

Report

# **Cloud Infrastructre Lab 1**

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26. September 2016

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## **2. Grundlegendes**

### **2.1. Tools**

1. Tftpd64 um Konfigurationen zu dumpen
2. jPerf um den Durchsatz zu messen
- 3.

### 3. Informationsbeschaffung

In einem ersten Schritt wurden sämtliche Konfigurationen mit dem Tool Tftpd64 von den Router und Switches kopiert. Diese wurden dann in einem nächsten Schritt auf Fehlkonfigurationen analysiert. Dabei gingen wir nach folgendem Schema vor:

1.

#### 3.1. Terminologie

**HQ** Head Quarter

**BR** Branch

**DS** Distribution

**CS** Core

**WER** WAN Exchange Router

**IER** Internet Exchange Router

**FRR** FrameRelayRouter

#### 3.2. Konfiguration kopieren

Für jedes Geräte wurden die Outputs der folgenden Befehle auf die lokalen Notebooks kopiert. Alle Konfiguration sind im Anhang A zu finden

```
1 copy run tftp und dann [your local ip addr]
2 show ip interface brief
3 show cdp neighbors
4 show interface status
5 show interface trunk
6 show vlan
7 show ip route
8 show spanning
```

#### 3.3. Analyse des Konfigurationen

#### 3.4. DHCP

#### 3.5. VLAN

IEEE 802.1Q = Paketbasierte tagged VLAN's



DHCP Pool	Beschreibung	Bemerkung
172.16.1.0/24	HR	
172.16.2.0/24	ENGINEERING	
172.16.3.0/24	PRODUCTION	
172.16.4.0/24	FINANCE	
172.16.16.0/24	IT	DHCP exlude 172.16.16.1, 172.16.16.10 172.16.16.12
172.16.17.0/24	SERVER	DHCP exclude 172.16.17.1, 172.16.17.10 172.16.17.12
172.16.18.0/24	MARKETING	DHCP exclude 172.16.18.250, 172.16.18.254, 172.16.18.10 172.16.18.12
172.16.19.0/24	SALES	DHCP exclude 172.16.19.250, 172.16.19.254, 172.16.19.10 172.16.19.12
172.16.103.0/24	Branch 2	DHCP exlude 172.16.103.1, 172.16.103.10, 172.16.103.12

Tabelle 1: DHCP Pools

VLAN	Name	Bedeutung
VLAN 10	HR	Personalabteilung
VLAN 11	IT	IT Abteilung
VLAN 99	MGMT	Management
VLAN 100	STAFF	Mitarbeiter
VLAN 150	IWAS	???
VLAN 200	STUDENTS	Studenten

Tabelle 2: VLAN's

VLAN	Subnetz	Bemerkung
VLAN1	172.16.103.0/24	
VLAN10	172.16.1.0/24	
VLAN11	172.16.2.0/24	
VLAN20	no ip addr assigned	(router ospf)
VLAN21	172.16.16.0/24	(mtu-ignore)
VLAN30	172.16.17.0/24	
VLAN40	172.16.18.0/24	(standby)
VLAN41	172.16.19.0/24	(mtu ignore)
VLAN100	172.16.20.0/24	(mtu ignore)
VLAN103	172.16.23.0/24	

Tabelle 3: VLAN Subnetze

## **4. Logische Topologie**

## **5. Gefundene Fehler**

### **5.1. Layer 1**

Auf OSI Layer 1 wurden keine Fehler gefunden.

### **5.2. Layer 2**

#### **5.2.1. Design**

- HQ\_CS2 bildet die einzige Verbindung zu den Branches. Es bildet somit einen Single Point of Failure

#### **5.2.2. Speed**

- Die Port Channel Group 4 beim HQ\_CS1 ist auf Half Duplex 100 eingestellt.
- Die Port Channel Group 2 bei HQ\_CS2 ist auf 10 eingestellt.

#### **5.2.3. Spanning Tree**

#### **5.2.4. VLAN**

### **5.3. Layer 3**

#### **5.3.1. Routen**

### **5.4. OSPF**

## **6. Messungen**

### **6.1. Traceroute**

Alle Durchgeführten Traceroute Messungen sind im Anhang B zu finden.

### **6.2. jPerf**

## 7. Empfehlungen

Aufgrund der vorangehenden Erkenntnissen empfehlen wir, an folgenden Punkten anzusetzen:

- 1.

### 7.1. Kostenvoranschlag

Für die Umsetzung unserer Empfehlungen würden folgende Kosten anfallen.

Beschreibung	Zeitaufwand in h	Stundenansatz in CHF	Total
<b>Total</b>			<u><u>1 Million</u></u>

Tabelle 4: Kostenvoranschlag

## A. Konfigurationen

### A.1. BR1-R1

#### A.1.1. Running Configuration

```
1 BR1_R1#show run
2 Building configuration...
3
4
5 Current configuration : 1829 bytes
6 !
7 ! Last configuration change at 16:09:57 UTC Fri Jul 4 2014
8 version 15.1
9 service timestamps debug datetime msec
10 service timestamps log datetime msec
11 no service password-encryption
12 !
13 hostname BR1_R1
14 !
15 boot-start-marker
16 boot-end-marker
17 !
18 !
19 enable secret 5 $1$iIN0$WQSejQFOMmTy6nGBblqi60
20 !
21 no aaa new-model
22 !
23 memory-size iomem 10
24 !
25 dot11 syslog
26 ip source-route
27 !
28 !
29 ip cef
30 !
31 !
32 !
33 no ipv6 cef
34 !
35 multilink bundle-name authenticated
36 !
37 !
38 !
39 !
40 !
41 !
42 !
43 !
44 !
45 !
46 !
47 voice-card 0
48 !
49 crypto pki token default removal timeout 0
50 !
51 !
52 !
53 !
54 license udi pid CISC02811 sn FCZ14322073
55 archive
```

```
56 log config
57   hidekeys
58 !
59 redundancy
60 !
61 !
62 !
63 !
64 !
65 !
66 !
67 !
68 !
69 !
70 interface Tunnel0
71   ip address 172.16.255.2 255.255.255.252
72   ip ospf 1 area 0
73   tunnel source 200.200.200.2
74   tunnel destination 200.200.200.1
75 !
76 interface FastEthernet0/0
77   ip address 200.200.200.2 255.255.255.240
78   duplex auto
79   speed auto
80 !
81 interface FastEthernet0/1
82   ip address 172.16.100.1 255.255.255.0
83   ip ospf 1 area 0
84   duplex auto
85   speed auto
86 !
87 interface Serial0/0/0
88   ip address 172.16.252.2 255.255.255.0
89   encapsulation frame-relay
90   ip ospf network point-to-multipoint
91   ip ospf 1 area 0
92   no fair-queue
93   frame-relay map ip 172.16.252.1 201 broadcast
94   no frame-relay inverse-arp IP 203
95   frame-relay lmi-type cisco
96 !
97 interface Serial0/0/1
98   no ip address
99   shutdown
100  clock rate 2000000
101 !
102 interface Serial1/0
103   no ip address
104   shutdown
105 !
106 interface Serial1/1
107   no ip address
108   shutdown
109 !
110 interface Serial1/2
111   no ip address
112   shutdown
113 !
114 interface Serial1/3
115   no ip address
116   shutdown
117 !
```

```

118 router ospf 1
119 !
120 ip forward-protocol nd
121 ip http server
122 no ip http secure-server
123 !
124 !
125 !
126 !
127 !
128 !
129 !
130 snmp-server community public R0
131 snmp-server community private RW
132 !
133 !
134 control-plane
135 !
136 !
137 !
138 !
139 mgcp profile default
140 !
141 !
142 !
143 !
144 !
145 !
146 line con 0
147 line aux 0
148 line vty 0 4
149 password ins@lab
150 login
151 transport input all
152 !
153 scheduler allocate 20000 1000
154 end

