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Cisco Nexus 1000V XML Management Interface User Guide, Release 4.0(4)SV1(3)

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Preface

This preface describes the *Cisco Nexus 1000V XML Management Interface User Guide, Release 4.0(4)SV1(3)* and includes the following sections:

- Audience, page v
- Organization, page v
- Document Conventions, page v
- Available Documents, page vi
- Obtaining Documentation and Submitting a Service Request, page viii

Audience

This publication is for experienced users who configure and maintain NX-OS devices.

Organization

This document is organized as follows:

Chapter and Title	Description
Chapter 1, “Overview”	Describes the Cisco Nexus 1000V XML API.
Chapter 2, “Configuring the XML Server”	Describes how to configure the XML API server.
Chapter 3, “Configuring XML Requests”	Describes how to configure XML API requests and messages.

Document Conventions

Command descriptions use these conventions:

Convention	Description
boldface font	Commands and keywords are in boldface.
italic font	Arguments for which you supply values are in italics.

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[ ]	Elements in square brackets are optional.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Screen examples use these conventions:

`screen font`	Terminal sessions and information that the switch displays are in screen font.
`boldface screen font`	Information you must enter is in boldface screen font.
`italic screen font`	Arguments for which you supply values are in italic screen font.
< >	Nonprinting characters, such as passwords, are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

This document uses the following conventions:

Note Means reader *take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Tip Means *the following information will help you solve a problem.*

Available Documents

This section lists the documents used with the Cisco Nexus 1000 and available on Cisco.com at the following url:

http://www.cisco.com/en/US/products/ps9902/tsd_products_support_series_home.html

General Information

Cisco Nexus 1000V Release Notes, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Compatibility Information, Release 4.0(4)SV1(3)

Cisco Nexus 1010 Management Software Release Notes, Release 4.0(4)SP1(1)

Install and Upgrade

Cisco Nexus 1000V Software Installation Guide, Release 4.0(4)SV1(3)

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Cisco Nexus 1000V Software Upgrade Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Virtual Ethernet Module Software Installation Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1010 Virtual Services Appliance Installation Guide

Configuration Guides

Cisco Nexus 1000V License Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Getting Started Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V High Availability and Redundancy Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Interface Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Layer 2 Switching Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Port Profile Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Quality of Service Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Security Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V System Management Configuration Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1010 Software Configuration Guide, Release 4.0(4)SP1(1)

Programming Guide

Cisco Nexus 1000V XML API User Guide, Release 4.0(4)SV1(3)

Reference Guides

Cisco Nexus 1000V Command Reference, Release 4.0(4)SV1(3)

Cisco Nexus 1000V MIB Quick Reference

Cisco Nexus 1010 Command Reference, Release 4.0(4)SP1(1)

Troubleshooting and Alerts

Cisco Nexus 1000V Troubleshooting Guide, Release 4.0(4)SV1(3)

Cisco Nexus 1000V Password Recovery Guide

Cisco NX-OS System Messages Reference

Network Analysis Module Documentation

Cisco Network Analysis Module Software Documentation Guide, 4.2

Cisco Nexus 1000V NAM Virtual Service Blade Installation and Configuration Guide

Network Analysis Module Command Reference Guide, 4.2

User Guide for the Cisco Network Analysis Module Virtual Service Blades, 4.2

Cisco Network Analysis Module Software Release Notes, 4.2

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Obtaining Documentation and Submitting a Service Request

For information about obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.

CHAPTER 1

Overview

This chapter describes how the XML API is used to configure and monitor the Cisco Nexus 1000V, and includes the following sections:

- Definition of Terms, page 1-1
- Introduction, page 1-1
- Schema, page 1-2
- Server, page 1-2
- Network Configuration Protocol, page 1-3
- XML Message and Reply Format, page 1-3
- Additional References, page 1-7

Introduction

The eXtensible markup language (XML) application programming interface (API) lets you manage and monitor the Cisco Nexus 1000V using XML. From a client PC, you can encode CLI commands with XML API tags that are then sent to the device over a secure SSH connection.

Definition of Terms

Table 1-1 defines the words, acronyms, and actions used throughout this guide.

Table 1-1 Definition of Terms

Term	Description
CLI	Command-line interface
NETCONF	Network Configuration Protocol
NETCONF operations	The actions carried out by NETCONF protocol.
RPC	Remote procedure call. A programming interface that allows your client PC to use the services of the remote XML server. Your client PC sends a request message to the remote XML server, which performs the operation requested, and replies with the results.
SSH	Secure Shell

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Table 1-1 Definition of Terms

Term	Description
XML	Extensible markup language, consisting mainly of text and tags.
XML agent	The XML server — An XML process on the Cisco Nexus 1000V responsible for carrying out client requests and then responding.
XML client	An external application that sends requests to, and receives responses from, the Cisco Nexus 1000V XML server.
XML operation	The portion of an XML client request that specifies what you want the XML agent to do.
XML operation provider	The Cisco Nexus 1000V code that does the following: • Parses XML requests. • Carries out the requested operations. • Assembles the XML reply.
XML request	An XML document sent to the Cisco Nexus 1000V containing a number of requested operations to be carried out.
XML reply	The reply to an XML request.
XML schema	An XML document specifying the structure and possible contents of XML elements that can be contained in an XML document.

