Newer Design Guide Available

Cisco Smart Business Architecture has become part of the Cisco Validated Designs program.

For up-to-date guidance on the designs described in this guide, see http://cvddocs.com/fw/Aug13-230

For information about the Cisco Validated Design program, go to http://www.cisco.com/go/cvd

Layer 2 WAN Configuration Files Guide

SMART BUSINESS ARCHITECTURE

February 2013 Series

Preface

Who Should Read This Guide

This Cisco® Smart Business Architecture (SBA) guide is for people who fill a variety of roles:

- Systems engineers who need standard procedures for implementing solutions
- Project managers who create statements of work for Cisco SBA implementations
- Sales partners who sell new technology or who create implementation documentation
- Trainers who need material for classroom instruction or on-the-job training

In general, you can also use Cisco SBA guides to improve consistency among engineers and deployments, as well as to improve scoping and costing of deployment jobs.

Release Series

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

The Release Notes for a series provides a summary of additions and changes made in the series.

All Cisco SBA guides include the series name on the cover and at the bottom left of each page. We name the series for the month and year that we release them, as follows:

month year Series

For example, the series of guides that we released in February 2013 is the "February Series".

You can find the most recent series of SBA guides at the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel

How to Read Commands

Many Cisco SBA guides provide specific details about how to configure Cisco network devices that run Cisco IOS, Cisco NX-OS, or other operating systems that you configure at a command-line interface (CLI). This section describes the conventions used to specify commands that you must enter.

Commands to enter at a CLI appear as follows:

```
configure terminal
```

Commands that specify a value for a variable appear as follows:

```
ntp server 10.10.48.17
```

Commands with variables that you must define appear as follows:

```
class-map [highest class name]
```

Commands shown in an interactive example, such as a script or when the command prompt is included, appear as follows:

```
Router# enable
```

Long commands that line wrap are underlined. Enter them as one command:

```
wrr-queue random-detect max-threshold 1 100 100 100 100 100
100 100 100
```

Noteworthy parts of system output or device configuration files appear highlighted, as follows:

```
interface Vlan64
  ip address 10.5.204.5 255.255.255.0
```

Comments and Questions

If you would like to comment on a guide or ask questions, please use the SBA feedback form.

If you would like to be notified when new comments are posted, an RSS feed is available from the SBA customer and partner pages.

Table of Contents

What's In This SBA Guide

Cisco SBA Borderless Networks

Cisco SBA helps you design and quickly deploy a full-service business network. A Cisco SBA deployment is prescriptive, out-of-the-box, scalable, and flexible.

Cisco SBA incorporates LAN, WAN, wireless, security, data center, application optimization, and unified communication technologies—tested together as a complete system. This component-level approach simplifies system integration of multiple technologies, allowing you to select solutions that solve your organization's problems—without worrying about the technical complexity.

Cisco SBA Borderless Networks is a comprehensive network design targeted at organizations with up to 10,000 connected users. The SBA Borderless Network architecture incorporates wired and wireless local area network (LAN) access, wide-area network (WAN) connectivity, WAN application optimization, and Internet edge security infrastructure.

Route to Success

To ensure your success when implementing the designs in this guide, you should first read any guides that this guide depends upon—shown to the left of this guide on the route below. As you read this guide, specific prerequisites are cited where they are applicable.

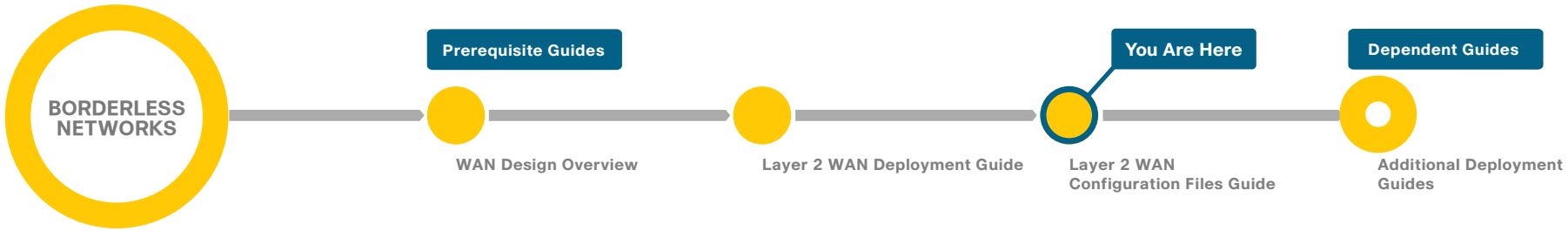
About This Guide

This *configuration files guide* provides, as a comprehensive reference, the complete network device configurations that are implemented in a Cisco SBA deployment guide.

You can find the most recent series of Cisco SBA guides at the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel



Introduction

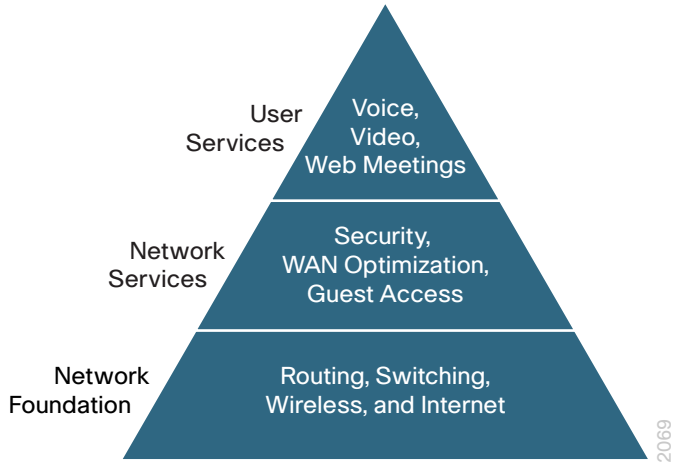
For Cisco partners and customers with up to10,000 connected users, Cisco has created an "out-of-the-box" deployment that is simple, fast, affordable, scalable, and flexible. It is designed to be easy to configure, deploy, and manage. The simplicity of this deployment, though, belies the depth and breadth of the architecture.

The Cisco Smart Business Architecture (SBA) WAN is documented in a single design guide, and there are deployment guides and configuration files guides for each of the three key WAN technologies: Multiprotocol Label Switching (MPLS) WAN, Layer 2 WAN, and VPN WAN.

Cisco SBA is a prescriptive reference design that provides step-by-step instructions for the deployment of the products in the design. It is based on best practice principles. Based on feedback from customers and partners, Cisco has developed a solid network foundation as a flexible platform that does not require reengineering to include additional network or user services.

Some of the base concepts referenced in this guide are covered in the Cisco SBA design and deployment guides. Those documents should be reviewed first.

Figure 1 - Smart Business Architecture model



This deployment guide has been architected to make your life a little bit—maybe even a lot—smoother. This architecture:

- Provides a solid foundation
- Makes deployment fast and easy
- Accelerates the ability to easily deploy additional services
- Avoids the need for re-engineering of the core network

Using the Deployment Guides

To reflect our ease-of-use principle, Cisco SBA has been divided into three sections: LAN, WAN, and Internet edge. Each section has one or more deployment guides and configuration guides. Each guide is organized into modules. You can start at the beginning or jump to any module. Each part of the guide is designed to stand alone, so you can deploy the Cisco technology for that section without having to follow the previous module.

Each deployment guide starts with a business problem and architecture overview. These sections cover the basics of the deployment guide, the value for you and your customer, and the broad stroke features and benefits of this compelling design. Each then has different modules depending on the network components being covered.