```

### A.1.2. IP Interfaces

```

1 BR1_R1#show ip interface brief
2 Interface IP-Address OK? Method Status Protocol
3 FastEthernet0/0 200.200.200.2 YES manual up up
4 FastEthernet0/1 172.16.100.1 YES manual up up
5 Serial0/0/0 172.16.252.2 YES manual up up
6 Serial0/0/1 unassigned YES unset administratively down down
7 Serial1/0 unassigned YES unset administratively down down
8 Serial1/1 unassigned YES unset administratively down down
9 Serial1/2 unassigned YES unset administratively down down
10 Serial1/3 unassigned YES unset administratively down down
11 Tunnel0 172.16.255.2 YES manual up up

```

### A.1.3. Interface Status

```

1 BR1_R1>show interface status

```



### A.1.4. Interface Trunk

```
1 BR1_R1>show interface trunk
```

### A.1.5. Neighbors

```
1 BR1_R1#show cdp neighbors
2 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
3                   S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
4                   D - Remote, C - CVTA, M - Two-port Mac Relay
5
6 Device ID      Local Intrfce Holdtme Capability Platform Port ID
7 BR1_S1        Fas 0/1      130      R S I WS-C3560- Fas 0/1
8 Switch        Fas 0/0      120      S I WS-C2960- Fas 0/2
9 BR1_R1#
```

### A.1.6. IP Route

```
1 BR1_R1#show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4         N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5         E1 - OSPF external type 1, E2 - OSPF external type 2
6         i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7         ia - IS-IS inter area, * - candidate default, U - per-user static route
8         o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9         + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13      172.16.0.0/16 is variably subnetted, 34 subnets, 4 masks
14 O      172.16.17.0/24 [110/69] via 172.16.252.1, 3d06h, Serial0/0/0
15 O      172.16.18.0/24 [110/68] via 172.16.252.1, 3d07h, Serial0/0/0
16 O      172.16.19.0/24 [110/68] via 172.16.252.1, 3d06h, Serial0/0/0
17 O      172.16.25.1/32 [110/68] via 172.16.252.1, 3d06h, Serial0/0/0
18 O      172.16.25.2/32 [110/67] via 172.16.252.1, 3d07h, Serial0/0/0
19 O      172.16.25.3/32 [110/69] via 172.16.252.1, 3d06h, Serial0/0/0
20 O      172.16.25.4/32 [110/70] via 172.16.252.1, 3d06h, Serial0/0/0
21 O      172.16.25.5/32 [110/69] via 172.16.252.1, 3d06h, Serial0/0/0
22 O      172.16.25.6/32 [110/68] via 172.16.252.1, 3d07h, Serial0/0/0
23 O      172.16.25.7/32 [110/70] via 172.16.252.1, 3d06h, Serial0/0/0
24 C      172.16.100.0/24 is directly connected, FastEthernet0/1
25 L      172.16.100.1/32 is directly connected, FastEthernet0/1
26 O      172.16.101.0/24 [110/2] via 172.16.100.2, 3d06h, FastEthernet0/1
27 O      172.16.102.0/24 [110/1068] via 172.16.252.1, 3d06h, Serial0/0/0
28 C      172.16.252.0/24 is directly connected, Serial0/0/0
29 O      172.16.252.1/32 [110/64] via 172.16.252.1, 3d13h, Serial0/0/0
30 L      172.16.252.2/32 is directly connected, Serial0/0/0
31 O      172.16.252.3/32 [110/1067] via 172.16.252.1, 3d06h, Serial0/0/0
32 O      172.16.254.0/30 [110/67] via 172.16.252.1, 3d06h, Serial0/0/0
33 O      172.16.254.4/30 [110/68] via 172.16.252.1, 3d06h, Serial0/0/0
34 O      172.16.254.8/30 [110/69] via 172.16.252.1, 3d06h, Serial0/0/0
35 O      172.16.254.12/30 [110/76] via 172.16.252.1, 3d07h, Serial0/0/0
36 O      172.16.254.16/30 [110/70] via 172.16.252.1, 3d06h, Serial0/0/0
37 O      172.16.254.20/30 [110/69] via 172.16.252.1, 3d06h, Serial0/0/0
38 O      172.16.254.32/29 [110/70] via 172.16.252.1, 3d06h, Serial0/0/0
39 O      172.16.254.40/29 [110/68] via 172.16.252.1, 3d06h, Serial0/0/0
```

```

40 O      172.16.254.48/29 [110/67] via 172.16.252.1, 3d07h, Serial0/0/0
41 O      172.16.254.56/30 [110/66] via 172.16.252.1, 3d07h, Serial0/0/0
42 O      172.16.254.60/30 [110/65] via 172.16.252.1, 3d13h, Serial0/0/0
43 O      172.16.254.64/30 [110/67] via 172.16.252.1, 3d07h, Serial0/0/0
44 C      172.16.255.0/30 is directly connected, Tunnel0
45 L      172.16.255.2/32 is directly connected, Tunnel0
46 O      172.16.255.4/30 [110/1067] via 172.16.252.1, 3d07h, Serial0/0/0
47 O      172.16.255.8/30 [110/1067] via 172.16.252.1, 3d07h, Serial0/0/0
48      200.200.200.0/24 is variably subnetted, 2 subnets, 2 masks
49 C      200.200.200.0/28 is directly connected, FastEthernet0/0
50 L      200.200.200.2/32 is directly connected, FastEthernet0/0

```

### A.1.7. Spanning Tree

```

1 BR1_R1#show spanning
2
3 No spanning tree instances exist.

```

### A.1.8. VLAN

```

1 BR1_R1#show vlans
2 No Virtual LANs configured

```

## A.2. BR1-S1

### A.2.1. Running Configuration

### A.2.2. IP Interfaces

### A.2.3. Interface Status

```

1 BR1_S1>show interface status
2
3 Port      Name      Status      Vlan      Duplex Speed Type
4 Fa0/1      Name      connected routed    a-full  a-100  10/100BaseTX
5 Fa0/2      Name      connected trunk  a-full  a-100  10/100BaseTX
6 Fa0/3      Name      notconnect 1        auto   auto   10/100BaseTX
7 Fa0/4      Name      connected trunk  a-full  a-100  10/100BaseTX
8 Fa0/5      Name      connected trunk  a-full  a-100  10/100BaseTX
9 Fa0/6      Name      connected trunk  a-full  a-100  10/100BaseTX
10 Fa0/7      Name      connected trunk  a-full  a-100  10/100BaseTX
11 Fa0/8      Name      notconnect 1        auto   auto   10/100BaseTX
12 Fa0/9      Name      notconnect 1        auto   auto   10/100BaseTX
13 Fa0/10     Name      notconnect 1        auto   auto   10/100BaseTX
14 Fa0/11     Name      notconnect 1        auto   auto   10/100BaseTX
15 Fa0/12     Name      connected 1        a-full a-100  10/100BaseTX
16 Fa0/13     Name      notconnect 1        auto   auto   10/100BaseTX
17 Fa0/14     Name      notconnect 1        auto   auto   10/100BaseTX
18 Fa0/15     Name      notconnect 1        auto   auto   10/100BaseTX
19 Fa0/16     Name      notconnect 1        auto   auto   10/100BaseTX
20 Fa0/17     Name      notconnect 1        auto   auto   10/100BaseTX
21 Fa0/18     Name      notconnect 1        auto   auto   10/100BaseTX
22 Fa0/19     Name      notconnect 1        auto   auto   10/100BaseTX
23 Fa0/20     Name      notconnect 1        auto   auto   10/100BaseTX
24 Fa0/21     Name      notconnect 1        auto   auto   10/100BaseTX
25

