

Advanced Services' Deploy, Maintain, and Troubleshoot Cisco IOS XR (DMTXR) Software Version 4.0.1



This course provides you with the advanced knowledge and skill sets required to successfully deploy, maintain, and troubleshoot Cisco IOS® XR Software Release 4.0.1 in a typical network environment. You will learn the fundamental concepts on which the operating system is based in order to understand how to troubleshoot problems relating to process crashes, stuck processes, high CPU and memory consumption, and interprocess communication (IPC). You will learn to interpret log messages and configure exception reporting and logging. Emergency recovery procedures for operating system recovery, Cisco® CRS-1 system recovery, Cisco XR 12000 Series system recovery, and Cisco IOS XR Software configuration and password recovery are covered. In addition, you will use system commands to monitor interfaces, controllers, and ASICs while troubleshooting traffic flow issues through both Cisco CRS-1 and XR 12000 series routers.

This course combines lecture materials and hands-on labs throughout to make sure that you are able to successfully deploy, maintain, and troubleshoot the Cisco IOS XR Software on Cisco CRS-1 and XR 12000 series routers in your network.

Duration

Five days.

Target Audience

This course is intended for network professionals (including designers and implementers), network operations center (NOC) personnel, and support staff who are involved with the deployment, operations, maintenance, and troubleshooting of Cisco routers that run the Cisco IOS XR Software operating system.

Course Objectives

Upon completion of this course, you should be able to:

- Describe the function of the system database (sysdb) and configuration manager
- Configure and monitor a TACACS+ AAA configuration on Cisco IOS XR Software

- Explain the architecture of the Cisco IOS XR Software operating system and the commands to monitor its operation
- Describe processes in Cisco IOS XR Software and the commands used to monitor process lifecycle
- Identify and explain the methods and mechanics of IPC
- Implement Network Time Protocol (NTP) in a Cisco IOS XR Software routed network
- Explain how to interpret logging messages and configure exception reporting and logging
- Use **show** commands to troubleshoot traffic flow issues in a Cisco IOS XR Software router
- Use **show** commands to trace packet flow through the Cisco CRS-1 line card and switching fabric to isolate and resolve fault conditions
- Describe emergency recovery procedures to perform operating system, system configuration, and password recovery on Cisco IOS XR Software routers
- Use **show** commands to trace packet flow through the Cisco XR 12000 line card and switching fabric to isolate and resolve fault conditions

Course Prerequisites

Following are the prerequisites for this course.

- Completion of the Cisco CRS-1 Essentials course, or Cisco XR 12000 Series Essentials, Cisco ASR 9000 Essentials, or Cisco IOS XR Software Fundamentals
- Fundamental knowledge of Cisco IOS XR Software configuration and operation
- Experience maintaining and troubleshooting the Cisco IOS XR Software routers in a service provider or enterprise production environment

To locate Cisco courses that cover the listed prerequisites, go to the Cisco Training & Events webpage at www.cisco.com/web/learning/index.html.

Course Outline

The course outline is as follows:

- Module 1: Configuration Management—Provides an overview of configuration management in Cisco IOS XR Software and the function of the sysdb service. It explains how data moves between the sysdb and line cards. The module explains the use of the binary configuration and examines the binary files in the commitdb directories.
- Module 2: AAA Security—Explains AAA security and the AAA security functions. It defines task-based authorization using task groups and user groups and explains how to configure task-based security and user security policies in Cisco IOS XR Software. The module explains the role of Management Plane Protection and how to implement it. You also create a TACACS+ AAA configuration on the router, and you create user and router policies on the TACACS+ server. The module also reviews the CLI commands you can use to monitor and troubleshoot AAA security operations.
- Module 3: Monitoring the Cisco IOS XR Software Operating System—Explains the architecture of the Cisco IOS XR Software operating system. It describes both the logical and physical architecture and the major components of the operating system. This module also introduces the commands used to monitor the Cisco IOS XR Software system.
- Module 4: Processes—Describes the process environment in Cisco IOS XR Software. It explains how to identify and locate abnormal memory usage and how to monitor system

performance. The module describes how to monitor problems relating to process failures, stuck processes, and high-CPU consumption processes. It also identifies the types of information to capture before contacting Cisco Technical Support.