The *Layer 2 WAN Deployment Guide* has the following sections:

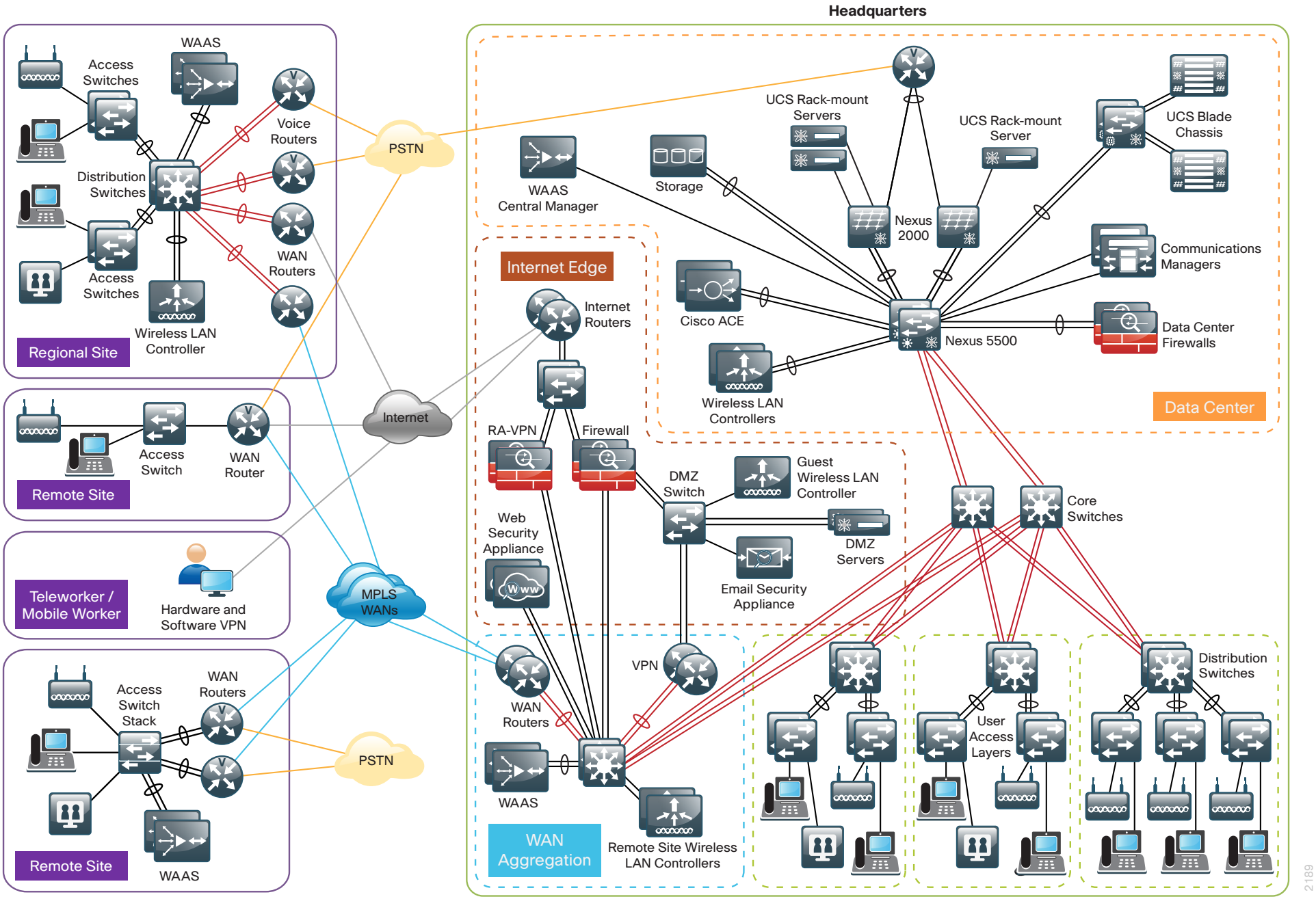
- Deploying a Layer 2 WAN
- Deploying a WAN Remote-Site Distribution Layer
- Deploying WAN Quality of Service

Using the Layer 2 WAN Configuration Files Guide

This document provides the available configuration files for the products used in *Layer 2 WAN Deployment Guide*. It is a companion document to the deployment guide as a reference for engineers who are evaluating or deploying Cisco SBA.

Both the *Layer 2 WAN Deployment Guide* and the *Layer 2 WAN Configuration Files Guide* provide the complete list of products used in the lab testing of this design.

Figure 2 - Cisco SBA Overview



Product List

WAN Aggregation

Functional Area	Product Description	Part Numbers	Software
WAN-aggregation Router	Aggregation Services 1002 Router	ASR1002-5G-VPN/K9	IOS-XE 15.2(2)S2 Advanced Enterprise license
	Aggregation Services 1001 Router	ASR1001-2.5G-VPNK9	

WAN Remote Site

Functional Area	Product Description	Part Numbers	Software
Modular WAN Remote-site Router	Cisco 3945 Voice Sec. Bundle, PVDM3-64, UC and SEC License PAK	C3945-VSEC/K9	15.1(4)M5 securityk9 license datak9 license
	Cisco 3925 Voice Sec. Bundle, PVDM3-64, UC and SEC License PAK	C3925-VSEC/K9	
	Data Paper PAK for Cisco 3900 series	SL-39-DATA-K9	
	Cisco 2951 Voice Sec. Bundle, PVDM3-32, UC and SEC License PAK	C2951-VSEC/K9	
	Cisco 2921 Voice Sec. Bundle, PVDM3-32, UC and SEC License PAK	C2921-VSEC/K9	
	Cisco 2911 Voice Sec. Bundle, PVDM3-32, UC and SEC License PAK	C2911-VSEC/K9	
	Data Paper PAK for Cisco 2900 series	SL-29-DATA-K9	

LAN Access Layer

Functional Area	Product Description	Part Numbers	Software
Modular Access Layer Switch	Cisco Catalyst 4507R+E 7-slot Chassis with 48Gbps per slot	WS-C4507R+E	3.3.0.SG(15.1-1SG) IP Base license
	Cisco Catalyst 4500 E-Series Supervisor Engine 7L-E	WS-X45-SUP7L-E	
	Cisco Catalyst 4500 E-Series 48 Ethernet 10/100/1000 (RJ45) PoE+ ports	WS-X4648-RJ45V+E	
	Cisco Catalyst 4500 E-Series 48 Ethernet 10/100/1000 (RJ45) PoE+,UPoE ports	WS-X4748-UPOE+E	
Stackable Access Layer Switch	Cisco Catalyst 3750-X Series Stackable 48 Ethernet 10/100/1000 PoE+ ports	WS-C3750X-48PF-S	15.0(2)SE IP Base license
	Cisco Catalyst 3750-X Series Stackable 24 Ethernet 10/100/1000 PoE+ ports	WS-C3750X-24P-S	
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	

Functional Area	Product Description	Part Numbers	Software
Standalone Access Layer Switch	Cisco Catalyst 3560-X Series Standalone 48 Ethernet 10/100/1000 PoE+ ports	WS-C3560X-48PF-S	15.0(2)SE IP Base license
	Cisco Catalyst 3560-X Series Standalone 24 Ethernet 10/100/1000 PoE+ ports	WS-C3560X-24P-S	
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	
Stackable Access Layer Switch	Cisco Catalyst 2960-S Series 48 Ethernet 10/100/1000 PoE+ ports and Two 10GbE SFP+ Uplink ports	WS-C2960S-48FPD-L	15.0(2)SE LAN Base license
	Cisco Catalyst 2960-S Series 48 Ethernet 10/100/1000 PoE+ ports and Four GbE SFP Uplink ports	WS-C2960S-48FPS-L	
	Cisco Catalyst 2960-S Series 24 Ethernet 10/100/1000 PoE+ ports and Two 10GbE SFP+ Uplink ports	WS-C2960S-24PD-L	
	Cisco Catalyst 2960-S Series 24 Ethernet 10/100/1000 PoE+ ports and Four GbE SFP Uplink ports	WS-C2960S-24PS-L	
	Cisco Catalyst 2960-S Series Flexstack Stack Module	C2960S-STACK	

