SAML Authentication with Pulse Connect Secure and Pulse Secure Virtual Traffic Manager

Deployment Guide

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SAML Authentication with Pulse Connect Secure and Pulse Secure Virtual Traffic Manager

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Introduction

Purpose of this Guide

An enterprise can deploy a secure SAML-based Identity Provider (IdP) to handle authentication for web services, applications, and resources delivered by one or more Service Providers (SPs).

This guide describes how to configure Pulse Secure Virtual Traffic Manager (the Traffic Manager) for SP–initiated SAML authentication with Pulse Connect Secure (PCS) acting as the IdP.

Prerequisites

This guide assumes you are familiar with the SAML protocol, SAML-based authentication methods, and terms such as SP and IdP.

The Traffic Manager supports configuration as a SAML SP from version 17.4 or later.

PCS supports configuration as a SAML IdP from version 8.2R1 or later.

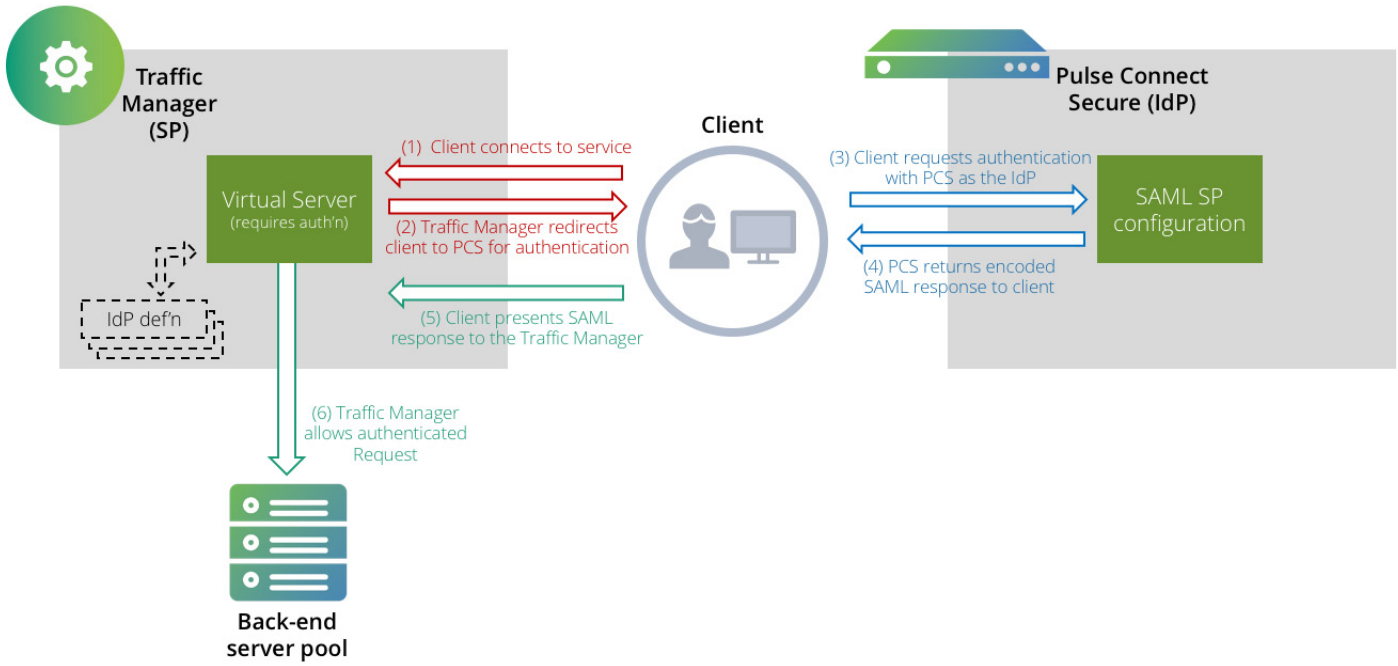
Overview

The Traffic Manager can function as a SAML SP to control access to your secure back-end web services. Access to these services is permitted only when the client presents a valid Traffic Manager authentication cookie.

In a typical scenario, a user's browser connects to the Traffic Manager to access a service. For the requested service, the Traffic Manager is configured to obtain prior validation, and thus redirects the browser to PCS to be authenticated. PCS checks the identity of the user against its own records, and obtains verification that the user has appropriate privileges for the desired service. If successful, PCS returns the browser to the Traffic Manager with a SAML assertion that the user is legitimate and has the declared identity (typically the email address).

An SP requires a SAML response from the IdP only during the initial authentication exchange.

FIGURE 1 The SAML message exchange between a client, the Traffic Manager, and PCS.



Summary of Configuration

The Traffic Manager requires certain IDP-derived details from PCS as part of its SAML configuration, and must also provide PCS with specific configuration items in return. To operate successfully, your SAML configuration must match on both the Traffic Manager and PCS.

To apply authentication control to your services, perform the following steps:

1. Configure the Traffic Manager with PCS as the defined IdP.
2. Configure PCS to operate as a SAML IdP, with details of the Traffic Manager as an active SP.
3. Configure your designated Traffic Manager virtual servers as SAML SP endpoints.

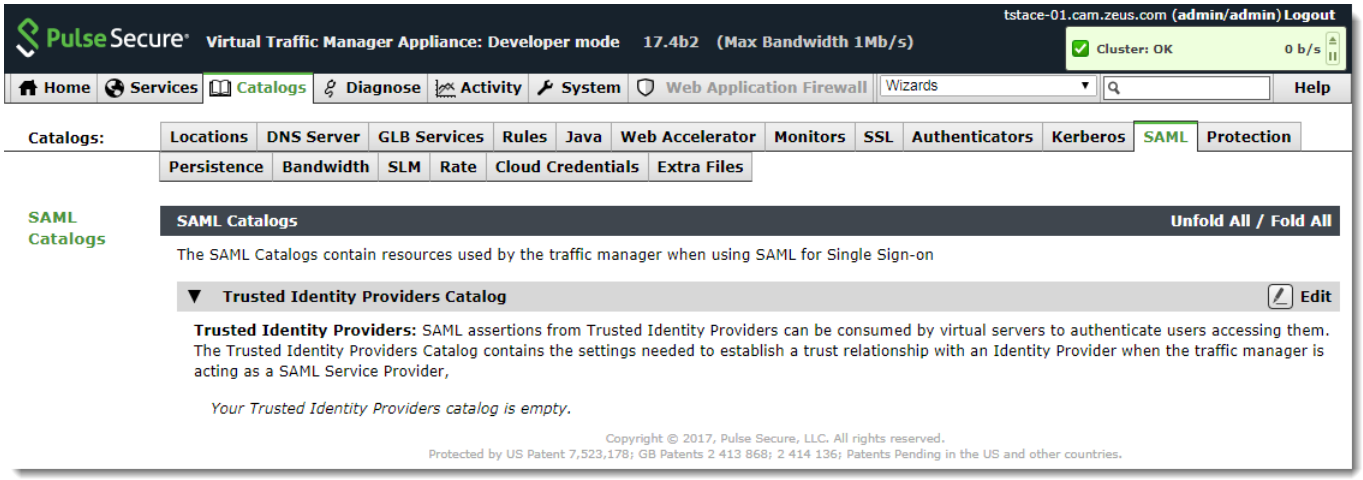
The remainder of this guide describes each of these steps in detail.

