APPENDIX B

Sample Configurations for Dhub Switches

This appendix presents sample configurations for the following Cisco Catalyst 6509 Dhub switches in Figure 3-1 on page 3-2, in Dhub A, Dhub B, and Dhub C, respectively:

DHub_Sw_A Configuration

```
version 12.2
service timestamps debug datetime localtime
service timestamps log datetime localtime
no service password-encryption
service internal
!
hostname DHub_Sw_A
!
boot system bootflash:s72033-jk9o3sv-mz.122-17d.SXB1.bin
logging snmp-authfail
enable password cisco123
!
clock timezone PST -8
clock summer-time PDT recurring
vtp mode transparent
ip subnet-zero
!
!
no ip domain-lookup
!
ip vrf Video
 description Video traffic received from Headend
 rd 1000:2
!
mpls ldp logging neighbor-changes
no mls flow ip
no mls flow ipv6
mls qos map dscp-cos 32 to 5
mls qos
mls cef error action freeze
!
!
power redundancy-mode combined
!
```

```
spanning-tree mode pvst
spanning-tree portfast bpduguard default
no spanning-tree optimize bpdu transmission
spanning-tree extend system-id
no spanning-tree vlan 1690,1694
port-channel load-balance dst-port
diagnostic cns publish cisco.cns.device.diag_results
diagnostic cns subscribe cisco.cns.device.diag_commands
!
redundancy
 mode rpr-plus
 main-cpu
  auto-sync running-config
  auto-sync standard
!
vlan internal allocation policy ascending
vlan access-log ratelimit 2000
!
vlan 1690,1694
!
class-map match-all class_high_speed_data
  match access-group name acl_high_speed_data
!
!
policy-map setDSCP
 description Mark DSCP values for the different types of traffic.
  class class_high_speed_data
   set dscp default
!
!
interface Loopback1
 description Endpoint for Tunnel1
 ip address 11.11.11.11 255.255.255.255
!
interface Loopback2
 description Endpoint for Tunnel2
 ip address 12.12.12.12 255.255.255.255
!
interface Port-channel1
 description Video traffic to/from QAM_Sw_A (Gig3/1,Gig4/14)
 ip vrf forwarding Video
 ip address 192.168.160.1 255.255.255.240
!
interface Tunnel1
 description Vlan1690 Tx to Headend_S3
 ip vrf forwarding Video
 no ip address
 tunnel source Loopback1
 tunnel destination 10.10.10.10
 tunnel udlr send-only Vlan1690
 tunnel udlr address-resolution
!
interface Tunnel2
 description Vlan1694 Rx from DHub_Sw_B
 ip vrf forwarding Video
 no ip address
 tunnel source Loopback2
 tunnel destination 13.13.13.13
 tunnel udlr receive-only Vlan1694
!
interface TenGigabitEthernet1/1
 description UDL1 Rx from Headend, UDL2 Tx to DHub_Sw_B
 no ip address
 no wrr-queue random-detect 2
```

```
    mls qos trust dscp
 switchport
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 1690,1694
 switchport mode trunk
 switchport nonegotiate
!
interface TenGigabitEthernet1/2
 no ip address
 shutdown
!
interface TenGigabitEthernet1/3
 no ip address
 shutdown
!
interface TenGigabitEthernet1/4
 no ip address
 shutdown
!
interface GigabitEthernet3/1
 description BDL1: Non-video traffic to/from Headend (Gig2/15)
 ip address 192.168.168.2 255.255.255.252
 mls qos trust dscp
!
interface GigabitEthernet3/2
 description BDL2: Non-video traffic to/from DHub_Sw_B (Gig3/2)
 ip address 192.168.168.5 255.255.255.252
 mls qos trust dscp
!
interface GigabitEthernet3/3
 no ip address
 shutdown
!
interface GigabitEthernet3/4
 description BDL42: High speed data
 ip address 192.168.168.17 255.255.255.252
 no cdp enable
 service-policy input setDSCP
!
interface GigabitEthernet3/5
 no ip address
 shutdown
!
interface GigabitEthernet3/6
 description BDL51: Video traffic to/from QAM_Sw_A (Gig3/1)
 ip vrf forwarding Video
 no ip address
 channel-group 1 mode on
!
interface GigabitEthernet3/7
 description BDL52: Video traffic to/from QAM_Sw_A (Gig4/14)
 ip vrf forwarding Video
 no ip address
 channel-group 1 mode on
!
interface GigabitEthernet3/8
 description BDL53: Video traffic to/from uMG9820
 ip vrf forwarding Video
 ip address 192.168.160.17 255.255.255.252
 no ip redirects
 no ip unreachables
 speed nonegotiate
!
