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SBA

BORDERLESS
NETWORKS

CONFIGURATION
FILES

LAN Configuration Files Guide

● ● ● SMART BUSINESS ARCHITECTURE

August 2012 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 August 2012 are the “August 2012 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.

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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.

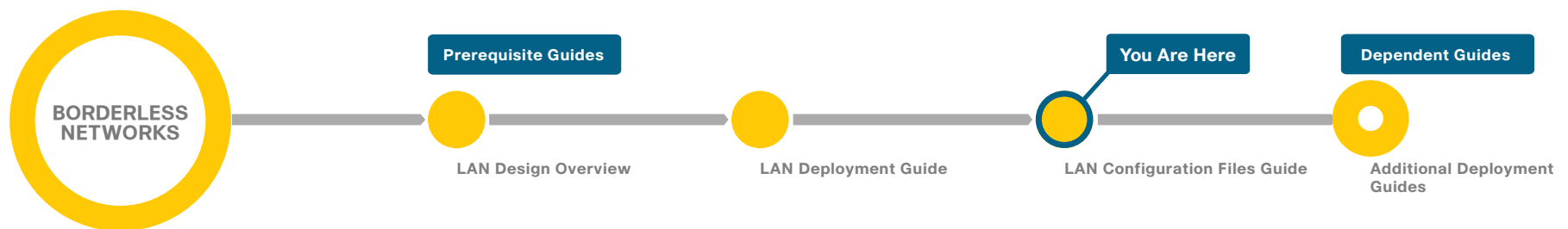
About This Guide

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>



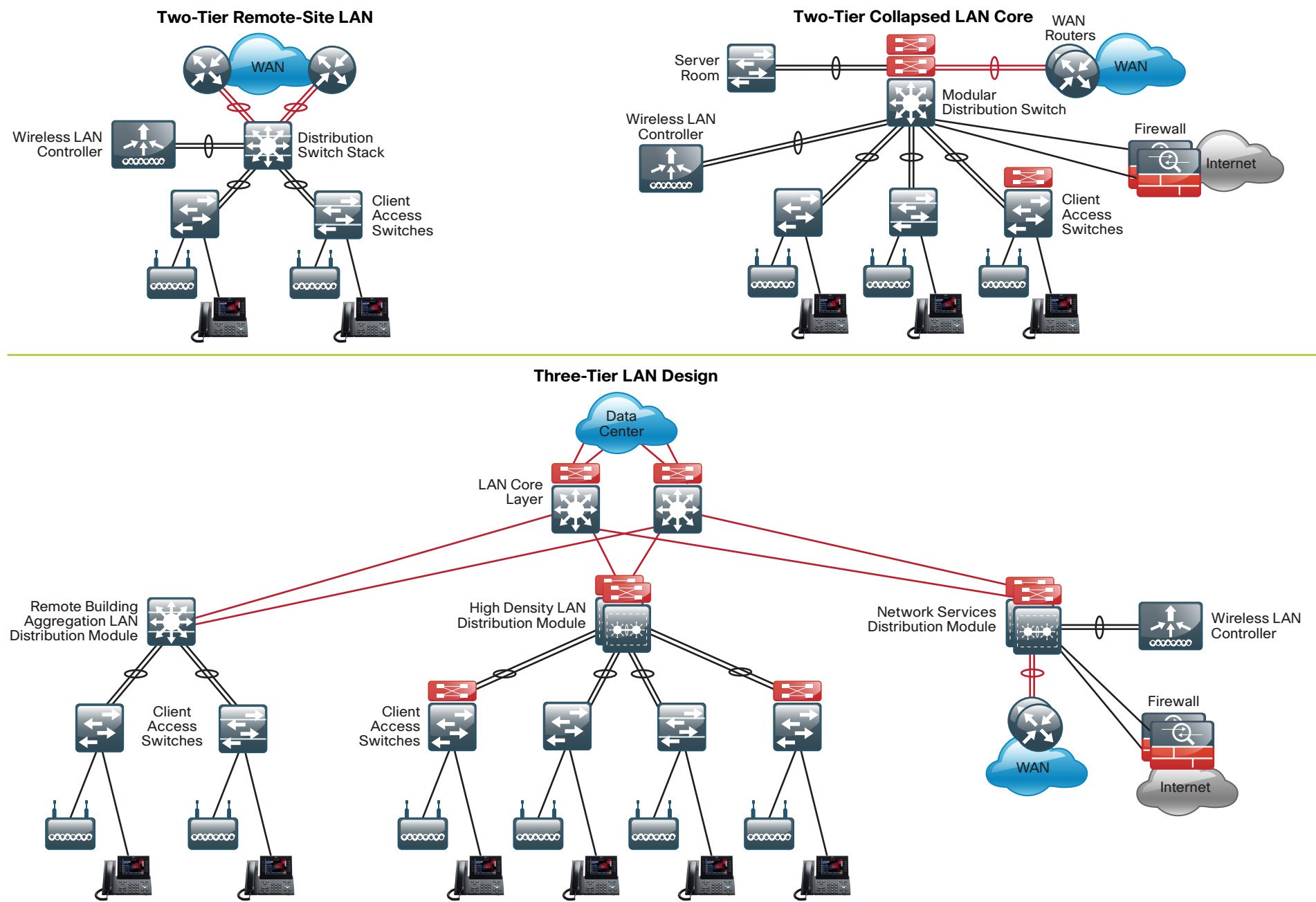
Introduction

The *Cisco SBA—Borderless Networks LAN Deployment Guide* provides an out-of-the-box deployment for wired network access with ubiquitous capabilities that scale from small environments with one to a few LAN switches to the larger campus-size LAN. Resiliency, security, and scalability are included to provide a robust communications environment. Quality of service (QoS) is integrated to ensure that the base architecture can support a multitude of applications including low latency, drop-sensitive, multimedia applications coexisting with data applications on a single network.

The Cisco SBA LAN architecture is designed to meet the needs of organizations with LAN connectivity requirements that range from a small remote-site LAN to up to 5,000 connected users at a single location.

Notes

Figure 1 - Cisco SBA scalable LAN architecture



2082

The modular design of the Cisco SBA LAN architecture provides multiple scale points to meet your organization's specific requirements:

- A highly resilient and scalable distribution layer with two modular chassis-based platforms using the Cisco Catalyst 6500 Virtual Switching System (VSS), that acts as a single logical distribution layer platform. This design allows for high density aggregation of Gigabit Ethernet and 10 Gigabit Ethernet connected wiring closets and other platforms. Cisco Catalyst 6500 VSS provides the most advanced feature set and the highest resiliency of the available platforms.
- A resilient modular chassis distribution layer design for locations where there is a mix of Gigabit Ethernet or 10-Gigabit Ethernet connected wiring closets that need to be aggregated. Cisco Catalyst 4507 with dual supervisors and dual power supplies provides resiliency with ISSU and sub-second failover.
- A stackable Cisco Catalyst 3750-X distribution layer switch to accommodate locations where there is a small number of gigabit connected wiring closets and other platforms that need to be aggregated. Cisco Catalyst 3750-X provides a resilient platform with StackWise and StackPower.
- A three tier network design that can accommodate the most demanding LAN requirements by incorporating one or many of the distribution layer designs connected to a highly reliable core layer. As the LAN design scales, the distribution layer modules that make up the design remain consistent to provide a scalable design.

In two-tier LAN designs where there is only an access layer and a single distribution layer, the distribution layer acts as a *collapsed core* as the distribution layer becomes the core for all connectivity in these locations.

Notes

Appendix A: Product List

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
	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(1)SE2 IP Base
	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	
Standalone Access Layer Switch	Cisco Catalyst 3560-X Series Standalone 48 Ethernet 10/100/1000 PoE+ ports	WS-C3560X-48PF-S	15.0(1)SE2 IP Base
	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(1)SE2 LAN Base
	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
	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	IP services
	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	
	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)
	Cisco Catalyst 4500 E-Series Supervisor Engine 7-E, 848Gbps	WS-X45-SUP7-E	Enterprise Services
	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(1)SE2
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	IP Services
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	

LAN Core Layer

Functional Area	Product Description	Part Numbers	Software
Modular Core Layer Switch	Cisco Catalyst 6500 E-Series 6-Slot Chassis	WS-C6506-E	15.0(1)SY1
	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	IP services
	Cisco Catalyst 6500 24-port GbE SFP Fiber Module w/DFC4	WS-X6824-SFP	
	Cisco Catalyst 6500 8-port 10GbE Fiber Module w/ DFC4	WS-X6908-10G-2T	

Appendix B: Access Layer Configurations

Catalyst 2960-S Series Switch

The Cisco Catalyst 2960-S Series switches are fixed-configuration, stack-able, 10/10/1000 Ethernet switches, with Power over Ethernet (PoE+) and non-powered versions designed for entry-level enterprise, midmarket, and remote site networks.

```
version 15.0
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname A2960S
!
boot-start-marker
boot-end-marker
!
enable secret 5 *****
!
username admin password 7 *****
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-c2960s-24pd-1
switch 2 provision ws-c2960s-24ps-1
switch 3 provision ws-c2960s-24pd-1
stack-mac persistent timer 0
ip arp inspection vlan 180-181
!
!
ip dhcp snooping vlan 180-181
no ip dhcp snooping information option
ip dhcp snooping
ip domain-name cisco.local
ip name-server 10.4.48.10
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 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 3 100 100 100 400
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
!
crypto pki trustpoint TP-self-signed-2499065344
  enrollment selfsigned
  subject-name cn=IOS-Self-Signed-Certificate-2499065344
  revocation-check none
  rsakeypair TP-self-signed-2499065344
!
crypto pki certificate chain TP-self-signed-2499065344
  certificate self-signed 01
    3082024A 308201B3 A0030201 02020101 300D0609 2A864886 F70D0101
04050030
    31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D
43657274
    69666963 6174652D 32343939 30363533 3434301E 170D3933 30333031
30363038
    35375A17 0D323030 31303130 30303030 305A3031 312F302D 06035504
03132649
    4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D32
34393930
    36353334 3430819F 300D0609 2A864886 F70D0101 01050003 818D0030
81890281
    8100CC24 6E69651A 0FA00004 F61C9DE0 50E4832C 27CE20D2 EFCCEE5E
9156E536

```

```

5A073A5D C28F1813 1605D0D0 01C75EA1 7BB1BE0D B7CE05AE 8D46EC71
B7079E06
3B4791F9 0C36A3E7 7BE8DCB3 4FF6BCFE 8C7DC321 AE3A2B14 E6C62B3A
8664E191
EF520178 2BDFFAC3 9F9E2A3F CFC6D50C 8288EE63 977BB15B A78260FA
BF228EF9
7B410203 010001A3 72307030 0F060355 1D130101 FF040530 030101FF
301D0603
551D1104 16301482 12413239 3630532E 63697363 6F2E6C6F 63616C30
1F060355
1D230418 30168014 072BD2E3 55BDB534 6046D717 038579CB A25D49D4
301D0603
551D0E04 16041407 2BD2E355 BDB53460 46D71703 8579CBA2 5D49D430
0D06092A
864886F7 0D010104 05000381 81009E47 A2CD120A 4510095D 4418CB1C
E3E68BE6
5CE25EBD 267FA766 9F67A8F8 1A2F9C87 D345998E 3429955C 5395B027
3951BFFD
94B40AC8 7BBC60E3 F46D566C 9FE3E823 49313E14 4C0BAAA7 9B1AF2AD
0B267E1A
9C4280AC 0D435F99 485E6CCD DFFF59DA 78866CEA 037EA808 25D011D9
ACC7DD5E
A7717D82 B2B7E6D0 C69A5A1A CED9
quit
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
auto qos srnd4
!
port-channel load-balance src-dst-ip
!
vlan internal allocation policy ascending
!
vlan 180
  name Data
!