Schema

The XML interface is implemented with an XML schema definition (XSD) of the supported CLI commands in XML. You can download the feature-based XSD files from Cisco.com.

To obtain a copy of the XSD, from your browser, navigate to the Cisco software download site at the following URL:

http://www.cisco.com/kobayashi/sw-center/index.shtml

Find the release of the Cisco Nexus 1000V software you are using, and open the folder. Navigate to the XML-API folder and the XSD files are inside. Look for a zip file with a name similar to the following:

- nexus-1000v.4.0.4.SV1.3.xsd.tar.gz

Server

A Cisco Nexus 1000V XML agent, also called the XML server, enables configuration and monitoring using an exchange of XML formatted request and reply streams over a secure connection.

When you start an SSH session with the XML server, it sends an immediate hello message including its capabilities, as shown in Example 1-1. Before the server processes further requests, you must advertise your capabilities in a hello message to the server, as shown in Example 1-2.

Note You must end all XML documents with]]>]]> to support synchronization in NETCONF over SSH.

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Example 1-1 Hello Message from the Server

```
<?xml version="1.0"?>
<hello xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <capabilities>
  <capability>urn:ietf:params:xml:ns:netconf:base:1.0</capability>
  </capabilities>
</hello>]]>]]>
```

Example 1-2 Hello Message from the Client

```
<?xml version="1.0"?>
<nc:hello xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0">
  <nc:capabilities>
    <nc:capability>urn:ietf:params:xml:ns:netconf:base:1.0</nc:capability>
  </nc:capabilities>
</nc:hello>]]>]]>
```

Network Configuration Protocol

Communication with the XML API is accomplished in XML over the Network Configuration Protocol (NETCONF). NETCONF uses a simple remote procedure call (RPC) and SSH transport protocol for a secure connection.

To run NETCONF over SSHv2, the client establishes an SSH transport connection with the XML server. The client and server exchange keys for security and password encryption. The NETCONF SSHv2 session user ID and password are used for authorization and authentication. The user privilege level is enforced and the client session may not have full access to the NETCONF operations if the privilege level is not high enough.

If AAA is configured, the AAA service is used as if you had established an SSH session directly to the Cisco Nexus 1000V. Once the client is successfully authenticated, it starts the SSH connection protocol and the SSH session is established. After the SSH session is established, the user or application starts NETCONF as an SSH subsystem.

For detailed information about NETCONF, see RFC 4741.

For detailed information about using the NETCONF protocol over the Secure Shell (SSH), see RFC 4742.

XML Message and Reply Format

The communication between client and server consists of a series of alternating request and reply messages.

A valid client ID is an unsigned 32-bit integer. If the request message contains a valid client ID, then the server also includes the same client ID in its reply. The client ID is treated as opaque data and ignored in every other way by the XML API.

Every request sent by a client application to the server begins with an XML declaration tag followed by a request tag and one or more operation tags. Each request can contain one or more operations for each supported operation type, and the operations can be repeated.

Similarly, every reply from the server begins with an XML declaration tag followed by a reply tag and one or more operation tags corresponding to those in the client request.