interface GigabitEthernet5/1
```

```
 no ip address
 shutdown
!
interface GigabitEthernet5/2
 no ip address
 media-type rj45
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
interface Vlan1690
 description Video traffic to/from Headend
 ip vrf forwarding Video
 ip address 192.168.169.2 255.255.255.252
!
interface Vlan1694
 description Video traffic to/from DHub_Sw_B
 ip vrf forwarding Video
 ip address 192.168.169.5 255.255.255.252
!
router ospf 100 vrf Video
 log-adjacency-changes
 capability vrf-lite
 network 192.168.160.0 0.0.0.255 area 0
 network 192.168.169.0 0.0.0.7 area 0
!
router ospf 101
 log-adjacency-changes
 passive-interface default
 no passive-interface Vlan1690
 no passive-interface Vlan1694
 no passive-interface GigabitEthernet3/1
 no passive-interface GigabitEthernet3/2
 network 1.1.1.2 0.0.0.0 area 0
 network 11.11.11.11 0.0.0.0 area 0
 network 12.12.12.12 0.0.0.0 area 0
 network 192.168.168.0 0.0.0.31 area 0
!
ip classless
no ip http server
!
!
ip access-list extended acl_high_speed_data
 remark Identify high speed data traffic.
 permit ip 192.168.168.16 0.0.0.3 any
!
!
dial-peer cor custom
!
!
line con 0
 exec-timeout 0 0
 password cisco123
 logging synchronous
 login
line vty 0 4
 exec-timeout 0 0
 password cisco123
 logging synchronous
 login
!
scheduler runtime netinput 300
```

```
!
end
```

DHub_Sw_B Configuration

```
version 12.2
service timestamps debug datetime localtime
service timestamps log datetime localtime
no service password-encryption
!
hostname DHub_Sw_B
!
boot system bootflash:s72033-jk9o3sv-mz.122-17d.SXB1.bin
logging snmp-authfail
enable password cisco123
!
clock timezone PST -8
clock summer-time PDT recurring
vtp mode transparent
ip subnet-zero
!
!
no ip domain-lookup
!
ip vrf Video
 description Video traffic received from Headend
 rd 1000:3
!
mpls ldp logging neighbor-changes
mls ip cef load-sharing full
no mls flow ip
no mls flow ipv6
mls qos map dscp-cos 32 to 5
mls qos
mls cef error action freeze
!
!
power redundancy-mode combined
!
spanning-tree mode pvst
spanning-tree portfast bpduguard default
no spanning-tree optimize bpdu transmission
spanning-tree extend system-id
no spanning-tree vlan 1694
port-channel load-balance dst-port
diagnostic cns publish cisco.cns.device.diag_results
diagnostic cns subscribe cisco.cns.device.diag_commands
!
redundancy
 mode sso
 main-cpu
  auto-sync running-config
  auto-sync standard
!
vlan internal allocation policy ascending
vlan access-log ratelimit 2000
!
vlan 164,166,1694
!
class-map match-all class_VoIP
  match access-group name acl_VoIP
```

```
class-map match-all class_high_speed_data
  match access-group name acl_high_speed_data
class-map match-all class_VoD_OOB
  match access-group name acl_VoD_OOB
!
!
policy-map setDSCP
 description Mark DSCP values for the different types of traffic
  class class_VoIP
    set dscp ef
  class class_VoD_OOB
    set dscp cs3
  class class_high_speed_data
    set dscp default
!
!
interface Loopback2
 description Endpoint for Tunnel2
 ip address 13.13.13.13 255.255.255.255
!
interface Port-channel2
 description Video traffic to/from QAM_Sw_B (Gig3/2,Gig5/14)
 ip vrf forwarding Video
 ip address 192.168.161.1 255.255.255.240
!
interface Tunnel2
 description UDL2 Tx to DHub_Sw_A
 ip vrf forwarding Video
 no ip address
 tunnel source Loopback2
 tunnel destination 12.12.12.12
 tunnel udlr send-only Vlan1694
 tunnel udlr address-resolution
!
interface TenGigabitEthernet1/1
 description UDL2: Video traffic from DHub_Sw_A (TenGig1/1)
 no ip address
 no keepalive
 mls qos trust dscp
 unidirectional receive-only
 switchport
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 1694
 switchport mode trunk
 switchport nonegotiate
!
interface TenGigabitEthernet1/2
 no ip address
 shutdown
!
interface TenGigabitEthernet1/3
 no ip address
 shutdown
!
interface TenGigabitEthernet1/4
 no ip address
 shutdown
!
interface GigabitEthernet3/1
 no ip address
 shutdown
!
interface GigabitEthernet3/2
 description BDL2: Non-video traffic to/from DHub_Sw_A (Gig3/2)
```

```
 ip address 192.168.168.6 255.255.255.252
 mls qos trust dscp
!
