CONFIGURATION GUIDE



Cloudpath Enrollment System Integration with Microsoft NPS Configuration Guide, 5.6

Supporting Cloudpath Software Release 5.6

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Overview

About this Document

This document helps network administrators configure a Microsoft[™] Network Policy Server to act as the RADIUS server for use with Cloudpath in a wireless network with EAP-TLS authentication.

This guide provides instructions for configuring firewall rules, configuring Cloudpath to act as a private CA and issue certificates to be imported by the NPS, how to configure RADIUS proxy, and troubleshooting information.

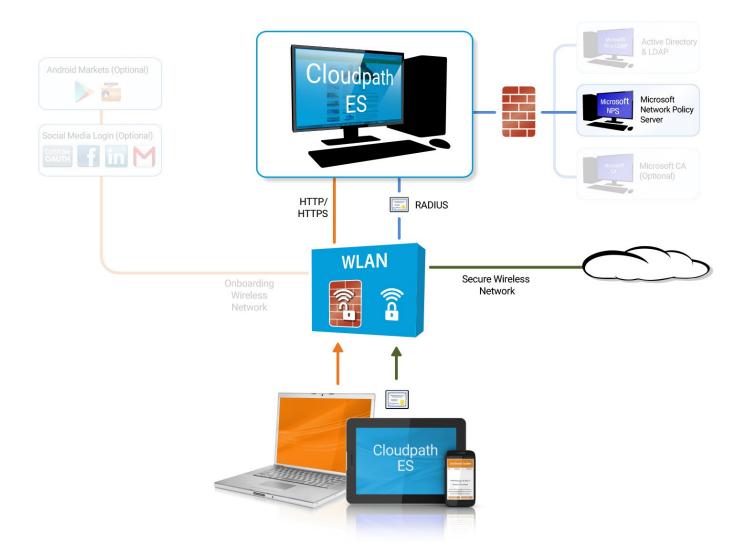
Overview of Network Policy Server

Network Policy Server (NPS) is the Microsoft implementation of a Remote Authentication Dial-in User Service (RADIUS) server and proxy.

As a RADIUS server, NPS performs authentication and authorization of network connection attempts. NPS authenticates users and devices by verifying their Active Directory credentials.

RADIUS clients are network access servers such as wireless access points (APs), 802.1X-capable switches, virtual private network (VPN) servers, and dial-up servers because they use the RADIUS protocol to communicate with RADIUS servers, such as NPS servers.

FIGURE 1 Cloudpath Integrated with Microsoft Network Policy Server



You can configure an NPS as a RADIUS server that integrates with the Cloudpath Enrollment System (ES). Cloudpath can be used as a private CA for certificate deployments using either PEAP-TLS or EAP-TLS authentication. Cloudpath provides certificates to your NPS server acting as a RADIUS server, and client certificates to your client computers and users. NPS servers are logically connected to your network so that they can receive incoming access requests directly from wireless APs or wireless controllers.

This guide describes how to configure a Microsoft 2008 NPS as a RADIUS server for use with the Cloudpath in an 802.11 wireless network with EAP-TLS authentication.

Prerequisites

Before you can configure an NPS to work with Cloudpath, your network must have certain devices and services.

You must have the following devices ad services set up in your network:

• Microsoft 2008 Domain Controller configured with Active Directory services.

Configuring Cloudpath

Configuring Firewall Rules for Use with Cloudpath

- Microsoft 2008 Network Policy Server must be configured (and registered) within your domain. See Tips and Troubleshooting on page 32 for more information.
- Wireless Controllers and/or Access Points configured for EAP-TLS authentication. Make note of the IP address of the RADIUS client. This is required when configuring the standard configuration for NPS for 802.1X wireless connections.

NOTE

It is recommended that you install Microsoft NPS services on a server separate from your Microsoft Active Directory services.

Configuring Firewall Rules for Use with Cloudpath

Network firewall rules must be configured to allow Cloudpath and the Network Policy Server to communicate.

Depending on where Cloudpath is placed in your network, certain TCP ports are required to allow Cloudpath to communicate with NPS and Active Directory (AD) services. Ensure you have done the following procedures to configure firewall rules for use with Cloudpath.

- Open TCP port 389 to allow Cloudpath to query AD for users and groups during user login.
- Open TCP port 80 to allow the NPS to query Cloudpath for OCSP.

NOTE

Refer to Tips and Troubleshooting on page 32 for additional information about firewall settings. Additional firewall information can be found on the **Administration** > **Advanced** > **Firewall Requirements** page.

Configuring Cloudpath

Overview of Configurating Cloudpath

If you deploy certificate=based authentication, a server running NPS must have a server certificate. During the autentication process, the NPS sends the server certificate to the client computer as proof of identity.

To work with Cloudpath, the NPS requires a server certificate and the private key of the Root CA from Cloudpath. The certificates are generated and downloaded from Cloudpath and then uploaded to the NPS.

This section describes how to configure Cloudpath as a private CA, generate the RADIUS server certificate, download the public and private key of the RADIUS server certificate, and download the public key of the intermediate CA.

Create the Certificate Authority

To set up a standalone certificate authority in Cloudpath, perform the following steps:

- 1. From the Cloudpath left menu, select **Certificate Authority > Manage CA**.
- 2. Click Add/Upload CA.
- 3. Select Generate New Certificate Authority.

- 4. On the **Create Root CA** page, enter the following information:
 - **Common Name:** The publicly visible name of the root CA. It is recommended that you use the word "Root" in the name and include a version number.
 - **Description:** Enter a description useful to other administrators.
 - **Enabled:** The default is enabled. Be sure this box is checked.
 - OSCP Host Name: The host name embedded into the CA as part of the URL for the OCSP.
 - Validity Period: Retain the default, or specify the Start and Expires dates.
 - CA Strength: Configure the strength of the CA by specifying the Key Length and Algorithm.
 - **CAP Properties:** Properties embedded into the CA. Enter the appropriate information as required by your network policy.

