卡、用户名/密码等。IdP对客户端的凭证进行身份验证后，会生成一个断言，将其发送到客户端，并将客户端重定向回SP
- 断言 — IdP在对用户成功进行身份验证后生成的对时间敏感的信息。此断言的目的是向SP提供有关经过身份验证的用户的信息
- 绑定 — 定义用于在实体之间传递SAML协议消息的传输方法。 思科统一通信产品使用HTTP
- 配置文件 — 预定义的限制和SAML消息内容（断言、协议、绑定）的组合，用于实现特定的业务使用案例。本培训重点介绍Web浏览器单点登录配置文件，因为这是CUCM使用的方法
- 元数据 — 各方之间交换的配置信息集。包含支持的SAML绑定、操作角色（如IdP或SP）、支持的标识符属性、标识符信息以及用于签名和加密请求或响应的证书信息等信息。

使用的组件

- 思科统一通信管理器(CUCM)12.5.1.14900-63
- Microsoft Windows Server 2016
- Active Directory联合身份验证服务(AD FS)4.0

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

背景信息

SSO的用途是允许用户和管理员访问多个思科协作应用，而无需对每个应用进行单独的身份验证。启用SSO有以下几个优势：

- 它提高了工作效率，因为用户无需在不同产品上重新输入同一身份的凭证。
- 它将身份验证从托管应用程序的系统传输到第三方系统。您可以在IdP和服务提供商之间创建一个信任圈，从而允许IdP代表SP对用户进行身份验证。
- 它提供加密以保护IdP、服务提供商和用户之间传递的身份验证信息。SSO还隐藏任何外部方在IdP和服务提供商之间传递的身份验证消息。
- 通过减少帮助台呼叫进行密码重置，可以降低成本。

信任圈

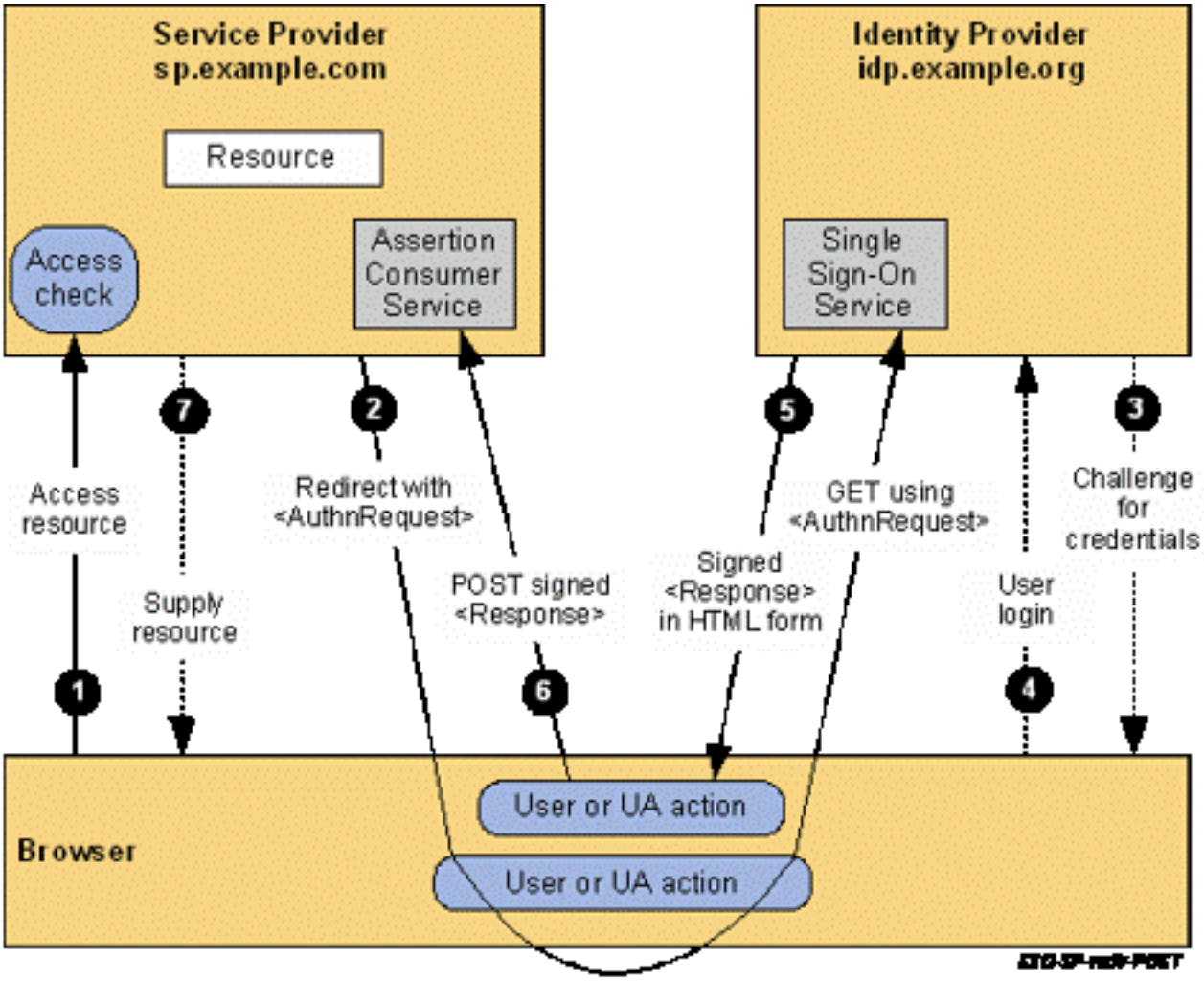
证书在SSO中扮演着非常重要的角色，它们通过元数据文件在SP和IdP之间交换。SP元数据文件包含服务提供程序的签名和加密证书以及其他一些重要信息，例如断言使用服务索引值和HTTP POST/REDIRECT信息。IdP元数据文件包含其证书以及一些有关IdP功能的其他信息。您需要将SP元数据导入IdP并将IdP元数据导入SP以创建信任圈。实质上，SP使用IdP信任的证书对生成的任何请求进行签名和加密，而IdP则使用该SP信任的证书对生成的任何声明（响应）进行签名和加密。

> **注意：**如果SP上的某些信息发生更改，例如主机名/完全限定域名(FQDN)或签名/加密证书（Tomcat或ITLRecovery），则可以打破信任循环。您需要从SP下载新的元数据文件并将其导入IdP。 如果有关IdP的某些信息更改，您需要从IdP下载新的元数据文件并重新运行SSO测试，以便可以更新SP上的信息。如果您不确定您的更改是否需要在另一台设备上更新元数据，最好更新该文件。在任一端进行元数据更新没有任何缺点，这是解决SSO问题的有效步骤，特别是在配置发生更改的情况下。