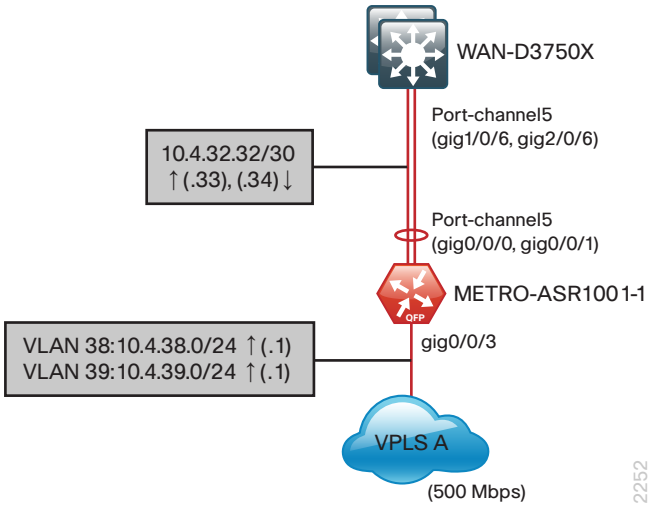
LAN Distribution Layer

Functional Area	Product Description	Part Numbers	Software
Modular Distribution Layer Virtual Switch Pair	Cisco Catalyst 6500 E-Series 6-Slot Chassis	WS-C6506-E	15.0(1)SY1 IP Services license
	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	
	Cisco Catalyst 6500 16-port 10GbE Fiber Module w/DFC4	WS-X6816-10G-2T	
	Cisco Catalyst 6500 24-port GbE SFP Fiber Module w/DFC4	WS-X6824-SFP-2T	
	Cisco Catalyst 6500 4-port 40GbE/16-port 10GbE Fiber Module w/DFC4	WS-X6904-40G-2T	
	Cisco Catalyst 6500 4-port 10GbE SFP+ adapter for WX-X6904-40G module	CVR-CFP-4SFP10G	
Modular Distribution Layer Switch	Cisco Catalyst 4507R+E 7-slot Chassis with 48Gbps per slot	WS-C4507R+E	3.3.0.SG(15.1-1SG) Enterprise Services license
	Cisco Catalyst 4500 E-Series Supervisor Engine 7-E, 848Gbps	WS-X45-SUP7-E	
	Cisco Catalyst 4500 E-Series 24-port GbE SFP Fiber Module	WS-X4624-SFP-E	
	Cisco Catalyst 4500 E-Series 12-port 10GbE SFP+ Fiber Module	WS-X4712-SFP+E	
Stackable Distribution Layer Switch	Cisco Catalyst 3750-X Series Stackable 12 GbE SFP ports	WS-C3750X-12S-E	15.0(2)SE IP Services license
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	

WAN-Aggregation Devices

This section includes configuration files corresponding to the trunked demarcation design model shown in Figure 3.

Figure 3 - WAN-aggregation design—Trunked Demarcation design model



The following table provides the loopback addresses for the WAN aggregation devices in the Trunked Demarcation design model.

Table 1 - Loopback addresses

Hostname	Loopback0
WAN-D3750X	10.4.32.240/32
METRO-ASR1001-1	10.4.32.245/32

The following table provides a summary of the various distribution layer switch device interconnections to other WAN-aggregation components.

Table 2 - Trunked Demarcation design model—distribution layer switch port channel information

Port-channel	Member interfaces	Layer3/Layer2	Connected device
5	gig1/0/6 gig2/0/6	Layer 3	METRO-ASR1001-1

WAN-D3750X

```
version 15.0
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname WAN-D3750X
!
boot-start-marker
boot-end-marker
!
!
logging buffered 1000000
enable secret 5 $1$ssq/$J5zW2nln0tp6NsQDx48yK1
!
username admin password 7 121A540411045D5679
aaa new-model
!
!
aaa group server tacacs+ TACACS-SERVERS
 server name TACACS-SERVER-1
!
```

```
aaa authentication login default group TACACS-SERVERS local
aaa authorization console
aaa authorization exec default group TACACS-SERVERS local
!
!
!
!
!
aaa session-id common
clock timezone PST -8 0
clock summer-time PDT recurring
switch 1 provision ws-c3750x-24
switch 2 provision ws-c3750x-24
stack-mac persistent timer 0
system mtu routing 1500
!
ip routing
!
!
!
ip domain-name cisco.local
ip name-server 10.4.48.10
ip multicast-routing distributed
vtp mode transparent
udld enable

!
mls qos map policed-dscp  0 10 18 24 46 to 8
mls qos map cos-dscp 0 8 16 24 32 46 48 56
mls qos srr-queue input bandwidth 70 30
mls qos srr-queue input threshold 1 80 90
mls qos srr-queue input priority-queue 2 bandwidth 30
mls qos srr-queue input cos-map queue 1 threshold 2 3
mls qos srr-queue input cos-map queue 1 threshold 3 6 7
mls qos srr-queue input cos-map queue 2 threshold 1 4
mls qos srr-queue input dscp-map queue 1 threshold 2 24
mls qos srr-queue input dscp-map queue 1 threshold 3 48 49 50 51
52 53 54 55
mls qos srr-queue input dscp-map queue 1 threshold 3 56 57 58 59
60 61 62 63
mls qos srr-queue input dscp-map queue 2 threshold 3 32 33 40 41
42 43 44 45
mls qos srr-queue input dscp-map queue 2 threshold 3 46 47
mls qos srr-queue output cos-map queue 1 threshold 3 4 5
mls qos srr-queue output cos-map queue 2 threshold 1 2
mls qos srr-queue output cos-map queue 2 threshold 2 3
mls qos srr-queue output cos-map queue 2 threshold 3 6 7
mls qos srr-queue output cos-map queue 3 threshold 3 0
mls qos srr-queue output cos-map queue 4 threshold 3 1
mls qos srr-queue output dscp-map queue 1 threshold 3 32 33 40 41
42 43 44 45
mls qos srr-queue output dscp-map queue 1 threshold 3 46 47
mls qos srr-queue output dscp-map queue 2 threshold 1 16 17 18 19
20 21 22 23
mls qos srr-queue output dscp-map queue 2 threshold 1 26 27 28 29
30 31 34 35
mls qos srr-queue output dscp-map queue 2 threshold 1 36 37 38 39
mls qos srr-queue output dscp-map queue 2 threshold 2 24
mls qos srr-queue output dscp-map queue 2 threshold 3 48 49 50 51
52 53 54 55
mls qos srr-queue output dscp-map queue 2 threshold 3 56 57 58 59
60 61 62 63
mls qos srr-queue output dscp-map queue 3 threshold 3 0 1 2 3 4 5
6 7
mls qos srr-queue output dscp-map queue 4 threshold 1 8 9 11 13
15
mls qos srr-queue output dscp-map queue 4 threshold 2 10 12 14
mls qos queue-set output 1 threshold 1 100 100 50 200
mls qos queue-set output 1 threshold 2 125 125 100 400
mls qos queue-set output 1 threshold 3 100 100 100 3200
mls qos queue-set output 1 threshold 4 60 150 50 200
mls qos queue-set output 1 buffers 15 25 40 20
mls qos
!
```

```
license boot level ipservices
license boot level ipservices switch 2
!
!
!
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
spanning-tree vlan 1-4094 priority 24576
!
!
!
port-channel load-balance src-dst-ip
!
vlan internal allocation policy ascending
!
ip ssh source-interface Loopback0
ip ssh version 2
!
!
macro name EgressQoS
 mls qos trust dscp
 queue-set 2
 srr-queue bandwidth share 1 30 35 5
 priority-queue out
@
!
!
interface Loopback0
 ip address 10.4.32.240 255.255.255.255
 ip pim sparse-mode
!
interface Port-channel5
 description METRO-ASR1000-1
 no switchport
 ip address 10.4.32.33 255.255.255.252
 ip pim sparse-mode
 logging event link-status
 carrier-delay msec 0
!
interface FastEthernet0
 no ip address
 no ip route-cache
 shutdown
!
interface GigabitEthernet1/0/6
 description METRO-ASR1000-1 Gig0/0/1
 no switchport
 no ip address
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 carrier-delay msec 0
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-group 5 mode on
!
interface TenGigabitEthernet1/1/1
 description connection to C6509-2 Te4/6
 no switchport
 ip address 10.4.40.46 255.255.255.252
 ip pim sparse-mode
 ip summary-address eigrp 100 10.4.32.0 255.255.248.0
 ip summary-address eigrp 100 10.5.0.0 255.255.0.0
 logging event link-status
 carrier-delay msec 0
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
```

```
 macro description EgressQoS
!
interface GigabitEthernet2/0/6
 description METRO-ASR1000-1 Gig0/0/0
 no switchport
 no ip address
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 carrier-delay msec 0
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-group 5 mode on
!
interface TenGigabitEthernet2/1/1
 description connection to C6509-1 Te4/6
 no switchport
 ip address 10.4.40.42 255.255.255.252
 ip pim sparse-mode
 ip summary-address eigrp 100 10.4.32.0 255.255.248.0
 ip summary-address eigrp 100 10.5.0.0 255.255.0.0
 logging event link-status
 carrier-delay msec 0
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
!
interface Vlan1
 no ip address
 shutdown
!
!
router eigrp 100
 network 10.4.0.0 0.1.255.255
 passive-interface default
 no passive-interface TenGigabitEthernet2/1/1
 no passive-interface TenGigabitEthernet1/1/1
 no passive-interface Port-channel5
 nsf
!
!
no ip http server
ip http authentication aaa
ip http secure-server
ip http timeout-policy idle 60 life 86400 requests 10000
!
ip pim autorp listener
ip pim register-source Loopback0
ip tacacs source-interface Loopback0
!
logging esm config
logging trap errors
logging 10.4.48.35
logging 10.4.48.36
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO 55
snmp-server community cisco123 RW 55
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
 address ipv4 10.4.48.15
 key 7 03375E08140A35674B10
!
!
!
line con 0
line vty 0 4
 exec-timeout 0 0
 transport preferred none
```

```
 transport input ssh
line vty 5 15
 exec-timeout 0 0
 transport preferred none
 transport input ssh
!
!
ntp source Loopback0
ntp server 10.4.48.17
end
```

