Oracle® Communications IP Service Activator

Cisco IOS XR Cartridge Guide

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Oracle Communications IP Service Activator Cisco IOS XR Cartridge Guide, Release 7.5

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Preface

This guide provides detailed technical information about Oracle Communications IP Service Activator features, device configuration information, and sample device configuration for Cisco IOS XR (Internetworking Operating System) devices.

IOS XR is an operating system supported on the CRS-1, XR12000, and ASR9000 router families. For more information, refer to the following links:

- http://www.cisco.com/c/en/us/products/ios-nx-os-software/ios-xr-software/index.html
- http://www.cisco.com/en/US/products/ps5845/prod_release_notes_list.html

The IOS XR has an enhanced provisioning model and Command Line Interface (CLI) command set compared to previous IOS versions. The IOS XR cartridge supports the IOS XR device, for which a new IP Service Activator base cartridge and other related IP Service Activator enhancements are made available to customers for delivering complete IP Service Activator IOS XR capability support. A valid device for IOS XR is a Cisco GSR 12K series.

Audience

This guide is intended for network managers and technical consultants responsible for implementing IP Service Activator within a network that uses the Cisco devices.

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Cisco IOS XR Cartridge Overview and Installation

This chapter gives a brief overview of the cartridge, and outlines the tasks involved in installing the Oracle Communications IP Service Activator Cisco IOS XR cartridge, and IP Service Activator support for Cisco devices.

Cartridge Overview

IP Service Activator cartridges enable you to support your existing services, emerging services, and business needs. The cartridges operate in conjunction with the IP Service Activator core product. The Cisco IOS XR cartridges support the existing Label Switched Path (LSP), Layer 3 Multi Protocol Label Switching (MPLS) Virtual Private Network (VPN), Quality of Service (QoS), Layer 2 VPN, and Interface Configuration Management modules. For more information, see *IP Service Activator Concepts*.

Installing the Cartridge

For cartridge installation procedures, see *IP Service Activator Installation Guide*.

IP Service Activator supports extensible configuration policies that can be viewed and edited using the IP Service Activator graphical user interface (GUI), the OSS Integration Manager (OIM), and also the OSS Java Development Library (OJDL).

For the configuration policy installation procedure, see *IP Service Activator Installation Guide*.

For more information on configuration policies, interface policy registration and interface/sub-interface creation, see IP Service Activator online Help.

General IP Service Activator Features

The following tables list the features and services supported by the IP Service Activator Cisco IOS XR cartridge.

Table 1-1 lists the support for general IP Service Activator features on the IP Service Activator Cisco IOS XR cartridge.

Table 1-1 General IP Service Activator Features

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Configuration Protocol Support	Telnet	Yes
Configuration Protocol Support	Secure Shell (SSH)	Yes
Configuration Protocol Support	Simple Network Management Protocol (SNMP)	No

Table 1-1 (Cont.) General IP Service Activator Features

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Configuration Protocol Support	Vendor Proprietary	No
Device Discovery	SNMP	Yes
Device Discovery	Discovery Module	No
Device Configuration	Configuration Audit	Yes
Device Configuration	Command Re-issue	Yes
Device Configuration	Auto ID Migration	No
Device Configuration	Save Running Configuration	Not Applicable
Device Configuration	Configuration Version	Yes
Device Configuration	Configuration Options	Yes
Device Configuration	Synonyms	Yes
Device Configuration	Command Thresholding	Yes
Device Configuration	Threshold Activated Configuration Control	Yes
Supported Services	Transparent local area network (LAN) service	No
Supported Services	Interface Configuration Management	Yes
Supported Services	Quality of Service (QoS)	Yes
Supported Services	Layer 3 Multiprotocol Label Switching (MPLS) VPN	Yes
Supported Services	Service Assurance Agent (SAA)	No
Supported Services	Netflow	No
Supported Services	Dynamic User VPN	No
Supported Services	IPsec	No
Supported Services	Virtual Routing and Forwarding (VRF)-Aware IPsec	No
Supported Services	Label Switched Path (LSP)	Yes
Supported Services	Virtual local area network (VLAN)	No
Supported Services	Base Configuration Policies	No
Supported Services	Layer 2 VLL	No
Supported Services	Layer 2 QoS	No
Supported Services	QoS Attachment	No
Supported Services	Virtual routing and forwarding (VRF) and IP Multicast	No
Supported Services	VRF Route Maps	No
Supported Services	VPN and IP Multicast Module	No
Supported Services	Configuration Template Manager	Yes

Table 1-1 (Cont.) General IP Service Activator Features

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Supported Services	QoS with Hierarchical Queuing Framework	No
Supported Services	QoS on ASR Devices	No
Configuration Management	Configuration Archiving and Versioning	Yes
Configuration Management	Configuration Restore	Yes
Configuration Management	Service Configuration Auditing	Yes
Configuration Management	Service Configuration Traceability	Yes
Configuration Management	Service Repair	Yes
Configuration Management	Real-time Configuration Change Tracking	No
SDK	Service Cartridge Software Development Kit (SDK)	Yes
SDK	Configuration Policy SDK	Yes

Label Switched Path

The IP Service Activator Cisco IOS XR cartridge supports the appropriate IOS XR LSP related commands and capabilities. It generates the following commands to enable MPLS LSP functionality on IOS XR:

```
explicit-path name MyPath
  index 10 next-address strict  ipv4 unicast 10.20.30.40
  index 20 next-address strict  ipv4 unicast 10.30.50.70
exit

interface tunnel-te60
  description My LSP 60
  ipv4 unnumbered Ethernet0/0
  destination 37.1.1.252
  autoroute announce
  autoroute metric absolute 30
  signalled-bandwidth 3
  priority 2 1
  affinity a0 mask b0
  path-option 5 explicit name MyPath
exit
```

The Cisco IOS XR cartridge supports the following configuration in global configuration mode:

```
mpls ldp
  interface <tunnel name1>
  exit

  interface <tunnel name2>
  exit
exit
```

The following section can help you understand the differences in support between the Cisco IOS XR cartridge and the Cisco IOS cartridge. The Cisco IOS cartridge supports the appropriate IOS LSP related commands and capabilities. It generates commands to enable MPLS LSP functionality on IOS and is different from those generated for IOS XR. They are as follows:

```
ip explicit-path name MyPath enable
  next-address 10.20.30.40
  next-address 10.30.50.70
exit

interface Tunnel60
  description My LSP 60
  ip unnumbered Ethernet0/0
  tunnel destination 37.1.1.252
  tunnel mode mpls traffic-eng
  tunnel mpls traffic-eng autoroute announce
  tunnel mpls traffic-eng autoroute metric absolute 30
  tunnel mpls traffic-eng bandwidth 3
  tunnel mpls traffic-eng priority 2 1
  tunnel mpls traffic-eng affinity 0xA mask 0xB
  tunnel mpls traffic-eng path-option 5 explicit name MyPath
exit
```

Table 1-2 lists the Label Switched Path (LSP) support on the IP Service Activator Cisco IOS XR cartridge.