配置

网络图

标准SSO登录的流程如图所示：

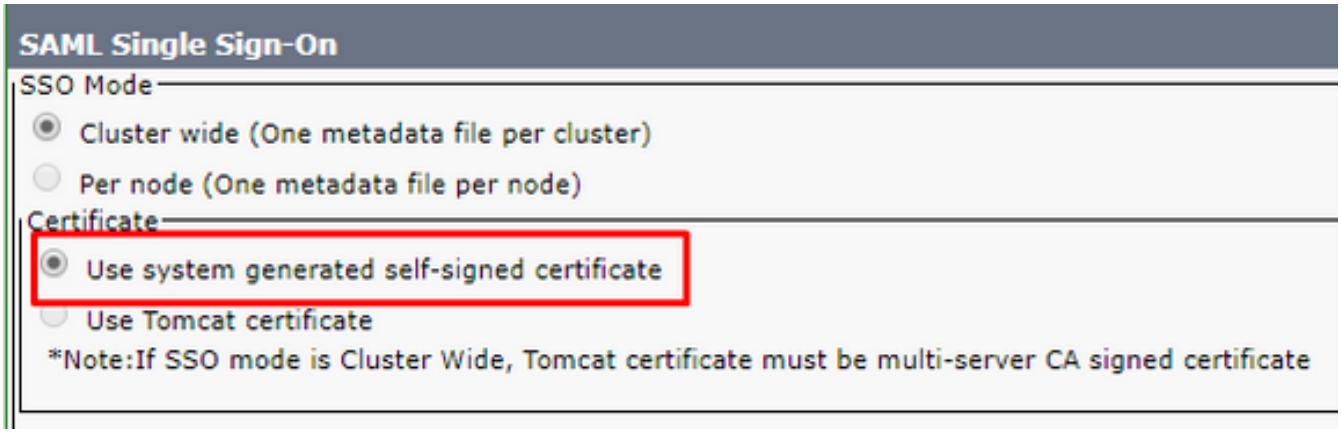


注意：图像中的过程不是按从左到右的顺序进行的。请记住，SP是CUCM，IdP是第三方应用。

配置

从CUCM的角度来看，对SSO配置很少。在CUCM 11.5及更高版本中，您可以选择集群范围或每节点SSO。

- 在CUCM 11.5中，集群范围的SSO要求在所有节点上安装多服务器tomcat证书，因为整个集群只有一个元数据文件（并且证书存储在该文件中，因此您需要每个节点具有相同的tomcat证书）。
- 在CUCM 12.0及更高版本中，您可以选择**Use system generated self-signed certificate** for Cluster wide SSO。此选项使用ITLRecovery证书而不是tomcat:



- 每个节点的SSO是CUCM 11.5之前的默认配置。在每个节点配置中，每个节点都有自己的元数据文件需要导入到IdP，因为任何这些节点都可能重定向用户进行身份验证。
- 您也可以在CUCM 11.5中启用RTMT的SSO。默认情况下启用此功能，它位于**Cisco Unified CM Administration > Enterprise Parameters > Use SSO for RTMT**。

注意：请注意，如果SSO模式是Cluster Wide，则Tomcat证书必须是多服务器CA签名证书在12.0和12.5上为错误，并且已打开一个缺陷以更正它(Cisco bug ID CSCvr49382)。

除了这些选项，SSO的其余配置在IdP上。配置步骤可能因您选择的IdP而明显不同。这些文档包含配置一些更常见的IdP的步骤：

- Microsoft AD FS配置指南
- Okta配置指南
- PingFederate配置指南
- Microsoft Azure配置指南

故障排除

要收集的数据

为了对SSO问题进行故障排除，需要将SSO跟踪设置为debug。无法通过GUI将SSO日志级别设置为调试。要将SSO日志级别设置为debug，请在CLI中运行此命令：**set samltrace level debug**

注意：此命令不是集群范围的，因此需要在可能涉及SSO日志尝试的每个节点上运行。

将日志级别设置为调试后，您需要重现问题并从CUCM收集此数据：

- **Cisco SSO日志**
- **Cisco Tomcat日志**

大多数SSO问题都会在SSO日志中生成异常或错误，但在某些情况下，Tomcat日志也会有所帮助。

示例分析

来自TAC实验室的设备信息

CUCM（服务提供商）：

- 版本：12.5.1.14900-11
- FQDN：1cucm1251.sckiewer.lab

Windows Server 2016（身份提供程序）：

- Active Directory联合身份验证服务3.0
- FQDN：WinServer2016.sckiewer.lab

CUCM日志审查

```
tomcat/logs/ssosp/log4j/

%%%%% A user has attempted to access Cisco Unified CM Administration
2021-04-30 09:00:53,156 DEBUG [http-bio-443-exec-83] filter.SSOAuthAgentFilter - servlet path
:/showHome.do
2021-04-30 09:00:53,157 DEBUG [http-bio-443-exec-83] filter.SSOAuthAgentFilter - recovery URL
:/showRecovery.do

%%%%% You can see the SP and IdP EntityIDs here
2021-04-30 09:00:53,194 DEBUG [http-bio-443-exec-83] fappend.SamlLogger - SPSSOFederate:
spEntityID is : 1cucm1251.sckiewer.lab
2021-04-30 09:00:53,194 DEBUG [http-bio-443-exec-83] fappend.SamlLogger - SPSSOFederate:
idpEntityID : http://WinServer2016.sckiewer.lab/adfs/services/trust

%%%%% The client is redirected to the SSO URL listed here
2021-04-30 09:00:53,196 DEBUG [http-bio-443-exec-83] fappend.SamlLogger - SPSSOFederate:
SingleSignOnService URL :https://winserver2016.sckiewer.lab/adfs/ls/

%%%%% CUCM prints the AssertionConsumerService URL and you can see that CUCM uses an HTTP-POST
2021-04-30 09:00:53,196 DEBUG [http-bio-443-exec-83] fappend.SamlLogger - SPSSOFederate:
AssertionConsumerService : URL
:https://1cucm1251.sckiewer.lab:8443/ssosp/saml/SSO/alias/1cucm1251.sckiewer.lab
2021-04-30 09:00:53,196 DEBUG [http-bio-443-exec-83] fappend.SamlLogger - SPSSOFederate:
AssertionConsumerService : Binding Passed in Query: urn:oasis:names:tc:SAML:2.0:bindings:HTTP-
POST
2021-04-30 09:00:53,196 DEBUG [http-bio-443-exec-83] fappend.SamlLogger - SPSSOFederate:
AssertionConsumerService : Binding : urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST

%%%%% Here CUCM prints the AuthnRequest to the client. The client is redirected to the IdP with
a 302 and this request
2021-04-30 09:00:53,199 DEBUG [http-bio-443-exec-83] fappend.SamlLogger - SPSSOFederate:
AuthnRequest:<samlp:AuthnRequest xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol"
ID="s29fd87c888ef6a4bc8c48d7e7087a8aeb997dd76f" Version="2.0" IssueInstant="2021-04-
30T13:00:53Z" Destination="https://winserver2016.sckiewer.lab/adfs/ls/" ForceAuthn="false"
IsPassive="false" AssertionConsumerServiceIndex="0">
<saml:Issuer
xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion">1cucm1251.sckiewer.lab</saml:Issuer>
<samlp:NameIDPolicy xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol"
Format="urn:oasis:names:tc:SAML:2.0:nameid-format:transient"
SPNameQualifier="1cucm1251.sckiewer.lab" AllowCreate="true"></samlp:NameIDPolicy>
</samlp:AuthnRequest>

%%%%% You can see that CUCM has received an encoded SAML response that is base64 encoded
2021-04-30 09:01:03,986 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - SAML
Response is
::PHNhbWxwOlJlc3BvbnNlIElEPSJfYTM2ZDE5ZjItM2UzZC00Yjg0LTlhNDItNGFmN2JkMWQ4YTcxIiBWZXJzaW9uPSIyLj
AiIElzc3VlSW5zdGFudD0iMjAxOS0wOC0zMFQxMzowMTowMy44OTFaIiBEZXN0aW5hdGlvbj0iaHR0cHM6Ly8xY3VjbTEyNT
Euc2NraWV3ZXIubGFiOjg0NDMvc3Nvc3Avc2FtbC9TU08vYWxpYXMvMWN1Y20xMjUxLnNja2lld2VyLmxhYiIgQ29uc2VudD
0idXJuOm9hc2lzOm5hbWVzOnRjOlNBTUw6Mi4wOmNvbnNlbnQ6dW5zcGVjaWZpZWQiIEluUmVzcG9uc2VUbz0iczI5ZmQ4N2
M4ODhlZjZhNGJjOGM0OGQ3ZTcwODdhOGFlYjk5N2RkNzZmIiB4bWxuczpzYW1scD0idXJuOm9hc2lzOm5hbWVzOnRjOlNBTU
```