METRO-ASR1001-1

```
version 15.2
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
no platform punt-keepalive disable-kernel-core
!
hostname METRO-ASR1001-1
!
!
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 4 /DtCCr53Q4B18jSIm1UEqu7cNVZTOhxTZyUnZdsSrsw
!
aaa new-model
!
!
aaa group server tacacs+ TACACS-SERVERS
 server name TACACS-SERVER-1
!
aaa authentication login default group TACACS-SERVERS local
aaa authorization console
aaa authorization exec default group TACACS-SERVERS local
!
!
!
!
!
aaa session-id common
clock timezone PST -8 0
clock summer-time PDT recurring
!
!
!
!
ip domain name cisco.local
ip multicast-routing distributed
!
!
!
!
!
multilink bundle-name authenticated
!
!
!
!
!
!
!
!
!
username admin password 7 110A4816141D5A5E57
!
redundancy
 mode none
!
```

```
!
!
!
!
!
ip ssh source-interface Loopback0
ip ssh version 2
!
class-map match-all CLASS-MAP-RS210
 match access-group name RS210-10.5.144.0
class-map match-all CLASS-MAP-RS211
 match access-group name RS211-10.5.152.0
class-map match-all CLASS-MAP-RS212
 match access-group name RS212-10.5.168.0
class-map match-all CLASS-MAP-RS213
 match access-group name RS213-10.5.176.0
class-map match-any DATA
 match dscp af21
class-map match-any INTERACTIVE-VIDEO
 match dscp cs4  af41
class-map match-any CRITICAL-DATA
 match dscp cs3  af31
class-map match-any VOICE
 match dscp ef
class-map match-any SCAVENGER
 match dscp cs1  af11
class-map match-any NETWORK-CRITICAL
 match dscp cs2  cs6
!
policy-map POLICY-MAP-RS210
 class VOICE
  priority percent 10
 class INTERACTIVE-VIDEO
  priority percent 23
 class CRITICAL-DATA
  bandwidth percent 15
  random-detect dscp-based
 class DATA
  bandwidth percent 19
  random-detect dscp-based
 class SCAVENGER
  bandwidth percent 5
 class NETWORK-CRITICAL
  bandwidth percent 3
 class class-default
  bandwidth percent 25
  random-detect
policy-map POLICY-MAP-RS211
 class VOICE
  priority percent 10
 class INTERACTIVE-VIDEO
  priority percent 23
 class CRITICAL-DATA
  bandwidth percent 15
  random-detect dscp-based
 class DATA
  bandwidth percent 19
  random-detect dscp-based
 class SCAVENGER
  bandwidth percent 5
 class NETWORK-CRITICAL
  bandwidth percent 3
 class class-default
  bandwidth percent 25
  random-detect
policy-map POLICY-MAP-RS212
 class VOICE
  priority percent 10
 class INTERACTIVE-VIDEO
  priority percent 23
 class CRITICAL-DATA
  bandwidth percent 15
  random-detect dscp-based
 class DATA
```

```
  bandwidth percent 19
  random-detect dscp-based
 class SCAVENGER
  bandwidth percent 5
 class NETWORK-CRITICAL
  bandwidth percent 3
 class class-default
  bandwidth percent 25
  random-detect
policy-map POLICY-MAP-RS213
 class VOICE
  priority percent 10
 class INTERACTIVE-VIDEO
  priority percent 23
 class CRITICAL-DATA
  bandwidth percent 15
  random-detect dscp-based
 class DATA
  bandwidth percent 19
  random-detect dscp-based
 class SCAVENGER
  bandwidth percent 5
 class NETWORK-CRITICAL
  bandwidth percent 3
 class class-default
  bandwidth percent 25
  random-detect
policy-map POLICY-MAP-L2-WAN-BACKBONE-WITH-PER-SITE-SHAPERS
 class NETWORK-CRITICAL
  bandwidth percent 3
 class CLASS-MAP-RS210
  shape average 10000000
   service-policy POLICY-MAP-RS210
 class CLASS-MAP-RS211
  shape average 10000000
   service-policy POLICY-MAP-RS211
 class CLASS-MAP-RS212
  shape average 20000000
   service-policy POLICY-MAP-RS212
 class CLASS-MAP-RS213
  shape average 20000000
   service-policy POLICY-MAP-RS213
policy-map WAN-INTERFACE-G0/0/3
 class class-default
  shape average 500000000
   service-policy POLICY-MAP-L2-WAN-BACKBONE-WITH-PER-SITE-
SHAPERS
!
!
!
!
!
interface Loopback0
 ip address 10.4.32.245 255.255.255.255
 ip pim sparse-mode
!
interface Port-channel5
 ip address 10.4.32.34 255.255.255.252
 ip pim sparse-mode
 no negotiation auto
!
interface GigabitEthernet0/0/0
 description WAN-D3750X Gig2/0/6
 no ip address
 negotiation auto
 cdp enable
 channel-group 5
!
interface GigabitEthernet0/0/1
 description WAN-D3750X Gig1/0/6
 no ip address
 negotiation auto
 cdp enable
 channel-group 5
```

```
!
interface GigabitEthernet0/0/2
 no ip address
 negotiation auto
 cdp enable
!
interface GigabitEthernet0/0/3
 description connection VPLS
 bandwidth 500000
 no ip address
 negotiation auto
!
interface GigabitEthernet0/0/3.38
 encapsulation dot1Q 38
 ip address 10.4.38.1 255.255.255.0
 ip pim sparse-mode
!
interface GigabitEthernet0/0/3.39
 encapsulation dot1Q 39
 ip address 10.4.39.1 255.255.255.0
 ip pim sparse-mode
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
!
!
router eigrp 100
 distribute-list route-map BLOCK-TAGGED-ROUTES in
 network 10.4.0.0 0.1.255.255
 redistribute eigrp 300 route-map SET-ROUTE-TAG-METROE
 passive-interface default
 no passive-interface Port-channel5
 eigrp router-id 10.4.32.245
!
!
router eigrp 300
 network 10.4.38.0 0.0.0.255
 network 10.4.39.0 0.0.0.255
 redistribute eigrp 100
 passive-interface default
 no passive-interface GigabitEthernet0/0/3.38
 no passive-interface GigabitEthernet0/0/3.39
 eigrp router-id 10.4.32.245
!
ip forward-protocol nd
!
no ip http server
ip http authentication aaa
ip http secure-server
ip http timeout-policy idle 60 life 86400 requests 10000
ip pim autorp listener
ip pim register-source Loopback0
ip tacacs source-interface Loopback0
!
ip access-list extended RS210-10.5.144.0
 permit ip any 10.5.144.0 0.0.7.255
ip access-list extended RS211-10.5.152.0
 permit ip any 10.5.152.0 0.0.7.255
ip access-list extended RS212-10.5.168.0
 permit ip any 10.5.168.0 0.0.7.255
ip access-list extended RS213-10.5.176.0
 permit ip any 10.5.176.0 0.0.7.255
!
logging 10.4.48.35
access-list 55 permit 10.4.48.0 0.0.0.255
cdp run
!
route-map BLOCK-TAGGED-ROUTES deny 10
 match tag 65512
!
route-map BLOCK-TAGGED-ROUTES permit 20
```

