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This guide is part of an older series of Cisco Validated Designs.

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CVD



Campus Wired LAN

CONFIGURATION FILES GUIDE

August 2013



VALIDATED
DESIGN

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Preface

Cisco Validated Designs (CVDs) provide the framework for systems design based on common use cases or current engineering system priorities. They incorporate a broad set of technologies, features, and applications to address customer needs. Cisco engineers have comprehensively tested and documented each CVD in order to ensure faster, more reliable, and fully predictable deployment.

This guide provides, as a comprehensive reference, the complete network device configurations that are implemented in a CVD design guide.

How to Read Commands

Many CVD guides tell you how to use a command-line interface (CLI) to configure network devices. 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 at a CLI or script prompt appear as follows:

```
Router# enable
```

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

```
police rate 10000 pps burst 10000 packets conform-action set-discard-class-  
transmit 48 exceed-action transmit
```

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 [feedback form](#).

For the most recent CVD guides, see the following site:

<http://www.cisco.com/go/cvd>

Introduction

The [Campus Wired LAN Design 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.

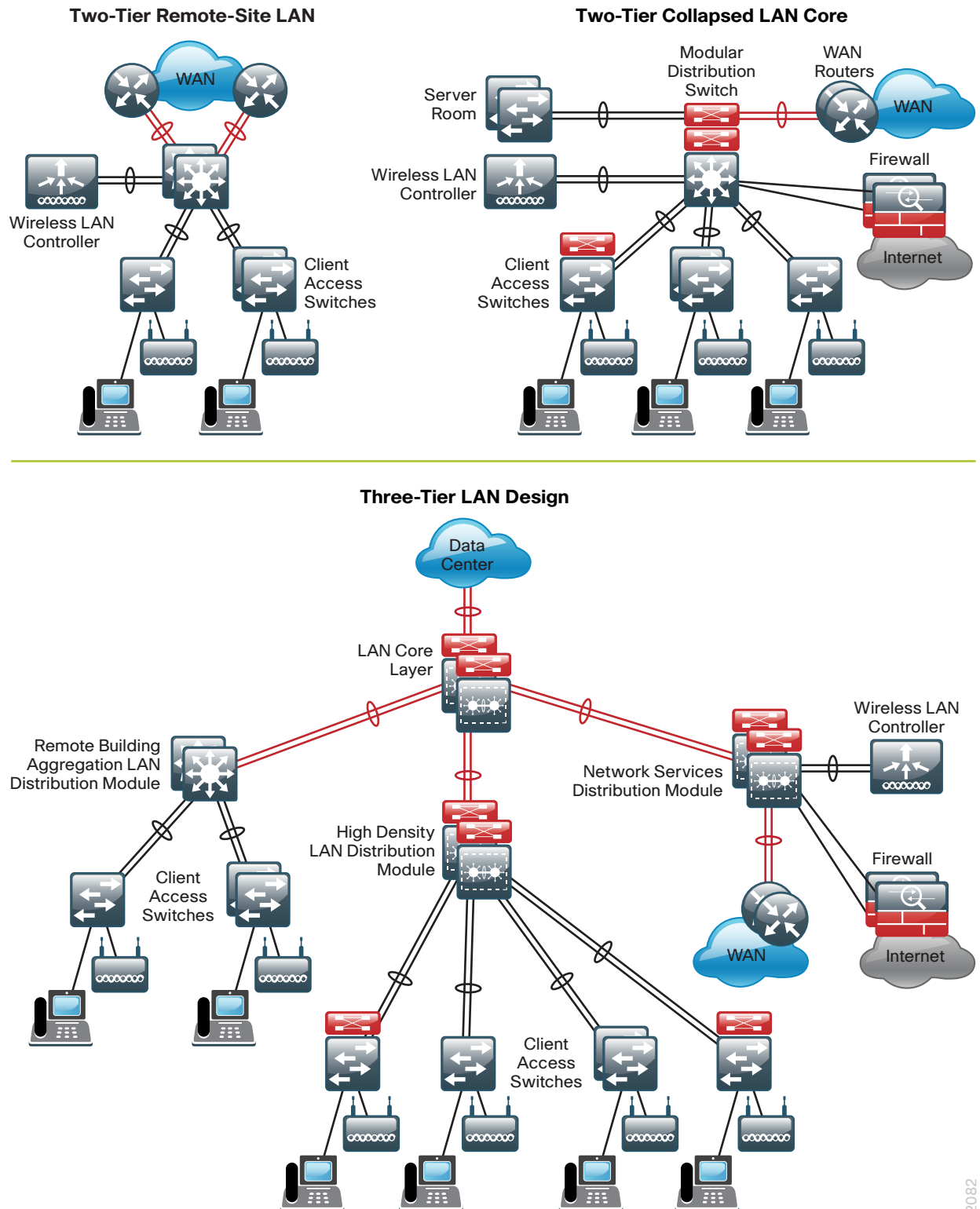
The CVD LAN architecture is designed to meet the needs of organizations with LAN connectivity requirements that range from a small remote-site LAN to up to a multi-building LAN at a single location.

The modular design of the CVD 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.

Figure 1 - CVD scalable LAN architecture



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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	3.4.0.SG(15.1-2SG) IP Base license
	Cisco Catalyst 4500 E-Series Supervisor Engine 7L-E	WS-X45-SUP7L-E	
	Cisco Catalyst 4500 E-Series 48 Ethernet 10/100/1000 (RJ45) PoE+ ports	WS-X4648-RJ45V+E	
	Cisco Catalyst 4500 E-Series 48 Ethernet 10/100/1000 (RJ45) PoE+,UPoE ports	WS-X4748-UPOE+E	
Stackable Access Layer Switch	Cisco Catalyst 3850 Series Stackable 48 Ethernet 10/100/1000 PoE+ ports	WS-C3850-48F	3.2.1SE(15.0-1EX1) IP Base license
	Cisco Catalyst 3850 Series Stackable 24 Ethernet 10/100/1000 PoE+ Ports	WS-C3850-24P	
	Cisco Catalyst 3850 Series 2 x 10GE Network Module	C3850-NM-2-10G	
	Cisco Catalyst 3850 Series 4 x 1GE Network Module	C3850-NM-4-1G	
	Cisco Catalyst 3750-X Series Stackable 48 Ethernet 10/100/1000 PoE+ ports	WS-C3750X-48PF-S	15.0(2)SE2 IP Base license
	Cisco Catalyst 3750-X Series Stackable 24 Ethernet 10/100/1000 PoE+ ports	WS-C3750X-24P-S	
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	
Standalone Access Layer Switch	Cisco Catalyst 3560-X Series Standalone 48 Ethernet 10/100/1000 PoE+ ports	WS-C3560X-48PF-S	15.0(2)SE2 IP Base license
	Cisco Catalyst 3560-X Series Standalone 24 Ethernet 10/100/1000 PoE+ ports	WS-C3560X-24P-S	
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	
Stackable Access Layer Switch	Cisco Catalyst 2960-S Series 48 Ethernet 10/100/1000 PoE+ ports and Two 10GbE SFP+ Uplink ports	WS-C2960S-48FPD-L	15.0(2)SE2 LAN Base license
	Cisco Catalyst 2960-S Series 48 Ethernet 10/100/1000 PoE+ ports and Four GbE SFP Uplink ports	WS-C2960S-48FPS-L	
	Cisco Catalyst 2960-S Series 24 Ethernet 10/100/1000 PoE+ ports and Two 10GbE SFP+ Uplink ports	WS-C2960S-24PD-L	
	Cisco Catalyst 2960-S Series 24 Ethernet 10/100/1000 PoE+ ports and Four GbE SFP Uplink ports	WS-C2960S-24PS-L	
	Cisco Catalyst 2960-S Series Flexstack Stack Module	C2960S-STACK	

LAN Distribution Layer

Functional Area	Product Description	Part Numbers	Software
Modular Distribution Layer Virtual Switch Pair	Cisco Catalyst 6500 E-Series 6-Slot Chassis	WS-C6506-E	15.1(1)SY IP Services license
	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	
	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	
	Cisco Catalyst 6500 24-port GbE SFP Fiber Module w/ DFC4	WS-X6824-SFP-2T	
Modular Distribution Layer Switch	Cisco Catalyst 4507R+E 7-slot Chassis with 48Gbps per slot	WS-C4507R+E	3.4.0.SG(15.1-2SG) Enterprise Services license
	Cisco Catalyst 4500 E-Series Supervisor Engine 7-E, 848Gbps	WS-X45-SUP7-E	
	Cisco Catalyst 4500 E-Series 24-port GbE SFP Fiber Module	WS-X4624-SFP-E	
	Cisco Catalyst 4500 E-Series 12-port 10GbE SFP+ Fiber Module	WS-X4712-SFP+E	
Stackable Distribution Layer Switch	Cisco Catalyst 3750-X Series Stackable 12 GbE SFP ports	WS-C3750X-12S-E	15.0(2)SE2 IP Services license
	Cisco Catalyst 3750-X Series Two 10GbE SFP+ and Two GbE SFP ports network module	C3KX-NM-10G	
	Cisco Catalyst 3750-X Series Four GbE SFP ports network module	C3KX-NM-1G	

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	15.1(1)SY IP services license
	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	
	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	
	Cisco Catalyst 6500 24-port GbE SFP Fiber Module w/ DFC4	WS-X6824-SFP-2T	