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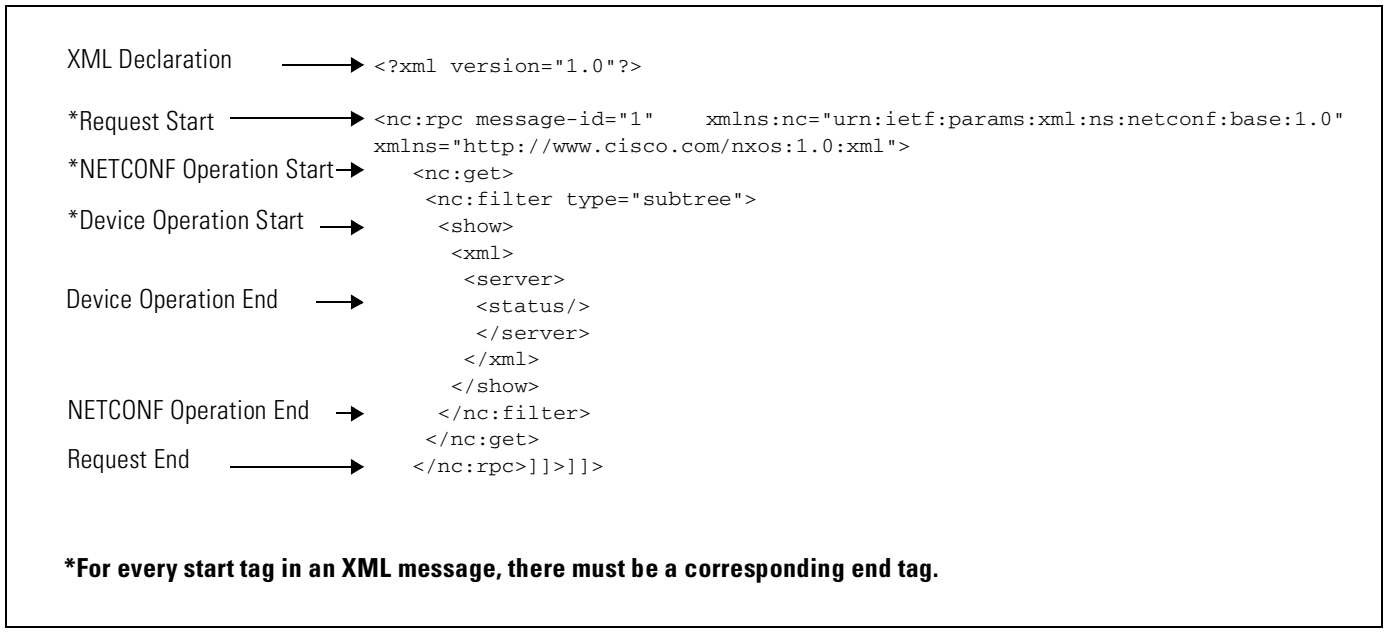
Figure 1-1 shows the tags used to identify each line of content in NETCONF XML messages:

- XML Declaration, page 1-4
- Request, page 1-4
- Operations, page 1-5

Figure 1-1 NETCONF XML Message Format



XML Declaration

Each request and reply begins with an XML declaration indicating which version of XML and (optionally) which character set are being used.

The following are the attributes of the XML declaration:

- Version—Specifies the version of XML to be used.
- Encoding—(optional) Specifies the standardized character set to be used.

Example 1-3 Declaration Statement

```
<?xml version="1.0"?>
```

Request

In the XML message format, the client request follows the XML declaration tag. Each request must be enclosed within a set of RPC tags. Requests include NETCONF and device (CLI-based) operations.

As shown in Example 1-4, you first specify the NETCONF operation (for example, **get**) followed by the CLI commands (for example, **show xml server status**).

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Example 1-4 Request

```
<nc:rpc message-id="1" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
  xmlns="http://www.cisco.com/nxos:1.0:xml">
   <nc:get>
      <nc:filter type="subtree">
        <show>
          <xml>
            <server>
           <status/>
            </server>
           </xml>
         </show>
       </nc:filter>
    </nc:get>
 </nc:rpc>]]>]]>
```

Operations

In your client request, you specify both NETCONF operations, and CLI command-based operations. Example 1-5 shows how the following operations appear in an XML API message.

NETCONF Operation	CLI Command Operation
get	
filter type = subtree	show xml server status

Note To identify which of the NETCONF operations are supported, see Table 1-2.

Example 1-5 Operations

```
    <nc:get>
      <nc:filter type="subtree">
        <show>
         <xml>
           <server>
             <status/>
             </server>
          </xml>
        </show>
    </nc:filter>
  </nc:get>
```

When your client request is received by an XML agent, the request is routed to the XML API library for processing. After all requested operations are processed, the XML agent sends an XML encoded reply stream back to your client. Table 1-2 shows which of the NETCONF operations are supported.

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Table 1-2 NETCONF Operations

NETCONF Operation	Supported?	Description	Example
close-session	Yes	Terminates your server session.	Example: Closing Your Session, page 3-11
commit	No	—	—
copy-config	No	—	—
delete-config	Yes	Performs the equivalent of the **write erase** command on the startup configuration.	Example: Deleting a Configuration, page 3-11
edit-config	Yes	Configures features in the running configuration of the device. You use this operation for configuration commands.	Example: Editing a Configuration, page 3-12
get	Yes	Receives configuration information from the device. You use this operation for **show** commands. The source of the data is the running configuration.	Example: Creating a Message with Multiple Operations, page 3-5
get-config	No	—	—
kill-session	Yes	Terminates another server session.	Example: Closing a Session Other Than Your Own, page 3-12
lock	No	—	—
unlock	No	—	—
validate	No	—	—

Reply

For every XML request you send from the client, the XML server sends an XML reply, as shown in Example 1-6. Just as in your request message, every reply from the server begins with an XML declaration and includes one or more operations. The possible replies are described in Table 1-3.