Configuring the Traffic Manager with PCS as an Identity Provider (IdP)

To configure Pulse Connect Secure as a Trusted Identity Provider in the Traffic Manager, perform the following steps:

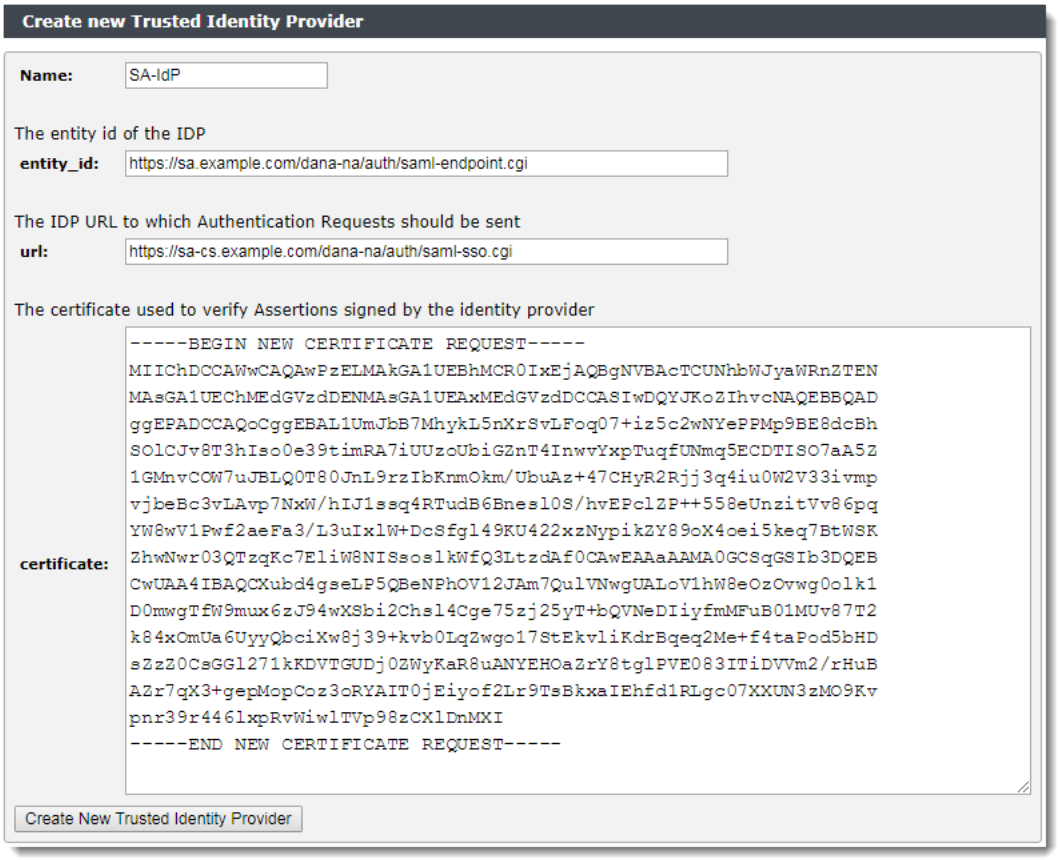
1. Login to the Traffic Manager Admin UI and navigate to **Catalogs > SAML > Trusted Identity Providers Catalog**.

FIGURE 2 The Trusted Identity Providers Catalog



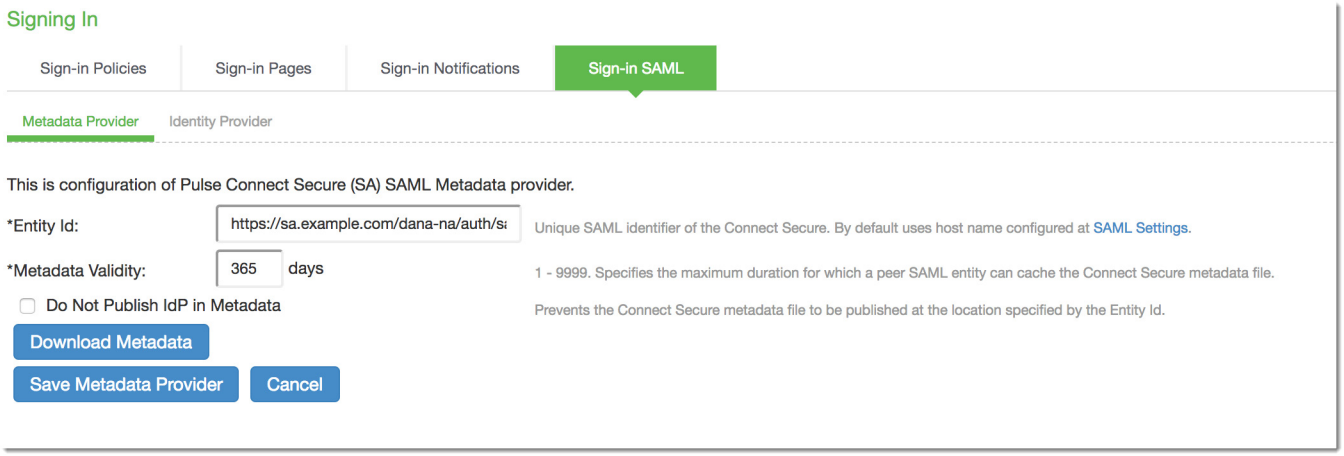
2. Type the details for your PCS instance into the **Create new Trusted Identity Provider** dialog.

FIGURE 3 Creating a new Trusted Identity Provider



3. Type an identifying name for this IdP.
4. Set **entity_id** to the unique SAML identifier for the PCS. To obtain the SAML identifier, login to the PCS Admin UI and navigate to **Authentication > Signing In > Sign-in SAML > Metadata Provider**.

FIGURE 4 Obtaining the PCS Entity ID



The Entity ID uses the URL format:

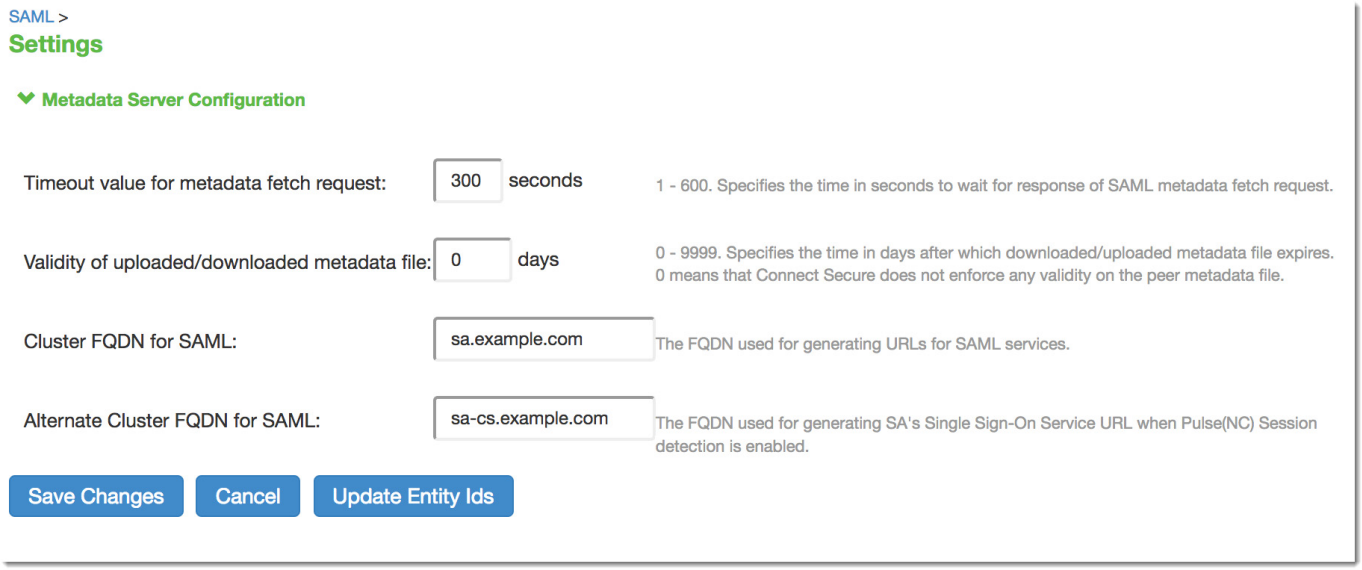
`https://<PCS-FQDN>/dana-na/auth/saml-endpoint.cgi.`

5. Set **url** to the URL to which the client is redirected for authentication. Use the format:

   ```
   https://<Alternate Host FQDN for SAML>/dana-na/auth/saml-sso.cgi
   ```

   To obtain the <Alternate Host FQDN for SAML>, login to the PCS Admin UI and navigate to **System > Configuration > SAML > Settings**. Use the value shown in “Alternate Cluster FQDN for SAML”.