```

26	Port	Name	Status	Vlan	Duplex	Speed	Type
27	Fa0/22		notconnect	1	auto	auto	10/100BaseTX
28	Fa0/23		notconnect	1	auto	auto	10/100BaseTX
29	Fa0/24		notconnect	1	auto	auto	10/100BaseTX
30	Gi0/1		notconnect	1	auto	auto	Not Present
31	Gi0/2		notconnect	1	auto	auto	Not Present

#### A.2.4. Interface Trunk

```

1 BR1_S1> show interface trunk
2
3 Port      Mode      Encapsulation Status Native vlan
4 Fa0/2     on        802.1q      trunking  1
5 Fa0/4     on        802.1q      trunking  1
6 Fa0/5     on        802.1q      trunking  1
7 Fa0/6     on        802.1q      trunking  1
8 Fa0/7     on        802.1q      trunking  1
9
10 Port      Vlans allowed on trunk
11 Fa0/2     1-4094
12 Fa0/4     1-4094
13 Fa0/5     1-4094
14 Fa0/6     1-4094
15 Fa0/7     1-4094
16
17 Port      Vlans allowed and active in management domain
18 Fa0/2     1
19 Fa0/4     1
20 Fa0/5     1
21 Fa0/6     1
22 Fa0/7     1
23
24 Port      Vlans in spanning tree forwarding state and not pruned
25
26 Port      Vlans in spanning tree forwarding state and not pruned
27 Fa0/2     1
28 Fa0/4     1
29 Fa0/5     1
30 Fa0/6     1
31 Fa0/7     1

```

#### A.2.5. Neighbors

#### A.2.6. IP Route

```

1 BR1_S1> show ip route
2 Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
3       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5       E1 - OSPF external type 1, E2 - OSPF external type 2
6       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7       ia - IS-IS inter area, * - candidate default, U - per-user static route
8       o - ODR, P - periodic downloaded static route
9
10 Gateway of last resort is not set
11
12      200.200.200.0/28 is subnetted, 1 subnets
13 0       200.200.200.0 [110/69] via 172.16.100.1, 3d06h, FastEthernet0/1

```

```

14 172.16.0.0/16 is variably subnetted, 31 subnets, 4 masks
15 0 172.16.254.64/30 [110/68] via 172.16.100.1, 3d06h, FastEthernet0/1
16 0 172.16.252.1/32 [110/65] via 172.16.100.1, 3d06h, FastEthernet0/1
17 0 172.16.254.0/30 [110/68] via 172.16.100.1, 3d06h, FastEthernet0/1
18 0 172.16.252.2/32 [110/1] via 172.16.100.1, 3d06h, FastEthernet0/1
19 0 172.16.255.0/30 [110/1001] via 172.16.100.1, 3d06h, FastEthernet0/1
20 0 172.16.252.3/32 [110/1068] via 172.16.100.1, 3d06h, FastEthernet0/1
21 0 172.16.254.4/30 [110/69] via 172.16.100.1, 3d06h, FastEthernet0/1
22 0 172.16.255.4/30 [110/1068] via 172.16.100.1, 3d06h, FastEthernet0/1
23 0 172.16.254.8/30 [110/70] via 172.16.100.1, 3d06h, FastEthernet0/1
24 0 172.16.255.8/30 [110/1068] via 172.16.100.1, 3d06h, FastEthernet0/1
25 0 172.16.254.12/30 [110/77] via 172.16.100.1, 3d06h, FastEthernet0/1
26 0 172.16.254.16/30 [110/71] via 172.16.100.1, 3d06h, FastEthernet0/1
27 0 172.16.254.20/30 [110/70] via 172.16.100.1, 3d06h, FastEthernet0/1
28 0 172.16.254.32/29 [110/71] via 172.16.100.1, 3d06h, FastEthernet0/1
29 0 172.16.254.40/29 [110/69] via 172.16.100.1, 3d06h, FastEthernet0/1
30 0 172.16.254.48/29 [110/68] via 172.16.100.1, 3d06h, FastEthernet0/1
31 0 172.16.254.56/30 [110/67] via 172.16.100.1, 3d06h, FastEthernet0/1
32 0 172.16.254.60/30 [110/66] via 172.16.100.1, 3d06h, FastEthernet0/1
33 0 172.16.25.5/32 [110/70] via 172.16.100.1, 3d06h, FastEthernet0/1
34 0 172.16.25.4/32 [110/71] via 172.16.100.1, 3d06h, FastEthernet0/1
35 0 172.16.25.7/32 [110/71] via 172.16.100.1, 3d06h, FastEthernet0/1
36 0 172.16.25.6/32 [110/69] via 172.16.100.1, 3d06h, FastEthernet0/1
37 0 172.16.25.1/32 [110/69] via 172.16.100.1, 3d06h, FastEthernet0/1
38 0 172.16.25.3/32 [110/70] via 172.16.100.1, 3d06h, FastEthernet0/1
39 0 172.16.25.2/32 [110/68] via 172.16.100.1, 3d06h, FastEthernet0/1
40 0 172.16.17.0/24 [110/70] via 172.16.100.1, 3d06h, FastEthernet0/1
41 0 172.16.18.0/24 [110/69] via 172.16.100.1, 3d06h, FastEthernet0/1
42 0 172.16.19.0/24 [110/69] via 172.16.100.1, 3d06h, FastEthernet0/1
43 C 172.16.100.0/24 is directly connected, FastEthernet0/1
44 C 172.16.101.0/24 is directly connected, Vlan1
45 0 172.16.102.0/24 [110/1069] via 172.16.100.1, 3d06h, FastEthernet0/1

```

### A.2.7. Spanning Tree

```

1 BR1_S1>show spanning
2
3 VLAN0001
4   Spanning tree enabled protocol ieee
5   Root ID Priority 32769
6       Address 001a.2fd4.2480
7       This bridge is the root
8       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
9
10  Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
11      Address 001a.2fd4.2480
12      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
13      Aging Time 300 sec
14
15  Interface      Role Sts Cost Prio.Nbr Type
16  -----
17  Fa0/2          Desg FWD 19   128.4 P2p
18  Fa0/4          Desg FWD 19   128.6 P2p
19  Fa0/5          Desg FWD 19   128.7 P2p
20  Fa0/6          Desg FWD 19   128.8 P2p
21  Fa0/7          Desg FWD 19   128.9 P2p
22  Fa0/12         Desg FWD 19   128.14 P2p

```

### A.2.8. VLAN

```

1 BR1_S1> show vlan
2
3 VLAN Name                Status Ports
4 -----
5 1  default                active Fa0/3, Fa0/8, Fa0/9, Fa0/10
6                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
7                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
8                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
9                                Fa0/23, Fa0/24, Gi0/1, Gi0/2
10 1002 fddi-default        act/unsup
11 1003 token-ring-default  act/unsup
12 1004 fddinet-default     act/unsup
13 1005 trnet-default       act/unsup
14
15 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
16 -----
17 1  enet 100001 1500 -   -   -   -   -   0   0
18 1002 fddi 101002 1500 -   -   -   -   -   0   0
19 1003 tr 101003 1500 -   -   -   -   -   0   0
20 1004 fdnet 101004 1500 -   -   -   ieee -   0   0
21 1005 trnet 101005 1500 -   -   -   ibm -   0   0
22
23 Remote SPAN VLANs
24 -----
25
26
27 Primary Secondary Type      Ports
28 -----

```

## A.3. BR2-R1

### A.3.1. Running Configuration

```

1 BR2_R1#show run
2 Building configuration...
3
4
5 Current configuration : 1595 bytes
6 !
7 ! Last configuration change at 23:56:23 UTC Thu Sep 22 2016
8 version 15.1
9 service timestamps debug datetime msec
10 service timestamps log datetime msec
11 no service password-encryption
12 !
13 hostname BR2_R1
14 !
15 boot-start-marker
16 boot-end-marker
17 !
18 !
19 enable secret 5 $1$tooV$GpQ3VCxj1U3jlmnAZbnQr/
20 !
21 no aaa new-model
22 !
23 memory-size iomem 10
24 !