interface GigabitEthernet3/3
 description BDL4: Non-video traffic to/from DHub_Sw_C (Gig3/3)
 ip address 192.168.168.9 255.255.255.252
 mls qos trust dscp
!
interface GigabitEthernet3/4
 description BDL43: High speed data
 ip address 192.168.168.21 255.255.255.252
 no cdp enable
 service-policy input setDSCP
!
interface GigabitEthernet3/5
 no ip address
 shutdown
!
interface GigabitEthernet3/6
 description BDL54: Video traffic to/from QAM_Sw_B (Gig3/2)
 ip vrf forwarding Video
 no ip address
 channel-group 2 mode on
!
interface GigabitEthernet3/7
 description BDL55: Video traffic to/from QAM_Sw_B (Gig5/14)
 ip vrf forwarding Video
 no ip address
 channel-group 2 mode on
!
interface GigabitEthernet3/8
 description BDL56: Video traffic to/from uMG9820
 ip vrf forwarding Video
 ip address 192.168.161.17 255.255.255.252
 no ip redirects
 no ip unreachables
!
interface FastEthernet4/1
 no ip address
 shutdown
!
! omitted interfaces FastEthernet4/2 - 42
!
!
interface FastEthernet4/43
 no ip address
 shutdown
!
interface FastEthernet4/44
 description BDL44: VoIP traffic
 no ip address
 switchport
 switchport access vlan 164
 switchport mode access
 spanning-tree portfast
 service-policy input setDSCP
!
interface FastEthernet4/45
 no ip address
 shutdown
!
interface FastEthernet4/46
 no ip address
 shutdown
```

```
!
interface FastEthernet4/47
 no ip address
 shutdown
!
interface FastEthernet4/48
 description BDL55: VoD OOB traffic
 no ip address
 speed 100
 duplex full
 switchport
 switchport access vlan 166
 switchport mode access
 no cdp enable
 spanning-tree portfast
 service-policy input setDSCP
!
interface GigabitEthernet5/1
 no ip address
 shutdown
!
interface GigabitEthernet5/2
 no ip address
 media-type rj45
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
!
interface Vlan164
 description VoIP traffic
 ip address 192.168.164.1 255.255.255.0
!
interface Vlan166
 description VoD OOB traffic
 ip address 192.168.166.1 255.255.255.0
!
interface Vlan1694
 description Video traffic to/from DHub_Sw_A
 ip vrf forwarding Video
 ip address 192.168.169.6 255.255.255.252
 no ip redirects
 no ip unreachables
!
router ospf 100 vrf Video
 log-adjacency-changes
 capability vrf-lite
 network 192.168.161.0 0.0.0.255 area 0
 network 192.168.169.0 0.0.0.15 area 0
!
router ospf 101
 log-adjacency-changes
 passive-interface default
 no passive-interface Vlan1694
 no passive-interface GigabitEthernet3/2
 no passive-interface GigabitEthernet3/3
 network 13.13.13.13 0.0.0.0 area 0
 network 192.168.164.0 0.0.0.255 area 0
 network 192.168.166.0 0.0.0.255 area 0
 network 192.168.168.0 0.0.0.63 area 0
!
ip classless
```

```
                    no ip http server
                    !
                    !
                    ip access-list extended acl_VoD_OOB
                     remark Identify VoD OOB traffic.
                     permit ip 192.168.166.0 0.0.0.255 any
                    ip access-list extended acl_VoIP
                     remark Identify VoIP traffic.
                     permit ip 192.168.164.0 0.0.0.255 any
                    ip access-list extended acl_high_speed_data
                     remark Identify high speed data.
                     permit ip 192.168.168.20 0.0.0.3 any
                    !
                    !
                    dial-peer cor custom
                    !
                    !
                    line con 0
                     exec-timeout 0 0
                     password cisco123
                     logging synchronous
                     login
                    line vty 0 4
                     exec-timeout 0 0
                     password cisco123
                     logging synchronous
                     login
                    !
                    end
```

DHub_Sw_C Configuration

```
                    version 12.2
                    service timestamps debug datetime localtime
                    service timestamps log datetime localtime
                    no service password-encryption
                    !
                    hostname DHub_Sw_C
                    !
                    boot system bootflash:s72033-jk9o3sv-mz.122-17d.SXB1.bin
                    logging snmp-authfail
                    enable password cisco123
                    !
                    clock timezone PST -8
                    clock summer-time PDT recurring
                    vtp mode transparent
                    ip subnet-zero
                    !