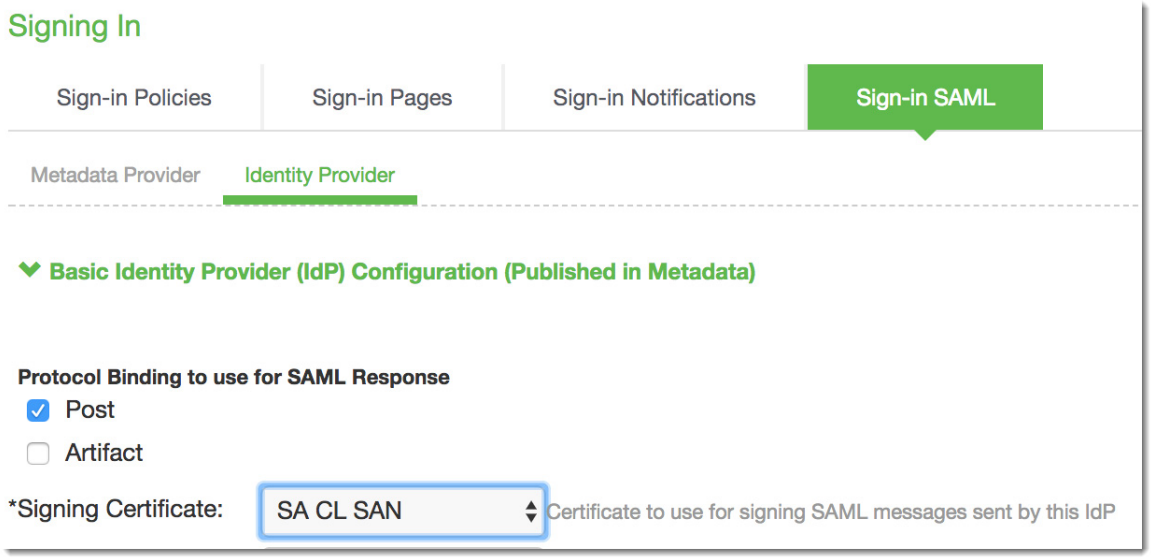
FIGURE 5 Obtaining the Alternate Host FQDN



6. Set **add_zlib_header** to "No".
7. Set **strict_verify** to "Yes".
8. For **certificate**, use the SAML Signing certificate used by PCS.

   To obtain the certificate, login to the PCS Admin UI and navigate to **Authentication > Signing In > Sign-in SAML > Identity Provider**.

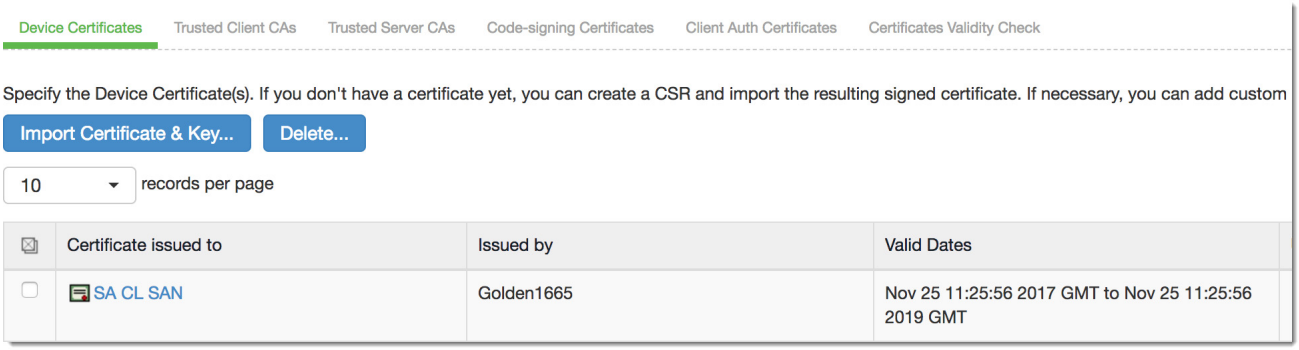
FIGURE 6 Locating the name of the SAML Signing certficate



In this example, the certificate is named "SA CL SAN".

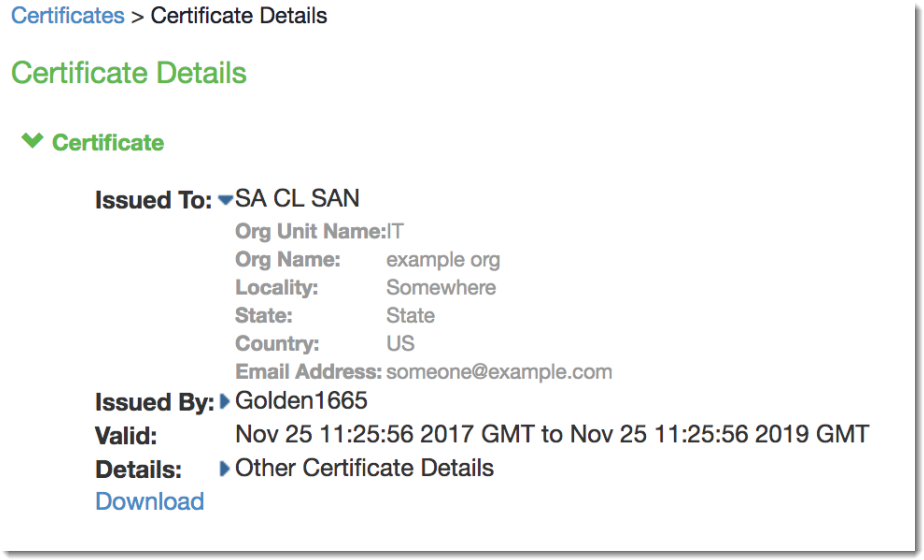
Then, navigate to **System > Configuration > Certificates > Device Certificate** and click on the certificate name to see the details.

FIGURE 7 Getting the certificate details



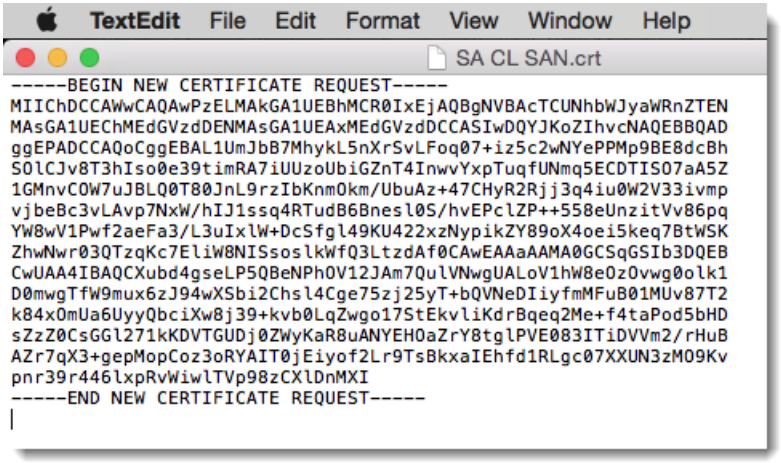
To obtain the certificate text, use the "Download" link.

FIGURE 8 Downloading the certficate



Open the downloaded certificate data in a text editor.

FIGURE 9 Viewing the certificate file in a text editor



Finally, copy the certificate text and paste it into the **Certificate** field in the Traffic Manager Trusted Identity Provider definition.