w6Mi4wOnByb3RvY29sIj48SXNzdWVyIHhtbG5zPSJ1cm46b2FzaXM6bmFtZXM6dGM6U0FNTDoyLjA6YXNzZXJ0aW9uIj5odH
RwOi8vV2luU2VydmVyMjAxNi5zY2tpZXdlci5sYWIvYWRmcy9zZXJ2aWNlcy90cnVzdDwvSXNzdWVyPjxzYW1scDpTdGF0dX
M+PHNhbWxwOlN0YXR1c0NvZGUgVmFsdWU9InVybjpvYXNpczpuYW1lczp0YzpTQU1MOjIuMDpzdGF0dXM6U3VjY2VzcyIgLz
48L3NhbWxwOlN0YXR1cz48RW5jcnlwdGVkQXNzZXJ0aW9uIHhtbG5zPSJ1cm46b2FzaXM6bmFtZXM6dGM6U0FNTDoyLjA6YX
NzZXJ0aW9uIj48eGVuYzpFbmNyeXB0ZWREYXRhIFR5cGU9Imh0dHA6Ly93d3cudzMub3JnLzIwMDEvMDQveG1sZW5jI0VsZW
1lbnQiIHhtbG5zOnhlbmM9Imh0dHA6Ly93d3cudzMub3JnLzIwMDEvMDQveG1sZW5jIyI+PHhlbmM6RW5jcnlwdGlvbk1ldG
hvZCBBbGdvcml0aG09Imh0dHA6Ly93d3cudzMub3JnLzIwMDEvMDQveG1sZW5jI2FlczI1Ni1jYmMiIC8+PEtleUluZm8geG
1sbnM9Imh0dHA6Ly93d3cudzMub3JnLzIwMDAvMDkveG1sZHNpZyMiPjxlOkVuY3J5cHRlZEtleSB4bWxuczplPSJodHRwOi
8vd3d3LnczLm9yZy8yMDAxLzA0L3htbGVuYyMiPjxlOkVuY3J5cHRpb25NZXRob2QgQWxnb3JpdGhtPSJodHRwOi8vd3d3Ln
czLm9yZy8yMDAxLzA0L3htbGVuYyNyc2Etb2FlcC1tZ2YxcCI+PERpZ2VzdE1ldGhvZCBBbGdvcml0aG09Imh0dHA6Ly93d3
cudzMub3JnLzIwMDAvMDkveG1sZHNpZyNzaGExIiAvPjwvZTpFbmNyeXB0aW9uTWV0aG9kPjxLZXlJbmZvPjxkczpYNTA5RG
F0YSB4bWxuczpkcz0iaHR0cDovL3d3dy53My5vcmcvMjAwMC8wOS94bWxkc2lnIyI+PGRzOlg1MDlJc3N1ZXJTZXJpYWw+PG
RzOlg1MDlJc3N1ZXJOYW1lPkw9UlRQLCBTPU5DLCBDTj1JVExSRUNPVkVSWV8xY3VjbTEyNTEuc2NraWV3ZXIubGFiLCBPVT
1UQUMsIE89Q2lzY28sIEM9VVM8L2RzOlg1MDlJc3N1ZXJOYW1lPjxkczpYNTA5U2VyaWFsTnVtYmVyPjEzNDkzNjAzNDA3Nz
A3NTkxMzA3MzMwMTI3MjY3OTM0NDY5MjA1MzwvZHM6WDUwOVNlcmlhbE51bWJlcj48L2RzOlg1MDlJc3N1ZXJTZXJpYWw+PC
9kczpYNTA5RGF0YT48L0tleUluZm8+PGU6Q2lwaGVyRGF0YT48ZTpDaXBoZXJWYWx1ZT5uRk9uN3RjNVFwZGV6SU1TTVMxc1
RBMW55aHNJTG5VQVRLakRkNUNMNkV0L3c3R2dVeEsrZkZsaDdhaGkzVFg1ZUcweEs4QkRXMXNORHM4dm94ZEYycTduL0xmck
FPTmg4ZzUzY1ZRZWN5TEtPaGlHZDNVZDNvazl5cHkwMmlZU1pYNkNMWGtGdGR5V0l6WUIzZDBwb0paeG5pdkRNUE8zMHEzbV
RwZmNQZVgzeTdGRU5UVS9DZ1Z3dkpTdllyNDRudnZmcmRHTm9DMTRhc2pqUHFvVXJ2MEN4TnUwNThCcGQwU25JSzdhSnRQaE
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5YSVV0Qnh4emVxNi91Vjlmbkt YcFpqMy9KRWRRR3ZsOVE9PTwvZTpDaXBoZXJWYWx1ZT48L2U6Q2lwaGVyRGF0YT48L2U6RW
5jcnlwdGVkS2V5PjwvS2V5SW5mbz48eGVuYzpDaXBoZXJEYXRhPjx4ZW5jOkNpcGhlclZhbHVlPjVxeVZRYmRYaEx5L2xOdH