```

```
25 | dot11 syslog
26 | ip source-route
27 | !
28 | !
29 | ip cef
30 | !
31 | !
32 | !
33 | no ipv6 cef
34 | !
35 | multilink bundle-name authenticated
36 | !
37 | !
38 | !
39 | !
40 | !
41 | !
42 | !
43 | !
44 | !
45 | !
46 | !
47 | voice-card 0
48 | !
49 | crypto pki token default removal timeout 0
50 | !
51 | !
52 | !
53 | !
54 | license udi pid CISC02811 sn FCZ1432207G
55 | archive
56 |   log config
57 |   hidekeys
58 | !
59 | redundancy
60 | !
61 | !
62 | !
63 | !
64 | !
65 | !
66 | !
67 | !
68 | !
69 | !
70 | interface Tunnel0
71 |   ip address 172.16.255.6 255.255.255.252
72 |   ip ospf 1 area 0
73 |   tunnel source 200.200.200.3
74 |   tunnel destination 200.200.200.1
75 | !
76 | interface FastEthernet0/0
77 |   ip address 200.200.200.3 255.255.255.240
78 |   duplex auto
79 |   speed auto
80 | !
81 | interface FastEthernet0/1
82 |   ip address 172.16.102.1 255.255.255.0
83 |   ip ospf 1 area 0
84 |   duplex auto
85 |   speed auto
86 | !
```

```

87 interface Serial0/0/0
88 ip address 172.16.252.3 255.255.255.0
89 encapsulation frame-relay
90 ip ospf network point-to-multipoint
91 ip ospf 1 area 0
92 frame-relay map ip 172.16.252.1 301 broadcast
93 frame-relay lmi-type cisco
94 !
95 interface Serial0/0/1
96 no ip address
97 shutdown
98 clock rate 2000000
99 !
100 router ospf 1
101 !
102 ip forward-protocol nd
103 no ip http server
104 no ip http secure-server
105 !
106 !
107 !
108 !
109 !
110 !
111 !
112 snmp-server community public R0
113 snmp-server community private RW
114 !
115 !
116 control-plane
117 !
118 !
119 !
120 !
121 mgcp profile default
122 !
123 !
124 !
125 !
126 !
127 !
128 line con 0
129 line aux 0
130 line vty 0 4
131 password ins@lab
132 login
133 transport input all
134 !
135 scheduler allocate 20000 1000
136 end

```

### A.3.2. IP Interfaces

```

1 BR2_R1#show ip interface brief
2 Interface IP-Address OK? Method Status Protocol
3 FastEthernet0/0 200.200.200.3 YES manual up up
4 FastEthernet0/1 172.16.102.1 YES manual up up
5 Serial0/0/0 172.16.252.3 YES manual up up
6 Serial0/0/1 unassigned YES unset administratively down down
7 Tunnel0 172.16.255.6 YES manual up up

```

### A.3.3. Interface Status

```
1 BR2_R1>show interface status
```

### A.3.4. Interface Trunk

```
1 BR2_R1>show interface trunk
```

### A.3.5. Neighbors

```
1 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
2                   S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
3                   D - Remote, C - CVTA, M - Two-port Mac Relay
4
5 Device ID      Local Intrfce Holdtme Capability Platform Port ID
6 BR2_S1        Fas 0/1      134          R S I WS-C3560V Fas 0/1
7 Switch        Fas 0/0      137          S I WS-C2960- Fas 0/3
```

### A.3.6. IP Route

```
1 BR2_R1#show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5       E1 - OSPF external type 1, E2 - OSPF external type 2
6       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7       ia - IS-IS inter area, * - candidate default, U - per-user static route
8       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9       + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13   172.16.0.0/16 is variably subnetted, 34 subnets, 4 masks
14 O    172.16.17.0/24 [110/1004] via 172.16.255.5, 3d06h, Tunnel0
15 O    172.16.18.0/24 [110/1003] via 172.16.255.5, 3d07h, Tunnel0
16 O    172.16.19.0/24 [110/1003] via 172.16.255.5, 3d06h, Tunnel0
17 O    172.16.25.1/32 [110/1003] via 172.16.255.5, 3d06h, Tunnel0
18 O    172.16.25.2/32 [110/1002] via 172.16.255.5, 3d07h, Tunnel0
19 O    172.16.25.3/32 [110/1004] via 172.16.255.5, 3d06h, Tunnel0
20 O    172.16.25.4/32 [110/1005] via 172.16.255.5, 3d06h, Tunnel0
21 O    172.16.25.5/32 [110/1004] via 172.16.255.5, 3d06h, Tunnel0
22 O    172.16.25.6/32 [110/1003] via 172.16.255.5, 3d07h, Tunnel0
23 O    172.16.25.7/32 [110/1005] via 172.16.255.5, 3d06h, Tunnel0
24 O    172.16.100.0/24 [110/1068] via 172.16.255.5, 3d06h, Tunnel0
25 O    172.16.101.0/24 [110/1069] via 172.16.255.5, 3d06h, Tunnel0
26 C    172.16.102.0/24 is directly connected, FastEthernet0/1
27 L    172.16.102.1/32 is directly connected, FastEthernet0/1
28 C    172.16.252.0/24 is directly connected, Serial0/0/0
29 O    172.16.252.1/32 [110/1003] via 172.16.255.5, 3d07h, Tunnel0
30 O    172.16.252.2/32 [110/1067] via 172.16.255.5, 3d07h, Tunnel0
31 L    172.16.252.3/32 is directly connected, Serial0/0/0
32 O    172.16.254.0/30 [110/1002] via 172.16.255.5, 3d06h, Tunnel0
33 O    172.16.254.4/30 [110/1003] via 172.16.255.5, 3d06h, Tunnel0
34 O    172.16.254.8/30 [110/1004] via 172.16.255.5, 3d06h, Tunnel0
35 O    172.16.254.12/30 [110/1011] via 172.16.255.5, 3d07h, Tunnel0
```



```

36 O      172.16.254.16/30 [110/1005] via 172.16.255.5, 3d06h, Tunnel0
37 O      172.16.254.20/30 [110/1004] via 172.16.255.5, 3d06h, Tunnel0
38 O      172.16.254.32/29 [110/1005] via 172.16.255.5, 3d06h, Tunnel0
39 O      172.16.254.40/29 [110/1003] via 172.16.255.5, 3d06h, Tunnel0
40 O      172.16.254.48/29 [110/1002] via 172.16.255.5, 3d07h, Tunnel0
41 O      172.16.254.56/30 [110/1002] via 172.16.255.5, 3d07h, Tunnel0
42 O      172.16.254.60/30 [110/1003] via 172.16.255.5, 3d07h, Tunnel0
43 O      172.16.254.64/30 [110/1001] via 172.16.255.5, 3d07h, Tunnel0
44 O      172.16.255.0/30 [110/2000] via 172.16.255.5, 3d13h, Tunnel0
45 C      172.16.255.4/30 is directly connected, Tunnel0
46 L      172.16.255.6/32 is directly connected, Tunnel0
47 O      172.16.255.8/30 [110/2000] via 172.16.255.5, 3d13h, Tunnel0
48      200.200.200.0/24 is variably subnetted, 2 subnets, 2 masks
49 C      200.200.200.0/28 is directly connected, FastEthernet0/0
50 L      200.200.200.3/32 is directly connected, FastEthernet0/0