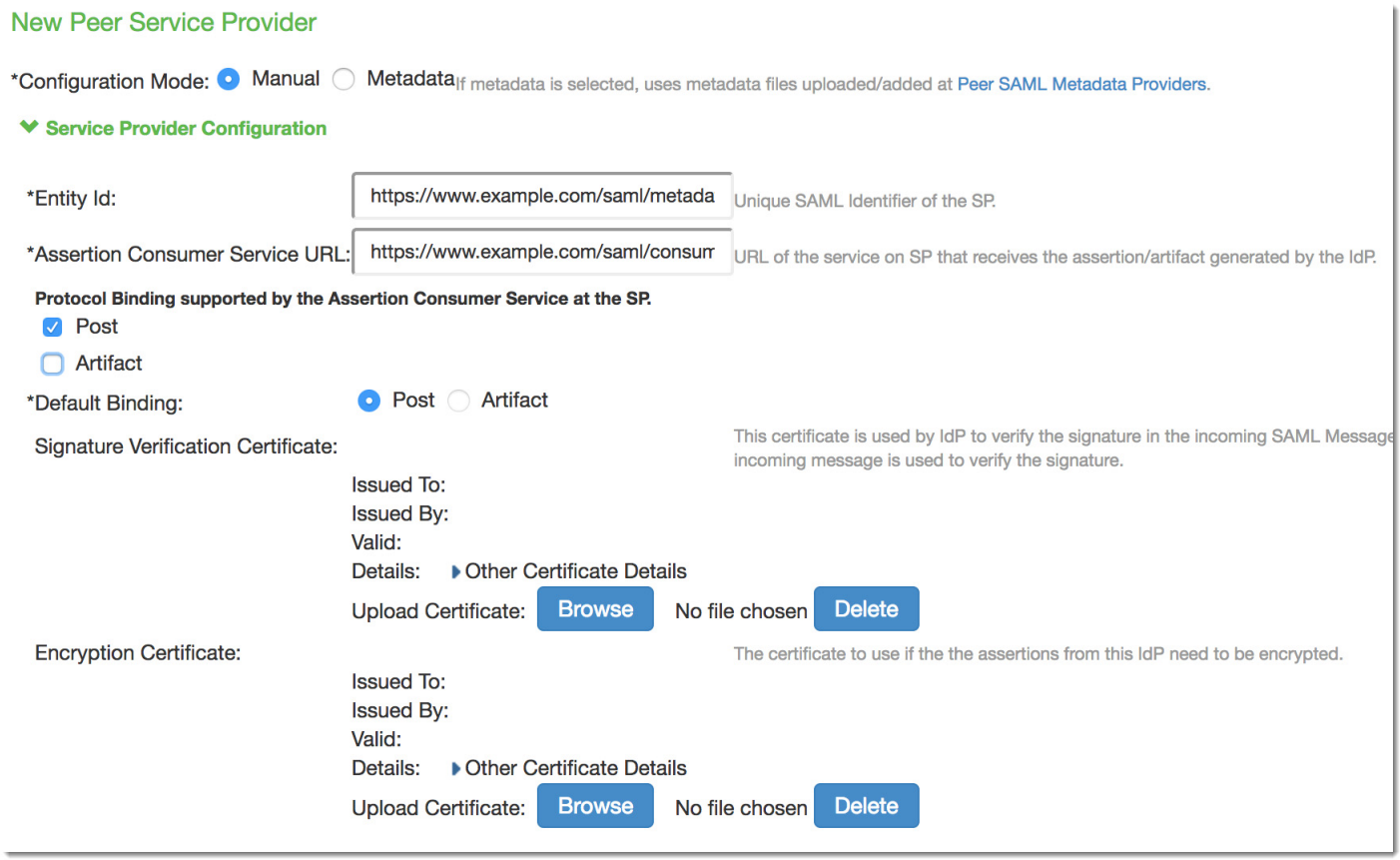
9. To save the Trusted Identity Provider definition, click **Create New Trusted Identity Provider**.

Configuring Pulse Connect Secure as a SAML IdP

To configure PCS as a SAML IdP to the Traffic Manager, perform the following steps:

1. Login to the PCS Admin UI and navigate to **Authentication > Signing In > Sign-in SAML > Identity Provider**.
2. Scroll to the bottom of the page to add a new Service Provider.
3. Select **Manual** configuration mode.

FIGURE 10 Adding a new Service Provider



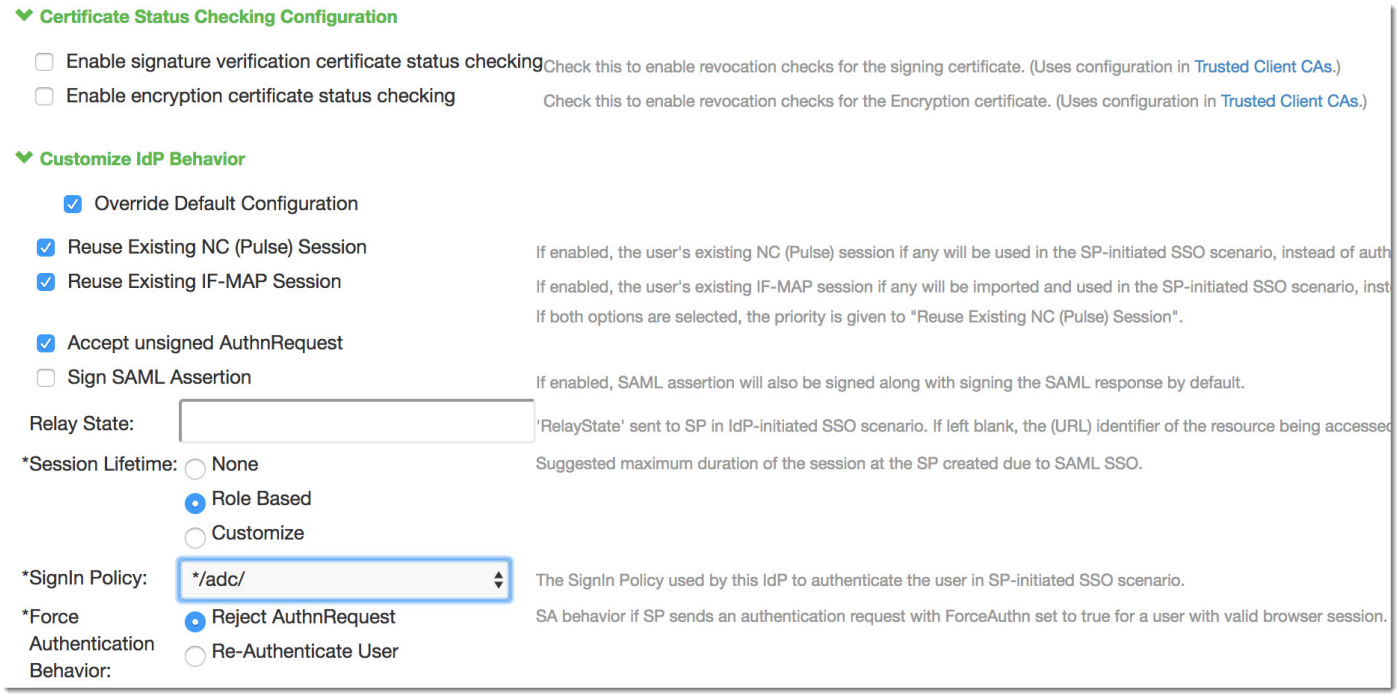
4. Set **Entity Id** and **Assertion Consumer Service** URL to the equivalent values used by your Traffic Manager SAML SP configuration (see "Configuring a Traffic Manager Virtual Server as a SAML SP Endpoint" on page 13).

   For Entity ID, ensure you match the value stored in **auth!saml!sp_entity_id**, and Assertion Consumer Service URL, use the value stored in **auth!saml!sp_acs_url**.

5. Select only POST protocol binding.

6. The Traffic Manager does not sign the authentication request so there is no requirement to add a Signature Verification Certificate or Encryption Certificate. Ensure “Accept unsigned AuthnRequest” is enabled.