Access Layer Configurations

Catalyst 2960-S Series Switch

The Cisco Catalyst 2960-S Series switches are fixed-configuration, stackable, 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-4k  
!  
boot-start-marker  
boot-end-marker  
!  
enable secret 4 /DtCCr53Q4B18jSIm1UEqu7cNVZTOhxTZyUnZdsSrsW  
!  
username admin password 7 104D580A061843595F  
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 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 domain SBAENT
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 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-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
    3082022B 30820194 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
    31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
    69666963 6174652D 32343939 30363533 3434301E 170D3131 30333330 30313330
    30395A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
    4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D32 34393930
    36353334 3430819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
    8100B2C2 FC0A0FBD 837DF346 67FF62FC 8A9DC022 340BF4BD E29A1265 1246D865
    A7E93A8C 7050C6E7 93D59BFD BF6445C0 1006ABCA D32539D9 37D3E1DF C5725548

```

```

81FE271A 345FC9EA B019B19B 4107E472 80A386A8 E41FAF9D EB04B9F3 00576E44
1254500E 4E605C72 E44F3652 72BF8169 0F414E9D 203E8CDC 87F8A1F5 A8D068A5
16390203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF 301F0603
551D2304 18301680 14EE9D5C AD804806 67111A10 584248CB 5DFAA6CF 6D301D06
03551D0E 04160414 EE9D5CAD 80480667 111A1058 4248CB5D FAA6CF6D 300D0609
2A864886 F70D0101 05050003 81810055 9E2A6A34 429432EE 0E5E33D5 3EA53D0E
8B266E23 CCB9F3D6 BA480605 F955604F 510E60DD 2BCD4523 24D1333D D0D44FC6
D4CD5324 535BA236 3099C129 AEE1E661 595DD08D B2CFDAF3 10E17EF9 CEB11E4A
68EFF6B2 B79FD15D F648F2AC 66F876AB 9CCB2941 F7B35518 2704AD09 38D43B0B
B15F2623 AC5E0546 EF4698F0 1BBF6C
quit
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
!
port-channel load-balance src-dst-ip
!
vlan internal allocation policy ascending
!
vlan 164
    name Data
!
vlan 165
    name Voice
!
vlan 179
    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 D4507
switchport trunk native vlan 999
switchport trunk allowed vlan 164,165,179
switchport mode trunk
ip arp inspection trust
logging event trunk-status
ip dhcp snooping trust
!
interface FastEthernet0
no ip address
shutdown
!
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
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 1/0/2 - 1/0/24 are all configured
! the same as 1/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/0/25
!
interface GigabitEthernet1/0/26
!
interface TenGigabitEthernet1/0/1
description Connected to D4507
switchport trunk native vlan 999
switchport trunk allowed vlan 164,165,179
switchport mode trunk
ip arp inspection trust
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 TenGigabitEthernet1/0/2
!
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 - 2/0/24 are all configured
! the same as 2/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet2/0/25
!
interface GigabitEthernet2/0/26
!
interface GigabitEthernet2/0/27
!
interface GigabitEthernet2/0/28
!
interface GigabitEthernet3/0/1
    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 3/0/2 - 3/0/24 are all configured
! the same as 3/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet3/0/25
!
interface GigabitEthernet3/0/26
!
interface TenGigabitEthernet3/0/1

```

```

description Connected to D4507
switchport trunk native vlan 999
switchport trunk allowed vlan 164,165,179
switchport mode trunk
ip arp inspection trust
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 TenGigabitEthernet3/0/2
!
interface Vlan1
no ip address
shutdown
!
interface Vlan179
ip address 10.4.79.5 255.255.255.0
!
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
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO
snmp-server community cisco123 RW
tacacs server TACACS-SERVER-1
address ipv4 10.4.48.15
key 7 0812494D1B1C113C1712
!
line con 0
line vty 0 4
exec-timeout 0 0
transport preferred none
transport input ssh
line vty 5 15
exec-timeout 0 0
transport preferred none

```

```
transport input ssh
!
ntp 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
service timestamps log datetime msec
service password-encryption
!
hostname A3750X
!
boot-start-marker
boot-end-marker
!
enable secret 4 /DtCCr53Q4B18jsIm1UEqu7cNVZTOhxTZyUnZdsSrsW
!
username admin password 7 0508571C22431F5B4A
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 102-103
!
ip dhcp snooping vlan 102-103
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 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-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
  3082022B 30820194 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
  31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
  69666963 6174652D 34303732 32313332 3438301E 170D3131 30333330 30313239
  35395A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
  4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D34 30373232
  31333234 3830819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
  8100B403 DE70BB51 31A5AF98 CC7AF1AC A8500AA4 A2034835 5291C698 F7C0FBCD
  EEB03980 3BB61CAF D9D21F84 DA7213EA C6352403 06CBEBFE EC97E297 06C6DAC9
  32424D6D F31A80E7 9F082907 14BA61BB AEFE0F18 0BF6C803 DDECDD08C 92C144F6
  4C86A82D BDABC1D2 8B77987B 8F6D15E4 63424027 931C59FF 05A4C98A 040B86E5
  1CE50203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF 301F0603
  551D2304 18301680 14BA4303 83D489F6 DB264C0A 2A70B153 9135B752 7E301D06
  03551D0E 04160414 BA430383 D489F6DB 264C0A2A 70B15391 35B7527E 300D0609
  2A864886 F70D0101 05050003 81810006 28742F06 6C70E15B A3330BDA AA6E496F
  36FE4E37 984C998E E6D57B6D 7D20B4A3 487AE82C 78F85DCA 798FA20E A36C4467
  A8B25709 B452F41B 7AED16A3 E0E7D255 9C282B82 25386DB0 BC431110 D2145250
  114CD7F5 F9306543 9DB2E3FF 373E5571 CCB1683E 2CB46BF8 B414F482 F3377295
  2DDD751F 8B95814E 38CE5A0F 9CF889
quit
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
!
port-channel load-balance src-dst-ip
!
vlan internal allocation policy ascending
!
vlan 102
  name Data
!
vlan 103
  name Voice
!
vlan 115
  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 Distribution Layer
switchport trunk encapsulation dot1q
switchport trunk native vlan 999
switchport trunk allowed vlan 102,103,115
switchport mode trunk
ip arp inspection trust
logging event trunk-status
ip dhcp snooping trust
!
interface FastEthernet0
no ip address
shutdown
!
interface GigabitEthernet1/0/1
description Connected to IP Phone
switchport access vlan 102
switchport mode access
switchport voice vlan 103
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 102
switchport mode access
switchport voice vlan 103
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 - 1/0/48 are all configured
! the same as 1/0/2 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/1/1
!
interface GigabitEthernet1/1/2
!
interface GigabitEthernet1/1/3

```

```

!
interface GigabitEthernet1/1/4
!
interface TenGigabitEthernet1/1/1
description Link to Distribution Layer 1/3/13
switchport trunk encapsulation dot1q
switchport trunk native vlan 999
switchport trunk allowed vlan 102,103,115
switchport mode trunk
ip arp inspection trust
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 102
switchport mode access
switchport voice vlan 103
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 - 2/0/48 are all configured
! the same as 2/0/1 and have been removed for conciseness
! *****

```

```

!
interface GigabitEthernet2/1/1
!
interface GigabitEthernet2/1/2
!
interface GigabitEthernet2/1/3
!
interface GigabitEthernet2/1/4
!
interface TenGigabitEthernet2/1/1
!
interface TenGigabitEthernet2/1/2
!
interface GigabitEthernet3/0/1
    switchport access vlan 102
    switchport mode access
    switchport voice vlan 103
    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 3/0/2 - 3/0/48 are all configured
! the same as 3/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet3/1/1
!
interface GigabitEthernet3/1/2
!
interface GigabitEthernet3/1/3
!
interface GigabitEthernet3/1/4
!

```

```

interface TenGigabitEthernet3/1/1
  description Link to Distribution Layer 2/3/13
  switchport trunk encapsulation dot1q
  switchport trunk native vlan 999
  switchport trunk allowed vlan 102,103,115
  switchport mode trunk
  ip arp inspection trust
  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
  shutdown
!
interface Vlan115
  ip address 10.4.15.6 255.255.255.0
!
ip default-gateway 10.4.15.1
no ip http server
ip http authentication aaa
ip http secure-server
!
ip access-list extended AUTOQOS-ACL-DEFAULT
  permit ip any any
!
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO
snmp-server community cisco123 RW
tacacs server TACACS-SERVER-1
  address ipv4 10.4.48.15
  key 7 04680E051D2458650C00
!
line con 0
line vty 0 4
  exec-timeout 0 0
  transport preferred none
  transport input ssh

```

```

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

```

Catalyst 3850 Series Switch

The Cisco Catalyst 3850 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-480 and Cisco StackPower technologies.