```

```

vlan 181
    name Voice
!
vlan 195
    name Management
!
vlan 999
    name antiVLANhopping
!
ip ssh version 2
!
class-map match-all AUTOQOS_VOIP_DATA_CLASS
    match ip dscp ef
class-map match-all AUTOQOS_DEFAULT_CLASS
    match access-group name AUTOQOS-ACL-DEFAULT
class-map match-all AUTOQOS_VOIP_SIGNAL_CLASS
    match ip dscp cs3
!
policy-map AUTOQOS-SRND4-CISCOPHONE-POLICY
    class AUTOQOS_VOIP_DATA_CLASS
        set dscp ef
        police 128000 8000 exceed-action policed-dscp-transmit
    class AUTOQOS_VOIP_SIGNAL_CLASS
        set dscp cs3
        police 32000 8000 exceed-action policed-dscp-transmit
    class AUTOQOS_DEFAULT_CLASS
        set dscp default
        police 10000000 8000 exceed-action policed-dscp-transmit
!
macro name AccessEdgeQoS
    auto qos voip cisco-phone
@
macro name EgressQoS
    mls qos trust dscp
    queue-set 1
    srr-queue bandwidth share 1 30 35 5
    priority-queue out

```

```

@
!
interface Port-channel1
    description Etherchannel link to D3750
    switchport trunk native vlan 999
    switchport trunk allowed vlan 180,181,195
    switchport mode trunk
    ip arp inspection trust
    logging event link-status
    ip dhcp snooping trust
!
interface Port-channel2
    description Etherchannel to 2960C Compact Switch
    switchport trunk native vlan 999
    switchport trunk allowed vlan 180,181,195
    switchport mode trunk
    ip arp inspection trust
    logging event link-status
    ip dhcp snooping trust
!
interface Port-channel3
    description Etherchannel to 3560C Compact Switch
    switchport trunk native vlan 999
    switchport trunk allowed vlan 180,181,195
    switchport mode trunk
    ip arp inspection trust
    logging event link-status
    ip dhcp snooping trust
!
interface FastEthernet0
    no ip address
    shutdown
!
interface GigabitEthernet1/0/1
    switchport access vlan 180
    switchport mode access
    switchport voice vlan 181

```

```

switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet1/0/2
switchport access vlan 180
switchport mode access
switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100

```

```

!
interface GigabitEthernet1/0/3
switchport access vlan 180
switchport mode access
switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
! *****
! Interface GigabitEthernet 1/0/3 - 1/0/24 are all configured
! the same as 1/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/0/25
description Etherchannel links to D3750
switchport trunk native vlan 999
switchport trunk allowed vlan 180,181,195
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

```



```

priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
ip dhcp snooping trust
!
interface GigabitEthernet1/0/26
!
interface TenGigabitEthernet1/0/1
!
interface TenGigabitEthernet1/0/2
!
interface GigabitEthernet2/0/1
switchport access vlan 180
switchport mode access
switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet2/0/2
switchport access vlan 180
switchport mode access

```

```

switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet2/0/3
switchport access vlan 180
switchport mode access
switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source

```

```

ip dhcp snooping limit rate 100
!
interface GigabitEthernet2/0/4
switchport access vlan 180
switchport mode access
switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet2/0/5
description links to 2960C Compact Switch
switchport trunk native vlan 999
switchport trunk allowed vlan 180,181,195
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp

```

```

channel-group 2 mode active
ip dhcp snooping trust
!
interface GigabitEthernet2/0/6
description Etherchannel to 3560C Compact Switch
switchport trunk native vlan 999
switchport trunk allowed vlan 180,181,195
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 3 mode active
!
interface GigabitEthernet2/0/7
switchport access vlan 180
switchport mode access
switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY

```

```

ip verify source
ip dhcp snooping limit rate 100
!
! *****
! Interface GigabitEthernet 2/0/8 - 3/0/4 are all configured
! the same as 2/0/7 and have been removed for conciseness
! *****
!
interface GigabitEthernet3/0/5
description links to 2960C Compact Switch
switchport trunk native vlan 999
switchport trunk allowed vlan 180,181,195
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 2 mode active
ip dhcp snooping trust
!

```

```

interface GigabitEthernet3/0/6
description Etherchannel to 3560C Compact Switch
switchport trunk native vlan 999
switchport trunk allowed vlan 180,181,195
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 3 mode active
!
interface GigabitEthernet3/0/7
switchport access vlan 180
switchport mode access
switchport voice vlan 181
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!

```

```

! *****
! Interface GigabitEthernet 3/0/8 - 3/0/24 are all configured
! the same as 3/0/7 and have been removed for conciseness
! *****
!
interface GigabitEthernet3/0/25
  description Etherchannel links to D3750
  switchport trunk native vlan 999
  switchport trunk allowed vlan 180,181,195
  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
  priority-queue out
  mls qos trust dscp
  macro description EgressQoS
  channel-protocol lacp
  channel-group 1 mode active
  ip dhcp snooping trust
!
interface GigabitEthernet3/0/26
!
interface TenGigabitEthernet3/0/1
!
interface TenGigabitEthernet3/0/2
!
interface Vlan1
  no ip address
  shutdown
!
interface Vlan195
  ip address 10.4.95.5 255.255.255.128
!
ip default-gateway 10.4.95.1
no ip http server

```

```

ip http authentication aaa
ip http secure-server
!
!
ip access-list extended AUTOQOS-ACL-DEFAULT
  permit ip any any
logging esm config
snmp-server community ***** RO
snmp-server community ***** RW
tacacs server TACACS-SERVER-1
  address ipv4 10.4.48.15
  key 7 *****
!
line con 0
  logging synchronous
line vty 0 4
  length 0
  transport preferred none
  transport input ssh
line vty 5 15
  length 0
  transport preferred none
  transport input ssh
!
ntp server 10.4.48.17
end

```

Catalyst 3750-X Series Switch

The Cisco Catalyst 3750-X Series switches are fixed-port, stackable, 10/100/1000 Ethernet switches, with PoE+ and non-PoE versions, that provide enhanced resiliency through the Cisco StackWise Plus and Cisco StackPower technologies.

```
version 15.0
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname A3750X
!
boot-start-marker
boot-end-marker
!
enable secret 5 *****
!
username admin password 7 *****
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-48p
switch 2 provision ws-c3750x-48p
switch 3 provision ws-c3750x-48p
stack-mac persistent timer 0
system mtu routing 1500
ip arp inspection vlan 164-165
```

```
!
ip dhcp snooping vlan 164-165
no ip dhcp snooping information option
ip dhcp snooping
ip domain-name cisco.local
ip name-server 10.4.48.10
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 3 100 100 100 400
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
!
crypto pki trustpoint TP-self-signed-4072213248
  enrollment selfsigned
  subject-name cn=IOS-Self-Signed-Certificate-4072213248
  revocation-check none
  rsa-keypair TP-self-signed-4072213248
!
crypto pki certificate chain TP-self-signed-4072213248
  certificate self-signed 01
    3082024A 308201B3 A0030201 02020101 300D0609 2A864886 F70D0101
04050030
    31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D
43657274
    69666963 6174652D 34303732 32313332 3438301E 170D3933 30333031
30353538
    35315A17 0D323030 31303130 30303030 305A3031 312F302D 06035504
03132649

```

```

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D34
30373232
  31333234 3830819F 300D0609 2A864886 F70D0101 01050003 818D0030
81890281
  8100C1EE 62498120 03C50FD2 B74E62D0 25C3F995 06A6B192 FAF79064
2C18A7F5
  3733B589 4CAF9E09 E148393D B33DEBA7 4DD52CDB B9A0F09D 60B38AF9
9DA87760
  C2624EC2 C6885C28 CED14B44 B40AC917 2CDC0858 54446DB0 C98245CF
22C04EB8
  8673BBC2 8C798468 7892E7F1 1EA3574B 2D7819AD 827E011B E2E594BB
F6AD3A42
  C0A50203 010001A3 72307030 0F060355 1D130101 FF040530 030101FF
301D0603
  551D1104 16301482 12413337 3530582E 63697363 6F2E6C6F 63616C30
1F060355
  1D230418 30168014 EBD2FE7F AE7C0C43 5F3B030C 9C552E92 33C7AF9B
301D0603
  551D0E04 160414EB D2FE7FAE 7C0C435F 3B030C9C 552E9233 C7AF9B30
0D06092A
  864886F7 0D010104 05000381 8100088C 667930CA D41D75CD F249F808
43038E7C
  9098AE7E A1F61185 5DBF8D77 4EE24BC3 B87EC44C DCAB2CE1 CC35598F
B3589F69
  9F0B74C8 36DF377B BA3004C4 D18740E4 A0D32EE0 27271196 A5F21BF4
25DDF0FA
  029FF3EF 668045EC 08F04230 69054CC1 9162BABD 4FFB4198 0052B0C2
0A399D35
  A30C206A 14CB906B BCF57C0D 2A46
quit
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
auto qos srnd4
!

```

```

port-channel load-balance src-dst-ip
!
vlan internal allocation policy ascending
!
vlan 164
    name A3750Xdata
!
vlan 165
    name A3750Xvoice
!
vlan 179
    name MgmtVLAN
!
vlan 999
    name antiVLANhopping
!
ip ssh version 2
!
class-map match-all AUTOQOS_VOIP_DATA_CLASS
    match ip dscp ef
class-map match-all AUTOQOS_DEFAULT_CLASS
    match access-group name AUTOQOS-ACL-DEFAULT
class-map match-all AUTOQOS_VOIP_SIGNAL_CLASS
    match ip dscp cs3
!
policy-map AUTOQOS-SRND4-CISCOPHONE-POLICY
    class AUTOQOS_VOIP_DATA_CLASS
        set dscp ef
        police 128000 8000 exceed-action policed-dscp-transmit
    class AUTOQOS_VOIP_SIGNAL_CLASS
        set dscp cs3
        police 32000 8000 exceed-action policed-dscp-transmit
    class AUTOQOS_DEFAULT_CLASS
        set dscp default
        police 10000000 8000 exceed-action policed-dscp-transmit
!