```

### A.3.7. Spanning Tree

```

1 BR2_R1#show spanning
2
3 No spanning tree instances exist.

```

### A.3.8. VLAN

```

1 BR2_R1#show vlans
2 No Virtual LANs configured

```

## A.4. BR2-S1

### A.4.1. Running Configuration

```

1 BR2_S1#show running-config
2 Building configuration...
3
4 Current configuration : 2667 bytes
5 !
6 ! Last configuration change at 13:10:42 UTC Mon Mar 1 1993
7 !
8 version 15.0
9 no service pad
10 service timestamps debug datetime msec
11 service timestamps log datetime msec
12 no service password-encryption
13 !
14 hostname BR2_S1
15 !
16 boot-start-marker
17 boot-end-marker
18 !
19 enable secret 5 $1$51.0$ebtjgur4cQu.x/Jy1FUIA1
20 !
21 username ins password 0 ins@lab
22 no aaa new-model
23 system mtu routing 1500
24 vtp domain CCIE
25 vtp mode transparent

```

```
26 ip routing
27 no ip domain-lookup
28 ip dhcp excluded-address 172.16.103.1
29 ip dhcp excluded-address 172.16.103.10 172.16.103.12
30 !
31 ip dhcp pool BRANCH2
32 network 172.16.103.0 255.255.255.0
33 default-router 172.16.103.1
34 !
35 !
36 !
37 !
38 crypto pki trustpoint HTTPS_SS_CERT_KEYPAIR
39 enrollment selfsigned
40 serial-number
41 revocation-check none
42 rsakeypair HTTPS_SS_CERT_KEYPAIR
43 !
44 !
45 crypto pki certificate chain HTTPS_SS_CERT_KEYPAIR
46 certificate self-signed 01
47 quit
48 !
49 !
50 !
51 !
52 !
53 spanning-tree mode pvst
54 spanning-tree extend system-id
55 !
56 vlan internal allocation policy ascending
57 !
58 vlan 2-5
59 !
60 vlan 10
61 name HR
62 !
63 vlan 11
64 name IT
65 !
66 vlan 17,19,46,1006
67 !
68 !
69 !
70 !
71 !
72 !
73 !
74 !
75 !
76 !
77 !
78 !
79 !
80 !
81 interface FastEthernet0/1
82 no switchport
83 ip address 172.16.102.2 255.255.255.0
84 ip ospf 1 area 0
85 !
86 interface FastEthernet0/2
87 switchport trunk encapsulation dot1q
```

```
88 | switchport mode trunk
89 |
90 | interface FastEthernet0/3
91 |   switchport trunk encapsulation dot1q
92 |   switchport mode trunk
93 | !
94 | interface FastEthernet0/4
95 |   switchport trunk encapsulation dot1q
96 |   switchport mode trunk
97 | !
98 | interface FastEthernet0/5
99 |   switchport trunk encapsulation dot1q
100 |   switchport mode trunk
101 | !
102 | interface FastEthernet0/6
103 |   switchport trunk encapsulation dot1q
104 |   switchport mode trunk
105 | !
106 | interface FastEthernet0/7
107 |   switchport trunk encapsulation dot1q
108 |   switchport mode trunk
109 | !
110 | interface FastEthernet0/8
111 | !
112 | interface FastEthernet0/9
113 | !
114 | interface FastEthernet0/10
115 | !
116 | interface FastEthernet0/11
117 | !
118 | interface FastEthernet0/12
119 | !
120 | interface FastEthernet0/13
121 | !
122 | interface FastEthernet0/14
123 | !
124 | interface FastEthernet0/15
125 | !
126 | interface FastEthernet0/16
127 | !
128 | interface FastEthernet0/17
129 | !
130 | interface FastEthernet0/18
131 | !
132 | interface FastEthernet0/19
133 | !
134 | interface FastEthernet0/20
135 | !
136 | interface FastEthernet0/21
137 | !
138 | interface FastEthernet0/22
139 | !
140 | interface FastEthernet0/23
141 | !
142 | interface FastEthernet0/24
143 | !
144 | interface GigabitEthernet0/1
145 | !
146 | interface GigabitEthernet0/2
147 | !
148 | interface Vlan1
149 |   ip address 172.16.103.1 255.255.255.0
```

```

150 ip ospf 1 area 0
151 shutdown
152 !
153 interface Vlan103
154 ip address 172.16.23.1 255.255.255.0
155 ip ospf 1 area 0
156 !
157 router ospf 1
158 !
159 ip http server
160 ip http secure-server
161 !
162 !
163 ip sla enable reaction-alerts
164 snmp-server community private RW
165 snmp-server community public RO
166 !
167 !
168 line con 0
169 line vty 0 4
170 password cisco
171 login
172 line vty 5 15
173 password cisco
174 login
175 !
176 end

```

#### A.4.2. IP Interfaces

```

1 BR2_S1#show ip interface brief
2 Interface      IP-Address  OK? Method Status      Protocol
3 Vlan1          172.16.103.1 YES manual administratively down down
4 Vlan103        172.16.23.1 YES manual down        down
5 FastEthernet0/1 172.16.102.2 YES manual up          up
6 FastEthernet0/2 unassigned  YES unset up          up
7 FastEthernet0/3 unassigned  YES unset up          up
8 FastEthernet0/4 unassigned  YES unset up          up
9 FastEthernet0/5 unassigned  YES unset up          up
10 FastEthernet0/6 unassigned  YES unset up          up
11 FastEthernet0/7 unassigned  YES unset up          up
12 FastEthernet0/8 unassigned  YES unset down        down
13 FastEthernet0/9 unassigned  YES unset down        down
14 FastEthernet0/10 unassigned YES unset down        down
15 FastEthernet0/11 unassigned YES unset down        down
16 FastEthernet0/12 unassigned YES unset down        down
17 FastEthernet0/13 unassigned YES unset down        down
18 FastEthernet0/14 unassigned YES unset down        down
19 FastEthernet0/15 unassigned YES unset down        down
20 FastEthernet0/16 unassigned YES unset down        down
21 FastEthernet0/17 unassigned YES unset down        down
22 FastEthernet0/18 unassigned YES unset down        down
23 FastEthernet0/19 unassigned YES unset down        down
24 FastEthernet0/20 unassigned YES unset down        down
25 FastEthernet0/21 unassigned YES unset down        down
26 FastEthernet0/22 unassigned YES unset down        down
27 FastEthernet0/23 unassigned YES unset down        down
28 FastEthernet0/24 unassigned YES unset down        down
29 GigabitEthernet0/1 unassigned YES unset down        down
30 GigabitEthernet0/2 unassigned YES unset down        down