> **Note:**
>
> Interior Gateway Protocols (IGP) metric ranges are as follows: Absolute: 1 to 2147483647; Relative: -10 to 10.

Table 1-2 LSP Support

IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
LSP Module	Yes
Primary Tunnel	Yes
Backup Tunnel	Yes
Bypass Tunnel	No
Setup Priority	Yes
Hold Priority	Yes
Affinity	Yes
Interior Gateway Protocol (IGP) Metric	Yes
Fast Reroute	Yes
Record Route	Yes
Label Distribution Protocol (LDP) Enabled	No

Quality of Service

Table 1-3 lists the Quality of Service (QoS) support on the IP Service Activator Cisco IOS XR cartridge.

Table 1-3 QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Layer 3 QoS Support	Layer 3 QoS Support	Yes
Access Rule Support	Access Rule Support	Yes
Access Rule Support	Inbound Access Rule Support	Yes
Access Rule Support	Outbound Access Rule Support	Yes
Access Rule Support	Logging	Yes
Access Rule Support	Suppress Management Traffic Terms	Yes
Access Rule Support	Named Access Control List (ACL) Support	Yes
Access Rule Support	Numbered ACL Support	Yes
Access Rule Support	Guarantees Supported	No
Access Rule Support	Limits Supported	No
Access Rule Support	Access Rule Classification Criteria	Yes
Access Rule Support	Access Rule Classification Based on Source IPv4 Address	Yes
Access Rule Support	Access Rule Classification Based on Source IPv6 Address	Yes
Access Rule Support	Access Rule Classification Based on Destination IPv4 Address	Yes
Access Rule Support	Access Rule Classification Based on Destination IPv6 Address	Yes
Access Rule Support	Access Rule Classification Based on Source IP Port	Yes
Access Rule Support	Access Rule Classification Based on Destination IP Port	Yes
Access Rule Support	Access Rule Classification Based on IP Protocol	Yes
Access Rule Support	Access Rule Classification Based on DiffServ Codepoints	Yes
Access Rule Support	Access Rule Classification Based on IPv4 Precedence Codepoints	Yes
Access Rule Support	Access Rule Classification Based on IPv6 Precedence Codepoints	Yes

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Access Rule Support	Access Rule Classification Based on IPv4 Type of Service (TOS) Codepoints	No
Access Rule Support	Access Rule Classification Based on IPv6 TOS Codepoints	No
Access Rule Support	Access Rule Classification Based on URL	No
Access Rule Support	Access Rule Classification Based on Multipurpose Internet Mail Extensions (MIME) Type	No
Access Rule Support	Access Rule Classification Based on Application protocol	No
Access Rule Support	Access Rule Classification Based on Application Type	No
Access Rule Support	Access Rule Classification Based on Domain Name	No
Access Rule Support	Access Rule Classification Based on 802.1p User Priority	No
Access Rule Support	Access Rule Classification based on MPLS EXP Value	Partially supported
Access Rule Support	Access Rule Classification Based on Transmission Control Protocol (TCP) Flag Values	Yes
Access Rule Support	Access Rule Classification Based on Internet Control Message Protocol (ICMP) Flag Values	Yes
Access Rule Support	Access Rule Classification Based on Fragments	No
Access Rule Support	Access Rule Classification Based on Input Interface Traffic	Yes
Access Rule Support	Access Rule Classification Based on VLAN Traffic	No
Access Rule Support	Access Rule Classification Based on Port Traffic	Yes
Access Rule Support	Access Rule Classification Based on Sub Application	No
Traffic Classification Rules	Inbound Traffic Classification Rule Support	Yes
Traffic Classification Rules	Outbound Traffic Classification Rule Support	Yes
Traffic Classification Rules	Named ACL Support	Yes
Traffic Classification Rules	Traffic Classification Rule Criteria	Yes

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Traffic Classification Rules	Traffic Classification Based on Source Media Access Control (MAC) Address	No
Traffic Classification Rules	Traffic Classification Based on Destination MAC Address	No
Traffic Classification Rules	Traffic Classification Based on Source IPv4 Address	Yes
Traffic Classification Rules	Traffic Classification Based on Source IPv6 Address	Yes
Traffic Classification Rules	Traffic Classification Based on Destination IPv4 Address	Yes
Traffic Classification Rules	Traffic Classification Based on Destination IPv6 Address	Yes
Traffic Classification Rules	Traffic Classification Based on Source IP Port	Yes
Traffic Classification Rules	Traffic Classification Based on Destination IP Port	Yes
Traffic Classification Rules	Traffic Classification Based on IP Protocol	Yes
Traffic Classification Rules	Traffic Classification Based on All DiffServ Code Points	Yes
Traffic Classification Rules	Traffic Classification Based on IPv4 Precedence Codepoints	Yes
Traffic Classification Rules	Traffic Classification Based on IPv6 Precedence Codepoints	Yes
Traffic Classification Rules	Traffic Classification Based on IPv4 TOS Codepoints	No
Traffic Classification Rules	Traffic Classification Based on IPv6 TOS Codepoints	No
Traffic Classification Rules	Traffic Classification Based on URL	No
Traffic Classification Rules	Traffic Classification Based on MIME Type	No
Traffic Classification Rules	Traffic Classification Based on Application Protocol	Yes
Traffic Classification Rules	Traffic Classification Based on Application Type	No
Traffic Classification Rules	Traffic Classification Based on Domain Name	No
Traffic Classification Rules	Traffic Classification Based on 802.1p User Priority	No
Traffic Classification Rules	Traffic Classification Based on MPLS EXP Value	Partially supported