```

```

macro name AccessEdgeQoS
    auto qos voip cisco-phone
@
macro name EgressQoS
    mls qos trust dscp
    queue-set 1
    srr-queue bandwidth share 1 30 35 5
    priority-queue out
@
!
interface Port-channel1
    description Etherchannel link to D4507
    switchport trunk encapsulation dot1q
    switchport trunk native vlan 999
    switchport trunk allowed vlan 164,165,179
    switchport mode trunk
    ip arp inspection trust
    logging event link-status
    ip dhcp snooping trust
!
interface FastEthernet0
    no ip address
!
interface GigabitEthernet1/0/1
    switchport access vlan 164
    switchport mode access
    switchport voice vlan 165
    switchport port-security maximum 11
    switchport port-security
    switchport port-security aging time 2
    switchport port-security violation restrict
    switchport port-security aging type inactivity
    ip arp inspection limit rate 100
    srr-queue bandwidth share 1 30 35 5
    priority-queue out
    mls qos trust device cisco-phone
    mls qos trust cos

```



```

macro description AccessEdgeQoS | AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet1/0/2
switchport access vlan 164
switchport mode access
switchport voice vlan 165
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
! *****
! Interface GigabitEthernet 1/0/3 - 1/0/47 are all configured
! the same as 1/0/2 and have been removed for conciseness
! *****
!

```

```

interface GigabitEthernet1/0/48
switchport access vlan 164
switchport mode access
switchport voice vlan 165
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS | AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet1/1/1
!
interface GigabitEthernet1/1/2
!
interface GigabitEthernet1/1/3
!
interface GigabitEthernet1/1/4
!
interface TenGigabitEthernet1/1/1
description Etherchannel links to D4507
switchport trunk encapsulation dot1q
switchport trunk native vlan 999
switchport trunk allowed vlan 164,165,179
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
ip dhcp snooping trust
!
interface TenGigabitEthernet1/1/2
!
interface GigabitEthernet2/0/1
switchport access vlan 164
switchport mode access
switchport voice vlan 165
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100

```

```

!
! *****
! Interface GigabitEthernet 2/0/2 - 3/0/47 are all configured
! the same as 2/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet3/0/48
switchport access vlan 164
switchport mode access
switchport voice vlan 165
switchport port-security maximum 11
switchport port-security
switchport port-security aging time 2
switchport port-security violation restrict
switchport port-security aging type inactivity
ip arp inspection limit rate 100
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
macro description AccessEdgeQoS
auto qos voip cisco-phone
spanning-tree portfast
service-policy input AUTOQOS-SRND4-CISCOPHONE-POLICY
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet3/1/1
!
interface GigabitEthernet3/1/2
!
interface GigabitEthernet3/1/3
!
interface GigabitEthernet3/1/4
!
interface TenGigabitEthernet3/1/1
description Etherchannel links to D4507

```

```

switchport trunk encapsulation dot1q
switchport trunk native vlan 999
switchport trunk allowed vlan 164,165,179
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
ip dhcp snooping trust
!
interface TenGigabitEthernet3/1/2
!
interface Vlan1
no ip address
!
interface Vlan179
ip address 10.4.79.2 255.255.255.128
!
ip default-gateway 10.4.79.1
no ip http server
ip http authentication aaa
ip http secure-server
!
!
ip access-list extended AUTOQOS-ACL-DEFAULT
permit ip any any
!
logging esm config
snmp-server community ***** RO
snmp-server community ***** RW
tacacs server TACACS-SERVER-1

```

```

address ipv4 10.4.48.15
key 7 *****
!
!
!
!
line con 0
line vty 0 4
length 0
transport preferred none
transport input ssh
line vty 5 15
length 0
transport preferred none
transport input ssh
!
ntp server 10.4.48.17
end

```

Catalyst 4500+E Series Switch

The Cisco Catalyst 4500 E-Series switches are modular switches that support multiple Ethernet connectivity options including 10/100/1000 Ethernet, 100-MB fiber, gigabit fiber, and 10-gigabit fiber. The Catalyst 4500 E-Series switches also have an upgradable supervisor module that enables future functionality to be added with a supervisor module upgrade while maintaining the initial investment in the chassis and the modules.

```

version 15.1
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
service compress-config
!
hostname A4507
!
boot-start-marker
boot system flash bootflash:cat4500e-universalk9.SPA.03.03.00.
SG.151-1.SG.bin

```

```

license boot level ipbase
boot-end-marker
!
enable secret 4 *****
!
username admin password 7 *****
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
hw-module uplink select tengigabitethernet
udld enable
!
ip arp inspection vlan 100-101
!
ip vrf mgmtVrf
!
ip domain-name cisco.local
ip name-server 10.4.48.10
!
ip dhcp snooping vlan 100-101
no ip dhcp snooping information option
ip dhcp snooping
vtp mode transparent
!

```

```

crypto pki trustpoint TP-self-signed-15385
    enrollment selfsigned
    subject-name cn=IOS-Self-Signed-Certificate-15385
    revocation-check none
    rsakeypair TP-self-signed-15385
!
power redundancy-mode redundant
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
spanning-tree vlan 1-4094 priority 24576
!
redundancy
    mode sso
    main-cpu
        auto-sync standard
!
vlan internal allocation policy ascending
!
vlan 100
    name Data
!
vlan 101
    name Voice
!
vlan 115
    name Management
!
vlan 999
!
ip ssh version 2
!
class-map match-any MULTIMEDIA-STREAMING-QUEUE
    match dscp af31 af32 af33

```

```

class-map match-any CONTROL-MGMT-QUEUE
  match dscp cs7
  match dscp cs6
  match dscp cs3
  match dscp cs2
class-map match-any TRANSACTIONAL-DATA-QUEUE
  match dscp af21 af22 af23
class-map match-any SCAVENGER-QUEUE
  match dscp cs1
class-map match-any MULTIMEDIA-CONFERENCING-QUEUE
  match dscp af41 af42 af43
class-map match-all VOIP_SIGNAL_CLASS
  match cos 3
class-map match-any BULK-DATA-QUEUE
  match dscp af11 af12 af13
class-map match-all VOIP_DATA_CLASS
  match cos 5
class-map match-any PRIORITY-QUEUE
  match dscp ef
  match dscp cs5
  match dscp cs4
!
policy-map 1P7Q1T_Access
  class PRIORITY-QUEUE
    priority
    police cir percent 30
  class CONTROL-MGMT-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-CONFERENCING-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-STREAMING-QUEUE
    bandwidth remaining percent 10
  class TRANSACTIONAL-DATA-QUEUE
    bandwidth remaining percent 10
    dbl

```

```

class BULK-DATA-QUEUE
  bandwidth remaining percent 4
  dbl
class SCAVENGER-QUEUE
  bandwidth remaining percent 1
class class-default
  bandwidth remaining percent 25
  dbl
policy-map CISCOPHONE-POLICY
  class VOIP_DATA_CLASS
    set dscp ef
    police cir 128000 bc 8000
    conform-action transmit
    exceed-action drop
  class VOIP_SIGNAL_CLASS
    set dscp cs3
    police cir 32000 bc 8000
    conform-action transmit
    exceed-action drop
  class class-default
    set dscp default
    police cir 10000000 bc 8000
    conform-action transmit
    exceed-action set-dscp-transmit cs1
policy-map 1P7Q1T
  class PRIORITY-QUEUE
    priority
  class CONTROL-MGMT-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-CONFERENCING-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-STREAMING-QUEUE
    bandwidth remaining percent 10
  class TRANSACTIONAL-DATA-QUEUE
    bandwidth remaining percent 10
    dbl

```

```

class BULK-DATA-QUEUE
    bandwidth remaining percent 4
    dbl
class SCAVENGER-QUEUE
    bandwidth remaining percent 1
class class-default
    bandwidth remaining percent 25
    dbl
!
macro name EgressQoS
    service-policy output 1P7Q1T
@
macro name AccessEdgeQoS
    qos trust device cisco-phone
    service-policy input CISCOPHONE-POLICY
    service-policy output 1P7Q1T_Access
@
!
interface Port-channel1
    description Etherchannel link to D6500VSS
    switchport
    switchport trunk native vlan 999
    switchport trunk allowed vlan 100,101,115
    switchport mode trunk
    ip arp inspection trust
    logging event link-status
    flowcontrol receive on
    ip dhcp snooping trust
!
interface FastEthernet1
    ip vrf forwarding mgmtVrf
    no ip address
    shutdown
    speed auto
    duplex auto
!
interface GigabitEthernet1/1

```

```

    switchport access vlan 100
    switchport mode access
    switchport voice vlan 101
    switchport port-security maximum 11
    switchport port-security
    switchport port-security aging time 2
    switchport port-security violation restrict
    switchport port-security aging type inactivity
    ip arp inspection limit rate 100
    qos trust device cisco-phone
    macro description AccessEdgeQoS
    spanning-tree portfast
    service-policy input CISCOPHONE-POLICY
    service-policy output 1P7Q1T_Access
    ip verify source vlan dhcp-snooping
    ip dhcp snooping limit rate 100
!
! *****
! Interface GigabitEthernet 1/2 - 1/47 are all configured
! the same as 1/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/48
    switchport access vlan 100
    switchport mode access
    switchport voice vlan 101
    switchport port-security maximum 11
    switchport port-security
    switchport port-security aging time 2
    switchport port-security violation restrict
    switchport port-security aging type inactivity
    ip arp inspection limit rate 100
    qos trust device cisco-phone
    macro description AccessEdgeQoS
    spanning-tree portfast
    service-policy input CISCOPHONE-POLICY
    service-policy output 1P7Q1T_Access

```

```

ip verify source vlan dhcp-snooping
ip dhcp snooping limit rate 100
!
interface TenGigabitEthernet3/1
description Etherchannel to Dist Layer D6500VSS
switchport trunk native vlan 999
switchport trunk allowed vlan 100,101,115
switchport mode trunk
ip arp inspection trust
logging event link-status
logging event trunk-status
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
service-policy output 1P7Q1T
ip dhcp snooping trust
!
interface TenGigabitEthernet3/2
!
interface GigabitEthernet3/3
!
interface GigabitEthernet3/4
!
interface GigabitEthernet3/5
!
interface GigabitEthernet3/6
!
interface TenGigabitEthernet4/1
description Etherchannel to Dist Layer D6500VSS
switchport trunk native vlan 999
switchport trunk allowed vlan 100,101,115
switchport mode trunk
ip arp inspection trust
logging event link-status
logging event trunk-status
macro description EgressQoS
channel-protocol lacp