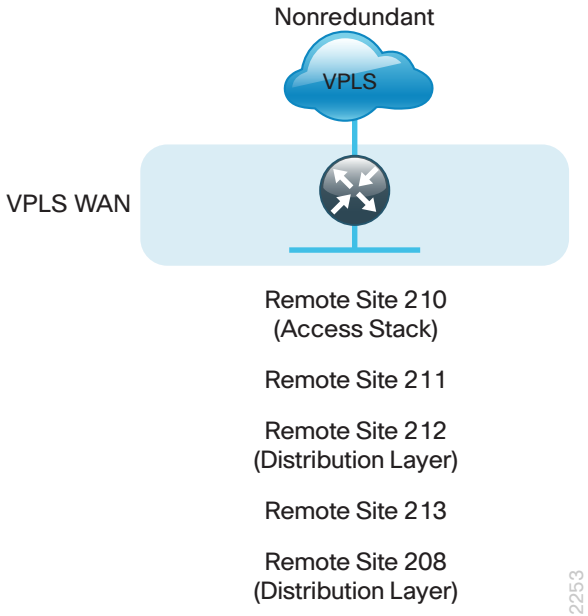
```
!
route-map SET-ROUTE-TAG-METROE permit 10
 match interface GigabitEthernet0/0/3.38 GigabitEthernet0/0/3.39
 set tag 300
!
snmp-server community cisco RO 55
snmp-server community cisco123 RW 55
snmp-server trap-source Loopback0
!
tacacs server TACACS-SERVER-1
 address ipv4 10.4.48.15
 key 7 0812494D1B1C113C1712
!
!
control-plane
!
!
!
line con 0
 logging synchronous
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 access-class 55 in
 transport preferred none
 transport input ssh
line vty 5 15
 access-class 55 in
 transport preferred none
 transport input ssh
!
ntp source Loopback0
ntp server 10.4.48.17
!
end
```

Notes

WAN Remote-Site Devices

This section includes configuration files corresponding to the WAN remote-site design topologies as referenced in Figure 4. Each remote-site type has its respective devices grouped together along with any other relevant configuration information. The EIGRP Autonomous System Number (ASN) used in Cisco SBA configurations is 300.

Figure 4 - WAN remote-site designs



Notes

Table 3 lists the specific details for the MPLS WAN and DMVPN WAN connections at each site.

Table 3 - Remote-site WAN connection details

Location	Net block	(WAN interface) address/mask	VLAN	WAN aggregation router	LAN interfaces	Loopbacks
Remote Site 210 (Single-router, single-link with access-layer stack)	10.5.144.0/21	(gig0/0.38) 10.4.38.210/24	38	10.4.38.1	(gig0/1, gig0/2)	10.255.255.210 (router)
Remote Site 211 (Single-router, single-link)	10.5.152.0/21	(gig0/0.38) 10.4.38.211/24	38	10.4.38.1	(gig0/2)	10.255.255.211 (router)
Remote Site 212 (Single-router, single-link with distribution layer)	10.5.168.0/21	(gig0/0.39) 10.4.39.212/24	39	10.4.39.1	(gig0/1, gig0/2)	10.255.255.212 (router)
Remote Site 213 (Single-router, single-link)	10.5.176.0/21	(gig0/0.39) 10.4.39.213/24	39	10.4.39.1	(gig0/2)	10.255.255.213 (router)

The following table lists the policed-rate link speeds for the remote-site quality of service (QoS) traffic shaping policies.

Table 4 - Remote-site policed-rate link speeds

Location	Net block	Layer 2 WAN link speeds
Remote Site 210	10.5.144.0/21	10 Mbps
Remote Site 211	10.5.152.0/21	10 Mbps
Remote Site 212	10.5.168.0/21	20 Mbps
Remote Site 213	10.5.176.0/21	20 Mbps

Remote Site 210: Single-Router, Single-Link with Access-Layer Stack

Table 5 - Remote Site 210—IP address information

Location	Net block	Data wired subnet	Voice wired subnet	Loopbacks and switches
Remote Site 210	10.5.144.0/21	10.5.148.0/24 (VLAN 64)	10.5.149.0/24 (VLAN 69)	10.255.255.210 (router) 10.5.148.5 (access switch)

RS210-2921

```
version 15.1
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname RS210-2921
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$JKAj$SZnj772b8Et.jyyyHOdxQ1
!
aaa new-model
!
!
aaa group server tacacs+ TACACS-SERVERS
 server name TACACS-SERVER-1
!
aaa authentication login default group TACACS-SERVERS local
aaa authorization console
aaa authorization exec default group TACACS-SERVERS local
!
!
!
!
!
aaa session-id common
!
clock timezone PST -8 0
clock summer-time PDT recurring
!
no ipv6 cef
ipv6 spd queue min-threshold 62
ipv6 spd queue max-threshold 63
ip source-route
ip auth-proxy max-login-attempts 5
ip admission max-login-attempts 5
ip cef
!
!
!
ip multicast-routing
!
!
ip domain name cisco.local
!
multilink bundle-name authenticated
!
!
!
!
!
!
!
!
!
!
!
license udi pid CISCO2921/K9 sn FTX1419ALZ6
hw-module pvdm 0/0
!
!
!
username admin password 7 104D580A061843595F
!
redundancy
!
!
!
!
ip ssh source-interface Loopback0
```

```
ip ssh version 2
!
class-map match-any DATA
 match  dscp af21
class-map match-any INTERACTIVE-VIDEO
 match  dscp cs4  af41
class-map match-any CRITICAL-DATA
 match  dscp cs3  af31
class-map match-any VOICE
 match  dscp ef
class-map match-any SCAVENGER
 match  dscp cs1  af11
class-map match-any NETWORK-CRITICAL
 match  dscp cs2  cs6
!
!
policy-map WAN
 class VOICE
  priority percent 10
 class INTERACTIVE-VIDEO
  priority percent 23
 class CRITICAL-DATA
  bandwidth percent 15
  random-detect dscp-based
 class DATA
  bandwidth percent 19
  random-detect dscp-based
 class SCAVENGER
  bandwidth percent 5
 class NETWORK-CRITICAL
  bandwidth percent 3
 class class-default
  bandwidth percent 25
  random-detect
policy-map WAN-INTERFACE-G0/0
 class class-default
  shape average 10000000
  service-policy WAN
!
!
!
!
!
!
interface Loopback0
 ip address 10.255.255.210 255.255.255.255
 ip pim sparse-mode
!
interface Port-channel1
 description RS210-A3750X
 no ip address
 hold-queue 150 in
!
interface Port-channel1.64
 description Wired Data
 encapsulation dot1Q 64
 ip address 10.5.148.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface Port-channel1.69
 description Wired Voice
 encapsulation dot1Q 69
 ip address 10.5.149.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface GigabitEthernet0/0
 bandwidth 10000
 no ip address
 duplex auto
 speed auto
 no cdp enable
 service-policy output WAN-INTERFACE-G0/0
```

```
!
interface GigabitEthernet0/0.38
 encapsulation dot1Q 38
 ip address 10.4.38.210 255.255.255.0
 ip pim sparse-mode
 ip summary-address eigrp 300 10.5.144.0 255.255.248.0
!
interface GigabitEthernet0/1
 description RS210-A3750X Gig1/0/24
 no ip address
 duplex auto
 speed auto
 channel-group 1
!
interface GigabitEthernet0/2
 description RS210-A3750X Gig2/0/24
 no ip address
 duplex auto
 speed auto
 channel-group 1
!
!
router eigrp 300
 network 10.4.38.0 0.0.0.255
 network 10.5.0.0 0.0.255.255
 network 10.255.0.0 0.0.255.255
 passive-interface default
 no passive-interface GigabitEthernet0/0.38
 eigrp router-id 10.255.255.210
 eigrp stub connected summary
!
ip forward-protocol nd
!
ip pim autorp listener
ip pim register-source Loopback0
no ip http server
ip http authentication aaa
ip http secure-server
ip http timeout-policy idle 60 life 86400 requests 10000
!
ip tacacs source-interface Loopback0
!
logging 10.4.48.35
!
!
!
!
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
 address ipv4 10.4.48.15
 key 7 097F4B0A0B0003390E15
!
!
!
control-plane
!
!
!
!
mgcp profile default
!
!
!
!
!
gatekeeper
 shutdown
!
!
!
line con 0
```

```
 logging synchronous
line aux 0
line vty 0 4
 transport preferred none
 transport input ssh
line vty 5 15
 transport preferred none
 transport input ssh
!
scheduler allocate 20000 1000
ntp source Loopback0
ntp server 10.4.48.17
!
end
```