```

!
version 15.0
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
service compress-config
!
hostname A3850
!
boot-start-marker
boot-end-marker
!
!
vrf definition Mgmt-vrf
!
  address-family ipv4
  exit-address-family
!
  address-family ipv6
  exit-address-family
!
enable secret 4 /DtCCr53Q4B18jSIm1UEqu7cNVZTOhxTZyUnZdsSrsW
!
username admin password 7 0508571C22431F5B4A
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
stack-mac persistent timer 0
clock timezone PST -8 0
clock summer-time PDT recurring
switch 1 provision ws-c3850-48p
switch 2 provision ws-c3850-24p
switch 3 provision ws-c3850-48p
ip arp inspection vlan 104-105
!
ip domain-name cisco.local
ip name-server 10.4.48.10
ip dhcp snooping vlan 104-105
no ip dhcp snooping information option
ip dhcp snooping
!
!
qos wireless-default-untrust
vtp mode transparent
udld enable
!
table-map AutoQos-4.0-Table-Policed-Dscp
    map from 0 to 8
    map from 10 to 8
    map from 18 to 8
    map from 24 to 8
    map from 46 to 8
    default copy
table-map policed-dscp
    default copy
!
!
crypto pki trustpoint TP-self-signed-0
    enrollment selfsigned
    subject-name cn=IOS-Self-Signed-Certificate-0
    revocation-check none
    rsakeypair TP-self-signed-0
!
!
crypto pki certificate chain TP-self-signed-0
    certificate self-signed 01
        30820237 308201A0 A0030201 02020101 300D0609 2A864886 F70D0101 04050030

```

```

28312630 24060355 0403131D 494F532D 53656C66 2D536967 6E65642D 43657274
69666963 6174652D 30301E17 0D313330 35313331 38333432 355A170D 32303031
30313030 30303030 5A302831 26302406 03550403 131D494F 532D5365 6C662D53
69676E65 642D4365 72746966 69636174 652D3030 819F300D 06092A86 4886F70D
01010105 0003818D 00308189 02818100 E3EFA26D 3C28269C F93FF90C 54857C9A
935A62A4 07877DC5 44052FB9 17CC78D0 B4BDABDC 1EAB92BC 622EEE5E 4C7F0007
F556BFDE 26ABDB78 8B4E9210 C3CA2476 3E226FB5 F78B9A64 804CF463 E65464C8
8A94D3CB 3950D403 78630931 E6605271 491DE9E3 B6F94C87 6C3568D6 F7346F1C
AEA2F359 01ABC9D6 7E8374AD D6CDEAB9 02030100 01A37130 6F300F06 03551D13
0101FF04 05300301 01FF301C 0603551D 11041530 13821141 33383530 2E636973
636F2E6C 6F63616C 301F0603 551D2304 18301680 142029DA ADFF0CAA 92EBDE09
50AEFBBF 6EC96FBA 80301D06 03551D0E 04160414 2029DAAD FF0CAA92 EBDE0950
AEFBBF6E C96FBA80 300D0609 2A864886 F70D0101 04050003 81810002 F558896B
630A2506 7E211298 E684A226 B20F7C70 BC2E5F7C 42D01ED2 3ACCCD08 A7C8EC36
C2D561B1 93E33567 1AE1A146 81CD7253 2FBDFD13 3071ACCE B9A5C0CE EC2699F2
7868BAA8 1A51E736 2DB45EB4 3E28A50D 6816C271 F863B913 A81F4511 E196D6C4
3B5C7B9E CF7F9773 720100C8 8820F532 3856B47F D68E28E1 91C103
quit
!
!
!
!
!
diagnostic bootup level minimal
port-channel load-balance src-dst-ip
identity policy webauth-global-inactive
inactivity-timer 3600
!
spanning-tree mode rapid-pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
!
redundancy
mode sso
!
!
vlan 104
name Data
!
vlan 105
name Voice
!
vlan 115
name Management
!
vlan 999
name AntiVLANhopping

```

```

!
ip ssh version 2
!
class-map match-any MULTIMEDIA-STREAMING-QUEUE
    match dscp af31 af32 af33
class-map match-any AutoQos-4.0-Output-Multimedia-Conf-Queue
    match dscp af41 af42 af43
    match cos 4
class-map match-any CONTROL-MGMT-QUEUE
    match dscp cs2 cs3 cs6 cs7
class-map match-any TRANSACTIONAL-DATA-QUEUE
    match dscp af21 af22 af23
class-map match-any AutoQos-4.0-Output-Bulk-Data-Queue
    match dscp af11 af12 af13
    match cos 1
class-map match-any AutoQos-4.0-Output-Priority-Queue
    match dscp cs4 cs5 ef
    match cos 5
class-map match-any AutoQos-4.0-Voip-Data-Class
    match ip dscp ef
class-map match-any AutoQos-4.0-Voip-Signal-Class
    match ip dscp cs3
class-map match-any AutoQos-4.0-Output-Multimedia-Strm-Queue
    match dscp af31 af32 af33
class-map match-any SCAVENGER-QUEUE
    match dscp cs1
class-map match-any MULTIMEDIA-CONFERENCING-QUEUE
    match dscp af41 af42 af43
class-map match-any BULK-DATA-QUEUE
    match dscp af11 af12 af13
class-map match-any non-client-nrt-class
    match non-client-nrt
class-map match-any AutoQos-4.0-Default-Class
    match access-group name AutoQos-4.0-Acl-Default
class-map match-any AutoQos-4.0-Output-Trans-Data-Queue
    match dscp af21 af22 af23
    match cos 2
class-map match-any PRIORITY-QUEUE
    match dscp cs4 cs5 ef
class-map match-any AutoQos-4.0-Output-Scavenger-Queue
    match dscp cs1
class-map match-any AutoQos-4.0-Output-Control-Mgmt-Queue
    match dscp cs3 cs6 cs7
    match cos 3
!
policy-map 2P6Q3T
    class PRIORITY-QUEUE

```

```

    priority level 1 percent 30
class CONTROL-MGMT-QUEUE
    bandwidth remaining percent 10
    queue-limit dscp cs2 percent 80
    queue-limit dscp cs3 percent 90
    queue-limit dscp cs6 percent 100
class MULTIMEDIA-CONFERENCING-QUEUE
    bandwidth remaining percent 10
    queue-buffers ratio 10
class MULTIMEDIA-STREAMING-QUEUE
    bandwidth remaining percent 10
    queue-buffers ratio 10
class TRANSACTIONAL-DATA-QUEUE
    bandwidth remaining percent 10
    queue-buffers ratio 10
class BULK-DATA-QUEUE
    bandwidth remaining percent 4
class SCAVENGER-QUEUE
    bandwidth remaining percent 1
    queue-buffers ratio 10
class class-default
    bandwidth remaining percent 25
    queue-buffers ratio 25
policy-map AutoQos-4.0-Output-Policy
class AutoQos-4.0-Output-Priority-Queue
    priority level 1 percent 30
class AutoQos-4.0-Output-Control-Mgmt-Queue
    bandwidth remaining percent 10
    queue-limit dscp cs2 percent 80
    queue-limit dscp cs3 percent 90
    queue-limit dscp cs6 percent 100
    queue-buffers ratio 10
class AutoQos-4.0-Output-Multimedia-Conf-Queue
    bandwidth remaining percent 10
    queue-buffers ratio 10
class AutoQos-4.0-Output-Trans-Data-Queue
    bandwidth remaining percent 10
    queue-buffers ratio 10
class AutoQos-4.0-Output-Bulk-Data-Queue
    bandwidth remaining percent 4
    queue-buffers ratio 10
class AutoQos-4.0-Output-Scavenger-Queue
    bandwidth remaining percent 1
    queue-buffers ratio 10
class AutoQos-4.0-Output-Multimedia-Strm-Queue
    bandwidth remaining percent 10
    queue-buffers ratio 10

```

```

class class-default
  bandwidth remaining percent 25
  queue-buffers ratio 25
policy-map AutoQos-4.0-CiscoPhone-Input-Policy
class AutoQos-4.0-Voip-Data-Class
  set ip dscp ef
  police cir 128000 bc 8000
    conform-action transmit
    exceed-action set-dscp-transmit dscp table policed-dscp
    violate-action drop
class AutoQos-4.0-Voip-Signal-Class
  set ip dscp cs3
  police cir 32000 bc 8000
    conform-action transmit
    exceed-action set-dscp-transmit dscp table policed-dscp
    violate-action drop
class AutoQos-4.0-Default-Class
  set dscp default
  police cir 10000000 bc 8000
    conform-action transmit
    exceed-action set-dscp-transmit dscp table policed-dscp
    violate-action drop
!
!
!
!
macro name AccessEdgeQoS
  auto qos voip cisco-phone
@
macro name EgressQoS
  service-policy output 2P6Q3T
@
!
!
interface Port-channel1
  description Etherchannel Link to D6500-VSS
  switchport trunk native vlan 999
  switchport trunk allowed vlan 104,105,115
  switchport mode trunk
  ip arp inspection trust
  logging event link-status
  logging event trunk-status
  ip dhcp snooping trust
!
interface GigabitEthernet0/0
  vrf forwarding Mgmt-vrf
  no ip address

```

```

negotiation auto
!
interface GigabitEthernet1/0/1
description Connected to IP Phone
switchport access vlan 104
switchport mode access
switchport voice vlan 105
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
trust device cisco-phone
auto qos voip cisco-phone
macro description AccessEdgeQoS
spanning-tree portfast
service-policy input AutoQos-4.0-CiscoPhone-Input-Policy
service-policy output AutoQos-4.0-Output-Policy
ip verify source
ip dhcp snooping limit rate 100
!
interface GigabitEthernet1/0/2
switchport access vlan 104
switchport mode access
switchport voice vlan 105
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
trust device cisco-phone
auto qos voip cisco-phone
macro description AccessEdgeQoS
spanning-tree portfast
service-policy input AutoQos-4.0-CiscoPhone-Input-Policy
service-policy output AutoQos-4.0-Output-Policy
ip verify source
ip dhcp snooping limit rate 100
!

```

```

! *****
! Interface GigabitEthernet 1/0/3 - 1/0/48 are all configured
! the same as 1/0/2 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/1/1
!
interface GigabitEthernet1/1/2
!
interface GigabitEthernet1/1/3
!
interface GigabitEthernet1/1/4
!
interface TenGigabitEthernet1/1/1
!
interface TenGigabitEthernet1/1/2
!
interface TenGigabitEthernet1/1/3
description Connected to D6500-VSS {Ten 1/2/14}
switchport trunk native vlan 999
switchport trunk allowed vlan 104,105,115
switchport mode trunk
ip arp inspection trust
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
ip dhcp snooping trust
!
interface TenGigabitEthernet1/1/4
!
interface GigabitEthernet2/0/1
switchport access vlan 104
switchport mode access
switchport voice vlan 105
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
trust device cisco-phone
auto qos voip cisco-phone
macro description AccessEdgeQoS
spanning-tree portfast

```