UvNnVQbmVUSzNIaStSc3dYVG10UnRSK1ZuQzNZMEtxU1VlWDR0TkJtNFZwclNrVUlFcDkrZDFueU9sclRPQkZNME1XUmtpbX
dKbDVGeTluWExQWXpIVndYQU5WaEFaZ3A0MEpTMXVQTlR2ZTVmY1RtbFh2UkhMR1U5WkFFbG9veGNGVDhKQloyRmJzM29NeE
5CK0J4N242bDFUZ2hpZE01M3d1Qm1xckRHWFFyQ0xJVGxOVmxMcjRJNnN4L0lmZUNJUS9KUHI3N011T20xTFk3a1BRSFFqOE
I5YlgzKzVLbUNWazhVbXFnRGZGcEVqdUl2OUdIbFVoS2FxeitGUVU4M3B5Y3B1djkvMjNQcnBIc01RTjNIQ3QvV0lDbHZPQV
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FMRk1LdE0weUxUUEcySnA4UklEaWpERDFZeU04eDN1NmIxenZrY2I2Mmo4Z2lGSWY2K1hiSkRWSVR1ZW4wa0cxeWFiM0NjZm
Y2OG8rQk1kVUFTc094UGZLVUF2UkN1WmdocDcrbFpmeEVjWlFHUnpVZ3B6MjI0TWNJVnVGbXNMVUtJMDVTVVJFNHJzaExGdX
RJRlJXNit6eXljSUlZWWFXRE5kUzUvWjRzd3lhTTQ1VFkyU1lBbW5laWYvVUwyVUMzSHphWWNta2xxak9OTG1WNFlycnN3Yj
ZxTFdOS3RrUnpJUnBpb0NZVjB3RFg4blZIRUhLNTk4RW1yclI2bWIzT0N2Y21IYnhUY2dCRGV5ZWFNd1Z1dVpxd2UrN29YOX
hZUjRZSHZTa1pVbXdOd0tmeGpvUUQrK3lKOTZ6QVFqQkpjRC81c1dOTm9ldTBJNFNtSXNmbEVkT1NRSzlzUjI5ZXJQV1J6c0
hBbkpaRVptK1I5Mm9SWU9Yd2hVb2J1WjF6bWM4dUt0K2tlMkRBVCtjU3N6bUZKbFo5SVdwQzJtSVh1RFpGdnNXLzR1QjJXWi
tWc2dYdUo4eEJ4cFB4RWhjaGNNMk5yaHJxMTZOczRuL3dhZS82Nk16NFN2Z0hkM3RjZUNheWdGOEF3a1JlSHVBM2VGRjVMWm
hrRjN3UzM0Zk9ieDhPbFhER1BMNE13M09GbVF4Q0p5ZDZtVXl6Qzk1WUhYckcvNHp2ek1YVXJ6NU9lUVBQNXRxNHl2clR6OD
lHMVFFMHJkMXZGN29PNGE0aFNPOFg0VllQdmoyT2h5Yk00ZUhOQU92K2hmTzNqeWlGTnN0SnVENlU2bVZQLzhSQjg3RWsxWH
AxNUJ5YWpMR0k0V3dFYkFJZjZtVUVSQlhrTCs4Ukh4RnVvRlVuQ1kwb0dkaGdkZGRtKzNXVlIwZXE2RjNiT1dyZVdZVjlMa3
pnMXo1VjlkR2hGazVhd0ZKQkJOZ1dDeHFJQ3RrV09URHZwRnRVRk5DUmc5dHdVb3lYQTlncnAyeEsvUURieEE4dzJFNXNpUU
VYN29VSFM3STVIbUUwdW50RkxDT2xOL2tYVXNneHpuVy90WWlESUZhSEd3bStId2pCN0I5WFhhbzB2aTZVS1Y5bnBCVngxNV
lLbXhPMkIyc282Z25JaUNzTno0c0ozOWR4YzhrWnhCYUtIYkt0c0N5aWtXRzh4VkY1cUlZTU5RV1JNTU0zam83Zk9HaElaV0
0zd0VOa1BYc1lqa3d2dExidnVSOEZRU3lIcXNwbnVYWktPQlJ3VjllMjQzMFV4Y3diM3ZsTTU1V2JndlpzSXBSdXg5aE1nSW
ZIdXlGVzJXV2lZdTJZaHZLamNpQndjL2NpQjJyVEYwc0dRNHBmY00vRWZ4S3VFbGhyY1kwbkwrVnNpVzFvem5mc2VjOXVsVn
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%%%%% Here is the encrypted SAML response from the client. You can see that the InResponseTo value matches the ID from the SAML request, so it is clear that this is a response to that request