Notes

Remote Site 211: Single-Router, Single-Link

Table 6 - Remote Site 211—IP address information

Location	Net block	Data wired subnet	Voice wired subnet	Loopbacks and switches
Remote Site 211	10.5.152.0/21	10.5.156.0/24 (VLAN 64)	10.5.157.0/24 (VLAN 69)	10.255.255.211 (router) 10.5.156.5 (access switch)

RS211-2921-1

```
version 15.1
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname RS211-2921-1
!
boot-start-marker
boot-end-marker
!
!
enable secret 4 /DtCCr53Q4B18jSIm1UEqu7cNVZTOhxTZyUnZdsSrsw
!
aaa new-model
!
!
aaa group server tacacs+ TACACS-SERVERS
 server name TACACS-SERVER-1
!
aaa authentication login default group TACACS-SERVERS local
aaa authorization console
aaa authorization exec default group TACACS-SERVERS local
!
!
!
!
!
aaa session-id common
!
clock timezone PST -8 0
clock summer-time PDT recurring
network-clock-participate wic 0
!
no ipv6 cef
ip source-route
ip cef
!
!
!
ip multicast-routing
!
!
ip domain name cisco.local
!
multilink bundle-name authenticated
!
!
!
!
!
!
!
!
license udi pid CISCO2911/K9 sn FTX1418AM08
hw-module pvdm 0/0
!
```

```
!
!
username admin password 7 121A540411045D5679
!
redundancy
!
!
!
!
ip ssh source-interface Loopback0
ip ssh version 2
!
!
class-map match-any DATA
 match  dscp af21
class-map match-any BGP-ROUTING
 match protocol bgp
class-map match-any INTERACTIVE-VIDEO
 match  dscp cs4  af41
class-map match-any CRITICAL-DATA
 match  dscp cs3  af31
class-map match-any VOICE
 match  dscp ef
class-map match-any SCAVENGER
 match  dscp cs1  af11
class-map match-any NETWORK-CRITICAL
 match  dscp cs2  cs6
!
!
policy-map MARK-BGP
 class BGP-ROUTING
  set dscp cs6
policy-map WAN
 class VOICE
  priority percent 10
 class INTERACTIVE-VIDEO
  priority percent 23
 class CRITICAL-DATA
  bandwidth percent 15
  random-detect dscp-based
 class DATA
  bandwidth percent 19
  random-detect dscp-based
 class SCAVENGER
  bandwidth percent 5
 class NETWORK-CRITICAL
  bandwidth percent 3
  service-policy MARK-BGP
 class class-default
  bandwidth percent 25
  random-detect
policy-map WAN-INTERFACE-G0/0
 class class-default
  shape average 10000000
  service-policy WAN
!
!
!
!
!
interface Loopback0
 ip address 10.255.255.211 255.255.255.255
 ip pim sparse-mode
!
interface GigabitEthernet0/0
 bandwidth 20000
 no ip address
 duplex auto
 speed auto
 no cdp enable
 service-policy output WAN-INTERFACE-G0/0
!
interface GigabitEthernet0/0.38
 encapsulation dot1Q 38
```

```
 ip address 10.4.38.211 255.255.255.0
 ip pim sparse-mode
 ip summary-address eigrp 300 10.5.152.0 255.255.248.0
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface GigabitEthernet0/2
 description RS211-A2960S Gig1/0/24
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/2.64
 description Wired Data
 encapsulation dot1Q 64
 ip address 10.5.156.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface GigabitEthernet0/2.69
 description Wired Voice
 encapsulation dot1Q 69
 ip address 10.5.157.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
!
router eigrp 300
 network 10.4.38.0 0.0.0.255
 network 10.5.0.0 0.0.255.255
 network 10.255.0.0 0.0.255.255
 passive-interface default
 no passive-interface GigabitEthernet0/0.38
 eigrp router-id 10.255.255.211
 eigrp stub connected summary
!
!
ip forward-protocol nd
!
ip pim autorp listener
ip pim register-source Loopback0
no ip http server
ip http authentication aaa
ip http secure-server
ip http timeout-policy idle 60 life 86400 requests 10000
!
ip tacacs source-interface Loopback0
!
logging 10.4.48.35
!
!
!
!
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
 address ipv4 10.4.48.15
 key 7 122A0014000E182F2F32
!
!
!
control-plane
!
!
!
mgcp profile default
!
!
```

```
!
!
gatekeeper
 shutdown
!
!
!
!
line con 0
 logging synchronous
line aux 0
line vty 0 4
 transport preferred none
 transport input ssh
line vty 5 15
 transport preferred none
 transport input ssh
!
scheduler allocate 20000 1000
ntp source Loopback0
ntp server 10.4.48.17
!
end
```

Notes

Remote Site 212: Single-Router, Single-Link with Distribution Layer

Table 7 - Remote Site 212—IP address information

Location	Net block	Data wired subnets	Voice wired subnets	Loopbacks and switches
Remote Site 212	10.5.168.0/21	10.5.169.0/24 (VLAN 100) 10.5.171.0/24 (VLAN 102)	10.5.170.0/24 (VLAN 101) 10.5.172.0/24 (VLAN 103)	10.255.255.212 (router) 10.5.175.254 (distribution switch) 10.5.175.2 (access switch 1) 10.5.175.3 (access switch 2)

The following two tables provide additional information about connecting to the distribution layer.