Note Replies may be received in a different sequence than the requests were sent.

Example 1-6 Reply

```
<nc:rpc-reply message-id=”315” xmlns xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0">
  <ok/>
</nc:rpc-reply>]]>]]>
```

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Table 1-3 Replies

Element	Description
<ok>	The request completed successfully and no additional information is included in the reply.
<data>	The request completed successfully and additional information is included in the reply.
<rpc-error>	The request failed, and error information is included with the reply.

Additional References

For additional information related to implementing the XML management interface, see the following sections:

- Standards, page 1-7
- RFCs, page 1-7

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

RFCs

RFCs	Title
RFC 4741	*NETCONF Configuration Protocol*
RFC 4742	*Using the NETCONF Configuration Protocol over Secure SHell (SSH)*

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CHAPTER 2

Configuring the XML Server

This chapter describes how to configure the XML server and includes the following sections:

- Configuring the Number of Allowed Sessions, page 2-1
- Configuring the Session Timeout Period, page 2-2
- Terminating a Server Session, page 2-4
- Default Settings, page 2-4
- Additional References, page 2-5

Configuring the Number of Allowed Sessions

Use this procedure to configure the maximum number of simultaneous sessions allowed on the XML server.

BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You are logged in to the CLI in EXEC mode.
- You can allow between 1 and 8 maximum sessions simultaneously on the XML server. The default is 8.

SUMMARY STEPS

1. (Optional) **show xml server status**
2. **config t**
3. **xml server max-session** *sessions*
4. (Optional) **show xml server status**
5. (Optional) **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose

Step 1	**show xml server status**
	
	Example:
	`switch# show xml server status`
	`operational status is enabled`
	`maximum session configured is 8`
		(Optional) Displays information about XML server settings and any active XML server sessions.

Step 2	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Places you in the CLI Global Configuration mode.

Step 3	**xml server max-session** *sessions* **Example:** `switch(config)# xml server max-session 6`	Sets the number of allowed XML server sessions. The default is 8. The range is from 1 to 8.
Step 4	**show xml server status** **Example:** `switch(config)# show xml server status`	(Optional) Displays information about the XML server settings and active XML server sessions.

Step 5	**copy running-config startup-config**
	
	Example:
	`switch(config)# copy running-config startup-config`
	`[##############################] 100%`
	`n1000v(config)#`
		(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.

Configuring the Session Timeout Period

Use this procedure to configure the inactive session timeout period on the XML server.

BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You are logged in to the CLI in EXEC mode.
- You can set the inactive session timeout period anywhere between 0 and 1200 seconds.

SUMMARY STEPS

1. **config t**
2. **xml server timeout** *seconds*
3. (Optional) **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Places you in the CLI Global Configuration mode.

Step 2	**xml server timeout** *seconds*
	
	Example:
	`switch(config)# xml server timeout 1200`
	`switch(config)#`
		Sets the number of seconds after which an inactive XML server session is terminated. The allowable range is from 0 to 1200 seconds.

Step 3	**copy running-config startup-config**
	
	Example:
	`switch(config)# copy running-config startup-config`
	`[################################] 100%`
	`n1000v(config)#`
		(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.

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Terminating a Server Session

Use this procedure to terminate an active XML server session.

BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You are logged in to the CLI in EXEC mode.

SUMMARY STEPS

1. (Optional) **show xml server status**
2. **xml server terminate** *session*
3. (Optional) **show xml server status**

DETAILED STEPS

	Command	Purpose

Step 1	**show xml server status**
	
	Example:
	`switch(config)# show xml server status`
	`operational status is enabled`
	`  maximum session configured is 8`
	`switch(config)#`
		(Optional) Displays information about the XML server settings and active XML server sessions.

Step 2	**xml server terminate** *session*
	
	Example:
	`switch(config)# xml server terminate 8665`
	`switch(config)#`
		Terminates the specified XML server session.

Step 3	**show xml server status** **Example:** `switch(config)# show xml server status`	(Optional) Displays information about the XML server settings and active XML server sessions. Verify that the session was terminated.

Default Settings

Table 2-1 lists the default settings for the XML API.

