IOSXRE (CISCO IOS XR SOFTWARE ESSENTIALS) 1.0

Objetivo

â¢Describe Cisco IOS XR Software architecture. â¢Explain how to install Cisco IOS XR Software packages. â¢Describe how to provision network devices by using zero touch provisioning. â¢Describe how to perform initial configurations on a Cisco IOS XR router, including interface, default route, and remote access configuration. â¢Recognize, implement, and manage system security features within Cisco IOS XR Software systems, ensuring the protection of network infrastructure and data â¢Monitor device performance through CLI and logging services. â¢Describe the methods and protocols for establishing timing and synchronization on Cisco IOS XR router platforms. â¢Describe the operation of Cisco IOS XR AAA Software services, task-based security mechanisms and user security policies. â¢Configure, manage, and troubleshoot Cisco IOS XR Software AAA services in a network environment. â¢Recognize how to implement QoS in various scenarios and environments, including Cisco IOS XR Software and a service provider environment. â¢Define the Cisco IOS XR Software implementation requirements for deploying common routing protocols and managing the Routing Information Base, Route Policy, forwarding, and load-balancing mechanisms. â¢Implement and configure MPLS and describe MPLS label propagation in service provider networks. â¢Configure SNMP in Cisco IOS XR Software environments for optimum performance and efficient management of network resources. â¢Describe the programmable features of Cisco IOS XR Software. â¢Comprehend and implement model-driven telemetry for enhanced network visibility and management. â¢Describe the application hosting architecture and how to deploy a third-party application on a Cisco 105 XR router. â¢Illustrate how to efficiently monitor processes using process monitoring concepts and tools such as employing the monitor processes command to track and manage system activities.

PÃºblico Alvo

The primary goal of this course for professionals want to describe and implement using fundamental concepts and configurations on Cisco IOS XR Software.

PrÃ©-Requisitos

The knowledge and skills that students are expected to have before attending this course are: â¢Experience working with CLI-based network devices. â¢Knowledge of general routing concepts.

Carga HorÃ¡ria

32 horas (4 dias).

ConteÃºdo ProgramÃ¡tico

Course Introduction
- Overview
- Course Goal and Objectives
- Course Flow

• Your Training Curriculum
• Learner Introductions

Cisco IOS-XR Software Fundamentals
• Describe Cisco IOS XR Software architecture
• Cisco IOS XR Software Evolution

Cisco IOS XR Software Installation and Upgrades
• Explain how to install Cisco IOS XR Software packages
• Software Package Basics
• Common Installation Workflows
• Describe how to create a Golden ISO image.
• Describe how bug fixes are implemented by using RPMs.
• Describe how card firmware can be updated.

Automatic Provisioning
• Describe how to provision network devices by using zero touch provisioning
• Automatic Provisioning Overview
• Describe iPXE a Preboot Execution Environment that is embedded in the router and that works at the BIOS level.

Cisco IOS XR Software CLI Basics
• Describe how to perform initial configurations on a Cisco IOS XR router
• Cisco IOS XR Software CLI Basics
• Describe how to perform initial configurations on a Cisco IOS XR router.
• Cisco IOS XR Configuration Operations
• Describe the configuration file system, command modes, and CLI prompts.
• Cisco IOS XR Initial Configuration
• Describe how to perform an initial configuration on a Cisco IOS XR router.
• Explain how to perform an initial configuration on a Cisco IOS XR router.

Cisco IOS XR Software System Security
• Recognize, implement, and manage system security features within Cisco IOS XR Software systems, ensuring the protection of network infrastructure and data
• Implementing Management Plane Security
• Comprehend and apply management plane security features within Cisco IOS XR Software systems.
• Implementing Data Plane Security
• Describe how to implement and manage data plane security features, including ACLs, uRPF, and RTBH filtering within Cisco IOS XR Software systems.
• Components of Trustworthy Systems
• Explain the key concepts and components of trustworthy systems, and how trust is established and maintained in hardware and software within Cisco IOS XR Software systems.

Cisco IOS XR Software Logging Configuration
• Monitor device performance through CLI and logging services.
• Monitoring Hardware
• CLI-Based Monitoring
• Implementing Logging for Monitoring

Timing and Synchronization
• Describe the methods and protocols for establishing timing and synchronization on Cisco IOS XR router platforms.
• Timing and Synchronization
• Define and describe the evolution of demanding 5G timing requirements.
• Synchronous Ethernet Clock Synchronization
• Transparent PDH over Packet and Channelized SDH over Packet Networking
• Using the Precision Time Protocol
• External Timing Clock Interfaces and Sources
• Implementing NTP
• Global Navigation Satellite System

Cisco IOS XR Software AAA Service Fundamentals
• Describe the operation of Cisco IOS XR AAA Software services, task-based security mechanisms and user security policies.
• AAA Fundamentals
• Task-Based Security
• Configuring a User Security Policy
• Demonstrate the ability to configure and verify user security policies, task groups, and user groups in Cisco IOS XR Software.
• Authentication with Remote Servers
• Compare and contrast RADIUS and TACACS+ in terms of remote server authentication and explain their operation within Cisco IOS XR Software.