FIGURE 2 Create Root CA

Create Certificate Authority		< Back Save
Reference Information		
	blicly-visible name. We recommend including "Root CA" or "Interme "Sample Corp Wireless Root CA I", or "Sample Corp Wireless Inter	
Common Name:	Test Root CA I	*
Description:		
• Enabled:	×	
OCSP Information		
	n to the CA as part of the URL for Online Certificate Status Protocol revocation status of the certificate. This field cannot be changed onc S]/admin/ocsp/check/Cert	
OCSP Hostname:	Test.company.net	
Validity Period		
	r 20 years. We have defaulted the start date back one month to avoi	id potential system clock
Start Date:	20131210 *	
• Expires Date:	20340110 *	
CA Strength The following properties determine the stre	ngth of the certificate authority.	
Key Length:	2048	
• Algorithm:	SHA-256 💌	
CA Properties The following properties are embedded into	the CA. Many organizations have guidelines specifying exactly wha	t these values need to be.
Organization:	Sample Company, Inc.	
Organizational Unit:	IT	
• Email Address:	it@company.com	
• Title:	[ex. Leave Blank]	
Locality:	Westminster	
State:	Colorado	
Country:	US	

5. Click **Save** to save the CA.

Set Up Client Certificate Template Settings for NPS

In Cloudpath, certificate templates are used to generate certificates.

A template defines the properties embedded into a certificate when it is issued. Some properties are static and remain the same for every certificate. Other properties are calculated or use variables, allowing them to differ per certificate, based on user and device.

To set up a client certificate template using an onboard CA, perform the following steps:

- 1. From the Cloudpath left menu, select **Certificate Authority > Manage Templates**.
- 2. Click **Add Template** to create a new certificate template.
- 3. Choose Use an onboard certificate authority and select the onboard CA you created in the previous section.

4. Select Client Certificates.

FIGURE 3	Create	Client	Certificate	Template
----------	--------	--------	-------------	----------

What t	ype of certificates should be iss	ued?	Cancel Next >
_			
۲	Client Certificates		
	Used on clients to authenticate the be applied appropriately.	client. The decoration of the username within the certificat	e allows RADIUS policies to
	• Username Decoration:	ername@byod.company.com	
		username@contractor.company.com	
		username@faculty.company.com	
		username@guest.company.com	
		username@it.company.com	
		username@student.company.com	
		username@other.company.com	
	• Grant Access Until:	1 Years Tafter issuance.	
	🗄 Configure Advanced Options:		
	Lifecycle Notifications		
	interact with the end-user, the admi	m supports events related to the lifecycle of the certificate. These nistrator, as well as external systems. Additional notifications can b v are some of the most common ones.	
	Notifications:	Send welcome email on issuance.	
		Send email 7 days before certificate expiration.	
		Send email if certificate is revoked.	
		Email administrator if revoked certificate is used.	
	RADIUS Options		
		will be honored for RADIUS authentications. The RADIUS attributes es are required, they may be added by editing the certificate temp	
	+ VLAN ID:	[ex. 50]	
	🗉 Filter ID:	[ex. BYOD]	
	+ Class:	[ex. BYOD]	

Server Certificates

Used on servers, such as a RADIUS server, to identify the server to a client.

5. Select or enter a Username Decoration. The decoration of the username within the certificate allows RADIUS policies to be applied appropriately.

Set Up Client Certificate Template Settings for NPS

6. Grant access for the appropriate amount of time.

For example, you might have client certificate template for a guest user that is valid for one, or a few days, another for a contractor that is valid for 6 months, and one for employees that is good for a year.

TIP

To configure pattern attributes, certificate strength, and EKUs, check the **Configure Advanced Options** box before you click **Next**.

- Select any email notifications to be sent to the user related to the lifecycle of the certificate.
 Additional certificate notifications can be configured after the template is created.
- 8. Enter data in the **RADIUS Options** fields to assign a VLAN ID or Filter ID to certificates that use this template. These settings only apply if you are using the onboard RADIUS server.

Client Certificate Template Advanced Options

The following table describes the actions to take for each of the fields on the Modify Certificate Template page, which displays if you checked **Configure Advanced Options** while creating a client certificate template.

Field	Action
Reference Information	Enter information in the Certificate Template Name and Notes fields. This information is for reference only. Enable the template.
Identity	Enter the Common Name Pattern used to determine the common name for certificates generated using the template. Variables, such as \${SERVER_NAME} are replaced when issued with the value from enrollment.
Validity Period	Used to determine the lifespan of the issued certificate.
Certificate Strength	Enter the Key Length and Algorithm for certificates using this template.
Organization Information	Enter the Patterns for certificates using this template.
Advanced Settings	Enter the Patterns for certificates using this template.
Cleanup	Use these options to delete client certificate templates and associated data.

If you are using the NPS as a RADIUS server in your environment, the server certificate requires that you have a **SAN Other Name** in addition to the **Common Name** properties. The **SAN Other Name Pattern** must match the variable used in the **Common Name Pattern** field.

NOTE

Client certificate templates must use *Microsoft Client EKU - 1.3.6.1.5.5.7.3.2*. This establishes the **Extended Key Usage** properties for the certificate.