Table 2-1 XML API Defaults

Parameters	Default
Maximum allowed XML server sessions	8
Active XML server timeout period	1200 seconds

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Additional References

For additional information related to implementing the XML management interface, see the following sections:

- Standards, page 2-5
- RFCs, page 2-5

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

RFCs

RFCs	Title
RFC 4741	*NETCONF Configuration Protocol*
RFC 4742	*Using the NETCONF Configuration Protocol over Secure SHell (SSH)*

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CHAPTER 3

Configuring XML Requests

This chapter describes how to configure XML requests and includes the following sections:

- Prerequisites, page 3-1
- Guidelines and Limitations, page 3-1
- Starting a Session with the XML Server, page 3-2
- Creating an XML Request, page 3-3
- Example Configurations, page 3-5
- Default Settings, page 3-13
- Additional References, page 3-13

Prerequisites

The XML API interface has the following prerequisites:

- SSH Version 2 is installed and enabled on the client PC.

Guidelines and Limitations

Before you begin exchanging messages with the Cisco Nexus 1000VXML API, verify the following conditions:

- You must use your own XML editor or XML management interface tool to create XML instances.
- If using an XML management tool, it must support NETCONF over SSH.

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Starting a Session with the XML Server

Use this procedure to start a NETCONF session between your XML client and the Cisco Nexus 1000V XML server.

Note The Cisco Nexus 1000V xmlagent service is referred to as the XML server.

BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You are logged in to your XML client PC where SSH Version 2 is enabled.
- You know the IP address for the Cisco Nexus 1000V XML server.
- There is an available XML server session.

  For more information, see the "Configuring the Number of Allowed Sessions" procedure on page 2-1.

SUMMARY STEPS

1. **ssh** *username@ipaddress* **-s xmlagent**
2. *password*

DETAILED STEPS

	Command	Purpose

Step 1	**ssh** *username@ip-address* **-s xmlagent**
	Example:
	`ssh admin@172.23.232.160 -s xmlagent`
	`User Access Verification`
	`Password:`
		Connects you to the Cisco Nexus 1000V XML agent over a secure SSH connection.
		Note The SSH command syntax may differ for the SSH software on the client PC.

Step 2	*password* **Example:** `Password: *******`	Authenticates your credentials and begins a NETCONF session between your client PC and the Cisco Nexus 1000V XML server.

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	Command	Purpose

Step 3	**<?xml version="1.0"?>**
	Example:
	`<?xml version="1.0"?>`
	`<hello xmlns="urn:ietf:params:xml:ns:netconf:base:1.0"> <capabilities>`
	`<capability>urn:ietf:params:xml:ns:netconf:base:1.0</capability>`
		Enter a declaration statement indicating the version of XML you are using. The server responds with a hello message indicating its capabilities.

Step 4	**<nc:hello xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0" ><nc:capabilities><nc:capability>urn:ietf:params:xml:ns:netconf:base:1.0</ nc:capability></ nc:capabilities></ nc:hello>**
	Example:
	`<nc:hello xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0" ><nc:capabilities><nc:capability>urn:ietf:params:xml:ns:netconf:base:1.0</ nc:capability></ nc:capabilities></ nc:hello>`
	`</capabilities>`
	`<session-id>17644</session-id>`
	`</hello>`
	`]]>]]>`
		Enter a hello message, indicating your client capabilities.
		
		Your NETCONF session is started.

Creating an XML Request

Use this procedure to create an XML request in a message to the XML server.

BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You have already started a NETCONF session with the XML server from your client PC.

  See the "Starting a Session with the XML Server" procedure on page 3-2.
- You will need to use your own XML editor or XML management interface tool to create XML messages.

DETAILED STEPS

Step 1 Enter a request start tag.

```
<nc:rpc message-id="1" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
 xmlns="http://www.cisco.com/nxos:1.0:xml">
```

Step 2 Enter the NETCONF operations start tags for the operations you are requesting.

```
<nc:get>
 <nc:filter type="subtree">
```

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Step 3 Enter the Cisco Nexus 1000V operation start tags for the operations you are requesting.

```
<show>
<xml>
<server>
<status/>
```

Step 4 Enter the Cisco Nexus 1000V operation end tags for the operations you are requesting.

```
</server>
</xml>
</show>
```

Step 5 Enter the NETCONF operations end tags for the operations you are requesting.

```
</nc:filter>
</nc:get>
</nc:rpc>
```

Step 6 Enter a request end tag followed by the **]]>]]>** end of message character sequence.

The following is what the entire XML request looks like:

```
<?xml version="1.0"?>
  <nc:rpc message-id="1" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
   xmlns="http://www.cisco.com/nxos:1.0:xml">
    <nc:get>
     <nc:filter type="subtree">
       <show>
         <xml>
           <server>
            <status/>
           </server>
         </xml>
       </show>
      </nc:filter>
     </nc:get>
    </nc:rpc>]]>]]>
```

Manually Sending a Document to the Server

Use this procedure to manually send an XML document or message to the server.

BEFORE YOU BEGIN.