Cisco IOS XR Software AAA Service Implementation
• Configure, manage, and troubleshoot Cisco IOS XR Software AAA services in a network environment.
• Configuring the AAA Server
• Apply knowledge of TACACS+ and RADIUS server configurations and assess their operation in Cisco IOS XR Software.
• Configuring Authentication
• TACACS+ Command Authorization
• Configuring Accounting
• AAA Troubleshooting
• Apply and evaluate AAA troubleshooting techniques, commands, and debugging methods for RADIUS and TACACS+ in Cisco IOS XR Software.

Cisco IOS XR Software Modular QoS
• Recognize how to implement QoS in various scenarios and environments, including Cisco IOS XR Software and a service provider environment.
• Understanding QoS
• Implement and manage Modular QoS in the Cisco IOS XR Software systems, optimizing network performance and resource utilization
• Implementing QoS in the Service Provider Network
• Describe how to implement MQC in a service provider network.

Cisco IOS XR Software Routing Protocol Configuration
• Define the Cisco IOS XR implementation requirements for deploying common routing protocols and managing the Routing Information Base, Route Policy, forwarding, and load balancing mechanisms.

• Explain how to configure IS-IS on Cisco IOS XR Software routers.
• Troubleshooting IS-IS Operations
• Implementing OSPFv2 and OSPFv3
• Implementing IGP Flexible Algorithm in IP Networks
• Implementing Static Routes
• Implementing BGP
• Troubleshooting BGP
• Configuring and Monitoring the RIB
• Describe how to configure and monitor the RIB and its collection of route data.
• Implementing Routing Policy
• Configuring Forwarding and Load Balancing
• Explain how to implement Cisco IOS XR Software load balancing and BFD.

Cisco IOS XR Software MPLS Operation and Implementation
• Implement and configure MPLS and describe MPLS label propagation in service provider networks.
• Describe MPLS architecture, control, and data planes.
• Configure MPLS in service provider environments.
• Using tools and commands for monitoring MPLS operation.
• MPLS Troubleshooting

Network Management with SNMP on Cisco IOS XR Software
• Configure SNMP in Cisco IOS XRE Software environments for optimum performance and efficient management of network resources.
• SNMP Overview
• Cisco IOS XR Software SNMP Best Practices

Cisco IOS XR Software Programmability
• Describe the programmable features of Cisco IOS XR Software.
• Model-Driven Programmability Basics
• Describe Cisco IOS XR Software support for model-driven programmability.
• NETCONF Fundamentals
• gRPC Fundamentals
• Cisco IOS XR Software Service Layer
• On-Box Automation Scripts

Model-Driven Telemetry
• Comprehend and implement model-driven telemetry for enhanced network visibility and management.
• Examining Telemetry Fundamentals
• Describe the basic concepts, history, and purpose of telemetry, including the telemetry push model.
• Identify the components and modes of model-driven telemetry and its use cases.
• Telemetry Encoding and Transport Methods
• gRPC Fundamentals
• Configuring Telemetry
• Telemetry Collectors

Application Hosting Overview
• Describe the application hosting architecture and how to deploy a third-party application on a Cisco IOS XR router

• Application Hosting Basics
• Describe application hosting basics.

Cisco IOS XR Software Process Monitoring
• Illustrate how to efficiently monitor processes using process monitoring concepts and tools such as employing the monitor processes command to track and manage system activities.
• Examining Processes and Threads
• Describe various processes and threads in Cisco IOS XR Software.
• Process Crashes
• Commands for Debugging Processes
• Restartability of Processes
• Describe process restart and the lifecycle of a process.
• Process Monitoring Overview
• Monitor processes and determine their resource utilization.
• Identifying Memory Problems
• Determine the state of memory and the default memory thresholds.
• Memory Depletion

Labs
Discovery 1: Cisco IOS XR Software Installation
• In this activity, you will learn how to update Cisco IOS XR Software packages.
• Task 1: View Cisco IOS XR Software Version, Active Packages, and Installation Partition
• Task 2: Install a Cisco IOS XR Software Package
• Task 3: Install Software Maintenance Updates
• Task 4: Remove an Installed Package

Discovery 2: Cisco IOS-XR Software Installation
• Create and configure local repository, install a Cisco IOS XR Software package, and remove a Cisco IOS XR Software package.
• Task 1: Package Upgrade from a Remote Repository
• Task 2: Create and Configure a Local Repository
• Task 3: Install RPM with Optional Feature
• Task 4: Remove RPM with Optional Feature

Discovery 3: Configure and Verify ZTP
• Configure autoprovisioning by using a static configuration and by using script.
• Task 1: Configure Autoprovisioning by Using a Static Configuration
• Task 2: Configure Autoprovisioning by Using a Script

Discovery 4: Initial Configuration of a Cisco IOS XR Router
• Configure initial configurations on a Cisco IOS XR router.
• Task 1: Initial Login, Hostname, and IP Address Configuration
• Task 2: Configure SSH
• Task 3: Configure a Static and Default Route
• Task 4: Configuration Verification
• Task 5: Preconfigure an Interface