```

```

channel-group 1 mode active
service-policy output 1P7Q1T
ip dhcp snooping trust
!
interface TenGigabitEthernet4/2
!
interface GigabitEthernet4/3
!
interface GigabitEthernet4/4
!
interface GigabitEthernet4/5
!
interface GigabitEthernet4/6
!
interface Vlan1
no ip address
!
interface Vlan115
ip address 10.4.15.5 255.255.255.0
!
ip http server
ip http authentication aaa
ip http secure-server
ip route 0.0.0.0 0.0.0.0 10.4.15.1
!
snmp-server community ***** RO
snmp-server community ***** RW
tacacs server TACACS-SERVER-1
address ipv4 10.4.48.15
key 7 *****
!
line con 0
exec-timeout 360 0
logging synchronous
stopbits 1
line vty 0 4
transport preferred none

```

```
transport input ssh
line vty 5 15
transport preferred none
transport input ssh
!
ntp server 10.4.48.17
end
```

Notes

Appendix C: Distribution Layer Configurations

Catalyst 3750X-12S Switch

The Catalyst 3750X-12S switch is configured as a single unit, but has independent load-sharing power supplies and processor for each switch in the Cisco StackWise Plus stack. The Cisco SBA LAN architecture uses a pair of stacked 3750X-12S-E switches that provide Layer 2 and Layer 3 switching for a small to medium density of Gigabit Ethernet access-closet support. The switches use Small Form-Factor Pluggable (SFP) transceivers for a port-by-port option of copper or fiber optic Gigabit Ethernet EtherChannel uplinks to access closets.

```
version 15.0
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
!
hostname D3750X
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 *****
!
username admin password 7 *****
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
switch 3 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 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
!
crypto pki trustpoint TP-self-signed-1442055808
  enrollment selfsigned
  subject-name cn=IOS-Self-Signed-Certificate-1442055808
  revocation-check none
  rsakeypair TP-self-signed-1442055808

```

```

!
crypto pki certificate chain TP-self-signed-1442055808
  certificate self-signed 02
    3082024A 308201B3 A0030201 02020102 300D0609 2A864886 F70D0101
04050030
    31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D
43657274
    69666963 6174652D 31343432 30353538 3038301E 170D3933 30333031
30303433
    35325A17 0D323030 31303130 30303030 305A3031 312F302D 06035504
03132649
    4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D31
34343230
    35353830 3830819F 300D0609 2A864886 F70D0101 01050003 818D0030
81890281
    8100D6A9 AEBA736F A5322A90 FD3014E9 43F2CF6A B8A1C690 580AA42E
EF3ADF3D
    259FE630 DEACF306 A60B8E44 595197C7 25AFB36C 994D5348 7BD96498
8F17BADF
    54CBCFD3 515FFAF0 56468D4E 8D6EBB87 46DE2BE9 63CB8495 43758186
34A00B08
    9986B533 0036494D C6C998BA 1850B559 49080E7F 84196A69 652E7076
A0C38ADF
    ACFF0203 010001A3 72307030 0F060355 1D130101 FF040530 030101FF
301D0603
    551D1104 16301482 12443337 3530582E 63697363 6F2E6C6F 63616C30
1F060355
    1D230418 30168014 F81734B3 00C58115 3E8C3371 4FEC3518 A99D3F30
301D0603
    551D0E04 160414F8 1734B300 C581153E 8C33714F EC3518A9 9D3F3030
0D06092A
    864886F7 0D010104 05000381 8100A789 2FCEC888 33420BA7 65BDAB36
415B0AA8
    CC2512DE 20D0962E 6551782C D8F25393 5293DC96 2FFB636D 907E6C23
0AED2540
    EA9E896B 321CE685 18329ECF B306C1E4 D749B1E7 94943272 2C349644
F29A1BF0

```

```

D6B8A951 5576C6A0 49DC1422 DBA1BA66 03A17E73 46802811 9FBA4519
6741F73E
23E493FD 2FC53F97 ABB93601 8269
quit
license boot level ipservices
license boot level ipservices switch 1
license boot level ipservices switch 3
!
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 180-181,195
!
ip ssh source-interface Loopback0
ip ssh version 2
!
macro name EgressQoS
 mls qos trust dscp
 queue-set 1
 srr-queue bandwidth share 1 30 35 5
 priority-queue out
@
!
interface Loopback0
 ip address 10.4.95.254 255.255.255.255
 ip pim sparse-mode
!
interface Port-channel1
 description Connection to A2960S
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999

```

```

switchport trunk allowed vlan 180,181,195
switchport mode trunk
logging event link-status
!
interface Port-channel31
 description Connection to C6509-1
 no switchport
 ip address 10.4.40.14 255.255.255.252
 ip pim sparse-mode
 ip summary-address eigrp 100 10.4.80.0 255.255.240.0
 logging event link-status
 carrier-delay msec 0
!
interface Port-channel36
 description Connection to C6509-2
 no switchport
 ip address 10.4.40.26 255.255.255.252
 ip pim sparse-mode
 ip summary-address eigrp 100 10.4.80.0 255.255.240.0
 logging event link-status
 carrier-delay msec 0
!
interface FastEthernet0
 no ip address
 no ip route-cache
 shutdown
!
interface GigabitEthernet1/0/1
 description Connection to A2960S
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 999
 switchport trunk allowed vlan 180,181,195
 switchport mode trunk
 logging event link-status
 logging event trunk-status
 logging event bundle-status
 srr-queue bandwidth share 1 30 35 5

```

```

priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
!
interface GigabitEthernet1/0/2
!
interface GigabitEthernet1/0/3
!
interface GigabitEthernet1/0/4
!
interface GigabitEthernet1/0/5
!
interface GigabitEthernet1/0/6
!
interface GigabitEthernet1/0/7
!
interface GigabitEthernet1/0/8
!
interface GigabitEthernet1/0/9
!
interface GigabitEthernet1/0/10
!
interface GigabitEthernet1/0/11
!
interface GigabitEthernet1/0/12
!
interface GigabitEthernet1/1/1
description Connection to C6509-1
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

```

```

priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 31 mode active
!
interface GigabitEthernet1/1/2
!
interface GigabitEthernet1/1/3
description Connection to C6509-2
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 36 mode active
!
interface GigabitEthernet1/1/4
!
interface TenGigabitEthernet1/1/1
!
interface TenGigabitEthernet1/1/2
!
interface GigabitEthernet2/0/1

```

```

!
! *****
! Interface GigabitEthernet 2/0/2 - 2/1/4 are all configured
! the same as 2/0/1 and have been removed for conciseness
! *****
!
interface TenGigabitEthernet2/1/1
!
interface TenGigabitEthernet2/1/2
!
interface GigabitEthernet3/0/1
description Connection to A2960S
switchport trunk encapsulation dot1q
switchport trunk native vlan 999
switchport trunk allowed vlan 180,181,195
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
srr-queue bandwidth share 1 30 35 5
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
!
interface GigabitEthernet3/0/2
!
interface GigabitEthernet3/0/3
!
interface GigabitEthernet3/0/4
!
interface GigabitEthernet3/0/5
!
interface GigabitEthernet3/0/6
!
interface GigabitEthernet3/0/7

```

```

!
interface GigabitEthernet3/0/8
!
interface GigabitEthernet3/0/9
!
interface GigabitEthernet3/0/10
!
interface GigabitEthernet3/0/11
!
interface GigabitEthernet3/0/12
!
interface GigabitEthernet3/1/1
description Connection to C6509-1
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
priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 31 mode active
!
interface GigabitEthernet3/1/2
!
interface GigabitEthernet3/1/3
description Connection to C6509-2
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

```

```

priority-queue out
mls qos trust dscp
macro description EgressQoS
channel-protocol lacp
channel-group 36 mode active
!
interface GigabitEthernet3/1/4
!
interface TenGigabitEthernet3/1/1
!
interface TenGigabitEthernet3/1/2
!
interface Vlan1
no ip address
shutdown
!
interface Vlan115
no ip address
!
interface Vlan180
ip address 10.4.80.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan181
ip address 10.4.81.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan195
ip address 10.4.95.1 255.255.255.128
!
router eigrp 100
network 10.4.0.0 0.1.255.255
passive-interface default
no passive-interface Port-channel31
no passive-interface Port-channel36

```

```

eigrp router-id 10.4.95.254
!
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
!
snmp-server community ***** RO
snmp-server community ***** RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
address ipv4 10.4.48.15
key 7 *****
!
line con 0
line vty 0 4
length 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

```

Catalyst 4507R+E Switch

The Cisco Catalyst 4507R+E switch has redundant supervisors, line cards, and power supplies. This design uses a single 4507R+E chassis configured with resilient components as a distribution layer platform. The Supervisor 7E has the ability to provide a medium density of Gigabit Ethernet and even 10-Gigabit Ethernet EtherChannel links to the access layer.

```
version 15.1
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
service compress-config
!
hostname D4507
!
boot-start-marker
boot system flash bootflash:cat4500e-universalk9.SPA.03.03.00.
SG.151-1.SG.bin
license boot level entservices
boot-end-marker
!
enable secret 4 *****
!
username admin password 7 *****
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
udld enable
```

```
!
ip vrf Mgmt-vrf
!
ip vrf forwardi
!
ip multicast-routing
ip domain-name cisco.local
ip name-server 10.4.48.10
!
vtp domain SBAENT
vtp mode transparent
!
crypto pki trustpoint TP-self-signed-142689
    enrollment selfsigned
    subject-name cn=IOS-Self-Signed-Certificate-142689
    revocation-check none
    rsakeypair TP-self-signed-142689
!
power redundancy-mode redundant
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
spanning-tree vlan 1-4094 priority 24576
!
redundancy
    mode sso
    main-cpu
    auto-sync standard
!
vlan internal allocation policy ascending
!
vlan 164
    name DataVlan
!
vlan 165
    name VoiceVlan
```

```

!
vlan 166
  name DataVlan2
!
vlan 167
  name VoiceVlan2
!
vlan 179
  name ManagementVlan
!
vlan 999
  name antiVLANhopping
!
ip ssh source-interface Loopback0
ip ssh version 2
!
class-map match-any MULTIMEDIA-STREAMING-QUEUE
  match dscp af31 af32 af33
class-map match-any CONTROL-MGMT-QUEUE
  match dscp cs7
  match dscp cs6
  match dscp cs3
  match dscp cs2
class-map match-any TRANSACTIONAL-DATA-QUEUE
  match dscp af21 af22 af23
class-map match-any DATA
  match dscp af21
class-map match-any SCAVENGER-QUEUE
  match dscp cs1
class-map match-any INTERACTIVE-VIDEO
  match dscp cs4 af41
class-map match-any CRITICAL-DATA
  match dscp cs3 af31
class-map match-any MULTIMEDIA-CONFERENCING-QUEUE
  match dscp af41 af42 af43
class-map match-all VOIP_SIGNAL_CLASS
  match cos 3