```

service-policy input AutoQos-4.0-CiscoPhone-Input-Policy
service-policy output AutoQos-4.0-Output-Policy
ip verify source
ip dhcp snooping limit rate 100
!
! *****
! Interface GigabitEthernet 2/0/2 - 2/0/24 are all configured
! the same as 2/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet2/1/1
!
interface GigabitEthernet2/1/2
!
interface GigabitEthernet2/1/3
!
interface GigabitEthernet2/1/4
!
interface TenGigabitEthernet2/1/1
!
interface TenGigabitEthernet2/1/2
!
interface TenGigabitEthernet2/1/3
!
interface TenGigabitEthernet2/1/4
!
interface GigabitEthernet3/0/1
    switchport access vlan 104
    switchport mode access
    switchport voice vlan 105
    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
    trust device cisco-phone
    auto qos voip cisco-phone
    macro description AccessEdgeQoS
    spanning-tree portfast
    service-policy input AutoQos-4.0-CiscoPhone-Input-Policy
    service-policy output AutoQos-4.0-Output-Policy
    ip verify source
    ip dhcp snooping limit rate 100
!

```

```

! *****
! Interface GigabitEthernet 3/0/2 - 3/0/48 are all configured
! the same as 3/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet3/1/1
!
interface GigabitEthernet3/1/2
!
interface GigabitEthernet3/1/3
!
interface GigabitEthernet3/1/4
!
interface TenGigabitEthernet3/1/1
!
interface TenGigabitEthernet3/1/2
!
interface TenGigabitEthernet3/1/3
description Connected to D6500-VSS {Ten 2/2/14}
switchport trunk native vlan 999
switchport trunk allowed vlan 104,105,115
switchport mode trunk
ip arp inspection trust
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS
channel-protocol lacp
channel-group 1 mode active
ip dhcp snooping trust
!
interface TenGigabitEthernet3/1/4
!
interface Vlan1
no ip address
shutdown
!
interface Vlan115
ip address 10.4.15.7 255.255.255.0
!
ip default-gateway 10.4.15.1
no ip http server
ip http authentication aaa
ip http secure-server
!
ip access-list extended AutoQoS-4.0-Acl-Default
permit ip any any

```

```
!  
access-list 55 permit 10.4.48.0 0.0.0.255  
!  
snmp-server community cisco RO  
snmp-server community cisco123 RW  
tacacs server TACACS-SERVER-1  
    address ipv4 10.4.48.15  
    key 7 0538030C33495A221C1C  
!  
line con 0  
    stopbits 1  
line aux 0  
    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  
ap dot11 24ghz rrm channel dca 1  
ap dot11 24ghz rrm channel dca 6  
ap dot11 24ghz rrm channel dca 11  
ap dot11 5ghz rrm channel dca 36  
ap dot11 5ghz rrm channel dca 40  
ap dot11 5ghz rrm channel dca 44  
ap dot11 5ghz rrm channel dca 48  
ap dot11 5ghz rrm channel dca 52  
ap dot11 5ghz rrm channel dca 56  
ap dot11 5ghz rrm channel dca 60  
ap dot11 5ghz rrm channel dca 64  
ap dot11 5ghz rrm channel dca 149  
ap dot11 5ghz rrm channel dca 153  
ap dot11 5ghz rrm channel dca 157  
ap dot11 5ghz rrm channel dca 161  
ap group default-group  
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 localtime  
service timestamps log datetime msec localtime  
service password-encryption  
service compress-config  
!  
hostname A4507  
!  
boot-start-marker  
boot-end-marker  
!  
vrf definition mgmtVrf  
!  
  address-family ipv4  
  exit-address-family  
!  
  address-family ipv6  
  exit-address-family  
!  
enable secret 4 /DtCCr53Q4B18jsIm1UEqu7cNVZTOhxTZyUnZdsSrs  
!  
username admin password 7 0007421507545A545C  
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  
hw-module uplink select tengigabitethernet  
udld enable  
ip arp inspection vlan 100-101  
!
```

```

ip vrf Liin-vrf
!
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
ipv6 multicast rpf use-bgp
vtp mode transparent
!
cts server deadtime 0
no cts server test all enable
cts server test all idle-time 0
cts server test all deadtime 0
!
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
!
crypto pki certificate chain TP-self-signed-15385
  certificate self-signed 01
    30820221 3082018A A0030201 02020101 300D0609 2A864886 F70D0101 05050030
    2C312A30 28060355 04031321 494F532D 53656C66 2D536967 6E65642D 43657274
    69666963 6174652D 31353338 35301E17 0D313330 35313332 30313134 315A170D
    32303031 30313030 30303030 5A302C31 2A302806 03550403 1321494F 532D5365
    6C662D53 69676E65 642D4365 72746966 69636174 652D3135 33383530 819F300D
    06092A86 4886F70D 01010105 0003818D 00308189 02818100 BC23517F 75A769FE
    BC8026B1 31013675 5F553C2F EC9B13CE 3D6309E7 8D10DEF0 D996FA34 9E752DE8
    06856084 E7FE5D31 3C9169AD 30E7531F 35C4968C F0616A81 394BF3F1 FD409FAC
    A4FD4E24 4477FD3E B3E5BA10 4523B920 F016CAE8 E9CDB237 DA96A375 80C837D0
    C61A2C71 783E3C49 E2D1DA33 BF4900D2 41B70D5B D4FCF8B9 02030100 01A35330
    51300F06 03551D13 0101FF04 05300301 01FF301F 0603551D 23041830 168014F2
    5F8AE4BB 821515A8 B97DE684 AEAFA684 4B152B30 1D060355 1D0E0416 0414F25F
    8AE4BB82 1515A8B9 7DE684AE AF68644B 152B300D 06092A86 4886F70D 01010505
    00038181 004CB4A6 E160FCA5 10D4FD0B C3824D68 C514E5F4 425F432E 0B1ADF35
    9FCB6E35 FC2EA30A 06E3BE4B FDE978CA 62CBE542 0440DF0B 5BE148D7 DEFB48E7
    06A23572 5BCE9F1E 04E9462C 1C5BB1CA 9AE6ACE3 734F5C6E A8FC222D 19C4F4F2
    0D371F87 3B1AFCB8 F425EB47 7157B5C7 DEB8D858 3CAD688E C9BD0BE7 5452BBCB
    B6CEA92D 26
  quit
power redundancy-mode redundant
!
spanning-tree mode rapid-pvst

```

```

spanning-tree portfast bpduguard default
spanning-tree extend system-id
!
redundancy
mode rpr
!
vlan internal allocation policy ascending
!
vlan 100
name Data
!
vlan 101
name Voice
!
vlan 115
name Management
!
vlan 999
name AntiVLANhopping
!
ip ssh version 2
!
class-map match-any MULTIMEDIA-STREAMING-QUEUE
match dscp af31 af32 af33
class-map match-all AutoQos-4.0-Scavenger-Classify
match access-group name AutoQos-4.0-ACL-Scavenger
class-map match-all AutoQos-4.0-Signaling-Classify
match access-group name AutoQos-4.0-ACL-Signaling
class-map match-any CONTROL-MGMT-QUEUE
match dscp cs2 cs3 cs6 cs7
class-map match-any AutoQos-4.0-Priority-Queue
match cos 5
match dscp ef
match dscp cs5
match dscp cs4
class-map match-all AutoQos-4.0-VoIP-Data-Cos
match cos 5
class-map match-any TRANSACTIONAL-DATA-QUEUE
match dscp af21 af22 af23
class-map match-any AutoQos-4.0-Multimedia-Stream-Queue
match dscp af31
match dscp af32
match dscp af33
class-map match-all AutoQos-4.0-VoIP-Signal-Cos
match cos 3
class-map match-any AutoQos-4.0-Multimedia-Conf-Queue
match cos 4

```

```

match dscp af41
match dscp af42
match dscp af43
match access-group name AutoQos-4.0-ACL-Multimedia-Conf
class-map match-all AutoQos-4.0-Default-Classify
match access-group name AutoQos-4.0-ACL-Default
class-map match-any AutoQos-4.0-Bulk-Data-Queue
match cos 1
match dscp af11
match dscp af12
match dscp af13
match access-group name AutoQos-4.0-ACL-Bulk-Data
class-map match-all AutoQos-4.0-Transaction-Classify
match access-group name AutoQos-4.0-ACL-Transactional-Data
class-map match-any SCAVENGER-QUEUE
match dscp cs1
class-map match-any MULTIMEDIA-CONFERENCING-QUEUE
match dscp af41 af42 af43
class-map match-any BULK-DATA-QUEUE
match dscp af11 af12 af13
class-map match-any AutoQos-4.0-Scavenger-Queue
match dscp cs1
match cos 1
match access-group name AutoQos-4.0-ACL-Scavenger
class-map match-any AutoQos-4.0-Control-Mgmt-Queue
match cos 3
match dscp cs7
match dscp cs6
match dscp cs3
match dscp cs2
match access-group name AutoQos-4.0-ACL-Signaling
class-map match-any PRIORITY-QUEUE
match dscp cs4 cs5 ef
class-map match-all AutoQos-4.0-Bulk-Data-Classify
match access-group name AutoQos-4.0-ACL-Bulk-Data
class-map match-any AutoQos-4.0-Trans-Data-Queue
match cos 2
match dscp af21
match dscp af22
match dscp af23
match access-group name AutoQos-4.0-ACL-Transactional-Data
class-map match-any AutoQos-4.0-VoIP-Data
match dscp ef
match cos 5
class-map match-all AutoQos-4.0-Multimedia-Conf-Classify
match access-group name AutoQos-4.0-ACL-Multimedia-Conf
class-map match-any AutoQos-4.0-VoIP-Signal

```