```

### A.4.3. Interface Status

```

1 BR2_S1>show interface status
2
3 Port      Name      Status    Vlan    Duplex Speed Type
4 Fa0/1     connected routed    a-full a-100 10/100BaseTX
5 Fa0/2     connected trunk   a-full a-100 10/100BaseTX
6 Fa0/3     connected trunk   a-full a-100 10/100BaseTX
7 Fa0/4     connected trunk   a-full a-100 10/100BaseTX
8 Fa0/5     connected trunk   a-full a-100 10/100BaseTX
9 Fa0/6     connected trunk   a-full a-100 10/100BaseTX
10 Fa0/7     connected trunk   a-full a-100 10/100BaseTX
11 Fa0/8     notconnect 1         auto  auto 10/100BaseTX
12 Fa0/9     notconnect 1         auto  auto 10/100BaseTX
13 Fa0/10    notconnect 1         auto  auto 10/100BaseTX
14 Fa0/11    notconnect 1         auto  auto 10/100BaseTX
15 Fa0/12    notconnect 1         auto  auto 10/100BaseTX
16 Fa0/13    notconnect 1         auto  auto 10/100BaseTX
17 Fa0/14    notconnect 1         auto  auto 10/100BaseTX
18 Fa0/15    notconnect 1         auto  auto 10/100BaseTX
19 Fa0/16    notconnect 1         auto  auto 10/100BaseTX
20 Fa0/17    notconnect 1         auto  auto 10/100BaseTX
21 Fa0/18    notconnect 1         auto  auto 10/100BaseTX
22 Fa0/19    notconnect 1         auto  auto 10/100BaseTX
23 Fa0/20    notconnect 1         auto  auto 10/100BaseTX
24 Fa0/21    notconnect 1         auto  auto 10/100BaseTX
25
26 Port      Name      Status    Vlan    Duplex Speed Type
27 Fa0/22    notconnect 1         auto  auto 10/100BaseTX
28 Fa0/23    notconnect 1         auto  auto 10/100BaseTX
29 Fa0/24    notconnect 1         auto  auto 10/100BaseTX
30 Gi0/1     notconnect 1         auto  auto Not Present
31 Gi0/2     notconnect 1         auto  auto Not Present

```

### A.4.4. Interface Trunk

```

1 BR2_S1> show interface trunk
2
3 Port      Mode      Encapsulation Status  Native vlan
4 Fa0/2     on        802.1q     trunking 1
5 Fa0/3     on        802.1q     trunking 1
6 Fa0/4     on        802.1q     trunking 1
7 Fa0/5     on        802.1q     trunking 1
8 Fa0/6     on        802.1q     trunking 1
9 Fa0/7     on        802.1q     trunking 1
10
11 Port      Vlans allowed on trunk
12 Fa0/2     1-4094
13 Fa0/3     1-4094
14 Fa0/4     1-4094
15 Fa0/5     1-4094
16 Fa0/6     1-4094
17 Fa0/7     1-4094
18
19 Port      Vlans allowed and active in management domain
20 Fa0/2     1-5,10-11,17,19,46,1006
21 Fa0/3     1-5,10-11,17,19,46,1006
22 Fa0/4     1-5,10-11,17,19,46,1006
23 Fa0/5     1-5,10-11,17,19,46,1006

```

```

24 Fa0/6      1-5,10-11,17,19,46,1006
25
26 Port      Vlans allowed and active in management domain
27 Fa0/7      1-5,10-11,17,19,46,1006
28
29 Port      Vlans in spanning tree forwarding state and not pruned
30 Fa0/2      1-5,10-11,17,19,46,1006
31 Fa0/3      2-5,10-11,17,19,46,1006
32 Fa0/4      1-5,10-11,17,19,46,1006
33 Fa0/5      1-5,10-11,17,19,46,1006
34 Fa0/6      1-5,10-11,17,19,46,1006
35 Fa0/7      1-5,10-11,17,19,46,1006

```

#### A.4.5. Neighbors

```

1 BR2_S1# show cdp neighbors
2 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
3                   S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
4                   D - Remote, C - CVTA, M - Two-port Mac Relay
5
6 Device ID    Local Intrfce Holdtme Capability Platform Port ID
7 BR2_S4       Fas 0/7      150          S I WS-C2960- Fas 0/24
8 BR2_S4       Fas 0/6      150          S I WS-C2960- Fas 0/23
9 BR2_S2       Fas 0/3      143          S I WS-C3560V Fas 0/24
10 BR2_S2       Fas 0/2      143          S I WS-C3560V Fas 0/23
11 BR2_S3       Fas 0/5      175          S I WS-C2960- Fas 0/24
12 BR2_S3       Fas 0/4      175          S I WS-C2960- Fas 0/23
13 BR2_R1       Fas 0/1      131          R S I 2811   Fas 0/1
14 BR2_S1#

```

#### A.4.6. IP Route

```

1 BR2_S1> show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4         N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5         E1 - OSPF external type 1, E2 - OSPF external type 2
6         i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7         ia - IS-IS inter area, * - candidate default, U - per-user static route
8         o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9         + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13 172.16.0.0/16 is variably subnetted, 32 subnets, 4 masks
14 0    172.16.17.0/24 [110/1005] via 172.16.102.1, 3d07h, FastEthernet0/1
15 0    172.16.18.0/24 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
16 0    172.16.19.0/24 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
17 0    172.16.25.1/32 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
18 0    172.16.25.2/32 [110/1003] via 172.16.102.1, 3d07h, FastEthernet0/1
19 0    172.16.25.3/32 [110/1005] via 172.16.102.1, 3d07h, FastEthernet0/1
20 0    172.16.25.4/32 [110/1006] via 172.16.102.1, 3d07h, FastEthernet0/1
21 0    172.16.25.5/32 [110/1005] via 172.16.102.1, 3d07h, FastEthernet0/1
22 0    172.16.25.6/32 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
23 0    172.16.25.7/32 [110/1006] via 172.16.102.1, 3d07h, FastEthernet0/1
24 0    172.16.100.0/24 [110/1069] via 172.16.102.1, 3d07h, FastEthernet0/1
25 0    172.16.101.0/24 [110/1070] via 172.16.102.1, 3d07h, FastEthernet0/1
26 C    172.16.102.0/24 is directly connected, FastEthernet0/1

```

```

27 L      172.16.102.2/32 is directly connected, FastEthernet0/1
28 0      172.16.252.1/32 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
29 0      172.16.252.2/32 [110/1068] via 172.16.102.1, 3d07h, FastEthernet0/1
30 0      172.16.252.3/32 [110/1] via 172.16.102.1, 3d06h, FastEthernet0/1
31 0      172.16.254.0/30 [110/1003] via 172.16.102.1, 3d07h, FastEthernet0/1
32 0      172.16.254.4/30 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
33 0      172.16.254.8/30 [110/1005] via 172.16.102.1, 3d07h, FastEthernet0/1
34 0      172.16.254.12/30 [110/1012] via 172.16.102.1, 3d07h, FastEthernet0/1
35 0      172.16.254.16/30 [110/1006] via 172.16.102.1, 3d07h, FastEthernet0/1
36 0      172.16.254.20/30 [110/1005] via 172.16.102.1, 3d07h, FastEthernet0/1
37 0      172.16.254.32/29 [110/1006] via 172.16.102.1, 3d07h, FastEthernet0/1
38 0      172.16.254.40/29 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
39 0      172.16.254.48/29 [110/1003] via 172.16.102.1, 3d07h, FastEthernet0/1
40 0      172.16.254.56/30 [110/1003] via 172.16.102.1, 3d07h, FastEthernet0/1
41 0      172.16.254.60/30 [110/1004] via 172.16.102.1, 3d07h, FastEthernet0/1
42 0      172.16.254.64/30 [110/1002] via 172.16.102.1, 3d07h, FastEthernet0/1
43 0      172.16.255.0/30 [110/2001] via 172.16.102.1, 3d07h, FastEthernet0/1
44 0      172.16.255.4/30 [110/1001] via 172.16.102.1, 3d07h, FastEthernet0/1
45 0      172.16.255.8/30 [110/2001] via 172.16.102.1, 3d07h, FastEthernet0/1
46      200.200.200.0/28 is subnetted, 1 subnets
47 0      200.200.200.0 [110/1002] via 172.16.102.1, 3d07h, FastEthernet0/1