FIGURE 4 Modify Client Certificate Template

			Cancel Save
Reference Information			
Certificate Template Name:	username@byod.compan	v.com	*
· Certificate Authority:			
Notes:			
			1
Enabled?			
dentity			
The following property is normally used to pro ssuance with the appropriate value from the		in the certificate. Variables, such as	{USERNAME}, will be replaced at the time
Common Name Pattern:	\${USERNAME}@byod.cor	mpany.com	
alidity Period he following properties determine the lifespar nd-user system clocks.	n of the issued certificates. W	e recommend setting the start date to	1 month before issuance to avoid issues v
Start Date:	1 Months	 before issuance. 	
Expiration Date:	1 Years	after issuance.	
OCSP Monitoring:	Revoke if unseen for	30 days.	4
Allow Authentication via RADIUS :	×		enticates using a certificate from
	By Certificate	this template, Clou based on the infor	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
ES Login	By Certificate	this template, Clou based on the infor may be used to ap	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
E Login RADIUS	By Certificate Policies	this template, Clou based on the infor may be used to ap	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
E Login RADIUS	By Certificate	this template, Clou based on the infor may be used to ap	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
E Login RADIUS	By Certificate Policies	this template, Clou based on the inform may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
E Login RADIUS ex. VL	Policies AN: 50	this template, Clou based on the inform may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
Elogin Elogin RADIUS ex. VL	Policies AN: 50	this template, Clou based on the inform may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
Elogin Capitolica RADIUS ex. VL Reply Username: Allowed SSID(s):	Policies AN: 50	this template, Clou based on the inform may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
Elogin Elogin CADIUS ex. VL Reply Username: Allowed SSID(s): VLAN ID:	By Certificate Policies AN: 50 Certificate Common Nam * [ex. 50 or BYOD]	this template, Clou based on the inform may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
Elogin Capito RADIUS ex. VL Reply Username: Allowed SSID(s): VLAN ID: Filter ID:	By Certificate Policies AN: 50 Certificate Common Nam * [ex. 50 or BYOD] [ex. BYOD]	this template, Clou based on the inform may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
E Login CADIUS ex. VL Reply Username: Allowed SSID(s): VLAN ID: Filter ID: Class:	By Certificate Policies AN: 50 Certificate Common Nam * [ex. 50 or BYOD] [ex. BYOD] [ex. BYOD]	this template, Clou based on the information may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
E Login CADIUS ex. VL Reply Username: Allowed SSID(s): VLAN ID: Filter ID: Class:	By Certificate Policies AN: 50 Certificate Common Nam * [ex. 50 or BYOD] [ex. BYOD] [ex. BYOD] [ex. 86400]	this template, Clou based on the information may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
E Login CADIUS ex. VL Reply Username: Allowed SSID(s): VLAN ID: Filter ID: Class: Reauthentication:	By Certificate Policies AN: 50 Certificate Common Nam * [ex. 50 or BYOD] [ex. BYOD] [ex. BYOD] [ex. 86400]	this template, Clou based on the information may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or
Reply Username: Allowed SSID(s): VLAN ID: Filter ID: Class: Certificate Strength	By Certificate Policies AN: 50 Certificate Common Nam * [ex. 50 or BYOD] [ex. BYOD] [ex. BYOD] [ex. 86400]	this template, Clou based on the information may be used to ap other connection p	dpath will return RADIUS attributes nation below. These attributes ply a dynamic VLAN, an ACL, or

Set Up a Certificate Template for the NPS Server Certificate

The server certificate helps to verify the identity of the NPS (acting as a RADIUS server) to wireless clients.

To set up a server certificate template in Cloudpath, perform the following steps:

- 1. From the Cloudpath left menu, select **Certificate Authority > Manage Templates**.
- 2. Click **Add Template** to create a new certificate template.
- 3. Choose **Use an onboard certificate authority**, and select the onboard CA you created in the previous section.
- 4. Select **Server Certificates**.
- 5. Enter a validity period for the server certificate, and click **Next** to use the default settings.

TIP

To configure pattern attributes, certificate strength, and EKUs, check the **Configure Advanced Options** box before you click **Next**.

Server Certificate Template Advanced Options

The following table describes the actions to take for each of the fields on the Modify Certificate Template page, which displays if you checked **Configure Advanced Options** while creating a server certificate template.

TABLE 2 Fields on the	he Modify Certificate	e Template Page
	ine mounty certification	e remplate i age

Field	Action
Reference Information	Enter information in the Certificate Template Name and Notes fields. This information is for reference only. Enable the template.
Identity	Enter the Common Name Pattern used to determine the common name for certificates generated using the template. Variables, such as \${SERVER_NAME} are replaced when issued with the value from enrollment.
Validity Period	Used to determine the lifespan of the issued certificate.
Certificate Strength	Enter the Key Length and Algorithm for certificates using this template.
Organization Information	Enter the Patterns for certificates using this template.
Advanced Settings	Enter the Patterns for certificates using this template.
Cleanup	Use these options to delete client certificate templates and associated data.

If you are using the NPS as a RADIUS server in your environment, the server certificate requires that you have a **SAN Other Name** in addition to the **Common Name** properties. The **SAN Other Name Pattern** must match the variable used in the **Common Name Pattern** field.

NOTE

Client certificate templates must use *Microsoft Client EKU - 1.3.6.1.5.5.7.3.2*. This establishes the **Extended Key Usage** properties for the certificate.

FIGURE 5 Modify Server Certificate Template

Modify Certificate Template		Cancel Save
Reference Information		
Reference Information		
🛞 Certificate Template Name:	Server Template	*
① Certificate Authority:	Anna Test Intermediate CA I	
Notes:		
Enabled?		
Identity		
	ide identity information within the certificate. Variables, such as \${USERN m the enrollment.	AME}, will be replaced at the
+ Common Name Pattern:	\${SERVER_NAME}	
Common Name Pattern:	SISERVER_MANES	
Validity Period		
The following properties determine the lifespan issues with end-user system clocks.	of the issued certificates. We recommend setting the start date to 1 mon	th before issuance to avoid
💿 Start Date:	Specific Date V 20150617	
• Expiration Date:	1 Years V after issuance.	
OCSP Monitoring:	Revoke if unseen for 30 days.	
⊎ ocsr Holitoniig.		
Certificate Strength		
The following properties determine the strength	n of the certificates.	
🗉 Key Length:	2048	
🗄 Algorithm:	SHA-256 ¥	
Organization Information		
Advanced Settings		
▶ Cleanup		
r cicaliup		

Generate the Server Certificate for the NPS

You can generate a server certificate from the server certificate template and Cloudpath onboard CA that you created in previous procedures.

To generate the server certificate, perform the following steps:

- 1. From the Cloudpath left menu, go to **Certificate Authority** > **Generate Certificate**.
- 2. Select the NPS server certificate template that you previously created.
- 3. Use the default **SERVER_NAME**.

4. Select Auto-Generate CSR from the SCR source and click Save.

The certificate is generated and displayed on the **View Certificate** page.

NOTE

Alternately, NPS can generate a Certificate Signing Request (CSR) to be used within Cloudpath for generating the RADIUS server certificate. You use the same server certificate template, but instead of allowing Cloudpath to auto-generate the certificate, you select the **Copy & Paste CR** option from the **CSR source**.

Download the RADIUS Server Certificate

To download the RADIUS Server Certificate, perform the following steps:

- 1. Navigate to the **Configuration** > **RADIUS Server** page.
- 2. In the **RADIUS Server Certificate** section, download the **Public Key** for the server certificate.

