



Preface

This document describes the extensible markup language (XML) application programming interface (API) provided by the router to developers of external management applications. The XML interface provides a mechanism for the router configuration and monitoring using XML formatted request and response streams.

The XML schemas referenced in this guide are used by the management application developer to integrate client applications with the router programmable interface. The XML API is also available for use on any Cisco platform running Cisco IOS XR software.



Note

The XML API code is available for use on any Cisco platform that runs Cisco IOS XR software.

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Document Revision History

The Document Revision History table records technical changes to this document. [Table 1](#) shows the document revision number for the change, the date of the change, and a brief summary of the change. Note that not all Cisco documents use a Document Revision History table.

Table 1 Document Revision History

Revision	Date	Change Summary
OL-4596-05	August 31, 2005	<ul style="list-style-type: none"> Added a procedure to obtain the XML schema files. See the “XML Schema Retrieval” section on page 125 of Chapter 14, “Cisco XML Schemas,” for more information.
OL-4596-04	July 8, 2005	<ul style="list-style-type: none"> Added a description of the alarm operation tags. See the “Alarm Operation Tags” section on page 26 of Chapter 1, “Cisco XML API Overview,” for more information. Updated the entries and commits relative to committing the target configuration from 20 entries and 20 commits to 100 entries and 100 commits. See the “Commit Operation” section on page 38 Chapter 2, “Cisco XML Router Configuration and Management,” for more information. Updated the examples for the “Commit Errors” section on page 39 of Chapter 2, “Cisco XML Router Configuration and Management.” Updated the examples for the “Replacing the Current Running Configuration” section on page 50 of Chapter 2, “Cisco XML Router Configuration and Management.” Updated the task names description. See the “Task Names” section on page 97 of Chapter 8, “Cisco XML Security,” for more information. Added a new chapter that describes alarm registration, alarm deregistration, and alarm notification. See Chapter 10, “Alarms,” for more information. Added the entire CLI command sequence to initiate the CORBA XML Agent. See the “CORBA XML Agent Initiative” section on page 120 of Chapter 12, “XML Transport and Event Notifications,” for more information. Added a new section that describes how to use TTY-based transports (Telnet and SSH). See the “TTY-Based Transports” section on page 121 of Chapter 12, “XML Transport and Event Notifications,” for more information. Updated the CLI command-to-XML tag mapping table for the router target configuration. See the Chapter 13, “Summary of Cisco XML API Configuration Tags,” for more information. Updated the common XML schemas (.xsd files) section. See “Common XML Schemas” section on page 126 of Chapter 14, “Cisco XML Schemas,” for more information.

Table 1 Document Revision History (continued)

Revision	Date	Change Summary
OL-4596-04	July 8, 2005	<ul style="list-style-type: none"> Added a new chapter that describes the Cisco IOS XR Perl Scripting Toolkit as an alternative method to the existing management methods. These methods enable the router to be managed by a Perl script running on a separate machine. See the Chapter 15, “Cisco IOS XR Perl Scripting Toolkit,” for more information.
OL-4596-02	October 31, 2004	<ul style="list-style-type: none"> Added an enhancement that customers should only use defined objects. See the “Component XML Schemas” section on page 126 of Chapter 14, “Cisco XML Schemas,” for more information.
OL-4596-01	July 30, 2004	Initial release of this document.

About This Document

This document provides a comprehensive description of the XML interface to the router. The goal of this guide is to help customers write client applications to interact with the XML infrastructure on the router, and use the XML API to build custom end-user interfaces for configuration and information retrieval and display.

Intended Audience

This document’s audience is expected to have background knowledge and information about XML, Common Object Request Broker Architecture (CORBA), and network management.

This document will be of particular use to those who want to build management client applications.

Organization of the Document

This document consists of the following chapters:

- [Chapter 1, “Cisco XML API Overview”](#)
- [Chapter 2, “Cisco XML Router Configuration and Management”](#)
- [Chapter 3, “Cisco XML Operational Requests and Fault Management”](#)
- [Chapter 4, “Cisco XML and Native Data Operations”](#)
- [Chapter 5, “Cisco XML and Native Data Access Techniques”](#)
- [Chapter 6, “Cisco XML and Encapsulated CLI Operations”](#)
- [Chapter 7, “Cisco XML and Large Data Retrieval \(Iterators\)”](#)
- [Chapter 8, “Cisco XML Security”](#)
- [Chapter 9, “Cisco XML Schema Versioning”](#)
- [Chapter 10, “Alarms”](#)
- [Chapter 11, “Error Reporting in Cisco XML Responses”](#)