```

#### A.4.7. Spanning Tree

```

1 BR2_S1> show spanning
2
3 VLAN0001
4   Spanning tree enabled protocol ieee
5   Root ID Priority 32769
6       Address 24b6.5725.d180
7       Cost 19
8       Port 4 (FastEthernet0/2)
9       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
10
11   Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
12       Address 24b6.572a.9d80
13       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
14       Aging Time 300 sec
15
16 Interface      Role Sts Cost Prio.Nbr Type
17 -----
18 Fa0/2          Root FWD 19   128.4 P2p
19 Fa0/3          Altn BLK 19   128.5 P2p
20 Fa0/4          Desg FWD 19   128.6 P2p
21 Fa0/5          Desg FWD 19   128.7 P2p
22 Fa0/6          Desg FWD 19   128.8 P2p
23 Fa0/7          Desg FWD 19   128.9 P2p
24
25
26
27 VLAN0002
28   Spanning tree enabled protocol ieee
29   Root ID Priority 32770
30       Address 24b6.5725.d180
31       Cost 19
32       Port 5 (FastEthernet0/3)
33       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
34
35   Bridge ID Priority 32770 (priority 32768 sys-id-ext 2)
36       Address 24b6.572a.9d80

```

```

37      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
38      Aging Time 300 sec
39

```

```

40 Interface      Role Sts Cost Prio.Nbr Type
41 -----

```

```

42 Fa0/2          Desg FWD 19   128.4 P2p
43 Fa0/3          Root FWD 19   128.5 P2p
44 Fa0/4          Desg FWD 19   128.6 P2p
45 Fa0/5          Desg FWD 19   128.7 P2p
46 Fa0/6          Desg FWD 19   128.8 P2p
47 Fa0/7          Desg FWD 19   128.9 P2p
48
49
50

```

```

51 VLAN0003

```

```

52   Spanning tree enabled protocol ieee
53   Root ID Priority 32771
54       Address 24b6.5725.d180
55       Cost    19
56       Port    5 (FastEthernet0/3)
57   Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
58

```

```

59   Bridge ID Priority 32771 (priority 32768 sys-id-ext 3)
60       Address 24b6.572a.9d80
61   Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
62   Aging Time 300 sec
63

```

```

64 Interface      Role Sts Cost Prio.Nbr Type
65 -----

```

```

66 Fa0/2          Desg FWD 19   128.4 P2p
67 Fa0/3          Root FWD 19   128.5 P2p
68 Fa0/4          Desg FWD 19   128.6 P2p
69 Fa0/5          Desg FWD 19   128.7 P2p
70 Fa0/6          Desg FWD 19   128.8 P2p
71 Fa0/7          Desg FWD 19   128.9 P2p
72
73
74

```

```

75 VLAN0004

```

```

76   Spanning tree enabled protocol ieee
77   Root ID Priority 32772
78       Address 24b6.5725.d180
79       Cost    19
80       Port    5 (FastEthernet0/3)
81   Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
82

```

```

83   Bridge ID Priority 32772 (priority 32768 sys-id-ext 4)
84       Address 24b6.572a.9d80
85   Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
86   Aging Time 300 sec
87

```

```

88 Interface      Role Sts Cost Prio.Nbr Type
89 -----

```

```

90 Fa0/2          Desg FWD 19   128.4 P2p
91 Fa0/3          Root FWD 19   128.5 P2p
92 Fa0/4          Desg FWD 19   128.6 P2p
93 Fa0/5          Desg FWD 19   128.7 P2p
94 Fa0/6          Desg FWD 19   128.8 P2p
95 Fa0/7          Desg FWD 19   128.9 P2p
96
97
98

```



```

99 VLAN0005
100 Spanning tree enabled protocol ieee
101 Root ID Priority 32773
102     Address 24b6.5725.d180
103     Cost    19
104     Port    5 (FastEthernet0/3)
105     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
106
107 Bridge ID Priority 32773 (priority 32768 sys-id-ext 5)
108     Address 24b6.572a.9d80
109     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
110     Aging Time 300 sec
111

```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/2	Desg	FWD	19	128.4	P2p
Fa0/3	Root	FWD	19	128.5	P2p
Fa0/4	Desg	FWD	19	128.6	P2p
Fa0/5	Desg	FWD	19	128.7	P2p
Fa0/6	Desg	FWD	19	128.8	P2p
Fa0/7	Desg	FWD	19	128.9	P2p

```

122
123 VLAN0010
124 Spanning tree enabled protocol ieee
125 Root ID Priority 32778
126     Address 24b6.5725.d180
127     Cost    19
128     Port    5 (FastEthernet0/3)
129     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
130
131 Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
132     Address 24b6.572a.9d80
133     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
134     Aging Time 300 sec
135

```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/2	Desg	FWD	19	128.4	P2p
Fa0/3	Root	FWD	19	128.5	P2p
Fa0/4	Desg	FWD	19	128.6	P2p
Fa0/5	Desg	FWD	19	128.7	P2p
Fa0/6	Desg	FWD	19	128.8	P2p
Fa0/7	Desg	FWD	19	128.9	P2p

```

144
145
146
147 VLAN0011
148 Spanning tree enabled protocol ieee
149 Root ID Priority 32779
150     Address 24b6.5725.d180
151     Cost    19
152     Port    5 (FastEthernet0/3)
153     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
154
155 Bridge ID Priority 32779 (priority 32768 sys-id-ext 11)
156     Address 24b6.572a.9d80
157     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
158     Aging Time 300 sec
159

```

Interface	Role	Sts	Cost	Prio.Nbr	Type
-----------	------	-----	------	----------	------

```

161 -----
162 Fa0/2          Desg FWD 19    128.4  P2p
163 Fa0/3          Root FWD 19    128.5  P2p
164 Fa0/4          Desg FWD 19    128.6  P2p
165 Fa0/5          Desg FWD 19    128.7  P2p
166 Fa0/6          Desg FWD 19    128.8  P2p
167 Fa0/7          Desg FWD 19    128.9  P2p
168
169
170
171 VLAN0017
172   Spanning tree enabled protocol ieee
173   Root ID Priority 32785
174       Address 24b6.5725.d180
175       Cost    19
176       Port    5 (FastEthernet0/3)
177       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
178
179   Bridge ID Priority 32785 (priority 32768 sys-id-ext 17)
180       Address 24b6.572a.9d80
181       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
182       Aging Time 300 sec
183
184   Interface      Role Sts Cost Prio.Nbr Type
185   -----
186   Fa0/2          Desg FWD 19    128.4  P2p
187   Fa0/3          Root FWD 19    128.5  P2p
188   Fa0/4          Desg FWD 19    128.6  P2p
189   Fa0/5          Desg FWD 19    128.7  P2p
190   Fa0/6          Desg FWD 19    128.8  P2p
191   Fa0/7          Desg FWD 19    128.9  P2p
192
193
194
195 VLAN0019
196   Spanning tree enabled protocol ieee
197   Root ID Priority 32787
198       Address 24b6.5725.d180
199       Cost    19
200       Port    5 (FastEthernet0/3)
201       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
202
203   Bridge ID Priority 32787 (priority 32768 sys-id-ext 19)
204       Address 24b6.572a.9d80
205       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
206       Aging Time 300 sec
207
208   Interface      Role Sts Cost Prio.Nbr Type
209   -----
210   Fa0/2          Desg FWD 19    128.4  P2p
211   Fa0/3          Root FWD 19    128.5  P2p
212   Fa0/4          Desg FWD 19    128.6  P2p
213   Fa0/5          Desg FWD 19    128.7  P2p
214   Fa0/6          Desg FWD 19    128.8  P2p
215   Fa0/7          Desg FWD 19    128.9  P2p
216
217
218
219 VLAN0046
220   Spanning tree enabled protocol ieee
221   Root ID Priority 32814
222       Address 24b6.5725.d180