```

    match dscp cs3
    match cos 3
!
policy-map AutoQos-4.0-Cisco-Phone-Input-Policy
  class AutoQos-4.0-VoIP-Data-Cos
    set dscp ef
    police cir 128000 bc 8000
      exceed-action set-dscp-transmit cs1
      exceed-action set-cos-transmit 1
  class AutoQos-4.0-VoIP-Signal-Cos
    set dscp cs3
    police cir 32000 bc 8000
      exceed-action set-dscp-transmit cs1
      exceed-action set-cos-transmit 1
  class class-default
    set dscp default
    set cos 0
policy-map AutoQos-4.0-Output-Policy
  class AutoQos-4.0-Scavenger-Queue
    bandwidth remaining percent 1
  class AutoQos-4.0-Priority-Queue
    priority
    police cir percent 30 bc 33 ms
  class AutoQos-4.0-Control-Mgmt-Queue
    bandwidth remaining percent 10
  class AutoQos-4.0-Multimedia-Conf-Queue
    bandwidth remaining percent 10
  class AutoQos-4.0-Multimedia-Stream-Queue
    bandwidth remaining percent 10
  class AutoQos-4.0-Trans-Data-Queue
    bandwidth remaining percent 10
    dbl
  class AutoQos-4.0-Bulk-Data-Queue
    bandwidth remaining percent 4
    dbl
  class class-default
    bandwidth remaining percent 25
    dbl
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 AccessEdgeQoS
    auto qos voip cisco-phone
@
macro name EgressQoS
    service-policy output 1P7Q1T
@
!
interface Port-channel1
    description EtherChannel Link to Distribution Layer
    switchport
    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
    ip dhcp snooping trust
!
interface FastEthernet1
    vrf forwarding mgmtVrf
    no ip address
    speed auto
    duplex auto
!
interface GigabitEthernet1/1
    description Connected to IP Phone
    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

```

```

auto qos voip cisco-phone
qos trust device cisco-phone
macro description AccessEdgeQoS
spanning-tree portfast
service-policy input AutoQos-4.0-Cisco-Phone-Input-Policy
service-policy output AutoQos-4.0-Output-Policy
ip verify source vlan dhcp-snooping
ip dhcp snooping limit rate 100
!
interface GigabitEthernet1/2
  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
  auto qos voip cisco-phone
  qos trust device cisco-phone
  macro description AccessEdgeQoS
  spanning-tree portfast
  service-policy input AutoQos-4.0-Cisco-Phone-Input-Policy
  service-policy output AutoQos-4.0-Output-Policy
  ip verify source vlan dhcp-snooping
  ip dhcp snooping limit rate 100
!
! *****
! Interface GigabitEthernet 1/3 - 1/48 are all configured
! the same as 1/2 and have been removed for conciseness
! *****
!
interface TenGigabitEthernet3/1
  description Link to D6500-VSS Ten 1/2/13
  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 Link to D6500-VSS Ten 2/2/13
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
!
no 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
!
ip access-list extended AutoQos-4.0-ACL-Bulk-Data
permit tcp any any eq ftp

```

```

permit tcp any any eq ftp-data
permit tcp any any eq 22
permit tcp any any eq smtp
permit tcp any any eq 465
permit tcp any any eq 143
permit tcp any any eq 993
permit tcp any any eq pop3
permit tcp any any eq 995
permit tcp any any eq 1914
ip access-list extended AutoQos-4.0-ACL-Default
    permit ip any any
ip access-list extended AutoQos-4.0-ACL-Multimedia-Conf
    permit udp any any range 16384 32767
ip access-list extended AutoQos-4.0-ACL-Scavenger
    permit tcp any any eq 1214
    permit udp any any eq 1214
    permit tcp any any range 2300 2400
    permit udp any any range 2300 2400
    permit tcp any any eq 3689
    permit udp any any eq 3689
    permit tcp any any range 6881 6999
    permit tcp any any eq 11999
    permit tcp any any range 28800 29100
ip access-list extended AutoQos-4.0-ACL-Signaling
    permit tcp any any range 2000 2002
    permit tcp any any range 5060 5061
    permit udp any any range 5060 5061
ip access-list extended AutoQos-4.0-ACL-Transactional-Data
    permit tcp any any eq 443
    permit tcp any any eq 1521
    permit udp any any eq 1521
    permit tcp any any eq 1526
    permit udp any any eq 1526
    permit tcp any any eq 1575
    permit udp any any eq 1575
    permit tcp any any eq 1630
    permit udp any any eq 1630
!
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO
snmp-server community cisco123 RW
tacacs server TACACS-SERVER-1
    address ipv4 10.4.48.15
    key 7 13361211190910012E3D
!
line con 0

```

```
stopbits 1
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 update-calendar
ntp server 10.4.48.17
end
```

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 CVD 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 4 /DtCCr53Q4B18jSIm1UEqu7cNVZTOhxTZyUnZdsSrs  
!  
username admin password 7 0205554808095E731F  
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 24 46 to 8
mls qos map cos-dscp 0 8 16 24 32 46 48 56
mls qos srr-queue input bandwidth 70 30
mls qos srr-queue input threshold 1 80 90
mls qos srr-queue input priority-queue 2 bandwidth 30
mls qos srr-queue input cos-map queue 1 threshold 2 3
mls qos srr-queue input cos-map queue 1 threshold 3 6 7
mls qos srr-queue input cos-map queue 2 threshold 1 4
mls qos srr-queue input dscp-map queue 1 threshold 2 24
mls qos srr-queue input dscp-map queue 1 threshold 3 48 49 50 51 52 53 54 55
mls qos srr-queue input dscp-map queue 1 threshold 3 56 57 58 59 60 61 62 63
mls qos srr-queue input dscp-map queue 2 threshold 3 32 33 40 41 42 43 44 45
mls qos srr-queue input dscp-map queue 2 threshold 3 46 47
mls qos srr-queue output cos-map queue 1 threshold 3 4 5
mls qos srr-queue output cos-map queue 2 threshold 1 2
mls qos srr-queue output cos-map queue 2 threshold 2 3
mls qos srr-queue output cos-map queue 2 threshold 3 6 7
mls qos srr-queue output cos-map queue 3 threshold 3 0
mls qos srr-queue output cos-map queue 4 threshold 3 1
mls qos srr-queue output dscp-map queue 1 threshold 3 32 33 40 41 42 43 44 45
mls qos srr-queue output dscp-map queue 1 threshold 3 46 47
mls qos srr-queue output dscp-map queue 2 threshold 1 16 17 18 19 20 21 22 23
mls qos srr-queue output dscp-map queue 2 threshold 1 26 27 28 29 30 31 34 35
mls qos srr-queue output dscp-map queue 2 threshold 1 36 37 38 39
mls qos srr-queue output dscp-map queue 2 threshold 2 24
mls qos srr-queue output dscp-map queue 2 threshold 3 48 49 50 51 52 53 54 55
mls qos srr-queue output dscp-map queue 2 threshold 3 56 57 58 59 60 61 62 63
mls qos srr-queue output dscp-map queue 3 threshold 3 0 1 2 3 4 5 6 7
mls qos srr-queue output dscp-map queue 4 threshold 1 8 9 11 13 15
mls qos srr-queue output dscp-map queue 4 threshold 2 10 12 14
mls qos queue-set output 1 threshold 1 100 100 50 200
mls qos queue-set output 1 threshold 2 125 125 100 400
mls qos queue-set output 1 threshold 3 100 100 100 3200
mls qos queue-set output 1 threshold 4 60 150 50 200
mls qos queue-set output 1 buffers 15 25 40 20
mls qos
!
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 01
  3082022B 30820194 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
  31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
  69666963 6174652D 31343432 30353538 3038301E 170D3131 30333330 30313335
  30335A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
  4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D31 34343230
  35353830 3830819F 300D0609 2A864886 F70D0101 01050003 818D0030 81890281
  8100BCA8 45E65AC2 2C30CA43 43C87577 1CF94F3F 2901A09A 9BE87755 E4B0953C
  4D89CD46 0376D6AE A7971FBE 1AB7C2DA FE68768B FD5BBEC1 90AC6487 A48DCF8E
  05FBB25C 3F157D66 149507A0 65818B31 8723E4A8 86D94E44 27046DCF 47C04C57
  F988D6C8 AE7E0970 81E2F5D3 CFBCFD7B FCB6A018 61206E1C 18025C12 9BEBC47C
  61830203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF 301F0603
  551D2304 18301680 144715FC C03CE92F 7EC99AA0 9ADB3CF3 E6AA4790 32301D06
  03551D0E 04160414 4715FCC0 3CE92F7E C99AA09A DB3CF3E6 AA479032 300D0609
  2A864886 F70D0101 05050003 8181003F 5706B7E4 46101724 C75CC80A 5ECC9533
  37C65480 88468C84 FBA862B4 E8B6A9D9 D869AAFD A52ED724 6CBE0C3F 92118207
  4419A9B4 30AF6BD0 96BD69DB 7DB02992 006A36A8 6559A1A0 5552F0F4 D98775DF
  8BCE7E2F 5CF15A6F E2886F1A 190CDC7A D817C3E9 B36DE0B9 A1798E97 6603650C
  F59AA1CB 6AB6CD02 27C0C234 B7B312
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
  name Data
!
vlan 181
  name Voice
!
vlan 195
  name Management
!
vlan 999
  name AntiVLANhopping