FIGURE 11 Enabling “Accept unsigned AuthnRequest”



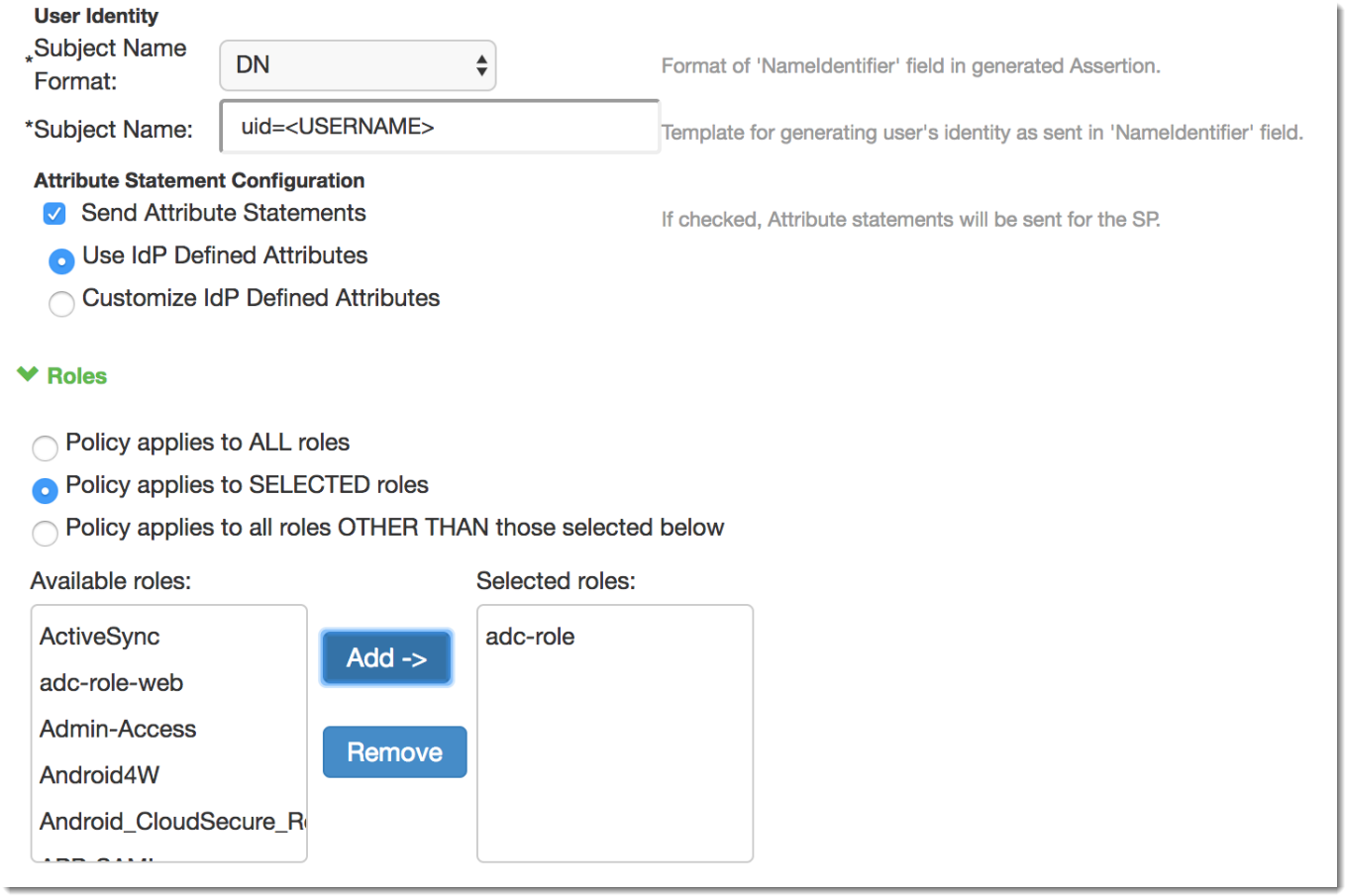
7. The settings **Reuse Existing NC (Pulse) Session** and **Reuse Existing IF-MAP Session** are covered in the use cases section in this document.

8. Select the **Signin Policy** from the drop-down list to be used by users as they authenticate. In this example, "*/adc/" is selected.

9. Select the User Identity to be used. In this example, the **Subject Name Format** is "DN" and **Subject Name** is "uid=<username>".

10. Finally, select for which **Roles** the IdP must issue SAML Assertions.

FIGURE 12 Selecting Roles for which SAML Assertions are issued



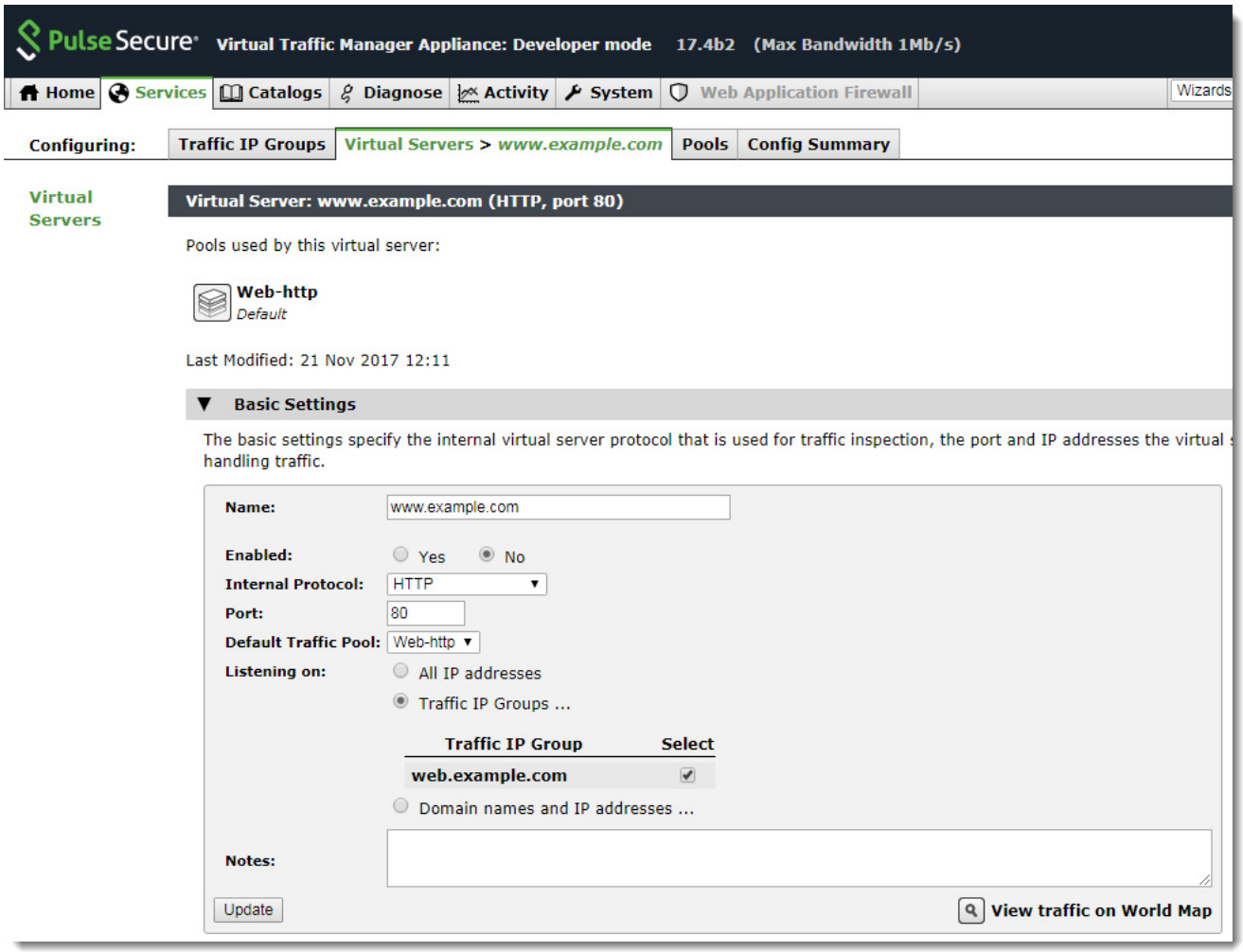
11. Save the new SAML SP configuration.

Configuring a Traffic Manager Virtual Server as a SAML SP Endpoint

To configure a Traffic Manager service with SAML SP authentication, perform the following steps:

1. Designate a virtual server as your SAML SP endpoint. Navigate to **Services > Virtual Servers** and click the name of the required virtual server.