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Traffic Classification Rules	Traffic Classification Based on TCP Flag Bits	Yes
Traffic Classification Rules	Traffic Classification Based on ICMP Flag Values	Yes
Traffic Classification Rules	Traffic Classification Based on Fragments	No
Traffic Classification Marking	Marking DiffServ Code Points	Yes
Traffic Classification Marking	Marking IPv4 IP Precedence	Yes
Traffic Classification Marking	Marking IPv6 IP Precedence	Yes
Traffic Classification Marking	Marking IPv4 TOS	No
Traffic Classification Marking	Marking IPv6 TOS	No
Traffic Classification Marking	Marking 802.1p User Priority	No
Traffic Classification Marking	Marking: MPLS Experimental Bit	Yes
Traffic Classification Marking	Marking: Topmost MPLS Experimental Bit	Yes
Traffic Classification Marking	Discard Class	Yes
Traffic Classification Marking	Trust Type	Yes
Traffic Policing Rules	Inbound Traffic Policing Rule Support	Yes
Traffic Policing Rules	Outbound Traffic Policing Rule Support	Yes
Traffic Policing Rules	Policing Rule: Named ACL Support	Yes
Traffic Policing Rules	Policing Rule Classification Criteria	Yes
Traffic Policing Rules	Policing Classification Based on Source MAC Address	No
Traffic Policing Rules	Policing Classification Based on Destination MAC Address	No
Traffic Policing Rules	Policing Classification Based on Source IPv4 Address	Yes
Traffic Policing Rules	Policing Classification Based on Source IPv6 Address	Yes
Traffic Policing Rules	Policing Classification Based on Destination IPv4 Address	Yes
Traffic Policing Rules	Policing Classification Based on Destination IPv6 Address	Yes
Traffic Policing Rules	Policing Classification Based on Source IP Port	Yes
Traffic Policing Rules	Policing Classification Based on Destination IP Port	Yes

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Traffic Policing Rules	Policing Classification Based on IP Protocol	Yes
Traffic Policing Rules	Policing Classification Based on All DiffServ Code Points	Yes
Traffic Policing Rules	Policing Classification Based on IPv4 Precedence Codepoints	Yes
Traffic Policing Rules	Policing Classification Based on IPv6 Precedence Codepoints	Yes
Traffic Policing Rules	Policing Classification Based on IPv4 TOS Codepoints	No
Traffic Policing Rules	Policing Classification Based on IPv6 TOS Codepoints	No
Traffic Policing Rules	Policing Classification Based on URL	No
Traffic Policing Rules	Policing Classification Based on MIME Type	No
Traffic Policing Rules	Policing Classification Based on Application Protocol	No
Traffic Policing Rules	Policing Classification Based on Application Type	No
Traffic Policing Rules	Policing Classification Based on Domain Name	No
Traffic Policing Rules	Policing Classification Based on 802.1p User Priority	No
Traffic Policing Rules	Policing Classification Based on MPLS EXP Value	Partially supported
Traffic Policing Rules	Policing Classification Based on TCP Flags	Yes
Traffic Policing Rules	Policing Classification based on ICMP Flag Values	Yes
Traffic Policing Rules	Policing Classification Based on Fragments	Yes
Traffic Policing Rules	Policing Rule Marking Actions	Yes
Traffic Policing Rules	Policing: Marking DiffServ Code Points	Yes
Traffic Policing Rules	Policing: Marking IP Precedence	Yes
Traffic Policing Rules	Policing: Marking IPv4 TOS	No
Traffic Policing Rules	Policing: Marking IPv6 TOS	No
Traffic Policing Rules	Policing: Marking 802.1p User Priority	No
Traffic Policing Rules	Policing: Marking: MPLS Experimental Bit	No

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Traffic Policing Rules	Policing: Marking Topmost MPLS Experimental Bit	No
Standard Per-Hop Behaviour (PHB) Group Support	PHB Weighted Round Robin (WRR)	No
Standard PHB Group Support	PHB WRR Inbound	No
Standard PHB Group Support	PHB WRR Outbound	No
Standard PHB Group Support	PHB Priority Queuing	No
Standard PHB Group Support	PHB Priority Queuing Inbound	No
Standard PHB Group Support	PHB Priority Queuing Outbound	No
Standard PHB Group Support	PHB Weighted Fair Queuing (WFQ)	No
Standard PHB Group Support	PHB WFQ Inbound	No
Standard PHB Group Support	PHB WFQ Outbound	No
Standard PHB Group Support	PHB WFQ Class-based Queuing Support	No
Standard PHB Group Support	PHB WFQ Discard Eligibility Marking	No
Standard PHB Group Support	PHB WFQ Priority Queuing (PQ) Percentage Bandwidth Support	No
Standard PHB Group Support	PHB WFQ Low Priority Queue Percentage Bandwidth Support	No
Standard PHB Group Support	PHB WFQ Per-queue WRED Support	No
Standard PHB Group Support	PHB WFQ Per-queue Tail Drop Limits	No
Standard PHB Group Support	PHB Congestion Avoidance: WRED	Yes
Standard PHB Group Support	PHB Inbound Weighted Random Early Detection (WRED)	Yes
Standard PHB Group Support	PHB Outbound WRED	Yes
Standard PHB Group Support	PHB WRED: Differentiated Services Code Point (DSCP) Support	Yes
Standard PHB Group Support	PHB WRED: IPv4 Precedence	Yes
Standard PHB Group Support	PHB WRED: IPv6 Precedence	Yes
Standard PHB Group Support	PHB WRED: Parameters	Yes
Standard PHB Group Support	PHB WRED: Min Threshold	Yes
Standard PHB Group Support	PHB WRED: Max Threshold	Yes
Standard PHB Group Support	PHB WRED: Weight Factor	Yes

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Standard PHB Group Support	PHB WRED: Exponential Weight Constant	Yes
Standard PHB Group Support	PHB: Explicit Congestion Notification	Yes
Standard PHB Group Support	PHB Rate Limiting	No
Standard PHB Group Support	PHB Inbound Rate Limiting	No
Standard PHB Group Support	PHB Outbound Rate Limiting	No
Standard PHB Group Support	PHB Rate Limit Average	No
Standard PHB Group Support	PHB Rate Limit Burst Rate	No
Standard PHB Group Support	PHB Rate Limit Burst Interval	No
Standard PHB Group Support	PHB Frame Relay Fragmentation (FRF)	No
Standard PHB Group Support	PHB FRF.12	No
Standard PHB Group Support	PHB Frame Relay Traffic Shaping (FRTS)	No
Standard PHB Group Support	PHB FRTS - committed information rate (CIR)	No
Standard PHB Group Support	PHB FRTS - MINCIR	No
Standard PHB Group Support	PHB FRTS - committed burst (BC)	No
Standard PHB Group Support	PHB FRTS - excess burst (BE)	No
Standard PHB Group Support	PHB Inbound CIR	No
Standard PHB Group Support	PHB Inbound MINCIR	No
Standard PHB Group Support	PHB Inbound BC	No
Standard PHB Group Support	PHB Inbound BE	No
Standard PHB Group Support	PHB backward explicit congestion notification (BECN)	No
Standard PHB Group Support	PHB forward explicit congestion notification (FECN)	No
Standard PHB Group Support	PHB Frame Relay Hold-Queue Depth	No
Standard PHB Group Support	PHB Asynchronous Transfer Mode (ATM) Traffic Shaping	No
Standard PHB Group Support	PHB Outbound ATM Traffic Shaping	No
Standard PHB Group Support	PHB Inbound ATM Traffic Shaping	No
Standard PHB Group Support	PHB ATM Service Classes	No
Standard PHB Group Support	PHB ATM Service Class - unspecified bit rate (UBR)	No