```

```

!
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-channel32
  description EtherChannel link to Core Switch C6500-VSS
  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
  carrier-delay msec 0
!
interface Port-channel33
  description EtherChannel link to Access Switch A2960S
  switchport trunk encapsulation dot1q
  switchport trunk native vlan 999
  switchport trunk allowed vlan 180,181,195
  switchport mode trunk
!
interface FastEthernet0
  no ip address
  no ip route-cache
  shutdown
!
interface GigabitEthernet1/0/1
  description Connected to A2960S
  switchport trunk encapsulation dot1q
  switchport trunk native vlan 999
  switchport trunk allowed vlan 180,181,195
  switchport mode trunk
  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 33 mode active
!
interface GigabitEthernet1/0/2
!
! *****
! Interface GigabitEthernet 1/0/3 - 1/0/12 are all configured
! the same as 1/0/3 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/1/1
description Connected to C6500-VSS
no switchport
no ip address
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 32 mode active
!
interface GigabitEthernet1/1/2
description Connected to C6500-VSS
no switchport
no ip address
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 32 mode active
!
interface GigabitEthernet1/1/3
description Connected to C6500-VSS
no switchport
no ip address
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 32 mode active
!
interface GigabitEthernet1/1/4
description Connected to C6500-VSS
no switchport
no ip address
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 32 mode active
!
interface TenGigabitEthernet1/1/1
!
interface TenGigabitEthernet1/1/2
!
interface GigabitEthernet2/0/1
shutdown
!
! *****
! Interface GigabitEthernet 2/0/2 - 2/0/12 are all configured
! the same as 2/0/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet2/1/1
shutdown
!
interface GigabitEthernet2/1/2
shutdown
!
interface GigabitEthernet2/1/3
shutdown
!
interface GigabitEthernet2/1/4
shutdown
!
interface TenGigabitEthernet2/1/1
!
interface TenGigabitEthernet2/1/2

```

```

!
interface GigabitEthernet3/0/1
  description Connected to A2960S
  switchport trunk encapsulation dot1q
  switchport trunk native vlan 999
  switchport trunk allowed vlan 180,181,195
  switchport mode trunk
  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 33 mode active
!
interface GigabitEthernet3/0/2
  shutdown
!
! *****
! Interface GigabitEthernet 3/0/3 - 3/0/12 are all configured
! the same as 3/0/2 and have been removed for conciseness
! *****
!
interface GigabitEthernet3/1/1
  description Connected to C6500-VSS
  no switchport
  no ip address
  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 32 mode active
!
interface GigabitEthernet3/1/2
  description Connected to C6500-VSS
  no switchport
  no ip address
  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 32 mode active
!
interface GigabitEthernet3/1/3
description Connected to C6500-VSS
no switchport
no ip address
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 32 mode active
!
interface GigabitEthernet3/1/4
description Connected to C6500-VSS
no switchport
no ip address
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 32 mode active
!
interface TenGigabitEthernet3/1/1
!
interface TenGigabitEthernet3/1/2
!
interface Vlan1
no ip address
shutdown
!
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
ip pim sparse-mode
!
router eigrp 100
network 10.4.0.0 0.1.255.255
passive-interface default
no passive-interface Port-channel32
eigrp router-id 10.4.95.254
nsf
!
no ip http server
ip http authentication aaa
ip http secure-server
!
ip pim autorp listener
ip pim register-source Loopback0
ip tacacs source-interface Loopback0
!
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
address ipv4 10.4.48.15
key 7 04680E051D2458650C00
!
line con 0
line vty 0 4
exec-timeout 0 0
transport preferred none
transport input ssh
line vty 5 15
exec-timeout 0 0
transport preferred none
transport input ssh
!
ntp source Loopback0
ntp server 10.4.48.17
end

```

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-end-marker  
!  
vrf definition mgmtVrf  
!  
  address-family ipv4  
  exit-address-family  
!  
  address-family ipv6  
  exit-address-family  
!  
enable secret 4 /DtCCr53Q4B18jSIm1UEqu7cNVZTOhxTZyUnZdsSrs  
!  
username admin password 7 094F1F1A1A0A464058  
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 Liin-vrf  
!  
ip multicast-routing
```

```

ip domain-name cisco.local
ip name-server 10.4.48.10
!
ipv6 multicast rpf use-bgp
vtp domain SBAENT
vtp mode transparent
!
crypto pki trustpoint TP-self-signed-14338
  enrollment selfsigned
  subject-name cn=IOS-Self-Signed-Certificate-14338
  revocation-check none
  rsakeypair TP-self-signed-14338
!
crypto pki certificate chain TP-self-signed-14338
  certificate self-signed 01
    30820221 3082018A A0030201 02020101 300D0609 2A864886 F70D0101 05050030
    2C312A30 28060355 04031321 494F532D 53656C66 2D536967 6E65642D 43657274
    69666963 6174652D 31343333 38301E17 0D313330 35313332 31353133 345A170D
    32303031 30313030 30303030 5A302C31 2A302806 03550403 1321494F 532D5365
    6C662D53 69676E65 642D4365 72746966 69636174 652D3134 33333830 819F300D
    06092A86 4886F70D 01010105 0003818D 00308189 02818100 9A4CD417 AFB0E70A
    44B43841 621022D9 74741412 69EDC33E F606C138 0D91B4B3 3AF341A5 11D77410
    C3AC819A 79958BB6 4FC07175 779B844B F4609851 4080A405 DAA285F3 D4B32880
    432CB73A 9DC619CC 97AF058A C7294A35 63BF259B 92A7266E A566C879 9B236CCD
    F972808B 1B287F28 1E0B3B60 83C06D76 C912C8B8 689FC523 02030100 01A35330
    51300F06 03551D13 0101FF04 05300301 01FF301F 0603551D 23041830 16801463
    D636407C 5245B03C 2229F4D6 4F710CBE B61CEF30 1D060355 1D0E0416 041463D6
    36407C52 45B03C22 29F4D64F 710CBEB6 1CEF300D 06092A86 4886F70D 01010505
    00038181 0029BE8E 998636BF 026396C2 B7EA1BF9 4F7AB005 13EBC052 3531E7EB
    82C87DA8 C3D88C11 1C1DEDDA 9A38602C D8F0C58B E8B76E75 4E22EC06 18C544A2
    454FC20D 4AC32E60 ECE2FE1B 151B9C3B D3E237E3 9B0A8437 34258CB6 7B9BD148
    83A7138E 9A6A9B10 DC919710 EC28EA9D A65BAA9B DD782F84 B1AB0B10 144C7574
    EBC862A2 1C
  quit
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
!
vlan internal allocation policy ascending
!
vlan 164

```

```

    name DataVlan
!
vlan 165
    name VoiceVlan
!
vlan 166
    name A3750EWdata
!
vlan 167
    name A3750EWvoice
!
vlan 168
    name PR2_DataVLAN
!
vlan 169
    name PR2_VoiceVLAN
!
vlan 179
    name ManagementVlan
!
vlan 901-902
!
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 cs2 cs3 cs6 cs7
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-any BULK-DATA-QUEUE
    match dscp af11 af12 af13
class-map match-any PRIORITY-QUEUE
    match dscp cs4 cs5 ef
!
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
@
!
interface Loopback0
    ip address 10.4.79.254 255.255.255.255
    ip pim sparse-mode
!
interface Port-channel32
    description EtherChannel link to A2960S-4k
    switchport
    switchport trunk native vlan 999
    switchport trunk allowed vlan 164,165,179
    switchport mode trunk
    logging event link-status
!
interface Port-channel34
    description Link to Core Switch C6500-VSS
    ip address 10.4.40.18 255.255.255.0
    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
!
interface FastEthernet1
    vrf forwarding mgmtVrf
    no ip address
    speed auto
    duplex auto
!

```

```

interface TenGigabitEthernet1/1
  description Connected to A2960S-4k
  switchport trunk native vlan 999
  switchport trunk allowed vlan 164,165,179
  switchport mode trunk
  logging event link-status
  logging event trunk-status
  macro description EgressQoS
  channel-protocol lacp
  channel-group 32 mode active
  service-policy output 1P7Q1T
!
interface TenGigabitEthernet1/2
!
! *****
! Interface TenGigabitEthernet 1/3 - 1/12 are all configured
! the same as 1/3 and have been removed for conciseness
! *****
!
interface TenGigabitEthernet2/1
  description Connected to A2960S-4k
  switchport trunk native vlan 999
  switchport trunk allowed vlan 164,165,179
  switchport mode trunk
  logging event link-status
  logging event trunk-status
  macro description EgressQoS
  channel-protocol lacp
  channel-group 32 mode active
  service-policy output 1P7Q1T
!
interface TenGigabitEthernet2/2
!
! *****
! Interface TenGigabitEthernet 2/3 - 2/12 are all configured
! the same as 2/3 and have been removed for conciseness
! *****
!
interface TenGigabitEthernet3/1
  description Link to C6506-2 Ten 4/1
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  carrier-delay msec 0
  macro description EgressQoS
  channel-protocol lacp

```

```

channel-group 34 mode active
service-policy output 1P7Q1T
!
interface TenGigabitEthernet3/2
!
interface TenGigabitEthernet3/3
!
interface TenGigabitEthernet3/4
!
interface TenGigabitEthernet4/1
description Link to C6506-1 Ten 4/1
no switchport
no ip address
logging event link-status
logging event trunk-status
carrier-delay msec 0
macro description EgressQoS
channel-protocol lacp
channel-group 34 mode active
service-policy output 1P7Q1T
!
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 pim sparse-mode
!
router eigrp 100
network 10.4.0.0 0.1.255.255
passive-interface default
no passive-interface Port-channel34
eigrp router-id 10.4.79.254
eigrp stub connected summary
nsf
!
no ip http server
ip http authentication aaa
ip http secure-server
ip pim autorp listener
ip pim register-source Loopback0
ip tacacs source-interface Loopback0
!
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
address ipv4 10.4.48.15
key 7 097F4B0A0B0003390E15
!
line con 0
stopbits 1
line vty 0 4
transport preferred none
transport input ssh
line vty 5 15

```