                    !
                    no ip domain-lookup
                    !
                    ip vrf Video
                     description Video traffic received from Headend
                     rd 1001:4
                    !
                    mpls ldp logging neighbor-changes
                    no mls flow ip
                    no mls flow ipv6
                    mls qos map dscp-cos 32 to 5
                    mls qos
                    mls cef error action freeze
```

```
!
!
power redundancy-mode combined
spanning-tree mode pvst
spanning-tree portfast bpduguard default
no spanning-tree optimize bpdu transmission
diagnostic cns publish cisco.cns.device.diag_results
diagnostic cns subscribe cisco.cns.device.diag_commands
!
redundancy
 mode rpr-plus
 main-cpu
  auto-sync running-config
  auto-sync standard
!
vlan internal allocation policy ascending
vlan access-log ratelimit 2000
!
vlan 165
!
class-map match-all class_VoIP
  match access-group name acl_VoIP
!
!
policy-map setDSCP
 description Mark DSCP values for the VoIP traffic.
  class class_VoIP
    set dscp ef
!
!
interface Loopback3
 description Endpoint for Tunnel 3
 ip address 15.15.15.15 255.255.255.255
!
 interface Tunnel3
 description UDL3 Tx to Headend
 ip vrf forwarding Video
 no ip address
 tunnel source Loopback3
 tunnel destination 14.14.14.14
 tunnel udlr send-only TenGigabitEthernet1/1
 tunnel udlr address-resolution
!
interface TenGigabitEthernet1/1
 description UDL3: Video traffic from Headend (TenGig7/3)
 ip vrf forwarding Video
 ip address 192.168.169.10 255.255.255.252
 mls qos trust dscp
 unidirectional receive-only
!
interface TenGigabitEthernet1/2
 no ip address
 shutdown
!
interface TenGigabitEthernet1/3
 no ip address
 shutdown
!
interface TenGigabitEthernet1/4
 no ip address
 shutdown
!
interface GigabitEthernet3/1
 description BDL3: Non-video traffic to/from Headend (Gig2/16)
```

```
 ip address 192.168.168.14 255.255.255.252
 mls qos trust dscp
!
interface GigabitEthernet3/2
 no ip address
 shutdown
!
interface GigabitEthernet3/3
 description BDL4: Non-video traffic to/from DHub_Sw_B (Gig3/3)
 ip address 192.168.168.10 255.255.255.252
 mls qos trust dscp
!
interface GigabitEthernet3/4
 no ip address
 shutdown
!
! omitted interfaces GigabitEthernet3/5 - 15
!
interface GigabitEthernet3/16
 no ip address
 shutdown
!
interface GigabitEthernet4/1
 description BDL57: Video traffic to QAM_Sw_C (Gig6/13)
 ip vrf forwarding Video
 ip address 192.168.162.1 255.255.255.248
!
interface GigabitEthernet4/3
 description BDL59: VoD traffic to uMG9820
 ip vrf forwarding Video
 ip address 192.168.162.17 255.255.255.252
 no ip redirects
 no ip unreachables
!
interface GigabitEthernet4/4
 no ip address
!
! omitted interfaces GigabitEthernet4/5 - 44
!
interface GigabitEthernet4/45
 no ip address
 shutdown
!
interface GigabitEthernet4/46
 description BDL48: VoIP traffic
 no ip address
 switchport
 switchport access vlan 165
 switchport mode access
 spanning-tree portfast
 service-policy input setDSCP
!
interface GigabitEthernet4/47
 no ip address
 shutdown
!
interface GigabitEthernet4/48
 no ip address
 shutdown
!
interface GigabitEthernet5/1
 no ip address
 shutdown
!
```

```
interface GigabitEthernet5/2
 no ip address
 media-type rj45
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
!
interface Vlan165
 description VoIP traffic
 ip address 192.168.165.1 255.255.255.0
!
router ospf 100 vrf Video
 log-adjacency-changes
 capability vrf-lite
 network 192.168.162.0 0.0.0.255 area 0
 network 192.168.169.0 0.0.0.31 area 0
!
router ospf 101
 log-adjacency-changes
 passive-interface default
 no passive-interface TenGigabitEthernet1/1
 no passive-interface GigabitEthernet3/1
 no passive-interface GigabitEthernet3/3
 network 15.15.15.15 0.0.0.0 area 0
 network 192.168.165.0 0.0.0.255 area 0
 network 192.168.168.8 0.0.0.7 area 0
!
ip classless
no ip http server
!
!
ip access-list extended acl_VoIP
 remark Identify VoIP traffic.
 permit ip 192.168.165.0 0.0.0.255 any
!
!
dial-peer cor custom
!
!
line con 0
 exec-timeout 0 0
 password cisco123
 logging synchronous
 login
line vty 0 4
 exec-timeout 0 0
 password cisco123
 logging synchronous
 login
!
end
```