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Standard PHB Group Support	PHB ATM Service Class - constant bit rate (CBR)	No
Standard PHB Group Support	PHB ATM Service Class - real time (RT) variable bit rate (VBR)	No
Standard PHB Group Support	PHB ATM Service Class - non real time (NRT) VBR	No
Standard PHB Group Support	PHB ATM Service Class - available bit rate (ABR)	No
Standard PHB Group Support	PHB ATM Service Class - VC-Class Map Generation	No
Standard PHB Group Support	PHB ATM Service Class - VC-Class Map Explicit Naming	No
Standard PHB Group Support	PHB ATM Hold-Queue Depth	No
Standard PHB Group Support	PHB ATM TX-Ring Limit Support	No
Modular Quality of Service Command-Line Interface (MQC)-PHB Support	MQC-PHB Classification Criteria	Yes
MQC-PHB Support	Traffic Classification Explicit ACL Number Specification	Yes
MQC-PHB Support	Traffic Classification Explicit ACL Name Specification	Yes
MQC-PHB Support	Traffic Classification Based on Source MAC Address	No
MQC-PHB Support	Traffic Classification Based on Destination MAC Address	No
MQC-PHB Support	Traffic Classification Based on Source IPv4 Address	Yes
MQC-PHB Support	Traffic Classification Based on Source IPv6 Address	Yes
MQC-PHB Support	Traffic Classification Based on Destination IPv4 Address	Yes
MQC-PHB Support	Traffic Classification Based on Destination IPv6 Address	Yes
MQC-PHB Support	Traffic Classification Based on Source IP Port	Yes
MQC-PHB Support	Traffic Classification Based on Destination IP Port	Yes
MQC-PHB Support	Traffic Classification Based on IP Protocol	Yes
MQC-PHB Support	Traffic Classification Based on All IPv4 DiffServ Code Points	Yes

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
MQC-PHB Support	Traffic Classification Based on All IPv6 DiffServ Code Points	Yes
MQC-PHB Support	Traffic Classification Based on URL	No
MQC-PHB Support	Traffic Classification Based on MIME Type	No
MQC-PHB Support	Traffic Classification Based on Application Protocol	Yes
MQC-PHB Support	Traffic Classification Based on MPLS EXP Value	Partially supported
MQC-PHB Support	Traffic Classification Based on ATM Cell Loss Priority	No
MQC-PHB Support	Traffic Classification - Nested Class Map	Yes
MQC-PHB Support	Traffic Classification Match Any Support	Yes
MQC-PHB Support	Traffic Classification Exclude Option	Yes
MQC-PHB Support	Traffic Classification Based on TCP Flag Bits	Yes
MQC-PHB Support	Traffic Classification Based on ICMP Flag Values	Yes
MQC-PHB Support	Traffic Classification Based on IP Precedence	Yes
MQC-PHB Support	Traffic Classification Based on Fragments	Yes
MQC-PHB Support	Traffic Classification Routing Table Protocol (RTP) Protocol Port	Yes
MQC-PHB Support	Traffic Classification Based on QoS Group	No
MQC-PHB Support	Compound Traffic Classification	Yes
MQC-PHB Support	Low Latency Queuing (LLQ)	Yes
MQC-PHB Support	LLQ Inbound	Yes
MQC-PHB Support	LLQ Outbound	Yes
MQC-PHB Support	LLQ Absolute Bandwidth Support	No
MQC-PHB Support	LLQ Percentage Bandwidth Support	No
MQC-PHB Support	LLQ Percentage Remaining Bandwidth Support	No
MQC-PHB Support	LLQ Device Default Bandwidth	Yes

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
MQC-PHB Support	LLQ Burst Support	No
MQC-PHB Support	Class Based Weighted Fair Queue (CBWFQ)	Yes
MQC-PHB Support	CBWFQ Inbound	No
MQC-PHB Support	CBWFQ Outbound	Yes
MQC-PHB Support	CBWFQ Absolute Bandwidth Support	Yes
MQC-PHB Support	CBWFQ Percentage Bandwidth Support	Yes
MQC-PHB Support	CBWFQ Remaining Percentage Bandwidth Support	Yes
MQC-PHB Support	CBWFQ Queue Limit Support	No
MQC-PHB Support	Fair-queue Flow Queue-limit Default	No
MQC-PHB Support	Fair-queue Flow Queue-limit Limit	No
MQC-PHB Support	Class Based Fair Queuing (CBFQ) Max Reserved Bandwidth	Yes
MQC-PHB Support	MQC-PHB Default WFQ	Yes
MQC-PHB Support	MQC-PHB Default WFQ Inbound	No
MQC-PHB Support	MQC-PHB Default WFQ Outbound	Yes
MQC-PHB Support	MQC-PHB Default Reserved Bandwidth Control	Yes
MQC-PHB Support	MQC-PHB Single Rate Policing	Yes
MQC-PHB Support	MQC-PHB Single Rate Policing Inbound	Yes
MQC-PHB Support	MQC-PHB Single Rate Policing Outbound	Yes
MQC-PHB Support	MQC-PHB Single Rate Policing Absolute Rate	Yes
MQC-PHB Support	MQC-PHB Single Rate Policing Percent Rate	Yes
MQC-PHB Support	Default Committed Burst Size (CBS)	Yes
MQC-PHB Support	Default Excess Burst Size (EBS)	Yes
MQC-PHB Support	MQC-PHB Two Rate Policing	Yes
MQC-PHB Support	MQC-PHB Two Rate Policing Inbound	Yes
MQC-PHB Support	MQC-PHB Two Rate Policing Outbound	Yes