Table 8 - Remote Site 212—Router connection to distribution layer

Remote-site information		Connection to distribution layer switch			Port-channel subinterface and IP assignments		
Location	Net block	Router	Port channel	Member interfaces	Subinterface	VLAN	Network
Remote Site 212	10.5.168.0/21	RS212-2911	1	gig0/1 gig0/2	Port-channel1.50	50	10.5.168.0/30

Table 9 - Remote Site 212—Distribution layer switch connections

Port channel	Member interfaces	Layer3/Layer2	Connected device
1	gig1/0/12 gig2/0/12	Layer 2 (VLAN 50)	RS212-2911
10	gig1/0/1 gig2/0/1	Layer 2 (VLAN 100,101,106)	RS212-A2960S
11	gig1/0/2 gig2/0/2	Layer 2 (VLAN 102,103,106)	RS212-A2960S-PR1

RS212-2911

```
version 15.1
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname RS212-2911
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$qHFJ$8E7pTMPjJtcXSOdyBDfwe/
!
aaa new-model
!
!
aaa group server tacacs+ TACACS-SERVERS
 server name TACACS-SERVER-1
!
aaa authentication login default group TACACS-SERVERS local
aaa authorization console
aaa authorization exec default group TACACS-SERVERS local
!
!
!
!
!
aaa session-id common
!
clock timezone PST -8 0
clock summer-time PDT recurring
!
no ipv6 cef
ipv6 spd queue min-threshold 62
ipv6 spd queue max-threshold 63
!
!
ip source-route
ip auth-proxy max-login-attempts 5
ip admission max-login-attempts 5
ip cef
!
!
!
ip multicast-routing
!
!
ip domain name cisco.local
!
multilink bundle-name authenticated
!
!
!
!
!
voice-card 0
!
!
!
!
!
!
!
license udi pid CISCO2911/K9 sn FTX1420AJLK
!
!
username admin password 7 130646010803557878
!
redundancy
!
!
!
!
ip ssh source-interface Loopback0
```

```
ip ssh version 2
!
class-map match-any DATA
 match  dscp af21
class-map match-any INTERACTIVE-VIDEO
 match  dscp cs4  af41
class-map match-any CRITICAL-DATA
 match  dscp cs3  af31
class-map match-any VOICE
 match  dscp ef
class-map match-any SCAVENGER
 match  dscp cs1  af11
class-map match-any NETWORK-CRITICAL
 match  dscp cs2  cs6
!
!
policy-map WAN
 class VOICE
  priority percent 10
 class INTERACTIVE-VIDEO
  priority percent 23
 class CRITICAL-DATA
  bandwidth percent 15
  random-detect dscp-based
 class DATA
  bandwidth percent 19
  random-detect dscp-based
 class SCAVENGER
  bandwidth percent 5
 class NETWORK-CRITICAL
  bandwidth percent 3
 class class-default
  bandwidth percent 25
  random-detect
policy-map WAN-INTERFACE-G0/0
 class class-default
  shape average 20000000
  service-policy WAN
!
!
!
!
!
interface Loopback0
 ip address 10.255.255.212 255.255.255.255
 ip pim sparse-mode
!
interface Port-channel1
 description EtherChannel link to RS212-D3750X
 no ip address
 hold-queue 150 in
!
interface Port-channel1.50
 description R1 routed link to distribution layer
 encapsulation dot1Q 50
 ip address 10.5.168.1 255.255.255.252
 ip pim sparse-mode
!
interface GigabitEthernet0/0
 bandwidth 20000
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/0.39
 encapsulation dot1Q 39
 ip address 10.4.39.212 255.255.255.0
 ip pim sparse-mode
 ip summary-address eigrp 300 10.5.168.0 255.255.248.0
 service-policy output WAN-INTERFACE-G0/0
!
interface GigabitEthernet0/1
 description RS212-D3750X Gig1/0/1
 no ip address
 duplex auto
 speed auto
```

```
 channel-group 1
!
interface GigabitEthernet0/2
 description RS212-D3750X Gig2/0/1
 no ip address
 duplex auto
 speed auto
 channel-group 1
!
router eigrp 300
 network 10.4.39.0 0.0.0.255
 network 10.5.0.0 0.0.255.255
 network 10.255.0.0 0.0.255.255
 passive-interface default
 no passive-interface GigabitEthernet0/0.39
 eigrp router-id 10.255.255.212
 eigrp stub connected summary
!
!
router eigrp 100
 network 10.5.0.0 0.0.255.255
 network 10.255.0.0 0.0.255.255
 redistribute eigrp 300
 passive-interface default
 no passive-interface Port-channel1.50
 eigrp router-id 10.255.255.212
!
ip forward-protocol nd
!
ip pim autorp listener
ip pim register-source Loopback0
no ip http server
ip http authentication aaa
ip http secure-server
ip http timeout-policy idle 60 life 86400 requests 10000
!
ip tacacs source-interface Loopback0
!
!
logging 10.4.48.35
!
!
!
!
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
 address ipv4 10.4.48.15
 key 7 15210E0F162F3F0F2D2A
!
!
!
control-plane
!
!
!
mgcp profile default
!
!
!
!
!
gatekeeper
 shutdown
!
!
!
line con 0
 logging synchronous
line aux 0
line vty 0 4
 transport preferred none
 transport input ssh
line vty 5 15
```

```
 transport preferred none
 transport input ssh
!
scheduler allocate 20000 1000
ntp source Loopback0
ntp server 10.4.48.17
!
end
```