```

transport preferred none
transport input ssh
!
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, 10-Gigabit Ethernet, and 40-Gigabit Ethernet EtherChannel uplinks using Cisco Multi-chassis EtherChannel.

```

!
version 15.1
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service password-encryption
service counters max age 5
!
hostname D6500-VSS
!
boot-start-marker
boot-end-marker
!
hw-module switch 1 slot 2 operation-mode port-group 2 TenGigabitEthernet
hw-module switch 1 slot 3 operation-mode port-group 2 TenGigabitEthernet
hw-module switch 2 slot 2 operation-mode port-group 2 TenGigabitEthernet
hw-module switch 2 slot 3 operation-mode port-group 2 TenGigabitEthernet
logging cns-events
enable secret 5 $1$c0E6$S0wlHmHkCh9EldWhQ7n/R.
!
username admin password 7 070C705F4D06485744
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
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
ipv6 multicast rpf use-bgp
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
    enrollment selfsigned
    subject-name cn=IOS-Self-Signed-Certificate-1225
    revocation-check none
    rsakeypair TP-self-signed-1225
!
crypto pki certificate chain TP-self-signed-1225
    certificate self-signed 01
        3082021F 30820188 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
        2B312930 27060355 04031320 494F532D 53656C66 2D536967 6E65642D 43657274
        69666963 6174652D 31323235 301E170D 31333035 31343030 34333031 5A170D32
        30303130 31303030 3030305A 302B3129 30270603 55040313 20494F53 2D53656C
        662D5369 676E6564 2D436572 74696669 63617465 2D313232 3530819F 300D0609
        2A864886 F70D0101 01050003 818D0030 81890281 8100BE83 D71D8491 F5704E5C
        688E9FE1 C30E0A2F 2E01A183 5EA67B85 24AC31C5 75462370 9C13BF70 A1DA5B4A
        F02D7090 2B3FF914 146A86BC B0116A3B F9E6BCC6 41A437C8 54724321 EC1A88B8
        4516F398 17EB2DD7 E1DF048E 46DB7046 E203E6F1 87FF28F2 8CAC820B 6EC64C9F
        BCE46654 BE5957B3 332D8644 33E1DE62 77469836 BFB50203 010001A3 53305130
        0F060355 1D130101 FF040530 030101FF 301F0603 551D2304 18301680 14B506AF
        51163CAE 4D0CC2D8 2F8AC651 59599E4B 92301D06 03551D0E 04160414 B506AF51
        163CAE4D 0CC2D82F 8AC65159 599E4B92 300D0609 2A864886 F70D0101 05050003
        81810014 5630C568 414F68DD 25C7E8C3 2C74B27B EF1FF061 753EA3EE 6A3C659B
        085ECBF2 CF6FA82C 6A0B3619 5FDD6E99 FF1C361C 831F0DA3 A2841133 4466A06B
        42C2C9FA 5C9732E8 E4D7F783 E1490CE6 85766480 DA4BCBA9 E2F21116 21E85788

```

```

4FDB9BAF C4FB1D7E 9CD07CDF 1B786D31 D41F6EF4 83007818 C43D0568 F25C806A DDADA4
quit
!
macro name EgressQoS_TenOrFortyGig
    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
!
power redundancy-mode combined switch 1
power redundancy-mode combined switch 2
!
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 Data
    mtu 9216
!
vlan 101
    name Voice
!
vlan 102
    name Data_2
!
vlan 103
    name Voice_2
!
vlan 104
    name Data_3
!
vlan 105
    name Voice_3
!

```

```

vlan 115
  name ManagementVlan
!
vlan 999
  name AntiVLANhopping
!
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 10.4.15.254 255.255.255.255
    ip pim sparse-mode
!
interface Port-channel1
    description EtherChannel link 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 link to A3750X
    switchport
    switchport trunk native vlan 999
    switchport trunk allowed vlan 102,103,115
    switchport mode trunk
    logging event link-status
!
interface Port-channel3
    description EtherChannel link to A3850
    switchport
    switchport trunk native vlan 999
    switchport trunk allowed vlan 104,105,115
    switchport mode trunk
    logging event link-status
!
interface Port-channel30
    description Link to Core VSS
    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
!
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
no switchport
no ip address
shutdown
!
! *****
! Interface GigabitEthernet 1/1/2 - 1/1/23 are all configured
! the same as 1/1/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/1/24
no switchport
no ip address
no cdp enable
dual-active fast-hello
!
interface FortyGigabitEthernet1/2/1
description Link to Core VSS
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 30 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet1/2/2
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/2/13
description Link 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 TenOrFortyGig
channel-protocol lacp
channel-group 1 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/2/14
description Link to A3850
switchport
switchport trunk native vlan 999
switchport trunk allowed vlan 104,105,115
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 3 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/2/15
no switchport
no ip address
shutdown
!
! *****
! Interface TenGigabitEthernet 1/2/16 - 1/2/20 are all configured
! the same as 1/2/15 and have been removed for conciseness
! *****
!
interface FortyGigabitEthernet1/3/1
description Link to Core VSS
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 30 mode active

```

```

    service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet1/3/2
    no switchport
    no ip address
    shutdown
!
interface TenGigabitEthernet1/3/13
    description Link to A3750X Ten1/1/1
    switchport
    switchport trunk native vlan 999
    switchport trunk allowed vlan 102,103,115
    switchport mode trunk
    logging event link-status
    logging event trunk-status
    logging event bundle-status
    macro description EgressQoS TenOrFortyGig
    channel-protocol lacp
    channel-group 2 mode active
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/3/14
    no switchport
    no ip address
    shutdown
!
! *****
! Interface TenGigabitEthernet 1/3/15 - 1/3/20 are all configured
! the same as 1/3/14 and have been removed for conciseness
! *****
!
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
no switchport
no ip address
shutdown
!
! *****
! Interface GigabitEthernet 2/1/2 - 2/1/23 are all configured
! the same as 2/1/1 and have been removed for conciseness
! *****
!
interface GigabitEthernet2/1/24
no switchport
no ip address
no cdp enable
dual-active fast-hello
!
interface FortyGigabitEthernet2/2/1
description Link to Core VSS
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoSSTenOrFortyGig
channel-protocol lacp
channel-group 30 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet2/2/2
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/2/13
description Link 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 TenOrFortyGig
channel-protocol lacp
channel-group 1 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/2/14
description Link to A3850
switchport
switchport trunk native vlan 999
switchport trunk allowed vlan 104,105,115
switchport mode trunk
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 3 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/2/15
no switchport
no ip address
shutdown
!
! *****
! Interface TenGigabitEthernet 2/2/16 - 2/2/20 are all configured
! the same as 2/2/15 and have been removed for conciseness
! *****
!
interface FortyGigabitEthernet2/3/1
description Link to Core VSS
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 30 mode active

```

```

    service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet2/3/2
    no switchport
    no ip address
    shutdown
!
interface TenGigabitEthernet2/3/13
    description Link to A3750X Ten3/1/1
    switchport
    switchport trunk native vlan 999
    switchport trunk allowed vlan 102,103,115
    switchport mode trunk
    logging event link-status
    logging event trunk-status
    logging event bundle-status
    macro description EgressQoS TenOrFortyGig
    channel-protocol lacp
    channel-group 2 mode active
    service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/3/14
    no switchport
    no ip address
    shutdown
!
! *****
! Interface TenGigabitEthernet 2/3/15 - 2/3/20 are all configured
! the same as 1/3/14 and have been removed for conciseness
! *****
!
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 Vlan102
ip address 10.4.2.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan103
ip address 10.4.3.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan104
ip address 10.4.4.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan105
ip address 10.4.5.1 255.255.255.0
ip helper-address 10.4.48.10
ip pim sparse-mode
!
interface Vlan115
ip address 10.4.15.1 255.255.255.128

```

```

ip pim sparse-mode
!
router eigrp 100
network 10.4.0.0 0.1.255.255
passive-interface default
no passive-interface Port-channel30
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
!
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
address ipv4 10.4.48.15
key 7 113A1C0605171F270133
!
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
line aux 0
line vty 0 4
transport preferred none
transport input ssh
line vty 5 15
transport preferred none
transport input ssh
!
ntp source Loopback0
ntp update-calendar
ntp server 10.4.48.17
!
module provision switch 1
slot 1 slot-type 156 port-type 31 number 24 virtual-slot 17
slot 2 slot-type 333 port-type 113 number 4 port-type 60 number 16 virtual-slot 18
slot 3 slot-type 333 port-type 113 number 4 port-type 60 number 16 virtual-slot 19
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 2 slot-type 333 port-type 113 number 4 port-type 60 number 16 virtual-slot 34
slot 3 slot-type 333 port-type 113 number 4 port-type 60 number 16 virtual-slot 35
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

```

Core Layer Configurations

Catalyst Virtual Switching System 4T

The Cisco Catalyst 6500 VSS 4T system is the premier LAN core platform and 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, 10-Gigabit Ethernet, and 40-Gigabit Ethernet EtherChannel connectivity using Cisco Multi-chassis EtherChannel. 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 15.1  
service timestamps debug datetime msec localtime  
service timestamps log datetime msec localtime  
service password-encryption  
service counters max age 5  
!  
hostname C6500-VSS  
!  
boot-start-marker  
boot-end-marker  
!  
logging cns-events  
enable secret 5 $l$xrJ.$DOOUPsEBh9N/m9LQinAlt0  
!  
username admin password 7 130646010803557878  
aaa new-model  
!  
aaa group server tacacs+ TACACS-SERVERS  
    server name TACACS-SERVER-1  
!  
aaa authentication login default group TACACS-SERVERS local  
aaa authorization console  
aaa authorization exec default group TACACS-SERVERS local  
!  
aaa session-id common  
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
```