Alternately, you can download the CSR or certificate Chain or replace an existing RADIUS server certificate.

Download the Public Key of the Intermediate CA

The Public Key of the Intermediate CA is used to establish the proper chaining of the RADIUS server certificate. Proper chaining is necessary for the wireless end-points to establish a 'trust' for the RADIUS server certificate to the Intermediate CA, which is used to sign the client certificates.

NOTE

By default, the Intermediate CA (onboard CA) signs the user certificate. If your environment is set up to have the Root CA sign the client certificate, you must download and install the public key of the Root CA.

To download the public key of the Intermediate CA, perform the following steps:

- 1. From the Cloudpath left menu, navigate to **Certificate Authority** > **Manage CA**. Expand the onboard CA you previously created.
- 2. Expand the onboard CA.
- 3. In the Sub CAs section, click the link to open the Intermediate CA page.

4. Download the **Public Key** of the Intermediate CA.

FIGURE 6 Download Public Key of Intermediate CA

CA: Anna T	est Intermediate CA I		L.
Parent CA:	Anna Test Intermediate CA I <u>Anna Test Root CA I</u> BBF7A9C5312550FE1D700398571B58651F77C	964	
Organizational Unit:	Sample Company, Inc. IT it@company.com	Start Date: Expires: Key Length:	20350616
State: Country:		OCSP Hash:	00000000000000000000000000000000000000
OCSP URL:	http://anna43.cloudpath.net/ocsp/checkCert	OCSP Name Hash: Referenced Workflows:	2E86425912E84B053C20A4F71F3CCAA45DB756C1 <u>Demo Data</u> <u>Primary Workflow</u>
Public Key: Chain: Private Key: P12 Format:	View Download PEM Download PKCS/ View Download	View Details	
Sub CAs:	No sub-CAs exist. Add Sub CA		
Templates:	Name J BYOD Policy Template J Guest Policy Template J Server Template J username@byod.company.com J username@test.company.com	Notes	Common Name Pattern \${USERNAME}@byod.company.com \${USERNAME}@guest.company.com \${USERNAME}@guest.company.com \${USERNAME}@byod.company.com \${USERNAME}@byod.company.com \${USERNAME}@byod.company.com

Configuring the Network Policy Server

Overview of Configuring the Network Policy Server

The following sections describe how to configure Microsoft 2008 Network Policy Server (NPS) to use as a RADIUS server with Cloudpath.

PREREQUISITE

The NPS must be configured within your domain.

Import the RADIUS Server Certificate for the NPS

To import the RADIUS Server Certificate for the NPS, perform the following procedures, which are described in the following sections.

• Add a Certificates Snap-in

• Import the RADIUS Server Certificate into the Local Computer Personal Certificate Store

Add a Certificates Snap-in

To import the server certificate to the NPS Certificate Store, perform the following steps:

1. From a command window, run **mmc** to open a console window.

TIP

Do not use certngr to import the server certificate. The certmgr allows you to manage certificates for the **Current User**. However, you must import the server certificate into the **NPS Computer** certificate store.

- 2. Go to File > Add/Remove Snap-in.
- 3. On the Add or Remove Snap-ins page, select Certificates from the left pane (Available Snap-ins:) and click Add.

FIGURE 7 Add Snap-in

🔚 Cons	ole1 - [Console Root]							
🚡 File	Add or Remove Snap-ins							XBX
Cor	You can select snap-ins for t extensible snap-ins, you can			e enabled	I. '	e the selected se	et of snap-ins. For	
	Available snap-ins:		_	S	elected snap-ins:			
	Snap-in	Vendor	_		Console Root		Edit Extensions	
	ActiveX Control	Microsoft Cor					Remove	
	Authorization Manager	Microsoft Cor Microsoft Cor					1121112112	
	Component Services	Microsoft Cor					Marca Lia	
	Computer Managem	Microsoft Cor					Move Up	
	Device Manager	Microsoft Cor					Move Down	
	🖃 Disk Management	Microsoft and	Add	>				
	Event Viewer	Microsoft Cor						
	Folder	Microsoft Cor						
	Group Policy Manag							
	Group Policy Manag							
	Group Policy Starter							
	IP Security Monitor	Microsoft Cor	-				Advanced	
	Descriptions							
	Description:			- Cilina -				_
	The Certificates snap-in allo	ows you to browse	the contents	s or the c	ertificate stores for you	irseit, a service,	or a computer.	
	1							
							OK Cancel	

- 4. In the **Certificates** snap-in window, select **Computer Account** and click **Next**.
- 5. In the **Select Computer** window, select **Local Computer** and click **Finish**.

Certificates (Local Computer) should be listed in the right pane (**Selected Snap-ins:**) of the **Add or Remove Snap-ins** window.

6. Click **OK**.

Import the RADIUS Server Certificate into the Local Computer Personal Certificate Store

To import the RADIUS Server Certificate, perform the following steps:

1. On the **Console** window, expand **Certificate (Local Computer)** to locate the **Personal/Certificates** folder.

FIGURE 8 Certificates Folder in Console Window

🚟 Console1 - [Console Roo	t\Certificates (Local Computer)\Per	sonal\Certificates]		
🚡 File Action View Fav	vorites Window Help			_ & ×
🗢 🔿 🖄 📅 🗎 🛛	1 🗟 🔽 📊			
Console Root	Issued To A	Issued By	Expirat	Actions
Certificates (Local Com Personal	KalRADIUS_Server_Cert	Sample Corp Root CA I	6/28/2	Certificates 🔺
Certificates				More Actions
🛨 🚞 Trusted Root Certi				
🕀 🚞 Enterprise Trust				
🕀 📔 Intermediate Certif				
🕀 📔 Trusted Publishers				
🕀 📔 Untrusted Certifica				
🕀 📔 Third-Party Root C				
🕀 🚞 Trusted People				
Remote Desktop				
Certificate Enrollme				
Trusted Devices				
• •	•		F	

- 2. Go to Action > All Tasks > Import to start the Certificate Import Wizard.
- 3. Browse to locate the private key of the server certificate you generated in Cloudpath to use for the NPS, and click **Open**.
- 4. On the Certificate Import Wizard, click Next.