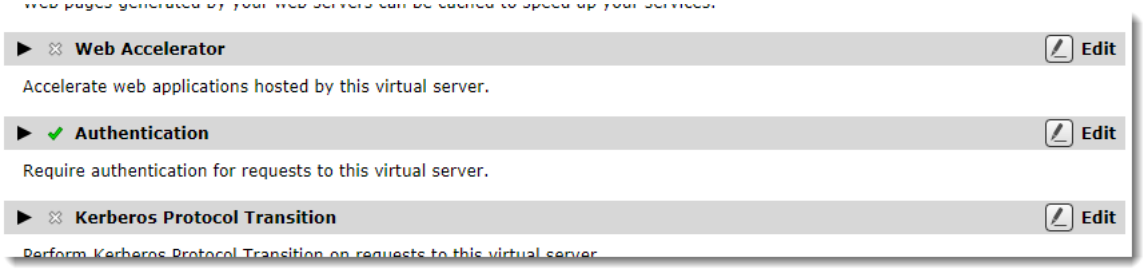
FIGURE 13 Editing a virtual server



Pulse Secure *strongly recommends* against using SAML authentication without TLS encryption. Your virtual server should therefore have SSL Decryption enabled.

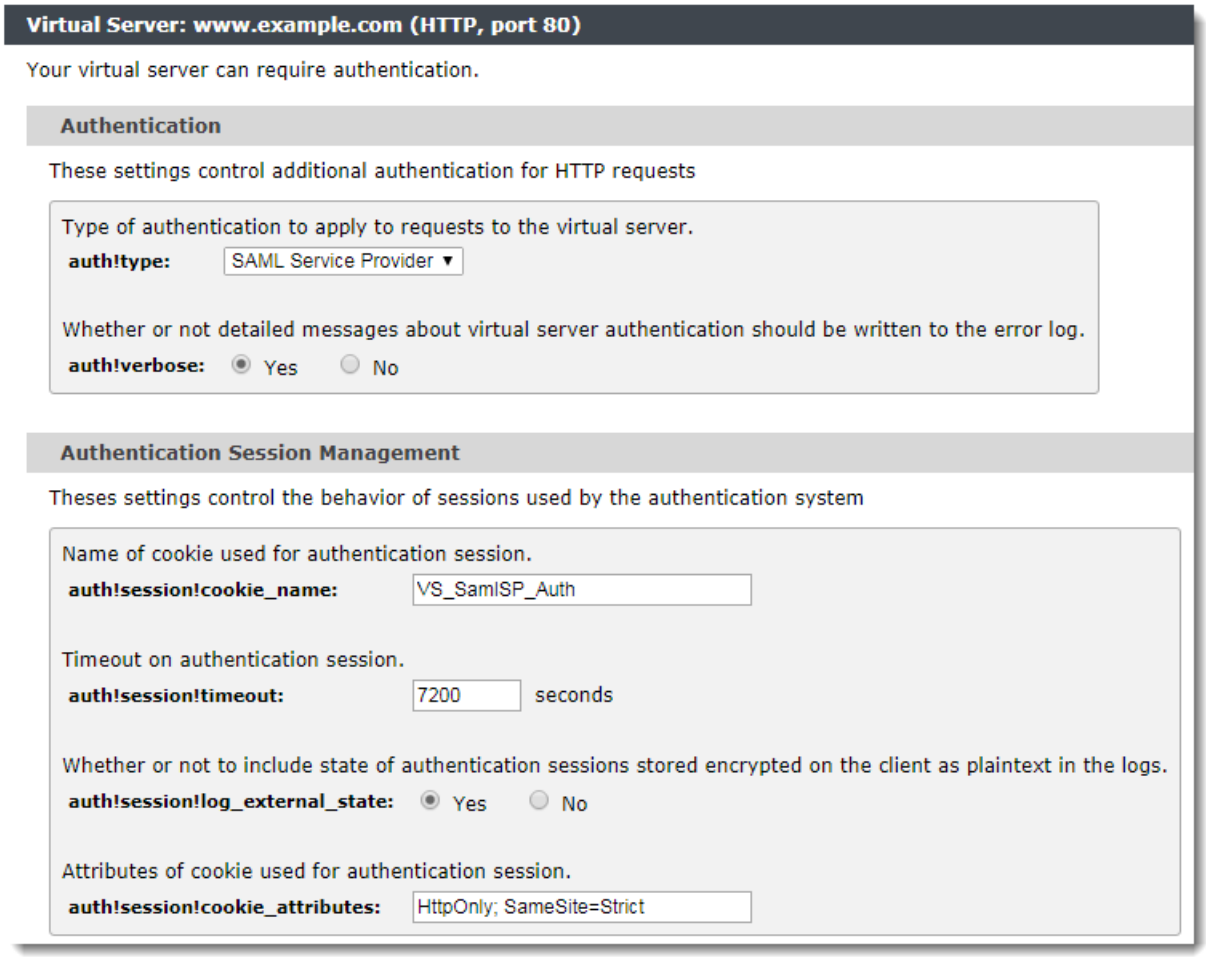
2. Locate the **Authentication** section and click to edit.

FIGURE 14 Locating the Authentication Settings



3. Set **auth!type** to "SAML Service Provider".
4. For troubleshooting or testing purposes, optionally set **auth!verbose** to "Yes". Note that this setting generates a lot of log content, so is recommended to be disabled for a live service.
5. For a typical service, leave the settings under "Authentication Session Management" as their default values.

FIGURE 15 Virtual Server Authentication settings



6. In the "SAML Service Provider" section, set **auth!saml!sp_entity_id** to an HTTPS URL that the IdP uses to identify the Traffic Manager as the SAML SP (that redirected a user agent for authentication). Then set **auth!saml!sp_acs_url** to the HTTPS URL of the SAML Assertion Consumer Service (ACS). In other words, the URL at which the Traffic Manager should handle SAML assertions.

   These values must match the equivalent fields specified in your PCS Service Provider configuration (see "Configuring Pulse Connect Secure as a SAML IdP" on page 7).

   In the following example, SAML Authentication is added to a Traffic Manager virtual server named "www.example.com". This virtual server is configured to listen on an IP address that resolves to a URL of the same name.

FIGURE 16 Your currently running services

The following example values can then be used:

- Entity ID:

```
https://www.example.com/saml/metadata
```

- Assertion Consumer Service URL:

```
https://www.example.com/saml/consume
```

When the Traffic Manager receives an HTTP request through the "www.example.com" virtual server, it first checks if the URL corresponds to the ACS URL. If yes, the Traffic Manager handles this URL as the SAML ACS endpoint; otherwise it forwards the request to the pool nodes.

7. Select the **auth!saml!idp** that was created in the first step in this guide.
8. As SAML is sensitive to time, Pulse Secure recommends that both the Traffic Manager and PCS are set to use Network Time Protocol (NTP). When using NTP, the tolerance of 5 seconds should be sufficient for the service.
9. Set **auth!saml!nameid_format** to "unspecified".

FIGURE 17 SAML Service Provider endpoint settings

SAML Service Provider

These settings control the behavior of the SAML Service Provider endpoint

The entity ID to be used by the SAML service provider function on this virtual server. This should usually be a URL, or a URN, however it may be any string. It must match the entity ID placed by the identity provider in the 'Audience' field in the SAML assertion.

auth!saml!sp_entity_id: https://www.example.com/saml/metadata

The 'Assertion Consumer Service' endpoint for the SAML service provider on this virtual server, ie the endpoint to which the identity provider will cause the user agent to send SAML assertions. This should be an HTTPS URL, must be in the same cookie domain as all hostnames used by the end user to access the virtual server (see cookie configuration) and the port must be the port on which this virtual server is listening. It must match the URI placed by the identity provider in the 'Recipient' attribute in the SAML assertion, if present.

auth!saml!sp_acs_url: https://www.example.com/saml/consume

Name of the Trusted Identity Provider configuration to use. To create Identity Providers, please visit section **Trusted Identity Providers**

auth!saml!idp:

	Name	Entity Id
○	*None*	
◉	**SA-IdP**	**https://sa.example.com/dana-na/auth/saml-endpoint.cgi**

Time tolerance on authentication checks. When checking time-stamps and expiry dates against the current time on the system, allow a tolerance of this many seconds. For example, if a SAML response contains a 'NotOnOrAfter' that is 4 seconds in the past according to the local time, and the tolerance is set to 5 seconds, it will still be accepted. This is to prevent a lack of clock synchronization from resulting in rejection of SAML responses.