```

```

class-map match-any BULK-DATA-QUEUE
  match dscp af11 af12 af13
class-map match-any VOICE
  match dscp ef
class-map match-all VOIP_DATA_CLASS
  match cos 5
class-map match-any PRIORITY-QUEUE
  match dscp ef
  match dscp cs5
  match dscp cs4
!
policy-map 1P7Q1T_Access
  class PRIORITY-QUEUE
    priority
    police cir percent 30
  class CONTROL-MGMT-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-CONFERENCING-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-STREAMING-QUEUE
    bandwidth remaining percent 10
  class TRANSACTIONAL-DATA-QUEUE
    bandwidth remaining percent 10
    dbl
  class BULK-DATA-QUEUE
    bandwidth remaining percent 4
    dbl
  class SCAVENGER-QUEUE
    bandwidth remaining percent 1
  class class-default
    bandwidth remaining percent 25
    dbl
policy-map CISCOPHONE-POLICY
  class VOIP_DATA_CLASS
    set dscp ef
    police cir 128000 bc 8000
    conform-action transmit
    exceed-action drop

```



```

class VOIP_SIGNAL_CLASS
  set dscp cs3
  police cir 32000 bc 8000
    conform-action transmit
    exceed-action drop
class class-default
  set dscp default
  police cir 10000000 bc 8000
    conform-action transmit
    exceed-action set-dscp-transmit csl
policy-map 1P7Q1T
  class PRIORITY-QUEUE
    priority
  class CONTROL-MGMT-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-CONFERENCING-QUEUE
    bandwidth remaining percent 10
  class MULTIMEDIA-STREAMING-QUEUE
    bandwidth remaining percent 10
  class TRANSACTIONAL-DATA-QUEUE
    bandwidth remaining percent 10
    dbl
  class BULK-DATA-QUEUE
    bandwidth remaining percent 4
    dbl
  class SCAVENGER-QUEUE
    bandwidth remaining percent 1
  class class-default
    bandwidth remaining percent 25
    dbl
!
macro name EgressQoS
service-policy output 1P7Q1T
@
macro name AccessEdgeQoS
  qos trust device cisco-phone
  service-policy input CISCOPHONE-POLICY
  service-policy output 1P7Q1T_Access

```

```

@
!
interface Loopback0
  ip address 10.4.79.254 255.255.255.255
  ip pim sparse-mode
!
interface Port-channel1
  description Connection to A3750X
  switchport
  switchport trunk native vlan 999
  switchport trunk allowed vlan 164,165,179
  switchport mode trunk
  logging event link-status
!
interface FastEthernet1
  ip vrf forwarding mgmtVrf
  no ip address
  shutdown
  speed auto
  duplex auto
!
interface TenGigabitEthernet1/1
  shutdown
!
interface TenGigabitEthernet1/2
  description Connection to A3750-X
  switchport trunk native vlan 999
  switchport trunk allowed vlan 164,165,179
  switchport mode trunk
  logging event link-status
  logging event trunk-status
  carrier-delay msec 0
  macro description EgressQoS
  channel-protocol lacp
  channel-group 1 mode active
  service-policy output 1P7Q1T
!

```

```

interface TenGigabitEthernet1/3
!
interface TenGigabitEthernet1/4
!
interface TenGigabitEthernet1/5
!
interface TenGigabitEthernet1/6
!
interface TenGigabitEthernet1/7
!
interface TenGigabitEthernet1/8
!
interface TenGigabitEthernet1/9
!
interface TenGigabitEthernet1/10
!
interface TenGigabitEthernet1/11
!
interface TenGigabitEthernet1/12
  description Connection to C6509-1
  no switchport
  ip address 10.4.40.18 255.255.255.252
  ip pim sparse-mode
  ip summary-address eigrp 100 10.4.64.0 255.255.240.0
  logging event link-status
  carrier-delay msec 0
  macro description EgressQoS
  service-policy output 1P7Q1T
!
interface TenGigabitEthernet2/1
  shutdown
!
interface TenGigabitEthernet2/2
  description Connection to A3750-X
  switchport trunk native vlan 999
  switchport trunk allowed vlan 164,165,179
  switchport mode trunk

```

```

  logging event link-status
  logging event trunk-status
  carrier-delay msec 0
  macro description EgressQoS
  channel-protocol lacp
  channel-group 1 mode active
  service-policy output 1P7Q1T
!
interface TenGigabitEthernet2/3
!
interface TenGigabitEthernet2/4
!
interface TenGigabitEthernet2/5
!
interface TenGigabitEthernet2/6
!
interface TenGigabitEthernet2/7
!
interface TenGigabitEthernet2/8
!
interface TenGigabitEthernet2/9
!
interface TenGigabitEthernet2/10
!
interface TenGigabitEthernet2/11
!
interface TenGigabitEthernet2/12
  description Connection to C6509-2
  no switchport
  ip address 10.4.40.30 255.255.255.252
  ip pim sparse-mode
  ip summary-address eigrp 100 10.4.64.0 255.255.240.0
  logging event link-status
  carrier-delay msec 0
  macro description EgressQoS
  service-policy output 1P7Q1T
!

```

```

interface TenGigabitEthernet3/1
!
interface TenGigabitEthernet3/2
!
interface TenGigabitEthernet3/3
!
interface TenGigabitEthernet3/4
!
interface TenGigabitEthernet4/1
!
interface TenGigabitEthernet4/2
!
interface TenGigabitEthernet4/3
!
interface TenGigabitEthernet4/4
!
interface Vlan1
  no ip address
!
interface Vlan164
  ip address 10.4.64.1 255.255.255.0
  ip helper-address 10.4.48.10
  ip pim sparse-mode
!
interface Vlan165
  ip address 10.4.65.1 255.255.255.0
  ip helper-address 10.4.48.10
  ip pim sparse-mode
!
interface Vlan166
  ip address 10.4.66.1 255.255.255.0
  ip helper-address 10.4.48.10
  ip pim sparse-mode
!
interface Vlan167
  ip address 10.4.67.1 255.255.255.0
  ip helper-address 10.4.48.10
  ip pim sparse-mode

```

```

!
interface Vlan168
  ip address 10.4.68.1 255.255.255.0
  ip helper-address 10.4.48.10
  ip pim sparse-mode
!
interface Vlan169
  ip address 10.4.69.1 255.255.255.0
  ip helper-address 10.4.48.10
  ip pim sparse-mode
!
interface Vlan179
  ip address 10.4.79.1 255.255.255.128
  ip helper-address 10.4.48.10
!
router eigrp 100
  network 10.4.0.0 0.0.255.255
  passive-interface default
  no passive-interface TenGigabitEthernet1/12
  no passive-interface TenGigabitEthernet2/12
  eigrp router-id 10.4.79.254
  nsf
!
no ip http server
ip http authentication aaa
ip http secure-server
ip pim autorp listener
!
ip tacacs source-interface Loopback0
!
logging 10.4.48.35
access-list 10 permit 239.1.0.0 0.0.255.255
!
snmp-server community ***** RO
snmp-server community ***** RO
snmp-server trap-source Loopback0
!

```

```

tacacs-server directed-request
tacacs server TACACS-SERVER-1
  address ipv4 10.4.48.15
  key 7 *****
!
!
!
line con 0
  exec-timeout 360 0
  stopbits 1
line vty 0 4
  transport preferred none
  transport input ssh
line vty 5 15
  access-class 55 in
  transport preferred none
  transport input ssh
line vty 16
!
ntp source Loopback0
ntp update-calendar
ntp server 10.4.48.17
end

```

Catalyst Virtual Switching System 4T

The Cisco Catalyst 6500 VSS 4T system effectively allows the clustering of two physical chassis into a logical entity that can be operated as a single device. This configuration provides redundant chassis, supervisors, line cards, and power supplies, and can also provide the highest density of the product options for Gigabit Ethernet and 10-Gigabit Ethernet EtherChannel uplinks using Cisco Multi-chassis EtherChannel.

```

version 15.0
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
service counters max age 5
!
hostname D6500VSS

```

```

!
boot-start-marker
boot system flash bootdisk:s2t54-ipservicesk9-mz.SPA.150-1.SY1.
bin
boot-end-marker
!
enable secret 5 *****
!
username admin password 7 *****
aaa new-model
!
aaa authentication login default group tacacs+ local
aaa authorization console
aaa authorization exec default group tacacs+ local
!
aaa session-id common
platform ip cef load-sharing ip-only
clock timezone PST -8
clock summer-time PDT recurring
!
ip domain-name cisco.local
ip name-server 10.4.48.10
ip multicast-routing
vtp mode transparent
udld enable
!
switch virtual domain 100
  switch mode virtual
  mac-address use-virtual
!
table-map cos-discard-class-map
  map from 0 to 0
  map from 1 to 8
  map from 2 to 16
  map from 3 to 24
  map from 4 to 32
  map from 5 to 46

```

```

map from 6 to 48
map from 7 to 56
!
crypto pki trustpoint TP-self-signed-1225
  revocation-check crl
!
macro name EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
@
macro name EgressQoS
  service-policy type lan-queuing output 1P3Q8T
@
!
spanning-tree mode rapid-pvst
spanning-tree portfast edge bpduguard default
spanning-tree extend system-id
spanning-tree vlan 1-4094 priority 24576
!
diagnostic bootup level minimal
!
redundancy
  main-cpu
  auto-sync running-config
  mode sso
!
vlan internal allocation policy ascending
vlan access-log ratelimit 2000
!
vlan 100
  name DataVlan
!
vlan 101
  name VoiceVlan
!
vlan 115
  name ManagementVlan
!