2021-04-30 09:01:04,005 DEBUG [http-bio-8443-exec-85] fappend.SamlLogger - SPACSUtils.getResponse: got response=<samlp:Response xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol" ID="_a36d19f2-3e3d-4b84-9a42-4af7bd1d8a71" InResponseTo="s29fd87c888ef6a4bc8c48d7e7087a8aeb997dd76f" Version="2.0" IssueInstant="2021-04-30T13:01:03Z" Destination="https://1cucm1251.sckiewer.lab:8443/ssosp/saml/SSO/alias/1cucm1251.sckiewer.lab" Consent="urn:oasis:names:tc:SAML:2.0:consent:unspecified"><saml:Issuer xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion">http://WinServer2016.sckiewer.lab/adfs/services/trust</saml:Issuer><samlp:Status xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol">
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enc:CipherData></xenc:EncryptedData></EncryptedAssertion></samlp:Response>

%%%%% Here you can see that the IdP uses a supported binding type
2021-04-30 09:01:04,010 DEBUG [http-bio-8443-exec-85] fappend.SamlLogger -
SAML2Utils.verifyResponse:binding is :urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST

%%%%% The decrypted assertion is printed here. You see that a lot of important information
covered later in this doc
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator -
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def8767a391c" IssueInstant="2021-04-30T13:01:03.891Z"
Version="2.0"><Issuer>http://WinServer2016.sckiewer.lab/adfs/services/trust</Issuer><ds:Signatur
e xmlns:ds="http://www.w3.org/2000/09/xmldsig#"><ds:SignedInfo><ds:CanonicalizationMethod
Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#"/><ds:SignatureMethod
Algorithm="http://www.w3.org/2001/04/xmldsig-more#rsa-sha256"/><ds:Reference URI="#_23d2b89f-
7e75-4dc8-b154-def8767a391c"><ds:Transforms><ds:Transform
Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/><ds:Transform
Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#"/></ds:Transforms><ds:DigestMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/><ds:DigestValue>aYnlNK8NiHWHshYMggpeDsta2Gy
UKQI5MmRmx+gI374=</ds:DigestValue></ds:Reference></ds:SignedInfo><ds:SignatureValue>rvkc6QWoTCLD

```
ly8/MoRCzGcu0FJr6PSu5BTQt3qp5ua7J/AQbbzWn7gWK6TzI+xcH2478M2Smm5mIVVINXnGW4N0U62hZz/aqIEm+3YAYTnv
aytw9TFjld2rngkWzTIILAm6fslr9uZCVDHS37g0Ry2mUHYU0KHHXsbm/ouDS/F/LAm/w27X+5++U0o6g+NGE00QYwmo5hg+
tNWmMxCnLtfENi8dGE+CSRv1oklLIx1QtK3mMI13WiebxOzp9ZP8IR5J1JxkkOWt9wSGBmZO7Gr7ZUmmEFpJ13qfKtcNZ9P8
545rZ9UYHBcPH6H2uwYL0g8Awp5P74CAXHFwS1X2eg==</ds:SignatureValue><KeyInfo
xmlns="http://www.w3.org/2000/09/xmldsig#"><ds:X509Data><ds:X509Certificate>MIIC8DCCAdigAwIBAgIQ
Q2RhydxzTY1GQQ88eF3LWjANBgkqhkiG9w0BAQsFADA0MTIwMAYDVQQDEylBREZTIFNpZ25pbmcgLSBXaW5TZXJ2ZXIyMDE2
LnNja2lld2VyLmxhYjAeFw0xOTA0MTYxMjM0NDFaFw0yMDA0MTUxMjM0NDFaMDQxMjAwBgNVBAMTKUFERlMgU2lnbmluZyAt
IFdpblNlcnZlcjIwMTYuc2NraWV3ZXIubGFiMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAsR20Nb3o8UqWeP8z
17wkXJqIIYnqtbxiQXmdh4fJ4kNDno590dWFRjGTtcM+S44d6inis1lAfTWUgpsPWOCUgQWlA0o8Dyaq8UfiMIkt9ZrvMWc7
krMCgILTC3m9eeCcypm9CdPZnuoL863yfRI+2TJr6j/nbUeIVL1KzJHcDgAVtcn/p/+0aHOC7GplC0yVI67FumWagVt9EaK+
0SumclZYFyFTX641lfbpRbmcfAKrx0b10bfCkKDdCjgzXobuxlabzPp6IUb4NIsGIpm7fo7B23wHl/WIswu26XDp0IADbX25
id9bRnR6GXRbfnYj1LBxCmpBq0VHsO1G7VwR4QIDAQABMA0GCSqGSIb3DQEBCwUAA4IBAQCPckMMbI7J/AQh62rFQbt2KFXJ
yyKCHhzQKai6hwMseM/eKScqOXG1VqPEjtbXx2XdqECZ8AJu64i6iaH1oMIcjxQtepZMHqMh/sKh1565oA23cFO5DttgXeEf
yUBQe6R4lILi7m6IFapyPN3jL4+y4ggS/4VFVS02QPaQYZmTNnor2PPbOlMkq0mZO0D81MFk5ou1Np2zOGASq96/pa0Gi58B
xyEZGCLbJlTe5v5dQnGHL3/f5BmIxduer7nUOvrEb+EdarxxwNHHRLB484j0W7GVQ/g6WVzvOGd1uAMdYfrW5Djw1W42Kv15
0eSh3RJg54Kr5EsoUidrz982Z+lX</ds:X509Certificate></ds:X509Data></KeyInfo></ds:Signature><Subject
><NameID Format="urn:oasis:names:tc:SAML:2.0:nameid-format:transient"
NameQualifier="http://WinServer2016.sckiewer.lab/adfs/com/adfs/service/trust"
SPNameQualifier="1cucm1251.sckiewer.lab">SCKIEWER\admin</NameID><SubjectConfirmation
Method="urn:oasis:names:tc:SAML:2.0:cm:bearer"><SubjectConfirmationData
InResponseTo="s29fd87c888ef6a4bc8c48d7e7087a8aeb997dd76f" NotOnOrAfter="2021-04-
30T13:06:03.891Z"
Recipient="https://1cucm1251.sckiewer.lab:8443/ssosp/saml/SSO/alias/1cucm1251.sckiewer.lab"/></S
ubjectConfirmation></Subject><Conditions NotBefore="2021-04-30T13:01:03.891Z"
NotOnOrAfter="2021-04-
30T14:01:03.891Z"><AudienceRestriction><Audience>1cucm1251.sckiewer.lab</Audience></AudienceRest
riction></Conditions><AttributeStatement><Attribute
Name="uid"><AttributeValue>admin</AttributeValue></Attribute></AttributeStatement><AuthnStatemen
t AuthnInstant="2021-04-30T13:01:03.844Z" SessionIndex="_23d2b89f-7e75-4dc8-b154-
def8767a391c"><AuthnContext><AuthnContextClassRef>urn:oasis:names:tc:SAML:2.0:ac:classes:Passwor
dProtectedTransport</AuthnContextClassRef></AuthnContext></AuthnStatement></Assertion> XML
Representation

%%%%% CUCM looks at its current time and makes sure that it is within the validity timeframe of
the assertion
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - Time
Valid?:true
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - SAML
Authenticator:ProcessResponse. End of time validation
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator -
Attributes: {uid=[admin]}

%%%%% CUCM prints the username here
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - userid
is ::admin
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - Realy
state is ::/ccmadmin/showHome.do
2021-04-30 09:01:04,091 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - http
request context is ::/ssosp

%%%%% The client is redirected to the resource it initially tried to access
2021-04-30 09:01:04,283 INFO [http-bio-8443-exec-85] servlet.RelayToOriginalAppServlet -
relayUrl ::/ccmadmin/showHome.do::
2021-04-30 09:01:04,284 INFO [http-bio-8443-exec-85] servlet.RelayToOriginalAppServlet -
redirecting to ::/ccmadmin/showHome.do::
```

详细了解SAML请求和断言

SAML请求

有关SAML请求的分析和信息：

```
AuthnRequest:<samlp:AuthnRequest xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol"

%%%%% The ID from the request is returned in the assertion generated by the IdP.  This allows
CUCM to correlate the assertion with a specific request
%%%%% This log snippet was taken from CUCM 12.5, so you use the AssertionConsumerServiceIndex
rather than AssertionConsumerServiceURL (more information later in this doc)
ID="s29fd87c888ef6a4bc8c48d7e7087a8aeb997dd76f" Version="2.0" IssueInstant="2021-04-
30T13:00:53Z" Destination="https://winserver2016.sckiewer.lab/adfs/ls/" ForceAuthn="false"
IsPassive="false" AssertionConsumerServiceIndex="0">
<saml:Issuer
xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion">1cucm1251.sckiewer.lab</saml:Issuer>

%%%%% The NameID Format must be transient.
%%%%% The SP Name Qualifier allows us to see which node generated the request.
<samlp:NameIDPolicy xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol"
Format="urn:oasis:names:tc:SAML:2.0:nameid-format:transient"
SPNameQualifier="1cucm1251.sckiewer.lab" AllowCreate="true"/>
</samlp:AuthnRequest>
```