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
MQC-PHB Support	MQC-PHB Two Rate Policing Absolute Rate	Yes
MQC-PHB Support	MQC-PHB Two Rate Policing Percent Rate	Yes
MQC-PHB Support	MQC-PHB Policing Actions	Yes
MQC-PHB Support	MQC-PHB Policing: Drop	Yes
MQC-PHB Support	MQC-PHB Policing: Set IP Precedence	Yes
MQC-PHB Support	MQC-PHB Policing: Set DiffServ Code Points	Yes
MQC-PHB Support	MQC-PHB Policing: Set MPLS Exp	Partially supported
MQC-PHB Support	MQC-PHB Policing: Set FR DE	No
MQC-PHB Support	MQC-PHB Policing: Set ATM CLP	No
MQC-PHB Support	MQC-PHB Shaping Support	Yes
MQC-PHB Support	MQC-PHB Shaping: Inbound	No
MQC-PHB Support	MQC-PHB Shaping: Outbound	Yes
MQC-PHB Support	MQC-PHB Shaping: Default Shaping	No
MQC-PHB Support	MQC-PHB Shaping: Shape Average	Yes
MQC-PHB Support	MQC-PHB Shaping: Shape Peak	No
MQC-PHB Support	MQC-PHB Shaping: Default Bc	No
MQC-PHB Support	MQC-PHB Shaping: Default Be	No
MQC-PHB Support	MQC-PHB Maximum Number of Shaping Buffers	Yes
MQC-PHB Support	MQC-PHB: FRTS Support	No
MQC-PHB Support	MQC-PHB: FRTS Inbound	No
MQC-PHB Support	MQC-PHB: FRTS Outbound	No
MQC-PHB Support	MQC-PHB: FRTS MINCir	No
MQC-PHB Support	MQC-PHB: FRTS BECN	No
MQC-PHB Support	MQC-PHB: FRTS FECN	No
MQC-PHB Support	MQC-PHB Marking Support	Yes
MQC-PHB Support	MQC-PHB Marking Inbound	Yes
MQC-PHB Support	MQC-PHB Marking Outbound	Yes
MQC-PHB Support	MQC-PHB Marking: DiffServ Code Point Support	Yes
MQC-PHB Support	MQC-PHB Marking: MPLS Experimental Bit Support	No

Table 1-3 (Cont.) QoS Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
MQC-PHB Support	MQC-PHB Marking TopMost MPLS EXP Support	Yes
MQC-PHB Support	MQC-PHB Marking Frame Relay Discard Eligibility Bit Support	No
MQC-PHB Support	MQC-PHB Marking ATM Cell Loss Priority Support	No
MQC-PHB Support	MQC-PHB Marking IP Precedence	Yes
MQC-PHB Support	MQC-PHB Marking IPv4 TOS	No
MQC-PHB Support	MQC-PHB Marking IPv6 TOS	No
MQC-PHB Support	MQC-PHB Marking IPv4 Discard Class	Yes
MQC-PHB Support	MQC-PHB Marking IPv6 Discard Class	Yes
MQC-PHB Support	MQC-PHB Marking Trust Type	No
MQC-PHB Support	MQC-PHB Marking: QoS Group	No
MQC-PHB Support	MQC-PHB Congestion Avoidance	Yes
MQC-PHB Support	MQC-PHB Inbound Congestion Avoidance	No
MQC-PHB Support	MQC-PHB Outbound Congestion Avoidance	No
MQC-PHB Support	Tail Drop Limit	No
MQC-PHB Support	Tail Drop Default	No
MQC-PHB Support	MQC-PHB WRED Device Default Parameters	No
MQC-PHB Support	MQC-PHB WRED IP Precedence Support	Yes
MQC-PHB Support	MQC-PHB WRED DSCP Support	Yes
MQC-PHB Support	MQC-PHB Nesting Support	Yes
MQC-PHB Support	MQC-PHB Inbound Nesting	Yes
MQC-PHB Support	MQC-PHB Outbound Nesting	Yes
MQC-PHB Support	MQC-PHB Header Compression	No
MQC-PHB Support	MQC-PHB RTP Header Compression Support	No
MQC-PHB Support	MQC-PHB TCP Header Compression Support	No

Layer 3 MPLS VPN

Table 1-4 lists the Layer 3 Multiprotocol Label Switching (MPLS) VPN support on the Cisco IOS XR cartridge.

> **Note:**
>
> iBGP peering should be configured manually.

Table 1-4 Layer 3 MPLS VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Layer 3 MPLS VPN Support	Layer 3 MPLS VPN Support	Yes
Topology	Mesh	Yes
Topology	Hub and Spoke	Yes
Topology	Management	Yes
Addressing	Public IP (IPv4 and IPv6)	Yes
Addressing	Private IP (IPv4 and IPv6)	Yes
Addressing	Unnumbered	Yes
Addressing	Interface Description	Yes
VRF Table	VRF Export Map Reference	Yes
VRF Table	VRF Import Map Reference	Yes
VRF Table	VRF DHCP Helper	No
VRF Table	VRF Description	Yes
VRF Table	VRF Label	No
VRF Table	VRF Route Targets	Yes
VRF Table	VRF Table Name	Yes
VRF Table	VRF Route Distinguisher	Yes
VRF Table	VRF Route Limit (Max Routes) (IPv4 and IPv6)	Yes
VRF Table	External Border Gateway Protocol (EBGP) Multipath Load Sharing	No
VRF Table	Enhanced Interior Gateway Routing Protocol (EIGRP) Multipath Load Sharing	No
VRF Table	Internal Border Gateway Protocol (IBGP) Multipath Load Sharing	No
- -	EBGP and IBGP (EIBGP) Multipath Load Sharing	No
VRF Table	IBGP Unequal-cost	Yes
VRF Table	VRF Import (Max Paths)	Yes

Table 1-4 (Cont.) Layer 3 MPLS VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
VRF Table	VRF Target	No
VRF Table	VRF Reduction	Yes
VRF Table	Force Install	Yes
VRF Table	Shareable	Yes
VRF Table	Open Shortest Path First (OSPF) Router ID	No
VRF Table	Interface-less VRF	No
Routing Option	Autonomous Systems (AS)	No
Routing Option	Autonomous System Number (ASN) Loops	No
Routing Option	Independent Domain	No
Routing Option	Load Balancing	No
Routing Option	IPv4 Multipath	No
Routing Option	IPv4 Multipath Unequal Cost	No
Routing Option	IPv4 Multipath External and Internal Border Gateway Protocol (BGP) Paths	No
Routing Option	IPv6 Multipath	No
Routing Option	IPv6 Multipath Unequal Cost	No
Routing Option	IPv6 Multipath External and Internal BGP Paths	No
Static Routing	Static Global Routes	Yes
Static Routing	Static Local Routes (Redistribution)	Yes
Static Routing	Static Permanent Routes	Yes
Static Routing	Static Tag Value	Yes
Static Routing	Static Next Hop IP Address (IPv4 and IPv6)	Yes
Static Routing	Static Next Hop Interface	Yes
Static Routing	Static Next Hop IP and Interface	Yes
Static Routing	Static Route to Null0	Yes
BGP	BGP Network Statements (IPv4 and IPv6)	Yes
BGP	BGP Aggregate Statements (IPv4 and IPv6)	Yes
EBGP	EBGP autonomous system (AS) override	Yes
EBGP	EBGP Site of Origin	Yes
EBGP	Remove Private AS	Yes