```

```

vlan 999
!
ip ssh source-interface Loopback0
ip ssh version 2
!
class-map type lan-queuing match-any MULTIMEDIA-STREAMING-QUEUE
  match dscp af31 af32 af33
class-map match-any class-copp-icmp-redirect-unreachable
class-map match-all class-copp-glean
class-map type lan-queuing match-any CONTROL-MGMT-QUEUE
  match dscp cs7
  match dscp cs6
  match dscp cs3
  match dscp cs2
  match cos 3 6 7
class-map type lan-queuing match-any TRANSACTIONAL-DATA-QUEUE
  match dscp af21 af22 af23
  match cos 2
class-map match-all class-copp-receive
class-map type lan-queuing match-any PRIORITY-QUEUE-GIG
  match cos 4 5
class-map match-any DATA
  match dscp af21
class-map match-all class-copp-options
class-map match-all class-copp-broadcast
class-map match-all class-copp-mcast-acl-bridged
class-map match-all class-copp-slb
class-map type lan-queuing match-any SCAVENGER-QUEUE
  match dscp cs1
  match cos 1
class-map match-all class-copp-mtu-fail
class-map match-all class-copp-ttl-fail
class-map match-all class-copp-arp-snooping
class-map match-any class-copp-mcast-copy
class-map match-any class-copp-ip-connected
class-map match-any class-copp-match-igmp
  match access-group name acl-copp-match-igmp

```

```

class-map match-all class-copp-unknown-protocol
class-map match-any class-copp-vacl-log
class-map match-all class-copp-mcast-ipv6-control
class-map match-any INTERACTIVE-VIDEO
    match dscp cs4 af41
class-map match-any class-copp-match-pimv6-data
    match access-group name acl-copp-match-pimv6-data
class-map match-any CRITICAL-DATA
    match dscp cs3 af31
class-map match-any class-copp-mcast-punt
class-map match-all class-copp-unsupp-rewrite
class-map match-all class-copp-ucast-egress-acl-bridged
class-map match-all class-copp-ip-admission
class-map type lan-queuing match-any MULTIMEDIA-CONFERENCING-
QUEUE
    match dscp af41 af42 af43
    match cos 4
class-map match-all class-copp-service-insertion
class-map type lan-queuing match-any BULK-DATA-QUEUE
    match dscp af11 af12 af13
class-map match-all class-copp-mac-pbf
class-map match-any VOICE
    match dscp ef
class-map match-any class-copp-match-mld
    match access-group name acl-copp-match-mld
class-map type lan-queuing match-any BULK-DATA-SCAVENGER
    match cos 1
class-map match-all class-copp-ucast-ingress-acl-bridged
class-map match-all class-copp-dhcp-snooping
class-map match-all class-copp-wccp
class-map match-all class-copp-nd
class-map match-any class-copp-ipv6-connected
class-map match-all class-copp-mcast-rpf-fail
class-map type lan-queuing match-any PRIORITY-QUEUE
    match dscp ef
    match dscp cs5
    match dscp cs4
    match cos 5

```

```

class-map match-any class-copp-ucast-rpf-fail
class-map match-all class-copp-mcast-ip-control
class-map match-any class-copp-match-pim-data
    match access-group name acl-copp-match-pim-data
class-map match-any class-copp-match-ndv6
    match access-group name acl-copp-match-ndv6
class-map type lan-queuing match-any CONTROL-AND-STREAM-MEDIA
    match cos 2 3 6 7
class-map match-any class-copp-mcast-v4-data-on-routedPort
class-map match-any class-copp-mcast-v6-data-on-routedPort
!
policy-map type lan-queuing 1P7Q4T
    class PRIORITY-QUEUE
        priority
    class CONTROL-MGMT-QUEUE
        bandwidth remaining percent 14
        queue-buffers ratio 10
        random-detect dscp-based
        random-detect dscp 16 percent 60 70
        random-detect dscp 24 percent 70 80
        random-detect dscp 48 percent 80 90
        random-detect dscp 56 percent 90 100
    class MULTIMEDIA-CONFERENCING-QUEUE
        bandwidth remaining percent 14
        queue-buffers ratio 10
        random-detect dscp-based
        random-detect dscp 34 percent 90 100
        random-detect dscp 36 percent 80 90
        random-detect dscp 38 percent 70 80
    class MULTIMEDIA-STREAMING-QUEUE
        bandwidth remaining percent 14
        queue-buffers ratio 10
        random-detect dscp-based
        random-detect dscp 26 percent 90 100
        random-detect dscp 28 percent 80 90
        random-detect dscp 30 percent 70 80

```

```

class TRANSACTIONAL-DATA-QUEUE
    bandwidth remaining percent 14
    queue-buffers ratio 10
    random-detect dscp-based
    random-detect dscp 18 percent 90 100
    random-detect dscp 20 percent 80 90
    random-detect dscp 22 percent 70 80
class BULK-DATA-QUEUE
    bandwidth remaining percent 6
    queue-buffers ratio 10
    random-detect dscp-based
    random-detect dscp 10 percent 90 100
    random-detect dscp 12 percent 80 90
    random-detect dscp 14 percent 70 80
class SCAVENGER-QUEUE
    bandwidth remaining percent 2
    queue-buffers ratio 10
    random-detect dscp-based
    random-detect dscp 8 percent 80 100
class class-default
    queue-buffers ratio 25
    random-detect dscp-based aggregate
    random-detect dscp values 0 1 2 3 4 5 6 7 percent 80 100
    random-detect dscp values 9 11 13 15 17 19 21 23 percent 80
100
    random-detect dscp values 25 27 29 31 33 35 37 39 percent 80
100
    random-detect dscp values 41 42 43 44 45 47 49 50 percent 80
100
    random-detect dscp values 51 52 53 54 55 57 58 59 percent 80
100
    random-detect dscp values 60 61 62 63 percent 80 100
policy-map policy-default-autocopp
    class class-copp-mcast-v4-data-on-routedPort
        police rate 10 pps burst 1 packets    conform-action drop
    exceed-action drop
    class class-copp-mcast-v6-data-on-routedPort
        police rate 10 pps burst 1 packets    conform-action drop

```

```

    exceed-action drop
        class class-copp-icmp-redirect-unreachable
            police rate 100 pps burst 10 packets    conform-action
        transmit    exceed-action drop
        class class-copp-ucast-rpf-fail
            police rate 100 pps burst 10 packets    conform-action
        transmit    exceed-action drop
        class class-copp-vacl-log
            police rate 2000 pps burst 1 packets    conform-action
        transmit    exceed-action drop
        class class-copp-mcast-punt
            police rate 1000 pps burst 256 packets    conform-action
        transmit    exceed-action drop
        class class-copp-mcast-copy
            police rate 1000 pps burst 256 packets    conform-action
        transmit    exceed-action drop
        class class-copp-ip-connected
            police rate 1000 pps burst 256 packets    conform-action
        transmit    exceed-action drop
        class class-copp-ipv6-connected
            police rate 1000 pps burst 256 packets    conform-action
        transmit    exceed-action drop
        class class-copp-match-pim-data
            police rate 1000 pps burst 1000 packets    conform-action
        transmit    exceed-action drop
        class class-copp-match-pimv6-data
            police rate 1000 pps burst 1000 packets    conform-action
        transmit    exceed-action drop
        class class-copp-match-mld
            police rate 10000 pps burst 10000 packets    conform-action
        set-discard-class-transmit 48    exceed-action transmit
        class class-copp-match-igmp
            police rate 10000 pps burst 10000 packets    conform-action
        set-discard-class-transmit 48    exceed-action transmit
        class class-copp-match-ndv6
            police rate 1000 pps burst 1000 packets    conform-action set-
        discard-class-transmit 48    exceed-action drop

```

```

policy-map type lan-queuing 1P3Q8T
  class PRIORITY-QUEUE-GIG
    priority
    queue-buffers ratio 15
  class CONTROL-AND-STREAM-MEDIA
    bandwidth remaining percent 55
    queue-buffers ratio 40
    random-detect cos-based
    random-detect cos 2 percent 60 70
    random-detect cos 3 percent 70 80
    random-detect cos 6 percent 80 90
    random-detect cos 7 percent 90 100
  class BULK-DATA-SCAVENGER
    bandwidth remaining percent 10
    queue-buffers ratio 20
    random-detect cos-based
    random-detect cos 1 percent 80 100
  class class-default
    queue-buffers ratio 25
    random-detect cos-based
    random-detect cos 0 percent 80 100
!
auto qos default
!
interface Loopback0
  ip address 10.4.15.254 255.255.255.255
  ip pim sparse-mode
!
interface Port-channel1
  description Etherchannel to A4507
  switchport
  switchport trunk native vlan 999
  switchport trunk allowed vlan 100,101,115
  switchport mode trunk
  logging event link-status
!
interface Port-channel2

```

```

  description Etherchannel to HQ-C3750X-PR1
  switchport
  switchport trunk native vlan 999
  switchport trunk allowed vlan 100,101,115
  switchport mode trunk
  logging event link-status
!
interface Port-channel30
  no switchport
  ip address 10.4.40.10 255.255.255.252
  ip pim sparse-mode
  ip summary-address eigrp 100 10.4.0.0 255.255.240.0
  logging event link-status
  carrier-delay msec 0
!
interface Port-channel35
  no switchport
  ip address 10.4.40.22 255.255.255.252
  ip pim sparse-mode
  ip summary-address eigrp 100 10.4.0.0 255.255.240.0
  logging event link-status
  carrier-delay msec 0
!
interface Port-channel101
  no switchport
  no ip address
  no platform qos channel-consistency
  switch virtual link 1
!
interface Port-channel102
  no switchport
  no ip address
  no platform qos channel-consistency
  switch virtual link 2
!
interface GigabitEthernet1/1/1
  switchport

```



```

switchport trunk native vlan 999
switchport trunk allowed vlan 100,101,115
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
shutdown
macro description EgressQoS
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet1/1/2
no switchport
no ip address
macro description EgressQoS
service-policy type lan-queuing output 1P3Q8T
!
! *****
! Interface GigabitEthernet 1/1/3 - 1/1/7 are all configured
! the same as 1/1/2 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/1/8
no switchport
no ip address
no cdp enable
dual-active fast-hello
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet1/1/9
no switchport
no ip address
service-policy type lan-queuing output 1P3Q8T

```

```

!
! *****
! Interface GigabitEthernet 1/1/10 - 1/1/24 are all configured
! the same as 1/1/9 and have been removed for conciseness
! *****
!
interface TenGigabitEthernet1/4/1
description 10GbEtherchannel links to C6500-1
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoSSTenGig
channel-protocol lacp
channel-group 30 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/2
switchport
switchport trunk native vlan 999
switchport trunk allowed vlan 100,101,115
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoSSTenGig
channel-protocol lacp
channel-group 2 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/3
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T

```

```

!
interface TenGigabitEthernet1/4/4
  no switchport
  no ip address
  shutdown
  macro description EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/5
  description 10GbEtherchannel to Core 6500-2
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  macro description EgressQoS TenGig
  channel-protocol lacp
  channel-group 35 mode active
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/6
  no switchport
  no ip address
  shutdown
  macro description EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/7
  no switchport
  no ip address
  shutdown
  macro description EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/8
  no switchport
  no ip address

```

```

  shutdown
  macro description EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/9
  description Etherchannel links to A4507
  switchport
  switchport trunk native vlan 999
  switchport trunk allowed vlan 100,101,115
  switchport mode trunk
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  macro description EgressQoS TenGig
  channel-protocol lacp
  channel-group 1 mode active
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/10
  no switchport
  no ip address
  shutdown
  macro description EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/11
  no switchport
  no ip address
  shutdown
  macro description EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/12
  no switchport
  no ip address
  shutdown
  macro description EgressQoS TenGig

```

```

service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/13
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/4/14
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/4/15
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/4/16
no switchport
no ip address
shutdown
!
interface GigabitEthernet1/5/1
no switchport
no ip address
shutdown
!
interface GigabitEthernet1/5/2
no switchport
no ip address
shutdown
!
interface GigabitEthernet1/5/3
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/5/4
no switchport