断言

有关SAML响应的分析和信息：

```
<Assertion xmlns="urn:oasis:names:tc:SAML:2.0:assertion" ID="_23d2b89f-7e75-4dc8-b154-
def8767a391c" IssueInstant="2021-04-30T13:01:03.891Z" Version="2.0">

%%%%% You can see that the issuer of the assertion was my Windows server
<Issuer>http://WinServer2016.sckiewer.lab/adfs/services/trust</Issuer>
<ds:Signature xmlns:ds="http://www.w3.org/2000/09/xmldsig#">
<ds:SignedInfo>
<ds:CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#"/>
<ds:SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#rsa-sha256"/>
<ds:Reference URI="#_23d2b89f-7e75-4dc8-b154-def8767a391c">
<ds:Transforms>
<ds:Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
<ds:Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#"/>
</ds:Transforms>
<ds:DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
<ds:DigestValue>aYnlNK8NiHWHshYMggpeDsta2GyUKQI5MmRmx+gI374=</ds:DigestValue>
</ds:Reference>
</ds:SignedInfo>
<ds:SignatureValue>rvkc6QWoTCLDly8/MoRCzGcu0FJr6PSu5BTQt3qp5ua7J/AQbbzWn7gWK6TzI+xcH2478M2Smm5mI
VVINXnGW4N0U62hZz/aqIEm+3YAYTnvaytw9TFjld2rngkWzTIILAm6fslr9uZCVDHS37g0Ry2mUHYU0KHHXsbm/ouDS/F/L
Am/w27X+5++U0o6g+NGE00QYwmo5hg+tNWmMxCnLtfENi8dGE+CSRv1oklLIx1QtK3mMI13WiebxOzp9ZP8IR5J1JxkkOWt9
wSGBmZO7Gr7ZUmmEFpJ13qfKtcNZ9P8545rZ9UYHBcPH6H2uwYL0g8Awp5P74CAXHFwS1X2eg==</ds:SignatureValue>
<KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
<ds:X509Data>
<ds:X509Certificate>MIIC8DCCAdigAwIBAgIQQ2RhydxzTY1GQQ88eF3LWjANBgkqhkiG9w0BAQsFADA0MTIwMAYDVQQD
EylBREZTIFNpZ25pbmcgLSBXaW5TZXJ2ZXIyMDE2LnNja2lld2VyLmxhYjAeFw0xOTA0MTYxMjM0NDFaFw0yMDA0MTUxMjM0
NDFaMDQxMjAwBgNVBAMTKUFERlMgU2lnbmluZyAtIFdpblNlcnZlcjIwMTYuc2NraWV3ZXIubGFiMIIBIjANBgkqhkiG9w0B
AQEFAAOCAQ8AMIIBCgKCAQEAsR20Nb3o8UqWeP8z17wkXJqIIYnqtbxiQXmdh4fJ4kNDno590dWFRjGTtcM+S44d6inis1lA
fTWUgpsPWOCUgQWlA0o8Dyaq8UfiMIkt9ZrvMWc7krMCgILTC3m9eeCcypm9CdPZnuoL863yfRI+2TJr6j/nbUeIVL1KzJHc
DgAVtcn/p/+0aHOC7GplC0yVI67FumWagVt9EaK+0SumclZYFyFTX641lfbpRbmcfAKrx0b10bfCkKDdCjgzXobuxlabzPp6
IUb4NIsGIpm7fo7B23wHl/WIswu26XDp0IADbX25id9bRnR6GXRbfnYj1LBxCmpBq0VHsO1G7VwR4QIDAQABMA0GCSqGSIb3
DQEBCwUAA4IBAQCPckMMbI7J/AQh62rFQbt2KFXJyyKCHhzQKai6hwMseM/eKScqOXG1VqPEjtbXx2XdqECZ8AJu64i6iaH1
oMIcjxQtepZMHqMh/sKh1565oA23cFO5DttgXeEfyUBQe6R4lILi7m6IFapyPN3jL4+y4ggS/4VFVS02QPaQYZmTNnor2PPb
OlMkq0mZO0D81MFk5ou1Np2zOGASq96/pa0Gi58BxyEZGCLbJlTe5v5dQnGHL3/f5BmIxduer7nUOvrEb+EdarxxwNHHRLB4
84j0W7GVQ/g6WVzvOGd1uAMdYfrW5Djw1W42Kv150eSh3RJg54Kr5EsoUidrz982Z+lX</ds:X509Certificate>
```

```
</ds:X509Data>
</KeyInfo>
</ds:Signature>
<Subject>

%%%%% The NameID Format is transient which is what CUCM expects
<NameID Format="urn:oasis:names:tc:SAML:2.0:nameid-format:transient"
NameQualifier="http://WinServer2016.sckiewer.lab/adfs/com/adfs/service/trust"
SPNameQualifier="1cucm1251.sckiewer.lab">SCKIEWER\admin</NameID>
<SubjectConfirmation Method="urn:oasis:names:tc:SAML:2.0:cm:bearer">

%%%%% You have an InResponseTo value that matches our SAML request, so you can correlate a given
assertion to a SAML request
<SubjectConfirmationData InResponseTo="s29fd87c888ef6a4bc8c48d7e7087a8aeb997dd76f"
NotOnOrAfter="2021-04-30T13:06:03.891Z"
Recipient="https://1cucm1251.sckiewer.lab:8443/ssosp/saml/SSO/alias/1cucm1251.sckiewer.lab"/>
</SubjectConfirmation>
</Subject>

%%%%% You can see here that this assertion is only to be considered valid from 13:01:03:891-
14:01:03:891 on 8/30/19
<Conditions NotBefore="2021-04-30T13:01:03.891Z" NotOnOrAfter="2021-04-30T14:01:03.891Z">
<AudienceRestriction>
<Audience>1cucm1251.sckiewer.lab</Audience>
</AudienceRestriction>
</Conditions>

%%%%% AttributeStatement is a required section that provides the ID of the user (admin in this
case) and the attribute type
<AttributeStatement>
<Attribute Name="uid">
<AttributeValue>admin</AttributeValue>
</Attribute>
</AttributeStatement>
<AuthnStatement AuthnInstant="2021-04-30T13:01:03.844Z" SessionIndex="_23d2b89f-7e75-4dc8-b154-
def8767a391c">
<AuthnContext>
<AuthnContextClassRef>urn:oasis:names:tc:SAML:2.0:ac:classes:PasswordProtectedTransport</AuthnCo
ntextClassRef>
</AuthnContext>
</AuthnStatement>
</Assertion> XML Representation
```

有用的CLI命令

- utils sso disable — 这允许您禁用SSO（如果SSO不起作用）
- utils sso status — 显示节点上SSO的当前状态
- utils sso recovery-url enable — 这允许您禁用恢复URL
- utils sso recovery-url disable — 这允许您启用恢复URL
- show samltrace level — 这显示SSO日志的当前日志级别
- set samltrace level — 这允许您设置SSO日志的日志级别。 需要将此项设置为DEBUG，以便有效地排除故障。