Table 1-4 (Cont.) Layer 3 MPLS VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
EBGP	EBGP Update Source	Yes
EBGP	EBGP Multihop	Yes
EBGP	EBGP Bidirectional Forwarding Detection (BFD)	Yes
EBGP	EBGP Allow AS in	Yes
EBGP	EBGP Provider Edge (PE)-Customer Edge (CE) MD5 Authentication	Yes
EBGP	EBGP Local AS	Yes
EBGP	EBGP Advertise Address Family (IPv4 and IPv6)	Yes
EBGP	EBGP Local AS No Prepend	Yes
EBGP	EBGP Neighbor Description	Yes
EBGP	EBGP Soft Reconfiguration	Yes
EBGP	EBGP Router as Next Hop	Yes
EBGP	EBGP Neighbor weight	Yes
EBGP	EBGP Filters	No
EBGP	EBGP Default route	Yes
EBGP	EBGP Prefix Limit (IPv4 and IPv6)	No
EBGP	EBGP Prefix Limit Restart (IPv4 and IPv6)	No
EBGP	EBGP Prefix Filters	No
EBGP	EBGP Standard Community Attributes	Yes
EBGP	EBGP Extended Community Attributes	Yes
EBGP	EBGP Timers	Yes
EBGP	Keep Alive	No
EBGP	Hold Timer	Yes
EBGP	EBGP Neighbor Advertisement Interval	Yes
EBGP	EBGP Inbound Route Map	Yes
EBGP	EBGP Neighbor Site of Origin (SOO)	Yes
EBGP	External Route Map	Yes
EBGP	Generated Route Map	Yes
EBGP	EBGP Local Preference	Yes
EBGP	EBGP Site of Origin Route Map	Yes

Table 1-4 (Cont.) Layer 3 MPLS VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
EBGP	Route Map Name	Yes
EBGP	EBGP Outbound Route Map	Yes
EBGP	External Route Map	Yes
EBGP	EBGP Route Dampening	Yes
EBGP	Redistribution into BGP	Yes
EBGP	BGP Redistribution Metric and Policy from Connected	Yes
EBGP	BGP Redistribution Metric and Policy from Static	Yes
EBGP	BGP Redistribution Metric and Policy from Routing Information Protocol (RIP)	Yes
EBGP	BGP Redistribution Metric and Policy from OSPF	No
EBGP	BGP Redistribution Metric and Policy from EIGRP	No
EBGP	Default Route	Yes
EBGP	EBGP Neighbor Transport Connection Mode Active/Passive	No
EBGP	EBGP Neighbor Transport PathMTUDiscovery	No
EBGP	EBGP Neighbor Transport Single Session/MultiSession	No
EBGP	EBGP Neighbor	Yes
EBGP	EBGP Log Updown	No
OSPF	OSPF Area	No
OSPF	OSPF Area Type	No
OSPF	OSPF not-so-stubby area (NSSA) Type 7 Redistribution	No
OSPF	OSPF Maximum Paths	No
OSPF	OSPF Cost	No
OSPF	OSPF BGP Redistribution Tag	No
OSPF	OSPF Distribute in Filter	No
OSPF	OSPF Distribute out Filter	No
OSPF	OSPF Shortest Path First (SPF) Throttling	No
OSPF	OSPF MD5 Authentication	No
OSPF	OSPF Summary Addresses	No
OSPF	Suppress Advertise	No

Table 1-4 (Cont.) Layer 3 MPLS VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
OSPF	Tag Value	No
OSPF	Redistribution into OSPF	No
OSPF	OSPF Redistribution Metric and Policy from Connected	No
OSPF	OSPF Redistribution Metric and Policy from Static	No
OSPF	OSPF Redistribution Metric and Policy from RIP	No
OSPF	OSPF Redistribution Metric and Policy from BGP	No
OSPF	OSPF Redistribution Metric and Policy from EIGRP	No
OSPF	Default Route	No
RIP	RIP Ignore Routes from Source	Yes
RIP	RIP Passive Interface	Yes
RIP	Redistribution into RIP	Yes
RIP	RIP Redistribution Metric and Policy from Connected	Yes
RIP	RIP Redistribution Metric and Policy from Static	Yes
RIP	RIP Redistribution Metric and Policy from OSPF	No
RIP	RIP Redistribution Metric and Policy from BGP	Yes
RIP	RIP Redistribution Metric and Policy from EIGRP	No
RIP	Default Route	No
EIGRP	EIGRP Device ASN	No
EIGRP	EIGRP Site ASN	No
EIGRP	EIGRP Site of Origin	No
EIGRP	EIGRP Route Map Name for SOO	No
EIGRP	EIGRP MD5 Authentication	No
EIGRP	EIGRP Maximum Paths	No
EIGRP	EIGRP Redistribution	No
EIGRP	EIGRP Redistribution Metrics and Policy from Connected	No
EIGRP	EIGRP Redistribution Metrics and Policy from Static	No
EIGRP	EIGRP Redistribution Metrics and Policy from BGP	No

Table 1-4 (Cont.) Layer 3 MPLS VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
EIGRP	EIGRP Redistribution Metrics and Policy from OSPF	No
EIGRP	EIGRP Redistribution Metrics and Policy from RIP	No

Layer 2 VPN

Table 1-5 lists the Layer 2 VPN support on the Cisco IOS XR cartridge.

Table 1-5 Layer 2 VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Layer 2 VPN Support	Layer 2 VPN Support	Yes
Topology	Mesh	Yes
Topology	Hub and Spoke	Yes
Topology	Point to Point	Yes
Topology	H-VPLS	Yes
Signaling	BGP	Yes
Signaling	LDP	Yes
Discovery	Auto-discovered	Yes
Discovery	Explicit	Yes
MAC Table	Table size	Yes
MAC Table	Limit action	Yes
MAC Table	Limit notification	Yes
MAC Table	Aging time	Yes
MAC Table	Aging type	Yes
VSI	Profile	Yes
VSI	Route distinguisher: explicit	Yes
VSI	Route distinguisher: auto	Yes
VSI	Bridge domain	Yes
VSI	Bridge group	Yes
VSI	Ve range	Yes
VSI	Ve ID	Yes
VSI	VPN ID	Yes
Cross-connect	Group name	Yes
Cross-connect	Virtual circuit ID	Yes

Table 1-5 (Cont.) Layer 2 VPN Support

Area	IP Service Activator Feature	Supported on IP Service Activator Cisco IOS XR Cartridge
Cross-connect	Point-to-point name	Yes
Cross-connect	Pseudowire name	Yes
Neighbor	IP Address (IPv4)	Yes
Neighbor	Pseudowire class	Yes
Neighbor	Pseudowire ID	Yes

Configuring Cisco IOS XR Cartridge Options

Table 1-6 lists Cisco IOS XR cartridge options.