Before beginning this procedure, you must know or do the following:

- Although you will generally use an automated method to send messages, you can verify the SSH connection to the XML server with this method.
- You are logged in to the XML client PC where SSH Version 2 is enabled.
- You have an XML editor application open on the client PC, and you have created an XML message that ends with the **]]>]]>** character sequence.
- You have opened an SSH session with the XML server and have already exchanged hello messages.

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DETAILED STEPS

Step 1 Copy the XML message from the editor application.

Step 2 Paste the XML message into the active SSH session.

The XML message is sent to the XML server where it is parsed and carried out, and then a response indicating the result is returned to your client.

Example Configurations

This section provides the following examples of XML messages.

- Example: Creating a Message with Multiple Operations, page 3-5
- Example: Creating a Port Profile, page 3-9
- Example: Deleting a Port Profile, page 3-10
- Example: Deleting a Configuration, page 3-11
- Example: Closing Your Session, page 3-11
- Example: Closing a Session Other Than Your Own, page 3-12
- Example: Editing a Configuration, page 3-12

Example: Creating a Message with Multiple Operations

You can include multiple NETCONF operations in a single XML message as long as all of the requests are for the same NETCONF operation.

The XML server ensures that all requests parse without errors before applying them. Any error causes the request to fail with a notification sent to you.

This section includes the following examples:

- Example 1, page 3-5
- Example 2, page 3-7

Example 1

This example shows two NETCONF get operations representing 2 CLI commands formatted in a single XML message.

CLI commands:

The following are the CLI commands that are required in the XML request message.

```
switch# show ssh server
switch# show xml server status
```

Message

The following is the XML request message representing the required CLI commands.

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```
<?xml version="1.0"?>
<nc:rpc message-id="1" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
  xmlns="http://www.cisco.com/nxos:1.0:security_tree">
  <nc:get>
    <nc:filter type="subtree">
      <show>
        <ssh>
          <server>
          </server>
        </ssh>
      </show>
      <show>
        <xml>
          <server>
            <status/>
          </server>
        </xml>
      </show>
    </nc:filter>
  </nc:get>
</nc:rpc>]]>]]>
```

Reply

The following is the RPC reply sent from the XML server after parsing and carrying out the request from your client.

Note The XML server may send replies in a different sequence than the requests were sent.

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
    xmlns="http://www.cisco.com/nxos:1.0:security_tree" message-id="1">
 <nc:data>
  <show>
   <xml>
    <server>
     <status>
      <__XML__OPT_Cmd_show_xml___readonly__>
       <__readonly__>
        <operational_status>
         <o_status>enabled</o_status>
        </operational_status>
        <maximum_sessions_c>
         <max_session>8</max_session>
        </maximum_sessions_c>
        <TABLE_sessions>
         <ROW_sessions>
          <session_id>24559</session_id>
          <user_name>admin</user_name>
          <start_time>Tue Mar 25 16:14:17 2008</start_time>
          <sap_id>10519</sap_id>
          <timeout>1200</timeout>
          <time_remaining_to_timeout>587</time_remaining_to_timeout>
          <ip_addr>171.71.55.134</ip_addr>
         </ROW_sessions>
        </TABLE_sessions>
       </__readonly__>
      </__XML__OPT_Cmd_show_xml___readonly__>
     </status>
    </server>
```

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```
   </xml>
  </show>
 </nc:data>
</nc:rpc-reply>
]]>]]><?xml version="1.0"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
    xmlns="http://www.cisco.com/nxos:1.0:security_tree" message-id="1">
  <nc:data>ssh is enabled
version 2 enabled
</nc:data>
</nc:rpc-reply>
]]>]]>
```

Example 2

This example shows two NETCONF get operations representing one valid CLI command and one erroneous CLI command formatted in a single XML message.

CLI commands:

The following are the CLI commands that are required in the XML request message.

```
switch# show version
switch# show version-error-does-not-exist
```

Message

The following is the XML request message representing the required CLI commands.

```
<?xml version="1.0"?>
   <nc:rpc message-id="1" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
     xmlns="http://www.cisco.com/nxos:1.0:sysmgrcli">
     <nc:get>
       <nc:filter type="subtree">
         <show>
             <version>
             </version>
         </show>
        <show>
             <version-error-doesnotexist>
             </version-error-doesnotexist>
         </show>
       </nc:filter>
     </nc:get>
</nc:rpc>]]>]]>
```

Reply

The following is the RPC reply sent from the XML server after parsing and carrying out the request from your client.

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns="http://www.cisco.com/nxos:1.0:sysmgrcli" message-id="1">
 <nc:data>
  <show>
   <version>
    <__XML__OPT_Cmd_sysmgr_show_version___readonly__>
     <__readonly__>
      <header_str>Cisco Nexus Operating System (NX-OS) Software
```