```

ipv6 multicast rpf use-bgp
vtp mode transparent
udld enable
!
switch virtual domain 1
  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-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
    3082021F 30820188 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
    2B312930 27060355 04031320 494F532D 53656C66 2D536967 6E65642D 43657274
    69666963 6174652D 31323333 301E170D 31333035 31343032 30343235 5A170D32
    30303130 31303030 3030305A 302B3129 30270603 55040313 20494F53 2D53656C
    662D5369 676E6564 2D436572 74696669 63617465 2D313233 3330819F 300D0609
    2A864886 F70D0101 01050003 818D0030 81890281 8100C137 7A1AD558 DD3065C9
    A387140A 4B7CDD9D 2FA03548 545F9BDC CA3A9DD2 E2CC511F 45230254 E8156486
    4D2A8ED2 6739A42B 827860D6 3C342E93 7592A351 7DD83A86 D25255A4 30A6CE8F
    580F5E5E A9A74A1C E2EE7764 EAAB6F2D C0DBD86A A3B38F37 EBBBCA27 3DED7008
    93FCB16F 52FBA1F9 0E5F9D73 F515FDCC B6EE1990 47D30203 010001A3 53305130
    0F060355 1D130101 FF040530 030101FF 301F0603 551D2304 18301680 14BDD669
    F0B0D474 FF6A5709 437AF50A FF07F20A 37301D06 03551D0E 04160414 BDD669F0
    B0D474FF 6A570943 7AF50AFF 07F20A37 300D0609 2A864886 F70D0101 05050003
    8181009C 84A17465 F186A0F0 3C1C5C65 5E0A5AF8 DCCB819C 9B5E2E8F 1BF30EA9
    8287BE78 08204B52 6446C40A 0125F7A7 25790820 076246A9 F7B2B637 D8900C5A
    557C0977 EB860940 08CCE5F2 5B9F5475 35DBA1A3 2233C52B 8E89DA21 104D20C4
    85E06E33 8270288F 10247680 CFC40F06 9E59395A 7F66F8A9 5C1993D4 4C9C8E76 AD9830
  quit
!
macro name EgressQoS TenOrFortyGig
  service-policy type lan-queuing output 1P7Q4T

```

```

@
macro name EgressQoS
    service-policy type lan-queuing output 1P3Q8T
@
!
spanning-tree mode rapid-pvst
spanning-tree extend system-id
!
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
    name NAM
!
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 Distribution Switch D6500-VSS
    no switchport
    ip address 10.4.40.9 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
!
interface Port-channel32
    description EtherChannel link to Distribution Switch D3750X
    no switchport
    ip address 10.4.40.25 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
!
interface Port-channel34
    description Link to Distribution Switch D4507
    no switchport
    ip address 10.4.40.17 255.255.255.252
    ip pim sparse-mode
    logging event link-status

```

```

    carrier-delay msec 0
!
interface Port-channel36
    description Link to IE-D3750X
    no switchport
    ip address 10.4.40.33 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
!
interface Port-channel38
    description Link to WAN-D3750X
    no switchport
    ip address 10.4.40.41 255.255.255.252
    ip pim sparse-mode
    logging event link-status
    carrier-delay msec 0
!
interface Port-channel40
    description EtherChannel link to Data Center Switch DC5500-A
    no switchport
    ip address 10.4.40.49 255.255.255.252
    ip pim sparse-mode
!
interface Port-channel41
    description EtherChannel link to Data Center Switch DC5500-B
    no switchport
    ip address 10.4.40.53 255.255.255.252
    ip pim sparse-mode
!
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
    description EtherChannel link to Distribution Switch D3750X
    no switchport
    no ip address
    logging event link-status

```

```

logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS
channel-protocol lacp
channel-group 32 mode active
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet1/1/2
description EtherChannel link to Distribution Switch D3750X
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS
channel-protocol lacp
channel-group 32 mode active
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet1/1/3
description EtherChannel link to Distribution Switch D3750X
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS
channel-protocol lacp
channel-group 32 mode active
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet1/1/4
description EtherChannel link to Distribution Switch D3750X
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS
channel-protocol lacp
channel-group 32 mode active
service-policy type lan-queuing output 1P3Q8T
!

```

```

interface GigabitEthernet1/1/5
  no switchport
  no ip address
  shutdown
  service-policy type lan-queuing output 1P3Q8T
!
! *****
! Interface GigabitEthernet1/1/6 - 1/1/23 are all configured
!   the same as 1/1/5 and have been removed for conciseness
! *****
!
interface GigabitEthernet1/1/24
  no switchport
  no ip address
  no cdp enable
  dual-active fast-hello
!
interface FortyGigabitEthernet1/3/1
  description EtherChannel link to D6500-VSS
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  carrier-delay msec 0
  macro description EgressQoS TenOrFortyGig
  channel-group 30 mode active
  service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet1/3/2
  no switchport
  no ip address
  shutdown
!
interface FortyGigabitEthernet1/3/3
  description EtherChannel link to D6500-VSS
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  carrier-delay msec 0
  macro description EgressQoS TenOrFortyGig
  channel-group 30 mode active
  service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet1/3/4

```

```

no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/4/1
description Link to Distribution Switch D4507
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 34 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/2
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/4/3
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/4/4
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet1/4/5
description Link to IE-D3750X
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 36 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/6
description Link to WAN-D3750X
no switchport
no ip address

```

```

logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 38 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/7
description EtherChannel link to DC Switch 5500-A eth1/19
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS TenOrFortyGig
channel-group 40 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet1/4/8
description EtherChannel link to DC Switch 5500-B eth1/19
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS TenOrFortyGig
channel-group 41 mode active
service-policy type lan-queuing output 1P7Q4T
!
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
  description EtherChannel link to Distribution Switch D3750X
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  carrier-delay msec 0
  macro description EgressQoS
  channel-protocol lacp
  channel-group 32 mode active
  service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet2/1/2
  description EtherChannel link to Distribution Switch D3750X
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  carrier-delay msec 0
  macro description EgressQoS
  channel-protocol lacp
  channel-group 32 mode active
  service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet2/1/3
  description EtherChannel link to Distribution Switch D3750X
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  carrier-delay msec 0
  macro description EgressQoS

```

```

channel-protocol lacp
channel-group 32 mode active
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet2/1/4
description EtherChannel link to Distribution Switch D3750X
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS
channel-protocol lacp
channel-group 32 mode active
service-policy type lan-queuing output 1P3Q8T
!
interface GigabitEthernet2/1/5
no switchport
no ip address
shutdown
service-policy type lan-queuing output 1P3Q8T
!
! *****
! Interface GigabitEthernet2/1/6 - 2/1/23 are all configured
! the same as 1/1/5 and have been removed for conciseness
! *****
!
interface GigabitEthernet2/1/24
no switchport
no ip address
no cdp enable
dual-active fast-hello
!
interface FortyGigabitEthernet2/3/1
description EtherChannel link to D6500-VSS
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS
channel-group 30 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet2/3/2

```

```

no switchport
no ip address
shutdown
!
interface FortyGigabitEthernet2/3/3
description EtherChannel link to D6500-VSS
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
carrier-delay msec 0
macro description EgressQoS TenOrFortyGig
channel-group 30 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface FortyGigabitEthernet2/3/4
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/4/1
description Link to Distribution Switch D4507
no switchport
no ip address
logging event link-status
logging event trunk-status
logging event bundle-status
macro description EgressQoS TenOrFortyGig
channel-protocol lacp
channel-group 34 mode active
service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/2
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/4/3
no switchport
no ip address
shutdown
!
interface TenGigabitEthernet2/4/4
no switchport
no ip address
shutdown

```

```

!
interface TenGigabitEthernet2/4/5
  description Link to IE-D3750X
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  macro description EgressQoS TenOrFortyGig
  channel-protocol lacp
  channel-group 36 mode active
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/6
  description Link to WAN-D3750X
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  macro description EgressQoS TenOrFortyGig
  channel-protocol lacp
  channel-group 38 mode active
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/7
  description EtherChannel link to DC Switch 5500-A eth1/20
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  carrier-delay msec 0
  macro description EgressQoS TenOrFortyGig
  channel-group 40 mode active
  service-policy type lan-queuing output 1P7Q4T
!
interface TenGigabitEthernet2/4/8
  description EtherChannel link to DC Switch 5500-B eth1/20
  no switchport
  no ip address
  logging event link-status
  logging event trunk-status
  logging event bundle-status
  carrier-delay msec 0
  macro description EgressQoS TenOrFortyGig
  channel-group 41 mode active

```

```

    service-policy type lan-queuing output 1P7Q4T
!
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
!
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 Loopback1 scope 32
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
!
access-list 10 permit 239.1.0.0 0.0.255.255
access-list 55 permit 10.4.48.0 0.0.0.255
!
snmp-server community cisco RO
snmp-server community cisco123 RW
snmp-server trap-source Loopback0
tacacs server TACACS-SERVER-1
  address ipv4 10.4.48.15
  key 7 0538030C33495A221C1C
!
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
line aux 0
line vty 0 4
  transport preferred none
  transport input ssh
line vty 5 15
  transport preferred none
  transport input ssh
!
ntp source Loopback0

```

```
ntp update-calendar
ntp server 10.4.48.17
!
module provision switch 1
  slot 1 slot-type 156 port-type 31 number 24  virtual-slot 17
  slot 3 slot-type 333 port-type 113 number 4 port-type 60 number 16  virtual-slot 19
  slot 4 slot-type 328 port-type 60 number 8  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 3 slot-type 333 port-type 113 number 4 port-type 60 number 16  virtual-slot 35
  slot 4 slot-type 328 port-type 60 number 8  virtual-slot 36
  slot 5 slot-type 318 port-type 31 number 3 port-type 60 number 2  virtual-slot 37
  !
end
```

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