5. Place the NPS server certificates in the **Personal** store, and click **Next**.

TIP



Be sure that the RADIUS server certificate show the key icon If it does not show it, you do not have the private key for the RADIUS certificate. If you have issues, try downloading the RADIUS certificate and private key in P12 format. You can also try using the command line interface to install the private key for the RADIUS certificate. See Missing EKU in the RADIUS Server Certificate on page 33.

FIGURE 9 Certificate Import Wizard

Ce	rtificate Import Wizard	×
	Certificate Store	
	Certificate stores are system areas where certificates are kept.	
-	Windows can automatically select a certificate store, or you can specify a location for	
	the certificate.	
	O Automatically select the certificate store based on the type of certificate	
	Place all certificates in the following store	
	Certificate store:	
	Personal Browse	
	Learn more about <u>certificate stores</u>	
-		
	< Back Next > Cancel	

6. Review the imported certificate, and click **Finish**.

Import the Public Key of the Intermediate CA

The public key of the Intermediate CA (onboard CA) establishes the proper trust chain of the RADIUS server certificate.

NOTE

By default, the Intermediate CA (onboard CA) signs the user certificate. If your environment is set up to have the Root CA sign the client certificate, you must download and install the public key of the Root CA.

To import the public key of the intermediate CA to the Enterprise Trust Store, perform the following steps:

- 1. On the Console window, expand Certificate (Local Computer) to locate the Enterprise Trust/Certificates folder.
- 2. Go to Action > All Tasks > Import to start the Certificate Import Wizard.
- 3. Browse to locate the public key of the Cloudpath on-board Intermediate CA, and click **Open**.
- 4. On the Certificate Import Wizard, click Next.
- 5. Import the public key of the Intermediate CA in the **Certificate (Local Computer) Trusted Root Certificate Authorities** store, and click **Next**.

NOTE

You will encounter fewer issues when you import into the Trusted Root CA store. However, if you import the public key of the onboard Intermediate CA into the Intermediate CA store, this should also work.

FIGURE 10 Root Certificate in the Enterprise Certificate Store

🚡 File Action View Favorites Window H 🐤 🔿 🔁 🕡 🛍 🤉 😰 🗊	elp				- 6	×
 Console Root Certificates (Local Computer) Personal Trusted Root Certification Authorities Enterprise Trust Intermediate Certification Authorities Certificates Certificates Trusted Publishers Untrusted Certification Authorities Trusted People Other People Homegroup Machine Certificates Trusted Devices Trusted Devices Windows Live ID Token Issuer 	Class 3 Public Primary Certificat Class 3 Public Primary Certificat Cloupdath Networks MSftCA Copyright (c) 1997 Microsoft C Cybertrust Global Root DigiCert Assured ID Root CA DigiCert Global Root CA DigiCert High Assurance EV Ro DST Root CA X3 Entrust Root Certification Auth	Class 3 Public Primary Certificatio Cloupdath Networks MSftCA Copyright (c) 1997 Microsoft Corp. Cybertrust Global Root DigiCert Assured ID Root CA DigiCert Global Root CA DigiCert High Assurance EV Root DST Root CA X3 Entrust Root Certification Authority	Expiration Date 5/30/2020 12/31/2030 11/19/2037 5/12/2025 4/30/2034 6/11/2027 8/2/2028 8/1/2028 1/7/2004 4/30/2035 12/30/1999 12/15/2021 11/9/2031 11/9/2031 11/9/2031 11/9/2031 11/9/2031 11/27/2026 7/24/2029 5/25/2019 8/22/2018 5/20/2022	Int ^ Se Se Se Se Se Se Se Se Se Se Se Se Se	Actions Certificates More Actions BVT - Enrollment System Interm More Actions	4 2 4

6. Review the imported certificate, and click **Finish**.

Set Up Roles and Services

To install Network Policy and Access Services (NPAS) as a Server Role, perform the following steps:

1. Open Server Manager.

2. Open the Add Roles wizard and install Network Policy and Access Services.

FIGURE 11 Install Network Policy and Access Services

Add Roles Wizard		X
Select Serve	er Roles	
Before You Begin Server Roles Confirmation Progress Results	Select one or more roles to install on this server. Roles: Active Directory Certificate Services Active Directory Domain Services Active Directory Federation Services Active Directory Rights Management Services Active Directory Rights Management Services Active Directory Rights Management Services Active Directory Rights Management Services DHCP Server DHCP Server DHCP Server File Services Hyper-V Network Policy and Access Services (Installed) Print and Document Services Remote Desktop Services Web Server (IIS) Windows Deployment Services Windows Server Update Services	Description: <u>Network Policy and Access Services</u> provides Network Policy Server (NPS), Routing and Remote Access, Health Registration Authority (HRA), and Host Credential Authorization Protocol (HCAP), which help safeguard the health and security of your network.
	More about server roles	(i) Additional role services can be added from the Roles home page.
	< Previous	Next > Install Cancel

- 3. Open the Add Role Services window and verify that the Network Policy Server is installed for Network Policy and Access Services.
- 4. In the **Role Summary** section, verify that NPS is running.

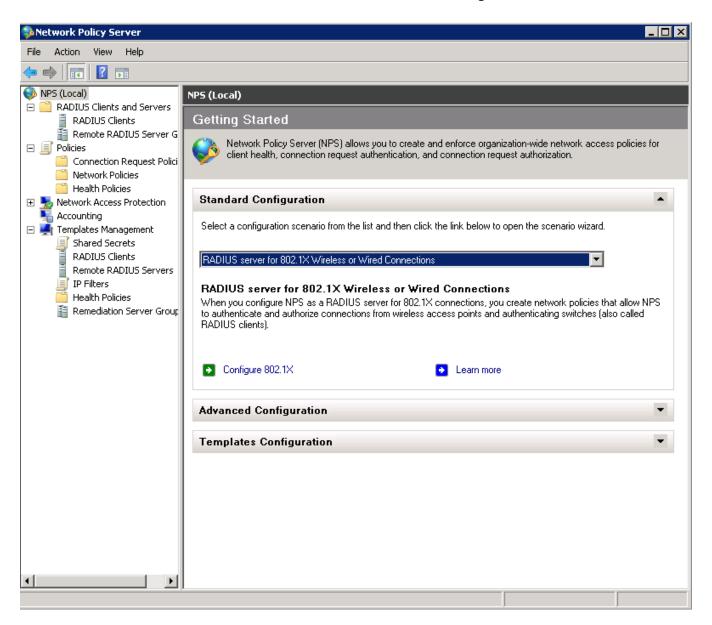
Network Policy Setup for EAP/TLS

To configure the 802.1X connection policy to set up 802.1X connections, perform the following steps:

- 1. Open Server Manager.
- 2. Expand Network Policy and Access Services, and select NPS (Local).