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```
TAC support: http://www.cisco.com/tac
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owned by other third parties and used and distributed under
license. Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or the GNU
Lesser General Public License (LGPL) Version 2.1. A copy of each
such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php
</header_str>
      <loader_ver_str>1.2(2) [last: image booted through mgmt0]</loader_ver_str>
      <kickstart_ver_str>4.0(4)SV1(2)</kickstart_ver_str>
      <sys_ver_str>4.0(4)SV1(2) [gdb]</sys_ver_str>
      <kick_file_name></kick_file_name>
      <kick_cmpl_time> 9/22/2009 2:00:00</kick_cmpl_time>
      <isan_file_name>bootflash:/isan.bin</isan_file_name>
      <isan_cmpl_time> 9/22/2009 2:00:00</isan_cmpl_time>
      <isan_tmstmp>09/26/2009 00:36:00</isan_tmstmp>
      <chassis_id>Nexus 1000V Chassis</chassis_id>
      <module_id>Virtual Supervisor Module</module_id>
      <cpu_name>Intel(R) Xeon(R) CPU        </cpu_name>
      <memory>2075012</memory>
      <mem_type>kB</mem_type>
      <proc_board_id>T5056BE7598</proc_board_id>
      <host_name>roshan-vsm</host_name>
      <bootflash_size>2332296</bootflash_size>
      <kern_uptm_days>3</kern_uptm_days>
      <kern_uptm_hrs>16</kern_uptm_hrs>
      <kern_uptm_mins>58</kern_uptm_mins>
      <kern_uptm_secs>3</kern_uptm_secs>
     </__readonly__>
    </__XML__OPT_Cmd_sysmgr_show_version___readonly__>
   </version>
  </show>
 </nc:data>
</nc:rpc-reply>
]]>]]>



<?xml version="1.0"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns="http://www.cisco.com/nxos:1.0:sysmgrcli" message-id="1">
  <nc:rpc-error>
    <nc:error-type>application</nc:error-type>
    <nc:error-tag>invalid-value</nc:error-tag>
    <nc:error-severity>error</nc:error-severity>
    <nc:error-message>Syntax error while parsing 'show version-error-doesnotexist '

</nc:error-message>
    <nc:error-info>
      <nc:bad-element>show</nc:bad-element>
    </nc:error-info>
  </nc:rpc-error>
</nc:rpc-reply>
]]>]]>
```

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Example: Creating a Port Profile

The following example shows the XML request message for creating a port profile.

Commands

The following are the CLI commands that are required in the XML request message.

```
switch# config t
switch(config)# port-profile testppf
switch(config-port-prof)# description portprofile-test-description
switch(config-port-prof)# vmware port-group portprofile-test
switch(config-port-prof)# state enabled
switch(config-port-prof)# no shut
```

Message

The following example shows the XML message for the required commands.

```
<?xml version="1.0"?>
<nf:rpc xmlns="http://www.cisco.com/nxos:1.0:ppm"
xmlns:nf="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="110">
<nf:edit-config>
 <nf:target>
  <nf:running/>
</nf:target>
<nf:config>
<nxos:configure xmlns:nxos="http://www.cisco.com/nxos:1.0:ppm">
<nxos:__XML__MODE__exec_configure>

<port-profile>
  <name>
    <__XML__PARAM_value isKey="true">testppf</__XML__PARAM_value>
    <__XML__MODE_port-prof>
      <description>
            <desc_text>portprofile-test-description</desc_text>
      </description>
      <vmware>
              <port-group>
                <__XML__OPT_Cmd_ppm_port_group_pg_name>
                  <pg_name>portprofile-test</pg_name>
                </__XML__OPT_Cmd_ppm_port_group_pg_name>
              </port-group>
      </vmware>
      <state>
              <enabled />
      </state>
      <no>
              <shutdown />
      </no>
    </__XML__MODE_port-prof>
  </name>
</port-profile>

</nxos:__XML__MODE__exec_configure>
</nxos:configure>
</nf:config>
</nf:edit-config>
</nf:rpc>]]>]]>
```

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Reply

The following is the XML server reply to the NETCONF message.

```
<?xml version="1.0"?>
<nf:rpc-reply xmlns="http://www.cisco.com/nxos:1.0:ppm"
xmlns:nf="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="110">
  <nf:ok/>
</nf:rpc-reply>
]]>]]>
```

Example: Deleting a Port Profile

The following example shows the XML request message for deleting a port profile.

Commands

The following are the CLI commands that are required in the XML request message.

```
switch# config t
switch(config)# no port-profile testppf
```

Message

The following example shows the XML message for the required commands.