Table 1-6 Cisco IOS XR Cartridge Options

Options	Default Value	Possible Values	Description
cartridge.cisco.iosxr.bgpce.neighbor.asOverride.inheritanceCommandSyntax	inheritance-disable	inheritance-disable disable	Indicates which command syntax to use: inheritance-disable (default): "as-override inheritance-disable" command is configured. disable: "as-override disable" command is configured.
cartridge.cisco.iosxr.bgpce.neighbor.nextHopSelf.inheritanceCommandSyntax	inheritance-disable	inheritance-disable disable	Indicates which command syntax to use: inheritance-disable (default): "next-hop-self inheritance-disable" command is configured. disable: "next-hop-self disable" command is configured.
cartridge.cisco.iosxr.bgpce.neighbor.softReconfigurationInbound.inheritanceCommandSyntax	inheritance-disable	inheritance-disable disable	Indicates which command syntax to use: inheritance-disable (default): "soft-reconfiguration inbound inheritance-disable" command is configured. disable - "soft-reconfiguration inbound disable" command is configured.
cartridge.cisco.iosxr.l2vpn.crossConnect.ipv4NeighborWithIpv4Keyword	true	true false	Indicates whether "ipv4" keyword is supported for cross-connect Ipv4 Neighbor or not: true: neighbor command with "ipv4" keyword is configured. false: neighbor command without "ipv4" keyword is configured.
cartridge.cisco.iosxr.qos.random.detect.default.isSupported	false	true false	Indicates whether "random-detect default" is supported.
cartridge.cisco.iosxr.qos.random.detect.default.coexist	false	true false	Indicates whether "random-detect default" can coexist with other random-detect command, such as "random-detect dscp", and so on.

Table 1-6 (Cont.) Cisco IOS XR Cartridge Options

Options	Default Value	Possible Values	Description
cartridge.cisco.iosxr.qos.policing.violate.action.isSupported	true	true false	Indicates whether "violate-action" is supported in policing.
cartridge.cisco.iosxr.ebgp.labelMode.commandFormat	withoutAllocation	withAllocation withoutAllocation	Indicates which command format to use when setting MPLS VPN Label Mode: • withAllocation: "label-allocation-mode <per-vrf|per-ce>" command will be configured • withoutAllocation "label mode <per-vrf|per-ce>" command will be configured

Interface Configuration Management

Table 1-7 lists the Interface Configuration Management support on the Cisco IOS XR cartridge.

Table 1-7 Interface Configuration Management Support

Area	IP Service Activator Feature	Supported on Cisco IOS XR Cartridge
Backup Interface	Backup Interface Policy	No
Channelized Interface Creation	E1 Channelized Interface	No
Channelized Interface Creation	E1 Controller	No
Channelized Interface Creation	E3 Controller	No
Channelized Interface Creation	E3 Channelized Interface	No
Channelized Interface Creation	Synchronous Transport Module level-1 (STM1) Channelized Interface	No
Channelized Interface Creation	STM1 Controller	No
Channelized Interface Creation	T1 Channelized Interface	No
Channelized Interface Creation	T1 Controller	No
Channelized Interface Creation	T3 Channelized Interface	No
Channelized Interface Creation	T3 Controller	No
Cisco	Cisco Ethernet Port	No
Cisco	Cisco Universal Interface	No
Dialer List	DialerList	No
DLSW	Data-Link Switching (DLSW) Device	No
DLSW	DLSW Ethernet Interface	No
DLSW	DLSW Token Ring Interface	No

Table 1-7 (Cont.) Interface Configuration Management Support

Area	IP Service Activator Feature	Supported on Cisco IOS XR Cartridge
HSRP	Hot Standby Router Protocol (HSRP)	Yes
Interface Creation	Basic Rate Interface (BRI)	No
Interface Creation	Dialer Interface	No
Interface Creation	Loopback Interface	Yes
Interface Creation	Multilink Interface	Yes
Interface Creation	Virtual Template Interface	No
Interface Decoration	POS Interface	No
Interface Decoration	Serial Interface	No
Multicast Interface	Multicast Interface	No
Multilink Point-to-Point Protocol (PPP)	Multilink PPP	No
SGBP	Stack Group Bidding Protocol (SGBP)	No
SubInterface Creation	ATM Sub Interface	Yes
SubInterface Creation	Frame Relay SubInterface	Yes
SubInterface Creation	VLAN Sub Interface	Yes

Note:

All supported interface configuration management configuration policies support IPv4 and IPv6 addresses.

Cisco Hardware and Software

For the most up-to-date information about the supported Cisco devices contact Oracle Global Customer Support (GCS).

Operating Systems

For complete information about the operating systems supported for the IP Service Activator Cisco IOS XR cartridge, see *IP Service Activator Installation Guide*.

2
Upgrading to Cisco IOS XR

This chapter explains the steps you need to perform before and after upgrading to Cisco IOS XR.

> **Note:**
>
> It is not recommended for customers to perform a device IOS upgrade in a production network, unless they have performed acceptance testing prior to the upgrade.

Prerequisites

Before performing the Cisco IOS XR upgrade, complete the following tasks for the device you are upgrading:

1. It is recommended that you resolve as many concretes as possible that are in a conflict or disabled state. Keep a record of those which you can resolve.
2. Run an audit to determine whether Oracle Communications IP Service Activator and the device configuration are synchronized. If there are missing commands, consider re-issuing them to clean up the audit. Preserve the audit output.

   For more information on viewing audit logs, see *IP Service Activator System Administrator's Guide*.
3. Stop all provisioning on the device.
4. Unmanage the device.

Upgrading to Cisco IOS XR

For instructions on upgrading to Cisco IOS XR, see the Cisco documentation.

Post-upgrade Tasks

After performing the Cisco IOS XR upgrade, complete the following tasks for the device you have upgraded:

1. Reset the device capabilities:
   a. Right-click the device and select **Properties**.
   b. Select the **Capabilities** property page.
   c. Click **Reset Device Capabilities**.
   d. In the confirmation popup, click **Yes**.
   e. Click **OK** and then **Commit**.

2. Modify the **AutoDiscovery.cfg** file by adding the following statement:

   ```
   NoAutoPersistant:9;0;
   ```

   This statement prevents configuration changes to interface name or interface snmp index number on a device when it is rediscovered.

   See *IP Service Activator System Administrator's Guide* for more information about **AutoDiscover.cfg** file.

3. Rediscover the device:
   a. Right-click the device.
   b. Select **Discover**.
4. Verify that the new IOS version was picked up by IP Service Activator:
   a. Right-click the device.
   b. Select **Properties**.