The Standard Configuration section should appear in the center pane.

3. Select RADIUS server for 802.1X Wireless or Wired Connections, and click Configure 802.1X.



4. In the **Select 802.1X Connection Type** window, select **Secure Wireless Connections**, enter a **Name** for the wireless connection, and click **Next**.

FIGURE 12 Select 802.1X Connection Type

Configure 802.1X	X
Select 802.1X Connections Type	
 Type of 802.1X connections: Secure Wireless Connections When you deploy 802.1X wireless access points on your network, NPS can authenticate and authorize connection requests made by wireless clients connecting through the access points. Secure Wired (Ethemet) Connections When you deploy 802.1X authenticating switches on your network, NPS can authenticate and authorize connection requests made by Ethemet clients connecting through the switches. Name: This default text is used as part of the name for each of the policies created with this wizard. You can use the default text or modify it . 	
Secure Wireless Connections Test Policy	
Previous Next Finish Cancel	

5. In the **Specify 802.1X Switches** window, click **Add** to configure a wireless access point (RADIUS client).

6. In the **New RADIUS Client** window, enter settings for the wireless access point, and click **OK**. Repeat this step to add additional RADIUS clients. Click **Next** on the **Specify 802.1X Switches** window to continue.

NOTE

If you already have a RADIUS client configured, skip to Step 10.

FIGURE 13 New RADIUS Client

RADIUS Client			
ttings			
-			
Select an existing temp	ate:		
			7
Name and Address			
Friendly name:			
New RADIUS Client			
Address (IP or DNS):			
172.16.4.20			Verify
Shared Secret Select an existing Shared	Secrets template:		
None			×
None To manually type a shared secret, click Generate. Yo secret entered here. Share	secret, click Manual. T u must configure the R/	ADIUS client with t	enerate a shared he same shared
None To manually type a shared secret, click Generate. Yo secret entered here. Share	secret, click Manual. T u must configure the R/ ed secrets are case-sen	ADIUS client with t	enerate a shared the same shared
None To manually type a shared secret, click Generate. Yo secret entered here. Share Manual Shared secret:	secret, click Manual. T u must configure the R/ ed secrets are case-sen	ADIUS client with t	enerate a shared he same shared
None To manually type a shared secret, click Generate. Yo secret entered here. Share Manual Shared secret:	secret, click Manual. T u must configure the R/ ed secrets are case-sen	ADIUS client with t	enerate a shared he same shared

- 7. In the **Configure Authentication Method** window, select **Smart Card or other certificate**.
- 8. To configure a RADIUS client, click **Configure**.

9. In the **Smart Card or other Certificate Properties** window, select the NPS RADIUS server certificate that you imported to the Computer Enterprise Trust store. (See Import the RADIUS Server Certificate for the NPS on page 15.) Click OK.

FIGURE 14 Configure Authentication Method

Configure	802.1X		×
	Configure a	n Authentication Method	
Select the	EAP type for this policy.		
Type (ba	sed on method of acce	ss and network configuration):	
Microsoft:	Smart Card or other certifica	ate Configure	
	Smart Card or other C	ertificate Properties	
		f to callers before the connection is completed. Select ant it to use as proof of identity.	
	Certificate issued to:	RADIUS	
	Friendly name:		
	Issuer:	Sample Root CA	
	Expiration date:	6/21/2014 10:08:39 AM	
		OK Cancel	
		Previous Next Finish Cancel	

- 10. When you select the server certificate, click **Next** in the **Configure an Authentication Method** window.
- 11. Set up **User Groups** and **Traffic Controls**, if needed.
- 12. Click Finish.

The RADIUS client configuration is added.

Prioritize the 802.1X Configuration

To prioritize the 8021.X configuration, perform the following steps:

- 1. From the Server manager, expand **Network Policy and Access Services** > **NPS (Local)** > **Policies**, and select the **Network Policies** folder.
- 2. The 802.1X policy you just created should be at the top of the list. If needed, select the policy, and select **Move Up** until the policy is at the top of the list.

FIGURE 15 Network Policies

File Action View Help		
🗢 🔿 🚈 🖬 🔢 🖬		
Server Manager (SHIN-NPS-2008R2)	Network Policies	Actions
🖃 🚏 Roles		Network Policies
 Network Policy and Access Services NPS (Local) 	Network policies allow you to designate who is authorized to connect to the network and the circumstances under which they can or cannot connect.	New
⊞ ☐ RADIUS Clients and Servers □ ☐ Policies		Export List
Connection Request Policies	Policy Name Status Processin Access Ty	
Network Policies	Secure Wireless Connections Test Policy Enabled 1 Grant Acc	ess U
📔 Health Policies	Wireless via ES Enabled 2 Grant Acc	
Network Access Protection Accounting	Connections to Microsoft Routing and Remote Access server Enabled 3 Deny Acc Connections to other access servers Enabled 4 Deny Acc	Help
🕀 🌉 Templates Management		Secure Wireless Connection 🔺
Features June Diagnostics		Move Up
🛨 🎆 Configuration		Move Down
🛨 📇 Storage	Secure Wireless Connections Test Policy	Disable
	Conditions - If the following conditions are met:	Delete
	Condition Value	Rename
	NAS Port Type Wireless - Other OR Wireless - IEEE 802.11	Duplicate Policy
		Properties
		? Help
	Settings - Then the following settings are applied:	
	Setting Value	
	Authentication Method EAP OR MS-CHAP v1 OR MS-CHAP v1 (User ca	-
	Access Permission Grant Access	
	Update Noncompliant Clients True	
	NAP Enforcement Allow full network access	
	Framed-Protocol PPP	
	Service-Type Framed	<u>ا لح</u>
<u>.</u>	,	

Verify Network Policy

You need to review your network policy, verify the conditions, verify that it uses the correct authentication method, and verify the network policy settings.