Discovery 5: Configuration Commit and Rollback

• View, discard, load, commit, and rollback configurations on a Cisco IOS XR router.
• Task 1: Examine Active and Target Configurations
• Task 2: Discard a Target Configuration
• Task 3: Save and Load the Target Configuration
• Task 4: Perform Atomic and Best-Effort Commits
• Task 5: Filter the Command Output by Using Regular Expressions
• Task 6: Roll Back a Configuration

Discovery 6: Configure and Verify MPP
• In this activity, you will learn how to configure uRPF and MPP on a Cisco IOS XR router.
• Task 1: Configure Management Plane Protection
• Task 2: Verify Management Plane Protection

Discovery 7: Configure and Verify IPv4 and IPv6 Filtering
• In this activity, you will learn how to configure packet filtering on a Cisco IOS XR router.
• Task 1: Configure IPv4 Filtering
• Task 2: Configure IPv6 Filtering
• Task 3: Use ACLs for Troubleshooting

Discovery 8: Configure and Verify uRPF
• In this activity, you will learn how to configure uRPF and MPP on a Cisco IOS XR router.
• Task 1: Implement and Verify uRPF

Discovery 9: Configure and Verify Logging
• Configure SNMP, telemetry, and logging.
• Task 1: Configure Logging
• Task 2: Verify Logging

Discovery 10: Configure and Verify NTP
• Configure NTP on a Cisco IOS XR router.
• Task 1: Configure and Verify an NTP Server Association
• Task 2: Configure and Verify an Authenticated NTP Server Association
• Task 3: Configure and Verify an NTP Peer Association

Discovery 11: Configure and Verify User Security Policies
• In this activity, you will familiarize yourself with how to configure task-based security.
• Task 1: Configure Task Groups
• Task 2: Configure User Groups
• Task 3: Configure Users
• Task 4: Verify User Security Policies

Discovery 12: Cisco IOS XR AAA Configuration
• In this activity, you will learn how to configure authentication, authorization, and accounting.
• Task 1: Configure TACACS+ for Console Authentication
• Task 2: Configure Accounting
• Task 3: Configure RADIUS Authentication for VTY Users
• Task 4: Configure Console Local Authentication

Discovery 13: Configure and Verify Modular QoS
• The learning lab describes the procedure of how to implement QoS in the network.
• Task 1: Implement an Inbound PE QoS Policy
• Task 2: Implement an Outbound PE QoS Policy
• Task 3: Implement an Outbound P Router QoS Policy

Discovery 14: Configure and Verify IS-IS
• Configure IS-IS routing protocol on a Cisco IOS XR router.
• Task 1: Configure IS-IS
• Task 2: Verify IS-IS
• Task 3: Configure and Verify IS-IS Authentication

Discovery 15: Configure and Verify OSPF
• Configure OSPF routing protocol on a Cisco IOS XR router.
• Task 1: Configure and Verify OSPFv2
• Task 2: Configure OSPF Authentication
• Task 3: Configure and Verify OSPFv3

Discovery 16: Configure and Verify BGP
• In this activity, you will learn how to configure BGP on a Cisco IOS XR router.
• Task 1: Configure and Verify IBGP
• Task 2: Configure and Verify EBGP
• Task 3: Edit an RPL

Discovery 17: Configure and Verify MPLS
• Configure and verify MPLS LDP and verify the MPLS operation.
• Task 1: Verify the IS-IS Routing
• Task 2: Configure and Verify MPLS
• Task 3: Verify MPLS Operation

Discovery 18: Configure and Verify SNMP
• In this activity, you will learn how to configure SNMP, telemetry, and logging.
• Task 1: Configure SNMPv2c
• Task 2: Configure SNMPv3

Discovery 19: Configure and Verify Devices by Using Model-Driven Programmability
• Retrieve and edit device configuration by using model-driven programmability
• Task 1: Configure NETCONF YANG Agent
• Task 2: Retrieve a Complete Running Configuration by Using Model-Driven Programmability
• Task 3: Retrieve Partial Configurations by Using Subtree Filtering
• Task 4: Edit Device Configuration by Using Model-Driven Programmability
• Task 5: Configure and Verify On-the-Box Automation

Discovery 20: Configure and Verify Model-Driven Telemetry
• Configure and verify Model-Driven Telemetry, and verify the streamed data on the Telemetry Collector Stack
• Task 1: Configure and Verify the MDT Destination Group
• Task 2: Configure and Verify the MDT Sensor Groups for Dial-Out
• Task 3: Configure and Verify the MDT Subscription for Dial-Out

• Task 4: Verify the Streamed Data on the Grafana
• Task 5: Configure and Verify gRPC Dialout with TLS
• Task 6: Configure and Verify gRPC Dial-in without TLS
• Task 7: Configure and Verify gRPC Dial-in with TLS

Lab 21: Configure and Verify Application Hosting Within a Docker Container
• Run the iPerfS in a Docker container and verify the application hosted in the Docker container.
• Task 1: Deploy iPerf3 in a Docker Container
• Task 2: Verify the Application Hosted in the Docker Container