- Module 5: Interprocess Communication—Describes how IPC occurs in Cisco IOS XR Software. It explains the ways in which processes perform message passing, and it describes the methods and mechanics of IPC.
- Module 6: Network Time Synchronization—Describes the function of the Network Time Protocol (NTP) server and explains the service modes. The module also presents the commands used to configure and verify the NTP server.
- Module 7: Error Messages and Core Dumps—Provides an overview of system error messages and core dumps. It explains how to interpret logging messages and to configure exception reporting and logging. The module also explains how to manually generate a core dump and use core dump information for troubleshooting purposes.
- Module 8: Cisco IOS XR Packet Forwarding—Examines the **show** commands that you can use to troubleshoot packet flow on the normal, exception, and “for-us” data paths.
- Module 9: Troubleshooting Cisco CRS-1 Traffic Flow—Describes how to trace packet flow through the Cisco CRS-1 line cards and switching fabric using **show** commands. It explains how to interpret the command output to identify and isolate fault conditions. This module also describes how to control switching fabric components.
- Module 10: Cisco IOS XR Software Emergency Recovery Procedures—Describes emergency recovery procedures for operating system recovery, CRS-1 and Cisco IOS XR 12000 system recovery, and Cisco IOS XR Software configuration and password recovery.
- Module 11: Troubleshooting Cisco XR 12000 Series Traffic Flow—Describes packet flow through the Cisco IOS XR 12000 line cards and explains how to troubleshoot packet flow issues in the switching fabric. This module also identifies and isolates faults using the information in **show** command output.

Lab Outline

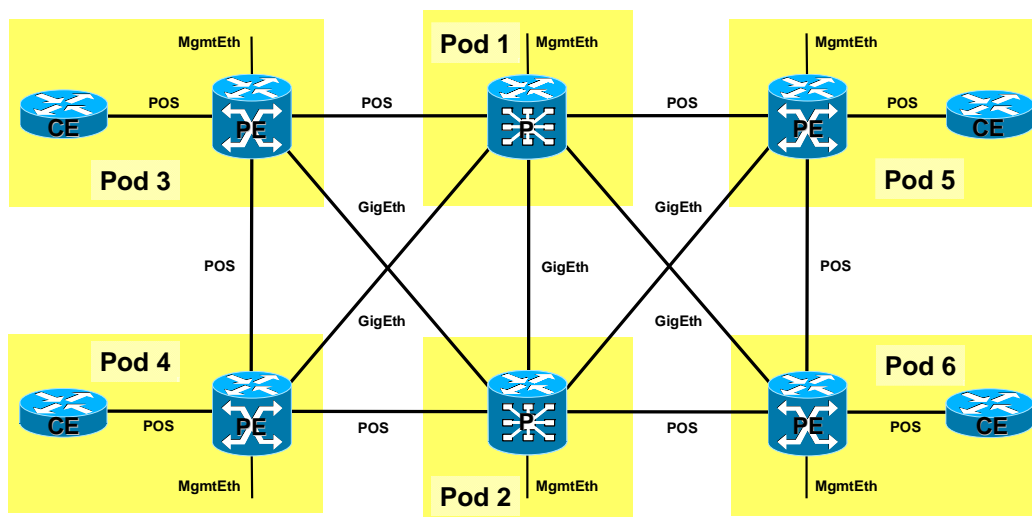
The lab outline is as follows:

- Lab 1: Setting Up the Initial Configuration
- Lab 2: Configuration Management
- Lab 3: Configuring AAA Security
- Lab 4: System Monitoring
- Lab 5: Monitoring Processes
- Lab 6: Network Time Synchronization
- Lab 7: Error Messages and Core Dumps
- Lab 8: Troubleshooting Packet Forwarding
- Lab 9: Troubleshooting Cisco CRS-1 Traffic Flow
- Lab 10: Cisco IOS XR Emergency Recovery Procedures
- Lab 11: Troubleshooting Cisco XR 12000 Traffic Flow

Lab Topology

Figure 1 shows the lab topology that is used in this course.

Figure 1. Lab Topology of Deploy, Maintain, and Troubleshoot Cisco IOS XR Software



Registration Information

For information about schedules and registration for this course, contact

aeskt_registration@cisco.com.

For More Information

For more information about Advanced Services Education course offerings, including custom training options, as well as Advanced Services Curriculum Planning Services and the Advanced Services Technical Knowledge Library (TKL), refer to the Advanced Services Education website at

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