The following sections describe each part of the procedure.

Review the Network Policy

To review the network policy, perform the following steps:

- 1. From the Server manager, expand **Network Policy and Acess Services** > **NPS (Local)** > **Policies**, and select the **Network Policies** folder.
- 2. Select the 802.1X policy that you previously created.
- 3. Click **Properties** to view the network policy properties and verify they are correct.

Verify Conditions of a Connection Request Policy

If you are using a Connection Request Policy, perform the following steps to verify the conditions:

- 1. Go to the Secure Wireless Connections Properties > Conditions tab.
- Verify that the **Conditions** match the Connection Request Policy. See Connection Request Policies on page 28.

Verify Authentication Method

To verify the authentication method, perform the following steps:

1. On the Secure Wireless Connections Properties > Constraints tab, select Authentication Methods.

FIGURE 16 Secure Wireless Connection Properties

Secure Wireless Connections Test Policy	Properties	X
Overview Conditions Constraints Setting	s	
	s cy.	
	Encrypted authentication (CHAP) Unencrypted authentication (PAP, SPAP)	
	Orientrypted authentication (FAP, SPAP) Allow clients to connect without negotiating an authentication method Perform machine health check only	
	OK Cancel Apply	

2. Verify that the Microsoft Smart Card or other certificate EAP Type is listed.

- 3. If it is not listed, perform the following steps:.
 - a) click **Add**.
 - b) On the Add EAP Type window, select Microsoft Smart Card or other certificate.
 - c) Click OK.
 - d) Select the **Microsoft Smart Card or other certificate** EAP Type.
 - e) Use the **Move Up** button to place it at the top of the list.

EAP Types are negotiated between NPS and the client in the order in which they are listed.

4. Click OK.

Verify Network Policy Settings

If you are using a Connection Request Policy, perform the following steps to verify network policy settings:

- 1. Go to the Secure Wireless Connections Properties > Settings tab.
- 2. Verify that your **Settings** match the Connection Request Policy.

If Conditions and **Constraints** match the connection request, and the **Policy** grants access, these **Settings** are applied.

Connection Request Policies

If you are using the NPS as a RADIUS server to authenticate, you can use the NPS default connection policy.

If you are using the NPS as a RADIUS proxy, you must configure a connection request policy for the remote RADIUS server group. See Configure a Connection Request Policy for RADIUS Proxy on page 29 for more information.

Setting Up RADIUS Proxy on NPS

Overview of Setting Up RADIUS Proxy on NPS

A Network Policy Server (NPS) must be configured as a RADIUS proxy so it can forward connection requests to other RADIUS servers for authentication and authorization.

To configure an NPS as a RADIUS proxy, you perform the following procedures, which are described in the following sections.

- Create a remote server group with one or more RADIUS servers to which RADIUS messages are forwarded.
- Create a connection request policy to forward connection requests and accounting information to the remote RADIUS server group.

Add a Remote RADIUS Server Group for RADIUS Proxy

Remote RADIUS server groups allow you to specify where to forward connection requests when the local NPS server is configured as a RADIUS proxy.

To add a remote RADIUS server group as a RADIUS proxy, perform the following steps:

1. On the NPS (local), expand RADIUS Clients and Servers, and select Remote RADIUS Server Groups.

2. From the **Action** menu, select **New**.

(Alternately, you can right-click and select **New**.)

3. In the New Remote RADIUS Server Group window, enter a Group name (for example, enter ES), and click Add.

FIGURE 17 Remote RADIUS Server Group

웢 Network Policy Server		. 8 ×
File Action View Help		
🗢 🔿 🚾 🔽 🖬		
NPS (Local) ADIUS Clients and Servers	Remote RADIUS Server Groups	
RADIUS Clients Remote RADIUS Server G Policies	Remote RADIUS server groups allow you to specify where to forward connection requests when the local NPS server is configured as a RADIUS proxy.	
Connection Request Polici Network Policies	Group Name	
Health Policies	ES STATE OF	
🖃 퉔 Network Access Protection		
E System Health Validators	New Remote RADIUS Server Group	
Remediation Server Group Accounting	Group name:	
 Templates Management 	Test - ES	
	RADIUS Servers:	
	RADIUS Servers. RADIUS Server Priority Weight Add	
	172.16.4.20 1 50	
	Edit	
	Hemove	
	OK Cancel	
	P	

- 4. In the Add RADIUS server window, on the Address tab, enter the IP address of the NPS acting as a RADIUS server.
- 5. On the Authentication/Accounting tab, enter the Shared secret of the NPS, and confirm. Click OK.
- 6. Click **OK** in the **New Remote RADIUS server** window.

The **ES** remote RADIUS server group is added.

Configure a Connection Request Policy for RADIUS Proxy

Connection request policies allow you to designate whether connection requests are processed locally or forwarded to remote RADIUS servers.

You can configure a connection policy request to look for <@guest> in the user name, and, if found, forward the request to the remote RADIUS server group. To configure a connection request policy for a RADIUS proxy, perform the following steps:

1. On the NPS, expand **Policies** and select **Connection Request Policy**.

- From the Action menu, select New (Alternately, you can right-click and select New.)
- 3. In the **New Connection Request Policy** window, enter a **Policy name**, and click **Next**.
- 4. In the **Specify Conditions** window, click **Add**.
- 5. In the **Select Condition** window, select **NAS Port Type**, and click **Add**.
- 6. In the **NAS Port Type** window, check the box for the following settings:
 - Wireless IEEE 802.11 in the 802.1X connection tunnel types section.
 - Wireless Other in the Others section.

Click **OK**.

FIGURE 18 NAS Port Type

NAS Port Type	×
Specify the access media types required to match this policy.	
Common dial-up and VPN tunnel types	
Async (Modem) ISDN Sync Sees (Tillier)	r
Sync (T1 Line) Virtual (VPN)	
Common 802.1X connection tunnel types	
Ethemet FDDI Token Ring	r
Wireless - IEEE 802.11	
Others	
✓ Wireless - Other ▲ ∴ X.25 X.75 ∴ xDSL - Digital Subscriber Line of unknown type ▼	
OK Cancel	

- 7. In the Specify Conditions window, click Add.
- 8. Select **User name** and click **Add**.
- 9. In the User Name window, enter .*@guest. Click OK.
- 10. In the Specify Conditions window, click Next.