```

```

no ip address
no cdp enable
channel-group 101 mode on
!
interface TenGigabitEthernet1/5/5
no switchport
no ip address
no cdp enable
channel-group 101 mode on
!
interface GigabitEthernet2/1/1
switchport
switchport trunk native vlan 999
switchport trunk allowed vlan 100,101,115
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
shutdown
macro description EgressQoS
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet2/1/2
no switchport
no ip address
shutdown
macro description EgressQoS
service-policy type lan-queuing output 1P3Q8T
!
! *****
! Interface GigabitEthernet 2/1/3 - 2/1/7 are all configured
! the same as 2/1/2 and have been removed for conciseness
! *****
!
interface GigabitEthernet2/1/8
no switchport
no ip address
no cdp enable
dual-active fast-hello

```

```

service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet2/1/9
no switchport
no ip address
shutdown
service-policy type lan-queuing output 1P3Q8T
!
! *****
! Interface GigabitEthernet 2/1/10 - 2/1/24 are all configured
! the same as 2/1/9 and have been removed for conciseness
! *****
!
interface TenGigabitEthernet2/4/1
description 10GbEtherchannel links to C6500-1
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoSSTenGig
channel-protocol lacp
channel-group 30 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/2
switchport
switchport trunk native vlan 999
switchport trunk allowed vlan 100,101,115
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoSSTenGig
channel-protocol lacp
channel-group 2 mode active
service-policy type lan-queuing output 1P7Q4T

```

```

!
interface TenGigabitEthernet2/4/3
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/4
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/5
description 10GbEtherchannel to Core 6500-2
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoSSTenGig
channel-protocol lacp
channel-group 35 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/6
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/7
no switchport
no ip address

```

```

shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/8
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/9
description Etherchannel links to A4507
switchport
switchport trunk native vlan 999
switchport trunk allowed vlan 100,101,115
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoSSTenGig
channel-protocol lacp
channel-group 1 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/10
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/11
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig

```

```

service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/12
no switchport
no ip address
shutdown
macro description EgressQoSSTenGig
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/13
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/4/14
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/4/15
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/4/16
no switchport
no ip address
shutdown
!
interface GigabitEthernet2/5/1
no switchport
no ip address
shutdown
!
interface GigabitEthernet2/5/2
no switchport
no ip address

```

```

shutdown
!
interface GigabitEthernet2/5/3
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/5/4
no switchport
no ip address
no cdp enable
channel-group 102 mode on
!
interface TenGigabitEthernet2/5/5
no switchport
no ip address
no cdp enable
channel-group 102 mode on
!
interface Vlan1
no ip address
shutdown
!
interface Vlan100
ip address 10.4.0.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan101
ip address 10.4.1.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan115
ip address 10.4.15.1 255.255.255.128
ip helper-address 10.4.48.10
ip pim sparse-mode

```

```

!
!
router eigrp 100
network 10.4.0.0 0.1.255.255
passive-interface default
no passive-interface Port-channel30
no passive-interface Port-channel35
eigrp router-id 10.4.15.254
nsf
!
ip forward-protocol nd
!
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
!
!
ip access-list extended acl-copp-match-igmp
permit igmp any any
ip access-list extended acl-copp-match-pim-data
deny pim any host 224.0.0.13
permit pim any any
!
logging 10.4.48.35
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community ***** RO 55
snmp-server community ***** RW 55
snmp-server trap-source Loopback0
tacacs-server host 10.4.48.15 key 7 *****
no tacacs-server directed-request
!
!
ipv6 access-list acl-copp-match-mld

```

```

permit icmp any any mld-report
permit icmp any any mld-query
permit icmp any any mld-reduction
permit icmp any any 143
!
ipv6 access-list acl-copp-match-ndv6
permit icmp any any nd-na
permit icmp any any nd-ns
permit icmp any any router-advertisement
permit icmp any any router-solicitation
permit icmp any any redirect
!
ipv6 access-list acl-copp-match-pimv6-data
deny 103 any host FF02::D
permit 103 any any
!
control-plane
service-policy input policy-default-autocopp
!
!
line con 0
exec-timeout 0 0
line aux 0
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 clock-period 17180052
ntp source Loopback0
ntp server 10.4.48.17
!
!
module provision switch 1
slot 1 slot-type 156 port-type 31 number 24 virtual-slot 17
slot 4 slot-type 284 port-type 60 number 16 virtual-slot 20
slot 5 slot-type 318 port-type 31 number 3 port-type 60 number 2
virtual-slot 21
!
module provision switch 2
slot 1 slot-type 156 port-type 31 number 24 virtual-slot 33
slot 4 slot-type 284 port-type 60 number 16 virtual-slot 36
slot 5 slot-type 318 port-type 31 number 3 port-type 60 number 2
virtual-slot 37
!
end

```

Appendix D: Core Layer Configurations

Catalyst 6500 Series Switch

The Cisco Catalyst 6500 Series switch, powered by the Supervisor 2T, is the premier LAN core platform. It delivers scalable performance, intelligence, and a broad set of features to address the needs of the most demanding deployment requirements for building a modular, resilient, scalable, and secure Layer 3 backbone solution.

```
version 15.0
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
service counters max age 5
!
hostname C6509-1
!
boot-start-marker
boot system flash bootdisk:s2t54-ipservicesk9-mz.SPA.150-1.SY1.
bin
boot-end-marker
!
enable secret 5 *****
!
username admin password 7 *****
aaa new-model
!
aaa authentication login default group tacacs+ local
aaa authorization console
aaa authorization exec default group tacacs+ local
!
aaa session-id common
```

```
platform ip cef load-sharing ip-only
clock timezone PST -8
clock summer-time PDT recurring
!
ip domain-name cisco.local
ip name-server 10.4.48.10
ip multicast-routing
vtp mode transparent
udld enable
!
table-map cos-discard-class-map
map from 0 to 0
map from 1 to 8
map from 2 to 16
map from 3 to 24
map from 4 to 32
map from 5 to 46
map from 6 to 48
map from 7 to 56
!
crypto pki trustpoint TP-self-signed-1233
enrollment selfsigned
subject-name cn=IOS-Self-Signed-Certificate-1233
revocation-check none
rsakeypair TP-self-signed-1233
!
crypto pki certificate chain TP-self-signed-1233
certificate self-signed 01
    3082023F 308201A8 A0030201 02020101 300D0609 2A864886 F70D0101
04050030
    2B312930 27060355 04031320 494F532D 53656C66 2D536967 6E65642D
43657274
    69666963 6174652D 31323333 301E170D 31323033 32393232 30323232
5A170D32
    30303130 31303030 3030305A 302B3129 30270603 55040313 20494F53
2D53656C
    662D5369 676E6564 2D436572 74696669 63617465 2D313233 3330819F
```



```

300D0609
 2A864886 F70D0101 01050003 818D0030 81890281 8100A0A9 9B3D4072
5C5C8A14
  A0159811 5CBCD8BF 80C38DBC 24D2F1F1 26F2ACA3 FB91367F A875EC47
9BC45DF2
  7770C5F0 FC3D7B41 75BDF56F 8172B04B 1E5F6AAA 118C29E1 951214A2
E31839F6
  463F381F C3E96D21 7359901B CA1FA7D0 B02CE420 8371E387 E808D60B
47822535
  FF9EDAA2 E10CEBFC 98E2C73E 38F96E13 14D15FAA A0650203 010001A3
73307130
  0F060355 1D130101 FF040530 030101FF 301E0603 551D1104 17301582
13433635
  30392D31 2E636973 636F2E6C 6F63616C 301F0603 551D2304 18301680
143A240B
  2A60E603 C90C192F B44EACC0 F6036C1A 62301D06 03551D0E 04160414
3A240B2A
  60E603C9 0C192FB4 4EACC0F6 036C1A62 300D0609 2A864886 F70D0101
04050003
  81810047 688F0C64 E06AE671 549C2B33 7B50C569 80F60A49 85D7F726
92625B21
  7BB741CB C328237C F5C01F5A F0F7C5E6 2E6FE2CE 3E6550B4 D6D7E8C2
969714A0
  94A0D770 0620A46C B10FBBC8 85D2ECAE 07C3C3AE 005F6651 1392AF08
2F3834D1
  D8EA7FB0 596509AF 5676A18A F742F6BF DD2313FF 891931CC 78225B2C
ED2E3F0A FF5607
quit
!
macro name EgressQoS TenGig
  service-policy type lan-queuing output 1P7Q4T
@
macro name EgressQoS
  service-policy type lan-queuing output 1P3Q8T
@
!
spanning-tree mode rapid-pvst

```

```

!
diagnostic bootup level minimal
!
redundancy
  main-cpu
    auto-sync running-config
  mode sso
!
vlan internal allocation policy ascending
vlan access-log ratelimit 2000
!
vlan 141
!
ip ssh source-interface Loopback0
ip ssh version 2
!
class-map type lan-queuing match-any MULTIMEDIA-STREAMING-QUEUE
  match dscp af31 af32 af33
class-map match-any class-copp-icmp-redirect-unreachable
class-map match-all class-copp-glean
class-map type lan-queuing match-any CONTROL-MGMT-QUEUE
  match dscp cs7
  match dscp cs6
  match dscp cs3
  match dscp cs2
  match cos 3 6 7
class-map type lan-queuing match-any TRANSACTIONAL-DATA-QUEUE
  match dscp af21 af22 af23
  match cos 2
class-map match-all class-copp-receive
class-map type lan-queuing match-any PRIORITY-QUEUE-GIG
  match cos 4 5
class-map match-all class-copp-options
class-map match-all class-copp-broadcast
class-map match-all class-copp-mcast-acl-bridged
class-map match-all class-copp-slb
class-map type lan-queuing match-any SCAVENGER-QUEUE

```

```

match dscp cs1
match cos 1
class-map match-all class-copp-mtu-fail
class-map match-all class-copp-ttl-fail
class-map match-all class-copp-arp-snooping
class-map match-any class-copp-mcast-copy
class-map match-any class-copp-ip-connected
class-map match-any class-copp-match-igmp
    match access-group name acl-copp-match-igmp
class-map match-all class-copp-unknown-protocol
class-map match-any class-copp-vacl-log
class-map match-all class-copp-mcast-ipv6-control
class-map match-any class-copp-match-pimv6-data
    match access-group name acl-copp-match-pimv6-data
class-map match-any class-copp-mcast-punt
class-map match-all class-copp-unsupp-rewrite
class-map match-all class-copp-ucast-egress-acl-bridged
class-map match-all class-copp-ip-admission
class-map type lan-queuing match-any MULTIMEDIA-CONFERENCING-
QUEUE
    match dscp af41 af42 af43
    match cos 4
class-map match-all class-copp-service-insertion
class-map type lan-queuing match-any BULK-DATA-QUEUE
    match dscp af11 af12 af13
class-map match-all class-copp-mac-pbf
class-map match-any class-copp-match-mld
    match access-group name acl-copp-match-mld
class-map type lan-queuing match-any BULK-DATA-SCAVENGER
    match cos 1
class-map match-all class-copp-ucast-ingress-acl-bridged
class-map match-all class-copp-dhcp-snooping
class-map match-all class-copp-wccp
class-map match-all class-copp-nd
class-map match-any class-copp-ipv6-connected
class-map match-all class-copp-mcast-rpf-fail
class-map type lan-queuing match-any PRIORITY-QUEUE