RS212-D3750X

```
version 15.0
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname RS212-D3750X
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$Uw72$5xAPOTtw6LASu1MYoIG4m0
!
username admin password 7 130646010803557878
aaa new-model
!
!
aaa group server tacacs+ TACACS-SERVERS
 server name TACACS-SERVER-1
!
aaa authentication login default group TACACS-SERVERS local
aaa authorization console
aaa authorization exec default group TACACS-SERVERS local
!
!
!
!
!
aaa session-id common
clock timezone PST -8 0
clock summer-time PDT recurring
switch 1 provision ws-c3750x-12s
switch 2 provision ws-c3750x-12s
stack-mac persistent timer 0
system mtu routing 1500
ip routing
!
!
!
ip domain-name cisco.local
ip name-server 10.4.48.10
ip multicast-routing distributed
vtp mode transparent
udld enable

!
mls qos map policed-dscp  0 10 18 24 46 to 8
mls qos map cos-dscp 0 8 16 24 32 46 48 56
mls qos srr-queue input bandwidth 70 30
mls qos srr-queue input threshold 1 80 90
mls qos srr-queue input priority-queue 2 bandwidth 30
mls qos srr-queue input cos-map queue 1 threshold 2 3
mls qos srr-queue input cos-map queue 1 threshold 3 6 7
mls qos srr-queue input cos-map queue 2 threshold 1 4
mls qos srr-queue input dscp-map queue 1 threshold 2 24
mls qos srr-queue input dscp-map queue 1 threshold 3 48 49 50 51
52 53 54 55
mls qos srr-queue input dscp-map queue 1 threshold 3 56 57 58 59
60 61 62 63
mls qos srr-queue input dscp-map queue 2 threshold 3 32 33 40 41
42 43 44 45
mls qos srr-queue input dscp-map queue 2 threshold 3 46 47
mls qos srr-queue output cos-map queue 1 threshold 3 4 5
mls qos srr-queue output cos-map queue 2 threshold 1 2
```

```
mls qos srr-queue output cos-map queue 2 threshold 2 3
mls qos srr-queue output cos-map queue 2 threshold 3 6 7
mls qos srr-queue output cos-map queue 3 threshold 3 0
mls qos srr-queue output cos-map queue 4 threshold 3 1
mls qos srr-queue output dscp-map queue 1 threshold 3 32 33 40 41
42 43 44 45
mls qos srr-queue output dscp-map queue 1 threshold 3 46 47
mls qos srr-queue output dscp-map queue 2 threshold 1 16 17 18 19
20 21 22 23
mls qos srr-queue output dscp-map queue 2 threshold 1 26 27 28 29
30 31 34 35
mls qos srr-queue output dscp-map queue 2 threshold 1 36 37 38 39
mls qos srr-queue output dscp-map queue 2 threshold 2 24
mls qos srr-queue output dscp-map queue 2 threshold 3 48 49 50 51
52 53 54 55
mls qos srr-queue output dscp-map queue 2 threshold 3 56 57 58 59
60 61 62 63
mls qos srr-queue output dscp-map queue 3 threshold 3 0 1 2 3 4 5
6 7
mls qos srr-queue output dscp-map queue 4 threshold 1 8 9 11 13
15
mls qos srr-queue output dscp-map queue 4 threshold 2 10 12 14
mls qos queue-set output 1 threshold 1 100 100 50 200
mls qos queue-set output 1 threshold 2 125 125 100 400
mls qos queue-set output 1 threshold 3 100 100 100 3200
mls qos queue-set output 1 threshold 4 60 150 50 200
mls qos queue-set output 1 buffers 15 25 40 20
mls qos
!
license boot level ipservices
!
!
!
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
spanning-tree vlan 1-4094 priority 24576
!
!
!
port-channel load-balance src-dst-ip
!
vlan internal allocation policy ascending
!
vlan 50
 name R1-Link
!
vlan 100
 name DataVLAN1
!
vlan 101
 name VoiceVLAN1
!
vlan 102
 name DataVLAN2
!
vlan 103
 name VoiceVLAN2
!
vlan 106
 name Management
!
vlan 999
 name NATIVE
!
ip ssh source-interface Loopback0
ip ssh version 2
!
!
!
!
macro name EgressQoS
 mls qos trust dscp
 queue-set 2
 srr-queue bandwidth share 1 30 35 5
```

```
 priority-queue out
@
!
!
interface Loopback0
 ip address 10.5.175.254 255.255.255.255
 ip pim sparse-mode
!
interface Port-channel1
 description EtherChannel link to RS212-2911
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 50
 switchport mode trunk
 ip arp inspection trust
 spanning-tree portfast trunk
 ip dhcp snooping trust
!
interface Port-channel10
 description EtherChannel RS212-A2960S
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport trunk allowed vlan 100,101,106
 switchport mode trunk
 logging event link-status
!
interface Port-channel11
 description EtherChannel link to RS212-A2960S-PR1
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport trunk allowed vlan 102,103,106
 switchport mode trunk
 logging event link-status
!
interface FastEthernet0
 no ip address
 no ip route-cache
 shutdown
!
interface GigabitEthernet1/0/1
 description Link to RS212-A2960S Gig1/0/49
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport trunk allowed vlan 100,101,106
 switchport mode trunk
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-protocol lacp
 channel-group 10 mode active
!
interface GigabitEthernet1/0/2
 description Link to RS212-A2960S-PR1 Gig1/0/25
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport trunk allowed vlan 102,103,106
 switchport mode trunk
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-protocol lacp
 channel-group 11 mode active
!
interface GigabitEthernet1/0/12
 description Link to RS212-2911 Gig0/1
```

```
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 50
 switchport mode trunk
 ip arp inspection trust
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface GigabitEthernet2/0/1
 description Link to RS212-A2960S Gig1/0/50
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport trunk allowed vlan 100,101,106
 switchport mode trunk
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-protocol lacp
 channel-group 10 mode active
!
interface GigabitEthernet2/0/2
 description Link to RS212-A2960S-PR1 Gig1/0/26
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport trunk allowed vlan 102,103,106
 switchport mode trunk
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-protocol lacp
 channel-group 11 mode active
!
interface GigabitEthernet2/0/12
 description Link to RS212-2911 Gig0/2
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 50
 switchport mode trunk
 ip arp inspection trust
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust dscp
 macro description EgressQoS
 channel-group 1 mode on
 ip dhcp snooping trust
!
interface Vlan1
 no ip address
 shutdown
!
interface Vlan50
 description Router 1 Link
 ip address 10.5.168.2 255.255.255.252
 ip pim sparse-mode
!
interface Vlan100
```

```
 description Wired Data 1
 ip address 10.5.169.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface Vlan101
 description Wired Voice 1
 ip address 10.5.170.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface Vlan102
 description Wired Data 2
 ip address 10.5.171.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface Vlan103
 description Wired Voice 2
 ip address 10.5.172.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface Vlan106
 description Management
 ip address 10.5.175.1 255.255.255.128
 ip pim sparse-mode
!
!
router eigrp 100
 network 10.4.0.0 0.1.255.255
 passive-interface default
 no passive-interface Vlan50
 eigrp router-id 10.5.175.254
 nsf
!
!
no ip http server
ip http authentication aaa
ip http secure-server
!
ip pim autorp listener
ip pim register-source Loopback0
ip tacacs source-interface Loopback0
!
logging esm config
logging 10.4.48.35
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO 55
snmp-server community cisco123 RW 55
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
 address ipv4 10.4.48.15
 key 7 0538030C33495A221C1C
!
!
!
line con 0
line vty 0 4
 exec-timeout 0 0
 transport preferred none
 transport input ssh
line vty 5 15
 transport preferred none
 transport input ssh
!
ntp source Loopback0
ntp server 10.4.48.17
end
```

Remote Site 213: Single-Router, Single-Link

Table 10 - Remote Site 213—IP address information

Location	Net block	Data wired subnet	Voice wired subnet	Loopbacks and switches
Remote Site 213	10.5.176.0/21	10.5.180.0/24 (VLAN 64)	10.5.181.0/24 (VLAN 69)	10.255.255.213 (router) 10.5.180.5 (access switch)

RS213-2911

```
version 15.1
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname RS213-2911
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$EZVQ$SdWFvRIIMCDGtrW5l5P7b1
!
aaa new-model
!
!
aaa group server tacacs+ TACACS-SERVERS
 server name TACACS-SERVER-1
!
aaa authentication login default group TACACS-SERVERS local
aaa authorization console
aaa authorization exec default group TACACS-SERVERS local
!
!
!
!
!
aaa session-id common
!
clock timezone PST -8 0
clock summer-time PDT recurring
!
no ipv6 cef
!
!
ip source-route
ip auth-proxy max-login-attempts 5
ip admission max-login-attempts 5
ip cef
!
!
!
!
ip multicast-routing
ip dhcp remember
!
!
ip domain name cisco.local
!
multilink bundle-name authenticated
!
!
!
!
voice-card 0
!
```

```
!
!
!
!
!
!
license udi pid CISCO2911/K9 sn FTX1420AJL9
license boot module c2900 technology-package securityk9
hw-module pvdm 0/0
!
!
!
username admin password 7 08221D5D0A16544541
!
redundancy
!
!
!
!
ip ssh source-interface Loopback0
ip ssh version 2
!
!
!
!
interface Loopback0
 ip address 10.255.255.213 255.255.255.255
 ip pim sparse-mode
!
interface GigabitEthernet0/0
 bandwidth 10000
 no ip address
 duplex auto
 speed auto
 no cdp enable
!
interface GigabitEthernet0/0.39
 encapsulation dot1Q 39
 ip address 10.4.39.213 255.255.255.0
 ip pim sparse-mode
 ip summary-address eigrp 300 10.5.176.0 255.255.248.0
!
interface GigabitEthernet0/2
 description RS213-3560X Gig0/24
 duplex auto
 speed auto
!
interface GigabitEthernet0/2.64
 description Wired Data
 encapsulation dot1Q 64
 ip address 10.5.180.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
interface GigabitEthernet0/2.69
 description Wired Voice
 encapsulation dot1Q 69
 ip address 10.5.181.1 255.255.255.0
 ip helper-address 10.4.48.10
 ip pim sparse-mode
!
!
router eigrp 300
 network 10.4.39.0 0.0.0.255
 network 10.5.0.0 0.0.255.255
 network 10.255.0.0 0.0.255.255
 passive-interface default
 no passive-interface GigabitEthernet0/0.39
 eigrp router-id 10.255.255.213
 eigrp stub connected summary
!
!
ip forward-protocol nd
!
```

```
ip pim autorp listener
ip pim register-source Loopback0
no ip http server
ip http authentication aaa
ip http secure-server
ip http timeout-policy idle 60 life 86400 requests 10000
!
ip tacacs source-interface Loopback0
!
logging 10.4.48.35
!
!
!
!
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
 address ipv4 10.4.48.15
 key 7 15210E0F162F3F0F2D2A
!
!
!
control-plane
!
!
!
mgcp profile default
!
!
!
!
!
gatekeeper
 shutdown
!
!
!
line con 0
 logging synchronous
line aux 0
line vty 0 4
 exec-timeout 0 0
 transport preferred none
 transport input ssh
line vty 5 15
 exec-timeout 0 0
 transport preferred none
 transport input ssh
!
scheduler allocate 20000 1000
ntp source Loopback0
ntp server 10.4.48.17
!
end
```

Feedback

Please use the feedback form to send comments and suggestions about this guide.

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