```
<?xml version="1.0"?>
<nf:rpc xmlns="http://www.cisco.com/nxos:1.0:ppm"
xmlns:nf="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="110">
<nf:edit-config>
 <nf:target>
  <nf:running/>
</nf:target>
<nf:config>
<nxos:configure xmlns:nxos="http://www.cisco.com/nxos:1.0:ppm">
<nxos:__XML__MODE__exec_configure>
<no>
<port-profile>
  <name>
    <__XML__PARAM_value isKey="true">testppf</__XML__PARAM_value>
  </name>
</port-profile>
</no>
</nxos:__XML__MODE__exec_configure>
</nxos:configure>
</nf:config>
</nf:edit-config>
</nf:rpc>]]>]]>
```

Reply

The following is the XML server reply to the NETCONF message.

```
<?xml version="1.0"?>
<nf:rpc-reply xmlns="http://www.cisco.com/nxos:1.0:ppm"
xmlns:nf="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="110">
  <nf:ok/>
</nf:rpc-reply>
]]>]]>
```

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Example: Deleting a Configuration

The following example shows the NETCONF **delete-config operation**, which performs the equivalent of the **write erase** command on the startup configuration.

Caution This procedure removes the existing configuration entirely.

CLI Command

switch# **write erase**

Message

The following example shows the XML message for the required command.

```
<?xml version="1.0"?>
<rpc message-id="101" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <delete-config>
    <target>
      <running/>
    </target>
  </delete-config>
</rpc>]]>]]>
```

Reply

The following is the XML server reply to the NETCONF message.

```
<?xml version="1.0"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
  xmlns="http://www.cisco.com/nxos:1.0" message-id="101">
  <nc:ok/>
</nc:rpc-reply>]]>]]>
```

Example: Closing Your Session

The following example shows the NETCONF close-session operation which closes your session with the XML server, also terminating the SSH session.

Message

The following is the XML message for the NETCONF close-session operation.

```
<?xml version="1.0"?>
<rpc message-id="101" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <close-session/>
</rpc>]]>]]>
```

Reply

The following is the XML server reply to the message.

```
<?xml version="1.0"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
```

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```
  xmlns="http://www.cisco.com/nxos:1.0" message-id="101">
  <nc:ok/>
</nc:rpc-reply>]]>]]>
```

Example: Closing a Session Other Than Your Own

The following example shows the NETCONF kill-session operation which terminates a server session other than your own.

Message

The following is the XML message for the NETCONF kill-session operation.

```
<?xml version="1.0"?>
<rpc message-id="101" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <kill-session>
    <session-id>31990</session-id>
  </kill-session>
</rpc>]]>]]>
```

Reply

The following is the XML server reply to the message.

```
<?xml version="1.0"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns="http://www.cisco.com/nxos:1.0" message-id="110">
<nc:ok/>
</nc:rpc-reply>]]>]]>\
```

Example: Editing a Configuration

This example shows a request for editing a configuration using the NETCONF edit-config operation.

CLI Commands

The following are the CLI commands required in the message.

```
switch# config t
switch(config)# interface ethernet 2/30
switch(config-if)# description Marketing Network
```

Message

The following is the XML message with the NETCONF edit-config operation and the required CLI commands.

```
<?xml version="1.0"?>
<nc:rpc message-id="16" xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
  xmlns="http://www.cisco.com/nxos:1.0:if_manager">
  <nc:edit-config>
    <nc:target>
      <nc:running/>
    </nc:target>
    <nc:config>
```

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```
      <configure>
        <__XML__MODE__exec_configure>
          <interface>
            <ethernet>
              <interface>2/30</interface>
              <__XML__MODE_if-ethernet>
                <__XML__MODE_if-ethernet>
                  <description>
                    <desc_line>Marketing Network</desc_line>
                  </description>
                </__XML__MODE_if-ethernet>
              </__XML__MODE_if-ethernet>
            </ethernet>
          </interface>
        </__XML__MODE__exec_configure>
      </configure>
    </nc:config>
  </nc:edit-config>
</nc:rpc>]]>]]>
```

Reply

The following is the XML server reply to the message.

```
<?xml version="1.0"?>
<nc:rpc-reply xmlns:nc="urn:ietf:params:xml:ns:netconf:base:1.0"
  xmlns="http://www.cisco.com/nxos:1.0:if_manager" message-id="16">
  <nc:ok/>
</nc:rpc-reply>]]>]]>
```

Default Settings

Table 3-1 lists the default SSH settings.

Table 3-1 SSH Defaults

Parameters	Default
SSH Version 6	Enabled

Additional References

For additional information related to implementing the XML management interface, see the following sections:

- Standards, page 3-14
- RFCs, page 3-14

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Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

RFCs

RFCs	Title
RFC 4741	*NETCONF Configuration Protocol*
RFC 4742	*Using the NETCONF Configuration Protocol over Secure Shell (SSH)*

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