从AssertionConsumerServiceURL更改为AssertionConsumerServiceIndex

在CUCM 11.5中添加集群范围的SSO时，CUCM不再在SAML请求中写入AssertionConsumerService(ACS)URL。相反，CUCM会写入AssertionConsumerServiceIndex。请参阅以下来自SAML请求的片段：

CUCM 11.5.1之前的版本：

```
AssertionConsumerServiceURL="https://1cucm1101.sckiewer.lab:443/ssosp/saml/SSO/alias/1cucm1101.sckiewer.lab"
```

CUCM 11.5.1及以上版本：

```
AssertionConsumerServiceIndex="0"
```

在11.5及更高版本中，CUCM希望IdP使用请求中的ACS索引号，以便从配置过程中上传的元数据文件中查找ACS URL。此CUCM元数据片段显示与索引0关联的发布者的POST URL:

```
<md:AssertionConsumerService index="0"
Location="https://cucm14.sckiewer.lab:8443/ssosp/saml/SSO/alias/cucm14.sckiewer.lab"
Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST"/>
```

没有更改此行为的解决方法，并且IdP必须使用ACS Index值而不是ACS URL。有关详细信息，请参阅Cisco bug ID CSCvc56596。

常见问题

无法访问操作系统管理或灾难恢复

在CUCM 12.x中，Cisco Unified OS管理和灾难恢复系统Web应用使用SSO。如果在启用SSO后登录尝试这些应用程序失败并出现403错误，则可能是由于CUCM平台无法找到用户ID。出现这种情况是因为这些应用程序不引用CM管理、适用性和报告使用的终端用户表。因此，CUCM平台端不存在已验证IdP的用户ID，因此CUCM返回403 Forbidden。本文档详细说明了如何将适当的用户添加到系统中，以便平台应用程序成功使用SSO。

NTP故障

SSO对时间敏感，因为IdP为断言附加了“有效性时间范围”。为了验证问题是否出现在您的案例中，您可以在SSO日志中查找此部分：

```
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - Time
Valid?:true
2021-04-30 09:01:04,090 DEBUG [http-bio-8443-exec-85] authentication.SAMLAuthenticator - SAML
Authenticator:ProcessResponse. End of time validation
```

如果您在SSO日志中发现**Time Valid?:false**，请调查断言的Conditions部分，以确定断言必须被视为有效的时间范围：

```
<Conditions NotBefore="2021-04-30T13:01:03.891Z" NotOnOrAfter="2021-04-30T14:01:03.891Z">
<AudienceRestriction>
<Audience>1cucm1251.sckiewer.lab</Audience>
</AudienceRestriction>
</Conditions>
```

您可以在示例代码片段中看到，此断言仅在2021年4月30日13:01:03:8917到14:01:03:8917之间有效。在故障场景中，请参阅CUCM收到此断言的时间，并验证它是否处于断言的有效期内。如果CUCM处理断言的时间超出了有效期，则这是问题的原因。确保CUCM和IdP都同步到同一NTP服务器，因为SSO非常时间敏感。

无效的属性语句

请参阅此处对断言的分析并查看有关attribute语句的说明。思科统一通信产品要求IdP提供属性语句，但有时候IdP不发送属性语句。作为参考，这是一个有效的AttributeStatement:

```
<AttributeStatement>
<Attribute Name="uid">
<AttributeValue>admin</AttributeValue>
</Attribute>
</AttributeStatement>
```

如果您看到来自IdP的断言，但省略了属性语句，则需要与IdP软件的供应商合作进行必要的更改，以便它提供此语句。此修复程序因IdP而异，在有些情况下，此语句中可发送的信息可能多于在代码片段中看到的信息。只要Attribute Name设置为uid，且AttributeValue与CUCM数据库中具有正确权限的用户匹配，登录就会成功。

两个签名证书 — AD FS

此问题特定于Microsoft AD FS。当AD FS上的签名证书接近到期时，Windows Server会自动生成新证书，但保留旧证书直到到期。发生这种情况时，AD FS元数据包含两个签名证书。在此时间范围内尝试运行SSO测试时，您可以看到的错误消息是**处理SAML响应时出错**。

> **注意：处理SAML响应**时也会显示其他问题，因此如果看到此错误，不要认为这是您的问题。请务必检查要验证的SSO日志。

如果看到此错误，请查看SSO日志并查找以下内容：

```
2018-12-26 13:49:59,581 ERROR [http-bio-443-exec-45] authentication.SAMLAuthenticator - Error
while processing saml response The signing certificate does not match what's defined in the
entity metadata.
com.sun.identity.saml2.common.SAML2Exception: The signing certificate does not match what's
defined in the entity metadata.
```

此错误表示导入到CUCM的IdP元数据包含与此SAML交换中使用的IdP不匹配的签名证书。此错误通常是由于AD FS具有两个签名证书。 当原始证书即将到期时，AD FS会自动生成新证书。 您必须从AD FS下载新的元数据文件，验证它只有一个签名和加密证书，然后将其导入CUCM。其他IdP还有需要更新的签名证书，因此可能有人手动更新了它，但只是没有将包含新证书的新元数据文件导入到CUCM。

如果遇到上述错误：

- 如果使用AD FS，请参阅Cisco Bug ID CSCuj66703
- 如果不使用AD FS，请从IdP收集新的元数据文件并将其导入CUCM

响应中的状态代码无效

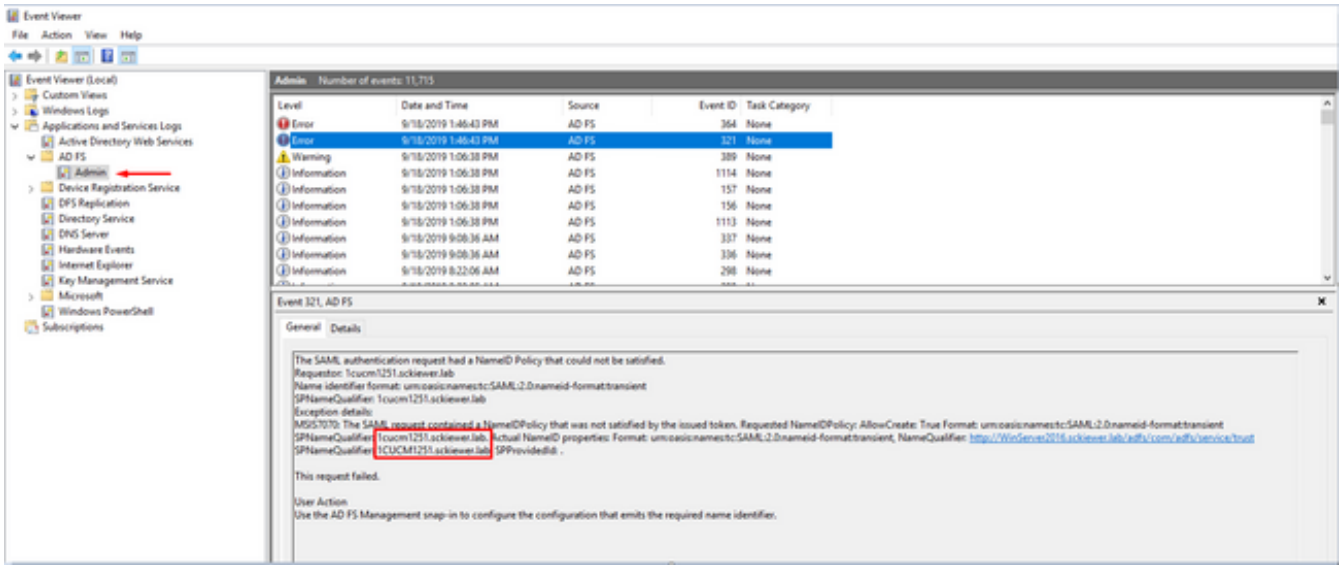
这是使用AD FS的部署中的常见错误：

```
Invalid Status code in Response. This may be caused by a configuration error in the IDP. Please
check the IDP logs and configuration.
```