- 11. In the Specify Connection Request Forwarding window, perform the following steps:
 - a) In the left pane, select **Authentication**.
 - b) In the right pane, select Forward requests to the following remote RADIUS server group for authentication.
 - c) Select the **ES** remote RADIUS server group you previously created.
 - d) Click **Next**.

FIGURE 19 Specify Connection Request - Authentication

roxyGuestsToEs Properties		2
Overview Conditions Settings		
Configure the settings for this network policy	A nection request and the policy grants access, settings are applied. Specify whether connection requests are processed locally, are forwarded to remote RADIUS servers for authentication, or are accepted without authentication. Authenticate requests on this server Forward requests to the following remote RADIUS server group for authentication: ES Accept users without validating credentials	
	OK Cancel Apply	

- 12. In the **Configure Settings** window, perform the following steps:
 - a) In the left pane, select **Attribute** under **Specify a Realm Name**.
 - b) In the right pane, select **User Name** from the **Attribute** list.
 - c) Click Next.

13. Review the connection request policy configuration in the **Completing Connection Request Policy Wizard** window, and click **Finish**.

With this configuration, *user@guest* is forwarded by the NPS to Cloudpath for authentication, while *user* is authenticated directly by the NPS.

Tips and Troubleshooting

Consider the following issues when you are testing or troubleshooting the configuration for Cloudpath integrated with a Network Policy Server.

Validate Server Certificate Setting in the License Server

When testing your configuration, begin with the **validate server certificate** setting unchecked on the Cloudpath system. This allows you to troubleshoot any certificate configuration issues for the EAPTLS/ PEAP protocol. After it is successful, enable the **validate server certificate** setting in Cloudpath.

After the certificate has been validated, the Network Policy Server (NPS) looks up the name on the certificate in AD and applies network policy.

LDAP

Using LDAP's default port (TCP-389) with a Base DN of the parent Active Directory domain will only show objects from the parent domain. Change the port to 3268, but keep the same Base DN to allow LDAP access to users from the child AD domain (Reference http://technet.microsoft.com/enus/library/cc978012.aspx).

Global Catalog queries are directed to port 3268, which explicitly indicates that Global Catalog semantics are required. By default, ordinary LDAP searches are received through port 389. If you bind to port 389, even if you bind to a Global Catalog server, your search includes a single domain directory partition. If you bind to port 3268, your search includes all directory partitions in the forest. If the server you attempt to bind to over port 3268 is not a Global Catalog server, the server refuses the bind.

OSCP Issues

OSCP Validation

The NPS server first attempts to validate a client certificate using the Online Certificate Status Protocol (OSCP). If the OSCP validation is successful, the validation verification is satisfied; otherwise, it attempts to perform a CRL validation of the user or computer certificate.

OCSP provides the ability to revoke certificates. However, if using OCSP affects the performance of your system, you could disable OCSP and use CRL only.

Certificate revocation checking behavior for NPS can be modified with registry settings (http:// technet.microsoft.com/en-us/ library/cc771995%28v=ws.10%29.aspx).

OSCP Server in the DNS

When the client fetches the OCSP response from the CA, it looks up the domain name of the CA's OCSP server in the DNS, as well as establishing a connection to the OCSP server.

If you receive a message that indicates the server cannot resolve the OSCP URL, check the hostname listed in the OSCP URL for the onboard Root CA you created in Cloudpath. See Create the Certificate Authority on page 6. You might need to add this hostname to the DNS of the domain.

Credentials Mismatch

If you receive an error that an authentication failed due to a user credentials mismatch, either the user name provided does not map to an existing user account, or the password was incorrect.

Certificate Template Issues

Common Name

The CN in the certificate template may need to include domain information. This can be specified as *\${USERNAME}@domain* within Cloudpath on the specific certificate template.

SAN Other Name

If the NPS logs show an issue with credentials, check the **SAN Other Name Pattern** in the certificate template. The variable listed in the **SAN Other Name Pattern** field should match the variable used in the Common Name Pattern field.

Missing EKU in the RADIUS Server Certificate

RADIUS certificates must contain Microsoft Server EKU-1.3.6.1.5.5.7.3.1. When you create the server certificate template in Cloudpath, you must check the box for the Microsoft Server EKU. See Set Up Client Certificate Template Settings for NPS on page 8 for more information.

EAP Method is Not Available on the Server

If you are receiving a message that the EAP message is not available on the server, check the following configuration issues.

Register the NPS With the Domain

If the NPS is not registered to the domain, you might receive an error message that the EAP method is not available on the server.

To see if the NPS is registered with the domain, right-click the NPS server. If the server is registered, the **Register with domain option** is not available.

If there is a problem with your working registration, try deleting and re-adding the registration using the NPS **Administrator** prompt and the commands in this example:

```
net stop ias
netsh ras delete registeredserver domain=x server=y
net start ias
net stop ias
netsh ras add registeredserver domain=samplecorp.local server=SAMPLE-NPS-Server
net start ias
```

RADIUS Server Certificate Missing Private Key

If the RADIUS server certificate is missing the private key, you might receive an error message that the EAP Method is not available on the server, you might be missing the private key for the RADIUS server certificate.

Be sure that the RADIUS server certificate in the Local Computer Personal Certificate Store shows the certificate with key icon



next to it. This indicates that the certificate is signed with the private key. If it does not show the icon, you do not have the private key for the RADIUS certificate. Try downloading the RADIUS certificate and private key in P12 format.

See Download the RADIUS Server Certificate on page 14 for instructions on downloading the certificate from Cloudpath, or use the following command examples from the NPS Administrator prompt:

```
certutil -dspublish -f root.cer NTAuthCA
certutil -enterprise -addstore NTAuth root.cer
```

Certificate Chain Not Trusted

If you receive an error that indicates the certificate chain is not trusted, verify that you have the public certificate and any intermediate certificates for the root CA. See Download the Public Key of the Intermediate CA on page 14 for more information.



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