- Chapter 12, “XML Transport and Event Notifications”
- Chapter 13, “Summary of Cisco XML API Configuration Tags”
- Chapter 14, “Cisco XML Schemas”
- Chapter 15, “Cisco IOS XR Perl Scripting Toolkit”
- Appendix A, “Sample BGP Configuration”

Related Documentation

The following list of related documents are useful:

- *Cisco IOS XR Getting Started Guide*
- *Cisco Craft Works Interface Configuration Guide*
- *Release Notes for Cisco IOS XR Software, Release 3.2*
- Cisco IOS XR software configuration guides and command references

Document Conventions

This publication uses the following conventions:

- The symbol ^ represents the key labeled Ctrl. For example, the key combination ^z means “hold down the Ctrl key while you press the Z key.”

Command descriptions use these conventions:

- Examples that contain system prompts denote interactive sessions, indicating the commands that you should enter at the prompt. The system prompt indicates the current level of the EXEC command interpreter. For example, the prompt Router> indicates the user level, and the prompt Router# indicates the privileged level. Access to the privileged level usually requires a password.
- Commands and keywords are in **boldface** font.
- Arguments for which you supply values are in *italic* font.
- Elements in square brackets ([]) are optional.
 - Alternative but required keywords are grouped in braces ({ }) and separated by vertical bars (|).

Examples use these conventions:

- Terminal sessions and sample console screen displays are in *screen* font.
- Information you enter is in **boldface screen** font.
- Nonprinting characters, such as passwords, are in angle brackets (< >) in environments in which italic font is not available.
- Default responses to system prompts are in square brackets ([]).
- An exclamation point (!) at the beginning of a line indicates a comment line.



Note

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

**Tip**

Means *the following information will help you solve a problem*. The information in tips might not contain troubleshooting or task-specific actions, but tips do contain useful information.

**Caution**

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

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/techsupport>

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

Cisco documentation and additional literature are available in the Product Documentation DVD package, which may have shipped with your product. The Product Documentation DVD is updated regularly and may be more current than printed documentation.

The Product Documentation DVD is a comprehensive library of technical product documentation on portable media. The DVD enables you to access multiple versions of hardware and software installation, configuration, and command guides for Cisco products and to view technical documentation in HTML. With the DVD, you have access to the same documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .pdf versions of the documentation available.

The Product Documentation DVD is available as a single unit or as a subscription. Registered Cisco.com users (Cisco direct customers) can order a Product Documentation DVD (product number DOC-DOCDVD=) from Cisco Marketplace at this URL:

<http://www.cisco.com/go/marketplace/>

Ordering Documentation

Beginning June 30, 2005, registered Cisco.com users may order Cisco documentation at the Product Documentation Store in the Cisco Marketplace at this URL:

<http://www.cisco.com/go/marketplace/>

Nonregistered Cisco.com users can order technical documentation from 8:00 a.m. to 5:00 p.m. (0800 to 1700) PDT by calling 1 866 463-3487 in the United States and Canada, or elsewhere by calling 011 408 519-5055. You can also order documentation by e-mail at tech-doc-store-mkpl@external.cisco.com or by fax at 1 408 519-5001 in the United States and Canada, or elsewhere at 011 408 519-5001.

Documentation Feedback

You can rate and provide feedback about Cisco technical documents by completing the online feedback form that appears with the technical documents on Cisco.com.

You can send comments about Cisco documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories and notices for Cisco products is available at this URL:

<http://www.cisco.com/go/psirt>

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies—security-alert@cisco.com

An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- Nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532



Tip

We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.x through 8.x.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, at this URL:

<http://www.cisco.com/techsupport>

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

**Note**

Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:
<http://www.cisco.com/go/marketplace/>
- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:
<http://www.cisco.com/packet>
- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:
<http://www.cisco.com/go/iqmagazine>
or view the digital edition at this URL:
<http://ciscoiq.texterity.com/ciscoiq/sample/>
- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:
<http://www.cisco.com/ipj>
- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:
<http://www.cisco.com/en/US/products/index.html>
- Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:
<http://www.cisco.com/discuss/networking>
- World-class networking training is available from Cisco. You can view current offerings at this URL:
<http://www.cisco.com/en/US/learning/index.html>