在几乎所有情况下，这都是AD FS端索赔规则的问题。我建议先将规则粘贴到记事本中，添加您的

实体ID，然后将规则从记事本粘贴到AD FS中。在某些情况下，直接从电子邮件或浏览器复制/粘贴可能会忽略某些标点并引起语法错误。

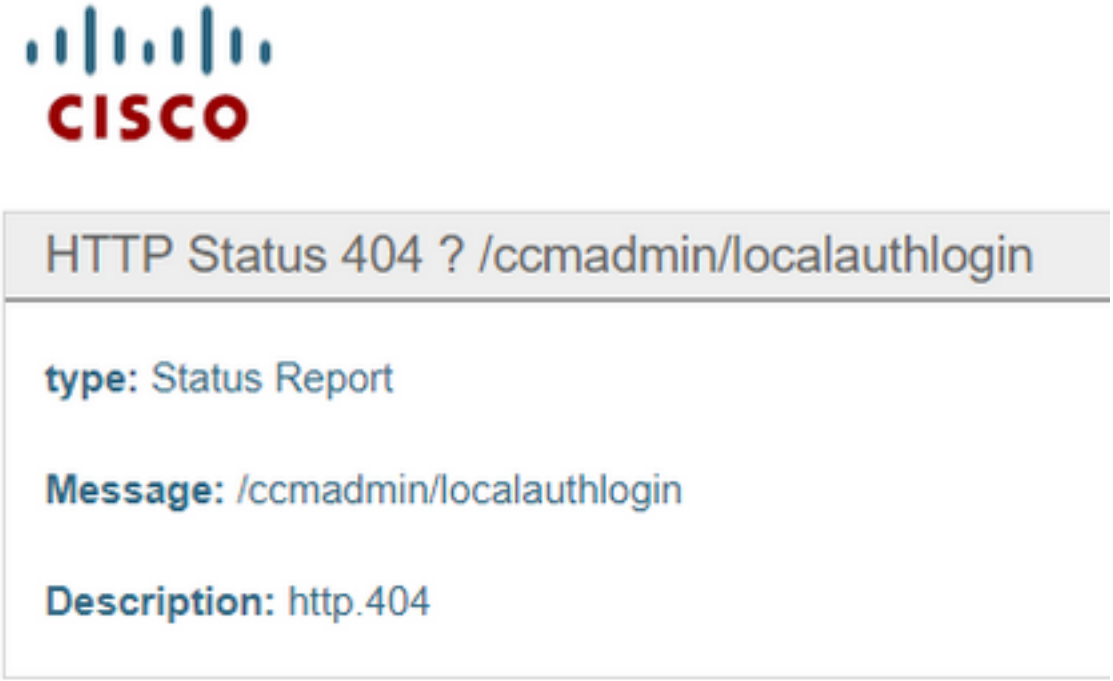
声明规则的另一个常见问题是IdP或SP FQDN的大小与元数据文件中的entityID不匹配。您需要检查Windows Server上的事件查看器日志，以确定这是否是您的问题。



在映像中可以看到，请求的NameID是1cucm1251.sckiewer.lab，而实际的NameID是1CUCM1251.sckiewer.lab。 在声明规则中设置实际名称ID时，请求的NameID必须与SP元数据文件中的entityID匹配。 要解决此问题，我需要用小写FQDN更新SP的声明规则。

CLI和GUI之间的SSO状态不匹配

在某些情况下，**utils sso status**和GUI可以显示有关SSO是启用还是禁用的不同信息。 解决此问题的最简单方法是禁用和重新启用SSO。有相当多的文件和引用可以通过启用过程更新，因此尝试手动更新所有这些文件是不可行的。 在大多数情况下，您可以登录GUI并禁用和重新启用而不出现任何问题， 当您尝试通过恢复URL或主链接访问发布服务器时，可能会看到此错误：



您可以检查GUI以查看恢复URL是否是一个选项，还可以检查CLI的**utils sso status**输出：

```
admin:utils sso status
SSO Status: SAML SSO Enabled
IdP Metadata Imported Date = Fri Apr 09 09:09:00 EDT 2021
SP Metadata Exported Date = Fri Apr 02 15:00:42 EDT 2021
SSO Test Result Date = Fri Apr 09 09:10:39 EDT 2021
SAML SSO Test Status = passed
Recovery URL Status = enabled
Entity ID = http://WinServer2016.sckiewer.lab/adfs/services/trust
```

接下来，您需要检查进程节点表。 在本示例中，您可以看到数据库中禁用了SSO（请参阅最右侧1cucm1251.sckiewer.lab的tkssomode值）：

```
admin:run sql select pkid,name,tkssomode from processnode
pkid name tkssomode
==================================== ================= =========
00000000-1111-0000-0000-000000000000 EnterpriseWideData 0
04bff76f-ba8c-456e-8e8f-5708ce321c20 1cucm1251.sckiewer.lab 0

admin:run sql select * from typessomode enum name moniker ==== ========== ================== 0
Disable SSO_MODE_DISABLE 1 Agent Flow SSO_MODE_AGENT_FLOW 2 SAML SSO_MODE_SAML
```

要解决此问题，您需要将进程节点表上的tkssomode字段重新设置为2，以便可以通过恢复URL登录：

```
admin:run sql update processnode set tkssomode='2' where name ='1cucm1251.sckiewer.lab'
Rows: 1

admin:run sql select pkid,name,tkssomode from processnode
pkid name tkssomode
==================================== ================= =========
00000000-1111-0000-0000-000000000000 EnterpriseWideData 0
04bff76f-ba8c-456e-8e8f-5708ce321c20 1cucm1251.sckiewer.lab 2
```

此时，测试恢复URL并继续执行**Disable > Re-enable of SSO**，这将触发CUCM更新系统中的所有引用。

相关信息

- [思科统一通信应用SAML SSO部署指南，版本12.5(1)]
- [安全断言标记语言(SAML)V2.0技术概述]
- [技术支持和文档 - Cisco Systems]

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