```

```

match dscp ef
match dscp cs5
match dscp cs4
match cos 5
class-map match-any class-copp-ucast-rpf-fail
class-map match-all class-copp-mcast-ip-control
class-map match-any class-copp-match-pim-data
    match access-group name acl-copp-match-pim-data
class-map match-any class-copp-match-ndv6
    match access-group name acl-copp-match-ndv6
class-map type lan-queuing match-any CONTROL-AND-STREAM-MEDIA
    match cos 2 3 6 7
class-map match-any class-copp-mcast-v4-data-on-routedPort
class-map match-any class-copp-mcast-v6-data-on-routedPort
!
policy-map type lan-queuing 1P7Q4T
    class PRIORITY-QUEUE
        priority
    class CONTROL-MGMT-QUEUE
        bandwidth remaining percent 14
        queue-buffers ratio 10
        random-detect dscp-based
        random-detect dscp 16 percent 60 70
        random-detect dscp 24 percent 70 80
        random-detect dscp 48 percent 80 90
        random-detect dscp 56 percent 90 100
    class MULTIMEDIA-CONFERENCING-QUEUE
        bandwidth remaining percent 14
        queue-buffers ratio 10
        random-detect dscp-based
        random-detect dscp 34 percent 90 100
        random-detect dscp 36 percent 80 90
        random-detect dscp 38 percent 70 80
    class MULTIMEDIA-STREAMING-QUEUE
        bandwidth remaining percent 14
        queue-buffers ratio 10
        random-detect dscp-based
        random-detect dscp 26 percent 90 100

```

```

    random-detect dscp 28 percent 80 90
    random-detect dscp 30 percent 70 80
class TRANSACTIONAL-DATA-QUEUE
    bandwidth remaining percent 14
    queue-buffers ratio 10
    random-detect dscp-based
    random-detect dscp 18 percent 90 100
    random-detect dscp 20 percent 80 90
    random-detect dscp 22 percent 70 80
class BULK-DATA-QUEUE
    bandwidth remaining percent 6
    queue-buffers ratio 10
    random-detect dscp-based
    random-detect dscp 10 percent 90 100
    random-detect dscp 12 percent 80 90
    random-detect dscp 14 percent 70 80
class SCAVENGER-QUEUE
    bandwidth remaining percent 2
    queue-buffers ratio 10
    random-detect dscp-based
    random-detect dscp 8 percent 80 100
class class-default
    queue-buffers ratio 25
    random-detect dscp-based aggregate
    random-detect dscp values 0 1 2 3 4 5 6 7 percent 80 100
    random-detect dscp values 9 11 13 15 17 19 21 23 percent 80
100
    random-detect dscp values 25 27 29 31 33 35 37 39 percent 80
100
    random-detect dscp values 41 42 43 44 45 47 49 50 percent 80
100
    random-detect dscp values 51 52 53 54 55 57 58 59 percent 80
100
    random-detect dscp values 60 61 62 63 percent 80 100
policy-map policy-default-autocopp
class class-copp-mcast-v4-data-on-routedPort
    police rate 10 pps burst 1 packets    conform-action drop

```

```

exceed-action drop
class class-copp-mcast-v6-data-on-routedPort
    police rate 10 pps burst 1 packets    conform-action drop
exceed-action drop
class class-copp-match-mld
    police rate 10000 pps burst 10000 packets    conform-action
set-discard-class-transmit 48    exceed-action transmit
class class-copp-match-igmp
    police rate 10000 pps burst 10000 packets    conform-action
set-discard-class-transmit 48    exceed-action transmit
class class-copp-icmp-redirect-unreachable
    police rate 100 pps burst 10 packets    conform-action
transmit    exceed-action drop
class class-copp-ucast-rpf-fail
    police rate 100 pps burst 10 packets    conform-action
transmit    exceed-action drop
class class-copp-vacl-log
    police rate 2000 pps burst 1 packets    conform-action
transmit    exceed-action drop
class class-copp-mcast-punt
    police rate 1000 pps burst 256 packets    conform-action
transmit    exceed-action drop
class class-copp-mcast-copy
    police rate 1000 pps burst 256 packets    conform-action
transmit    exceed-action drop
class class-copp-ip-connected
    police rate 1000 pps burst 256 packets    conform-action
transmit    exceed-action drop
class class-copp-ipv6-connected
    police rate 1000 pps burst 256 packets    conform-action
transmit    exceed-action drop
class class-copp-match-pim-data
    police rate 1000 pps burst 1000 packets    conform-action
transmit    exceed-action drop
class class-copp-match-pimv6-data
    police rate 1000 pps burst 1000 packets    conform-action
transmit    exceed-action drop
class class-copp-match-ndv6

```

```

    police rate 1000 pps burst 1000 packets    conform-action set-
discard-class-transmit 48    exceed-action drop
policy-map type lan-queuing 1P3Q8T
class PRIORITY-QUEUE-GIG
    priority
    queue-buffers ratio 15
class CONTROL-AND-STREAM-MEDIA
    bandwidth remaining percent 55
    queue-buffers ratio 40
    random-detect cos-based
    random-detect cos 2 percent 60 70
    random-detect cos 3 percent 70 80
    random-detect cos 6 percent 80 90
    random-detect cos 7 percent 90 100
class BULK-DATA-SCAVENGER
    bandwidth remaining percent 10
    queue-buffers ratio 20
    random-detect cos-based
    random-detect cos 1 percent 80 100
class class-default
    queue-buffers ratio 25
    random-detect cos-based
    random-detect cos 0 percent 80 100
!
auto qos default
!
interface Loopback0
    ip address 10.4.40.254 255.255.255.255
    ip pim sparse-mode
!
interface Loopback1
    ip address 10.4.40.252 255.255.255.255
    ip pim sparse-mode
!
interface Port-channel30
    description Etherchannel link to D6500VSS
    ip address 10.4.40.9 255.255.255.252
    ip pim sparse-mode

```

```

    logging event link-status
    carrier-delay msec 0
!
interface Port-channel31
    description Connection to D3750X
    ip address 10.4.40.13 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
!
interface GigabitEthernet1/1
    description Connection to D3750X
    no ip address
    logging event link-status
    logging event trunk-status
    logging event bundle-status
    macro description EgressQoS
    channel-protocol lacp
    channel-group 31 mode active
    service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet1/2
    description Connection to D3750X
    no ip address
    logging event link-status
    logging event trunk-status
    logging event bundle-status
    macro description EgressQoS
    channel-protocol lacp
    channel-group 31 mode active
    service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet1/3
    no ip address
    shutdown
    macro description EgressQoS
    service-policy type lan-queuing output 1P3Q8T

```

```

!
! *****
! Interface GigabitEthernet1/4 - 1/24 are all configured
! the same as 1/3 and have been removed for conciseness
! *****
!
interface TenGigabitEthernet4/1
    description Etherchannel links to D6500VSS
    no ip address
    logging event link-status
    logging event trunk-status
    logging event bundle-status
    macro description EgressQoSSTenGig
    channel-protocol lacp
    channel-group 30 mode active
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet4/2
    description Etherchannel links to D6500VSS
    no ip address
    logging event link-status
    logging event trunk-status
    logging event bundle-status
    macro description EgressQoSSTenGig
    channel-protocol lacp
    channel-group 30 mode active
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet4/3
    description IE-D3750X Ten1/1/1
    ip address 10.4.40.65 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
    macro description EgressQoSSTenGig
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet4/4

```

```

    no ip address
    shutdown
    macro description EgressQoSSTenGig
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet4/5
    description D4507 Te1/12
    ip address 10.4.40.17 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
    macro description EgressQoSSTenGig
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet4/6
    description WAN-D3750X Te2/1/1
    ip address 10.4.40.41 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
    macro description EgressQoSSTenGig
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet4/7
    description Link to DC7010-2 Eth4/17
    ip address 10.4.40.49 255.255.255.252
    ip pim sparse-mode
    macro description EgressQoSSTenGig
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet4/8
    description Link to DC7010-1 eth 4/18
    ip address 10.4.40.53 255.255.255.252
    ip pim sparse-mode
    macro description EgressQoSSTenGig
    service-policy type lan-queuing output 1P7Q4T
!
interface GigabitEthernet5/1

```

```

no ip address
shutdown
!
interface GigabitEthernet5/2
no ip address
shutdown
!
interface GigabitEthernet5/3
no ip address
shutdown
!
interface TenGigabitEthernet5/4
no ip address
shutdown
!
interface TenGigabitEthernet5/5
no ip address
shutdown
!
interface Vlan1
no ip address
shutdown
!
!
router eigrp 100
network 10.4.0.0 0.1.255.255
eigrp router-id 10.4.40.254
!
ip forward-protocol nd
!
no ip http server
ip http authentication aaa
ip http secure-server
ip pim autorp listener
ip pim send-rp-announce Loopback1 scope 32 group-list 10
ip pim send-rp-discovery Loopback0 scope 32
ip pim register-source Loopback0

```

```

ip msdp peer 10.4.40.253 connect-source Loopback0
ip msdp cache-sa-state
ip msdp originator-id Loopback0
ip tacacs source-interface Loopback0
!
!
ip access-list extended acl-copp-match-igmp
permit igmp any any
ip access-list extended acl-copp-match-pim-data
deny pim any host 224.0.0.13
permit pim any any
!
access-list 10 permit 239.1.0.0 0.0.255.255
!
snmp-server community ***** RO
snmp-server community ***** RW
snmp-server trap-source Loopback0
tacacs-server host 10.4.48.15 key 7 *****
no tacacs-server directed-request
!
!
ipv6 access-list acl-copp-match-mld
permit icmp any any mld-report
permit icmp any any mld-query
permit icmp any any mld-reduction
permit icmp any any 143
!
ipv6 access-list acl-copp-match-ndv6
permit icmp any any nd-na
permit icmp any any nd-ns
permit icmp any any router-advertisement
permit icmp any any router-solicitation
permit icmp any any redirect
!
ipv6 access-list acl-copp-match-pimv6-data
deny 103 any host FF02::D
permit 103 any any

```

```
!  
control-plane  
  service-policy input policy-default-autocopp  
!  
!  
line con 0  
  exec-timeout 60 0  
line aux 0  
line vty 0 4  
  transport preferred none  
  transport input ssh  
line vty 5 15  
  transport preferred none  
  transport input ssh  
!  
ntp clock-period 17180075  
ntp source Loopback0  
ntp update-calendar  
ntp server 10.4.48.17  
!  
end
```

Notes

Feedback

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