auth!saml!time_tolerance: 5 seconds

The NameID format to request and expect from the identity provider.

auth!saml!nameid_format: unspecified

Apply Changes

Update

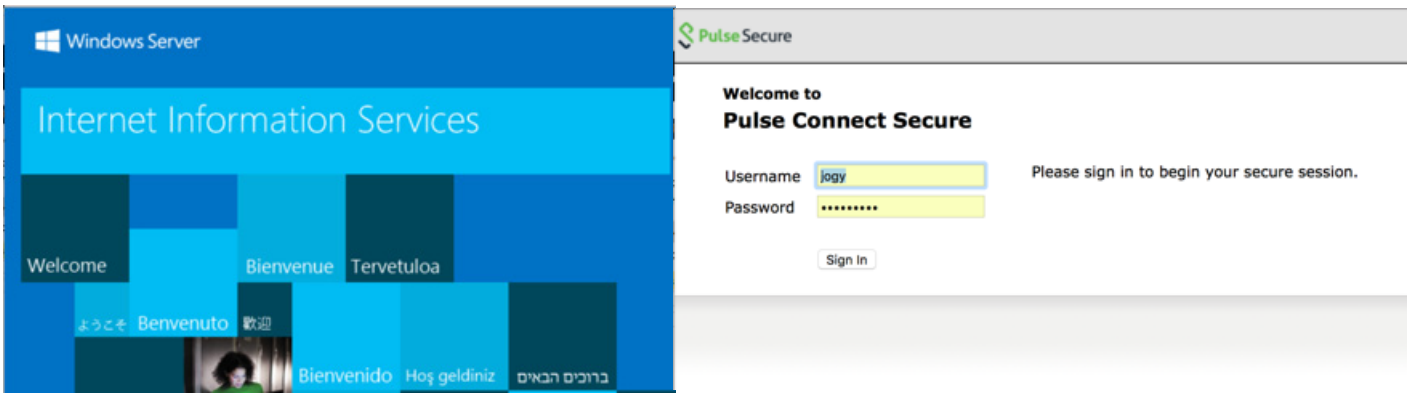
10. To save the configuration, click **Update**.

Use Cases and Examples

Browser Access – Simple User Authentication

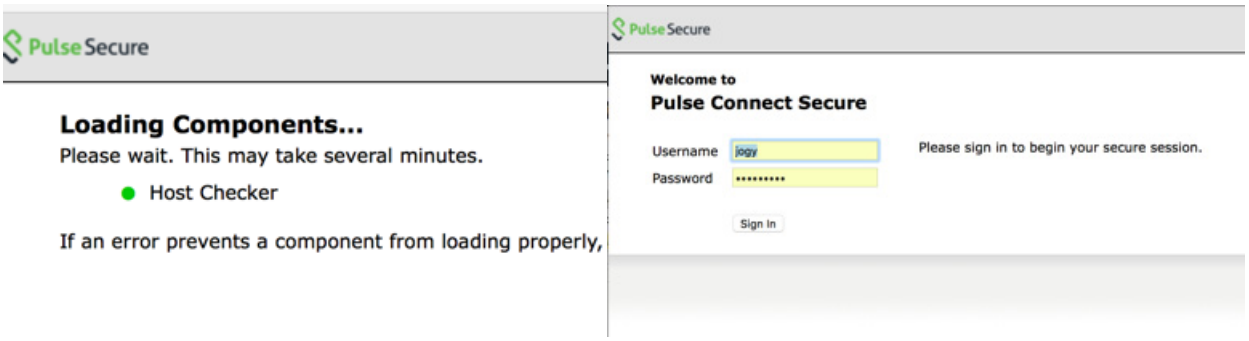
A user attempts to access the Traffic Manager-served "www.example.com". As this service is configured as a SAML SP endpoint, the user's browser is redirected to the PCS sign-in page for authentication.

FIGURE 18 The PCS authentication sign-in page



After passing authentication, PCS returns the user's browser to the Traffic Manager, complete with a SAML assertion that the user is legitimate, to access the back-end pool resource originally requested.

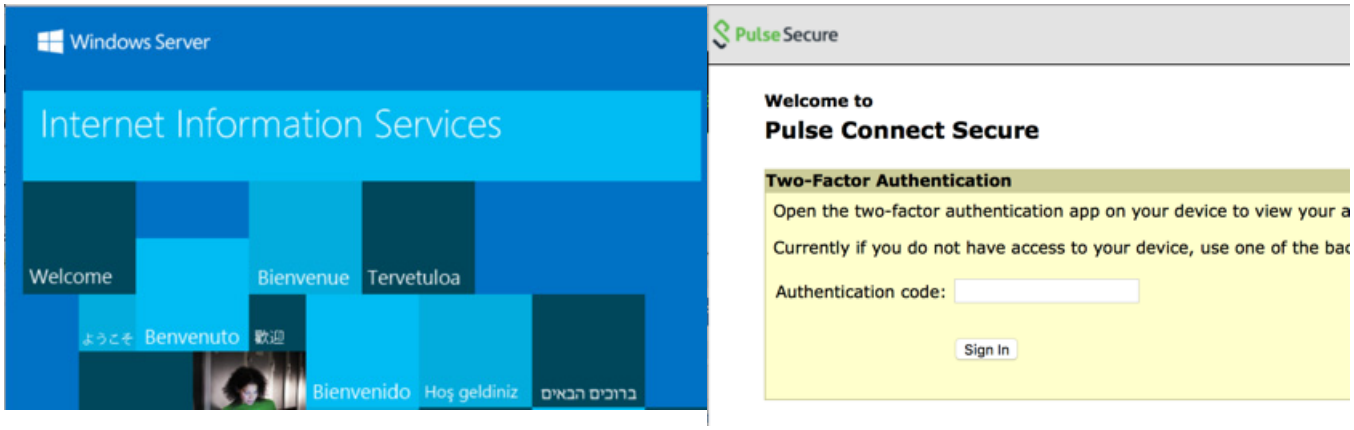
FIGURE 19 Authentication successful



Adding Compliance Checking and TOTP to the Authentication

A user attempts to access the Traffic Manager-served "www.example.com". As this service is configured as a SAML SP endpoint, the user's browser is redirected to the PCS sign-in page for a compliance check, and both Active Directory and TOTP authentication.

FIGURE 20 Performing two-factor authentication

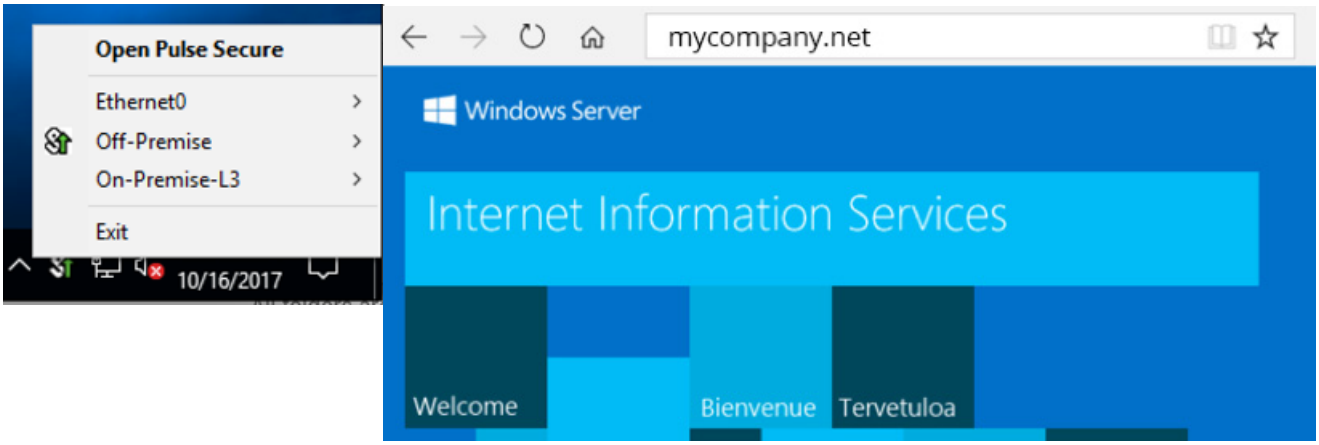


Cloud Secure – "Reuse Existing NC (Pulse) Session"

By configuring the SAML SP in PCS to reuse an existing session, any user with an existing VPN or AppVPN session uses Single Sign-On (SSO) to the protected resource served by the Traffic Manager virtual server.