      The **Description** field displays the new IOS version.
5. Manage the device and set it to offline test mode:
   a. Right-click the device and select **Properties**.
   b. Select the **Management** property page.
   c. Select **Offline Maintenance** on the **Command Delivery** list.
   d. Right-click the device and select **Manage**.
   e. Click **OK** and then **Commit**.

      You can access the audit log at the following location to confirm commands were processed in offline maintenance mode:

      /opt/OracleCommunications/ServiceActivator/AuditTrails/nplosXr.audit.log

      For more information about checking an audit trail log for a cartridge, see *IP Service Activator System Administrator's Guide*.

      The audit log must be empty. If there are rejected concretes in step 1 of "Prerequisites" (based on the reason for rejection), you can view commands. These commands configure the service for the concrete and are related to rejected concretes. If so, you can continue.

      If there are other commands, refer to the options documentation, and confirm that all the concretes used in installation are not in conflict. You must check if the capabilities were fetched correctly. If not, it may be because the registry was not set up correctly to point to the specific capabilities file.

      If you view commands for non-rejected concretes, check the options. Review the options and see if there is an entry that controls the behavior you view. It is possible that the MIPSA registry entry you made for Device/IOS combination is not being applied. You must check the Network Processor logs to assist you in tracking this down.

> **Note:**
>
> Ideally for every new Device/IOS combination, you must perfect the Network Processor configuration on a lab system, and then apply the changes to the live system after it is debugged. To access the Network Processor logs to confirm processing of the configuration after managing the device:
>
> **/opt/OracleCommunications/ServiceActivator/AuditTrails/nplosXr.audit.log**

When you manage the device in offline maintenance mode, the following message appears in the **Current Faults** pane for concretes associated with the managed device:

```
Changes to configuration were attempted while in an Offline Mode;some
configuration has not been applied to the device.
```

You can safely ignore this message.

6. Right-click the device, select **Command Delivery**, select **Online**, and then select **Commit**.

   IP Service Activator retries sending any rejected configuration.

7. Run an audit to verify that IP Service Activator and the device configuration are synchronized:
   a. Right-click the device and select **Properties**.
   b. Select the **Audit/Migrate** property page.
   c. Click the **Initiate Audit** button.
   d. When the audit is finished, click **Detach Audit**. Then right-click in the new window that appears, choose **Select All** and copy-paste the text to another application or file.

      The device is ready for provisioning through IP Service Activator.

3
Device Configuration

This chapter details the authentication methods supported on Oracle Communications IP Service Activator Cisco IOS XR cartridge, and describes the required manual pre-configuration to support various options and services.

Supported Authentication Methods

The IP Service Activator Cisco IOS XR cartridge supports the following authentication methods on all devices:

- Telnet with TACACS+
- SSH with password authentication

> **Note:**
>
> Anonymous without enable is invalid for Cisco.

Manual Pre-configuration

This section describes the manual pre-configuration required by the IP Service Activator Cisco IOS XR cartridge to support various options and services.

Configuring SNMP

Simple Network Management Protocol (SNMP) must be enabled on all routers for the IP Service Activator discovery process to work. Ensure the following line is included in the router configuration:

```
snmp-server community community-name RO
```

> **Note:**
>
> Set up SNMP for the IP Service Activator discovery process using a community name (typically *public*). You can set the authentication as required. As a best practice make the Community read-only. The network discovery process uses a default community of *public*; you will need to amend the appropriate SNMP parameter in the **Discovery** dialog if you set a different read community on the devices.

Configuring SSH

To use Secure Shell (SSH) authentication, you need to configure an SSH server on the device.

The device must have a hostname and domain-name.

In configuration mode, enter the following commands:

```
crypto key generate rsa
```

You are prompted for a modulus size for the key. The default is 512, but Cisco recommends the use of a minimum modulus size of 1024 bits.

```
ip ssh time-out 120
ip ssh authentication-retries 3
```

> **Note:**
>
> On later versions of IOS, SSH is configured automatically when the device is booted. For more information, see the Cisco documentation.

4

Cisco Pre-checks and Post-checks

This chapter describes the pre-checks and post-checks that can be run and explains how to install, enable, and disable them. It also describes the behavior of the individual pre-checks and post-checks for the Oracle Communications IP Service Activator Cisco IOS XR cartridge.

About Pre-checks and Post-checks

Pre-checks look for existing configuration on a device when you commit a configuration. This prevents disruption of existing services.

Pre-checks also determine if the IP Service Activator configuration will create conflicts with an existing configuration, during creation of a new service instance by IP Service Activator. In case a conflict is detected, the operation is aborted and an error message generated.

The post-checks look for the configuration after it has been applied on a device. Post-checks determine if an IP Service Activator configuration is really configured on the device or silently rejected by that device, after an IP Service Activator creates a new service instance. An error message is generated if the device silently rejects the configuration, and the applied configuration is rolled back.

Post-checks can validate successful application of a configuration beyond the simple validation offered by the device response during command issue.

Installing Pre-checks and Post-checks

The standard pre-checks and post-checks are installed when IP Service Activator is installed. However, currently, there are no post-checks implemented for Cisco IOS XR cartridges. For more information, see *IP Service Activator Installation Guide*.

Enabling/Disabling Pre-checks and Post-checks

You can enable pre-checks and post-checks using the **standard.properties** file. The file is located in the following directory:

Config/networkProcessor/com/metasolv/serviceactivator/cartridges/cisco/pre_check/standard.properties

To disable a particular pre-check or post-check change its value to **false**, as shown in the example below. The value **true** indicates an enabled pre-check or post-check.

```
<checkProperties xmlns="http://www.metasolv.com/ serviceactivator/checkproperties">
    <preCheckRouteMap>true</preCheckRouteMap>
    <preCheckClassMap>true</preCheckClassMap>
    <preCheckPolicyMap>true</preCheckPolicyMap>
    <preCheckNamedAcl>true</preCheckNamedAcl>
    <preCheckVrf>true</preCheckVrf>
    <preCheckCryptoMap>true</preCheckCryptoMap>
    <preCheckConfigVersion>false</preCheckConfigVersion>
    <preCheckRouterIOSUpgrade>false</preCheckRouterIOSUpgrade>
```

```
    <preCheckPolicer>true</preCheckPolicer>
</checkProperties>
```

Individual Pre-checks

Table 4-1 outlines the behavior of the individual pre-checks for the Cisco IOS XR cartridge.

Table 4-1 Pre-checks

Name	Behavior	Default
preCheckPolicyMap	Raises a fault when a policy map with the specified name exists. It is a quality of service (QOS) pre-check.	On
preCheckNamedAcl	Raises a fault when an ACL with the specified name exists. It is a QoS pre-check.	On