The user has a Pulse Secure VPN connection to PCS and accesses the virtual server.

FIGURE 21 Connecting to a VPN



User logs from PCS, acting as a SAML IdP.

FIGURE 22 PCS user logs showing SAML authentication activity

Severity	ID	Message
Info	SML30974	2017-10-16 12:38:30 - ive - [127.0.0.1] System()[] - Sending SAML response for Username: [jogy], User Agent: [Pulse-Secure/8.3.3.919 (Windows 10) Pulse/5.3.3.919], Subject Name: [uid=jogy], Source IP: [192.168.1.1], Type: [SP-Initiated], SP EntityID: [http://www.[illegible].net/saml/metadata], Session ID: [sid225fb912dd5f3fc1cf09f3adc53dfd860bf3fb03e05eef26], Relay State: [/T2IIiQ6+3pIRGSCT1U0yzJ/yH2fKy/4/KhcTw/XW7/bw5Wg0gIexm4XEJU+WNSA/8uc6oY2bISRdAWtfpMZIIK40ti9x+KBGpuyq2/RDMGuKRu3HbfUX5WAW0BUKB4U4XUxKBPke21AGw0m930Cw==], AuthnRequest ID: [_c09ffc67-de79-cb42-e1d6-7fd0584ae974], Remote IP: [10.0.1.225]
Info	AUT30799	2017-10-16 12:38:30 - ive - [127.0.0.1] System()[] - 'NC/Pulse' session detected for SAML AuthnRequest Id '_c09ffc67-de79-cb42-e1d6-7fd0584ae974'
Info	AUT30797	2017-10-16 12:38:30 - ive - [127.0.0.1] System()[] - SAML AuthnRequest received '<?xml version="1.0"?><samlp:AuthnRequest xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol" ID="_c09ffc67-de79-cb42-e1d6-7fd0584ae974" Version="2.0" IssueInstant="2017-10-16T10:38:29Z" ProtocolBinding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST" AssertionConsumerServiceURL="http://www.[illegible]/saml/consume"><saml:Issuer xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion">http://www.[illegible].net/saml/metadata</saml:Issuer> <samlp:NameIDPolicy Format="urn:oasis:names:tc:SAML:1.1:nameid-format:unspecified" AllowCreate="true"/></samlp:AuthnRequest>'

The user's browser is redirected to PCS with the SAML AuthnRequest.

```
2017-10-16 12:38:30 - ive - [127.0.0.1] System()[] - SAML AuthnRequest received '<?xml
version="1.0"?><samlp:AuthnRequest xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol"
ID="_c09ffc67-de79-cb42-e1d6-7fd0584ae974" Version="2.0" IssueInstant="2017-10-
16T10:38:29Z" ProtocolBinding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST"
```

```
AssertionConsumerServiceURL="http://www.example.com/saml/consume"><saml:Issuer
xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion">http://www.example.com/saml/metadata</
saml:Issuer><samlp:NameIDPolicy Format="urn:oasis:names:tc:SAML:1.1:nameid-
format:unspecified" AllowCreate="true"/></samlp:AuthnRequest>'
```

PCS finds an existing session from this user and reuses it.

```
2017-10-16 12:38:30 - ive - [127.0.0.1] System()[] - 'NC/Pulse' session detected for SAML
AuthnRequest Id '_c09ffc67-de79-cb42-e1d6-7fd0584ae974'
```

PCS generates a SAML Assertion giving the user SSO to the virtual server.

```
2017-10-16 12:38:30 - ive - [127.0.0.1] System()[] - Sending SAML response for Username:
[jogy], User Agent: [Pulse-Secure/8.3.3.919 (Windows 10) Pulse/5.3.3.919], Subject Name:
[uid=jogy], Source IP: [192.168.1.1], Type: [SP-Initiated], SP EntityID: [http://
www.example.com/saml/metadata], Session ID:
[sid225fb912dd5f3fc1cf09f3adc53df0860bf38b03e05eef26], Relay State: [/
T2lilQ6+3pIRGSCT1U0yzJ/yH2fKyl4/KhcTw/XW7lbw5Wg0gIexm4XEJU+WNSA/
8uc6oY2biSRdAWIfpM2IlK40tl9x+KBGpuyql2iRDMGuKRu3HbfUX5WAW0BUKB4U4XUxKBPke21AGw0m930Cw==],
AuthnRequest ID: [_c09ffc67-de79-cb42-e1d6-7fd0584ae974], Remote IP: [10.0.1.225]
```

Cloud Secure – “Reuse Existing NC (Pulse) Session” and “Reuse Existing IF-MAP Session”

This use case includes the Federation functionality provided by IF-MAP.

PCS and Pulse Policy Secure (PPS) are acting as IF-MAP clients and publish user sessions to the Federation (IF-MAP) server.

In this use case, the user is on the internal network and has an existing session with PPS. The user still gets SSO to the protected resource served by the Traffic Manager virtual server.

The user browser is redirected to Pulse Connect Secure with the SAML AuthnRequest

```
2017-10-16 13:17:42 - ive - [127.0.0.1] System()[] - SAML AuthnRequest received '<?xml
version="1.0"?><samlp:AuthnRequest xmlns:samlp="urn:oasis:names:tc:SAML:2.0:protocol"
ID="_16fca8ef-38ea-bcd1-6bb6-fb9fa601f613" Version="2.0" IssueInstant="2017-10-
16T11:17:43Z" ProtocolBinding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST"
AssertionConsumerServiceURL="http://www.example.com/saml/consume"><saml:Issuer
xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion">http://www.example.com/saml/metadata</
saml:Issuer><samlp:NameIDPolicy Format="urn:oasis:names:tc:SAML:1.1:nameid-
format:unspecified" AllowCreate="true"/></samlp:AuthnRequest>'
```

PCS (the IdP) does not find any local session for the user. PCS queries the Federation (IF-MAP) server, finds a session, and imports it.

```
2017-10-16 13:17:43 - ive - [127.0.0.1] System()[] - 'IF-MAP' session detected for SAML
AuthnRequest Id '_16fca8ef-38ea-bcd1-6bb6-fb9fa601f613'
```

```
2017-10-16 13:17:43 - ive - [10.0.2.50] jogy(IF-MAP Import)[O365, Salesforce,
SecureAccess] - Imported session published by 1CgABCQ/- from IF-MAP
```

PCS generates a SAML Assertion giving the user SSO to the virtual server.

```
2017-10-16 13:17:43 - ive - [127.0.0.1] System()[] - Sending SAML response for Username:
[jogy], User Agent: [Mozilla/5.0 (Windows NT 10.0; WOW64; rv:56.0) Gecko/20100101 Firefox/
56.0], Subject Name: [uid=jogy], Source IP: [10.0.2.50], Type: [SP-Initiated], SP EntityID:
[http://www.example.com/saml/metadata], Session ID: [], Relay State: [/
T2lilQ6+3pIRGSCT1U0y3c7tqiB3U7+zyKi9eM2tdu23Q4ccJSMm6ct14DpjduwSSWYqo4tBwJDpw/
eqnDRXeEB6nSYpOz5ymDVpb/b20ukCT45GpNiTDZc5i/
tSGl61XFVhImpWMriLxcoxwfrtjWWH33QPU4qpXFXd6ptW/M=], AuthnRequest ID: [_16fca8ef-38ea-bcd1-
6bb6-fb9fa601f613]
```

Note: If no session is found locally or via the federation layer, the user is presented with the standard browser authentication experience.

References

- https://www.pulsesecure.net/download/techpubs/current/1022/Pulse-vADC-Solutions/Pulse-Virtual-Traffic-Manager/17.4/ps-vtm-17.4-releasenotes.pdf
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