```

```

223         Cost      19
224         Port      5 (FastEthernet0/3)
225         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
226
227     Bridge ID Priority 32814 (priority 32768 sys-id-ext 46)
228         Address 24b6.572a.9d80
229         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
230         Aging Time 300 sec
231
232     Interface      Role Sts Cost Prio.Nbr Type
233     -----
234     Fa0/2          Desg FWD 19   128.4 P2p
235     Fa0/3          Root FWD 19   128.5 P2p
236     Fa0/4          Desg FWD 19   128.6 P2p
237     Fa0/5          Desg FWD 19   128.7 P2p
238     Fa0/6          Desg FWD 19   128.8 P2p
239     Fa0/7          Desg FWD 19   128.9 P2p
240
241
242
243     VLAN1006
244     Spanning tree enabled protocol ieee
245     Root ID Priority 33774
246         Address 24b6.5725.d180
247         Cost      19
248         Port      5 (FastEthernet0/3)
249         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
250
251     Bridge ID Priority 33774 (priority 32768 sys-id-ext 1006)
252         Address 24b6.572a.9d80
253         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
254         Aging Time 300 sec
255
256     Interface      Role Sts Cost Prio.Nbr Type
257     -----
258     Fa0/2          Desg FWD 19   128.4 P2p
259     Fa0/3          Root FWD 19   128.5 P2p
260     Fa0/4          Desg FWD 19   128.6 P2p
261     Fa0/5          Desg FWD 19   128.7 P2p
262     Fa0/6          Desg FWD 19   128.8 P2p
263     Fa0/7          Desg FWD 19   128.9 P2p

```

#### A.4.8. VLAN

```

1  BR2_S1> show vlan
2
3  VLAN Name                Status Ports
4  -----
5  1  default                  active Fa0/8, Fa0/9, Fa0/10, Fa0/11
6                                Fa0/12, Fa0/13, Fa0/14, Fa0/15
7                                Fa0/16, Fa0/17, Fa0/18, Fa0/19
8                                Fa0/20, Fa0/21, Fa0/22, Fa0/23
9                                Fa0/24, Gi0/1, Gi0/2
10 2  VLAN0002                 active
11 3  VLAN0003                 active
12 4  VLAN0004                 active
13 5  VLAN0005                 active
14 10 HR                      active
15 11 IT                      active
16 17 VLAN0017                active

```

```

17 19 VLAN0019          active
18 46 VLAN0046          active
19 1002 fddi-default    act/unsup
20 1003 trcrf-default   act/unsup
21 1004 fddinet-default act/unsup
22 1005 trbrf-default  act/unsup
23 1006 VLAN1006        active
24
25 VLAN Type SAID  MTU  Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
26 ----
27 1  enet 100001 1500 -   -   -   -   -   0    0
28 2  enet 100002 1500 -   -   -   -   -   0    0
29 3  enet 100003 1500 -   -   -   -   -   0    0
30 4  enet 100004 1500 -   -   -   -   -   0    0
31 5  enet 100005 1500 -   -   -   -   -   0    0
32 10 enet 100010 1500 -   -   -   -   -   0    0
33 11 enet 100011 1500 -   -   -   -   -   0    0
34 17 enet 100017 1500 -   -   -   -   -   0    0
35 19 enet 100019 1500 -   -   -   -   -   0    0
36 46 enet 100046 1500 -   -   -   -   -   0    0
37 1002 fddi 101002 1500 -   -   -   -   -   0    0
38 1003 trcrf 101003 4472 1005 3276 -   -   srb   0    0
39 1004 fdnet 101004 1500 -   -   -   -   -   0    0
40 1005 trbrf 101005 4472 -   -   15   -   -   0    0
41 1006 enet 101006 1500 -   -   -   -   -   0    0
42
43
44 VLAN AREHops STEHops Backup CRF
45 ----
46 1003 7      7      off
47
48 Remote SPAN VLANs
49 -----
50
51
52 Primary Secondary Type      Ports
53 -----

```

## A.5. CCNA-CCNP-FRSwitch

### A.5.1. Running Configuration

```

1 CCNA-CCNP-FRSwitch#show run
2 Building configuration...
3
4 Current configuration : 2648 bytes
5 !
6 version 12.3
7 service timestamps debug datetime msec
8 service timestamps log datetime msec
9 no service password-encryption
10 !
11 hostname CCNA-CCNP-FRSwitch
12 !
13 boot-start-marker
14 boot-end-marker
15 !
16 !
17 memory-size iomem 10
18 no aaa new-model

```

```
19 ip subnet-zero
20 !
21 !
22 !
23 ip cef
24 frame-relay switching
25 !
26 !
27 !
28 !
29 !
30 !
31 !
32 !
33 !
34 !
35 !
36 !
37 !
38 !
39 !
40 interface Ethernet0/0
41 no ip address
42 shutdown
43 half-duplex
44 no cdp enable
45 no clns route-cache
46 !
47 interface Ethernet0/1
48 no ip address
49 shutdown
50 half-duplex
51 no cdp enable
52 no clns route-cache
53 !
54 interface Serial1/0
55 description 102 103 104
56 no ip address
57 encapsulation frame-relay
58 clockrate 64000
59 no fair-queue
60 no clns route-cache
61 frame-relay intf-type dce
62 frame-relay route 102 interface Serial1/1 201
63 frame-relay route 103 interface Serial1/2 301
64 frame-relay route 104 interface Serial1/3 401
65 !
66 interface Serial1/1
67 description 201 203
68 no ip address
69 encapsulation frame-relay
70 clockrate 64000
71 no clns route-cache
72 frame-relay intf-type dce
73 frame-relay route 201 interface Serial1/0 102
74 frame-relay route 203 interface Serial1/2 302
75 !
76 interface Serial1/2
77 description 301 302
78 no ip address
79 encapsulation frame-relay
80 clockrate 64000
```

```
81 no clns route-cache
82 frame-relay intf-type dce
83 frame-relay route 301 interface Serial1/0 103
84 frame-relay route 302 interface Serial1/1 203
85 !
86 interface Serial1/3
87 description 301 302
88 no ip address
89 encapsulation frame-relay
90 clockrate 64000
91 no clns route-cache
92 frame-relay intf-type dce
93 frame-relay route 301 interface Serial1/0 103
94 frame-relay route 302 interface Serial1/1 203
95 !
96 interface Serial1/4
97 description 102 103 104
98 no ip address
99 encapsulation frame-relay
100 clockrate 64000
101 no fair-queue
102 no clns route-cache
103 frame-relay intf-type dce
104 frame-relay route 102 interface Serial1/5 201
105 frame-relay route 103 interface Serial1/6 301
106 frame-relay route 104 interface Serial1/7 401
107 !
108 interface Serial1/5
109 description 201 203
110 no ip address
111 encapsulation frame-relay
112 clockrate 64000
113 no clns route-cache
114 frame-relay intf-type dce
115 frame-relay route 201 interface Serial1/4 102
116 frame-relay route 203 interface Serial1/6 302
117 !
118 interface Serial1/6
119 description 301 302
120 no ip address
121 encapsulation frame-relay
122 clockrate 64000
123 no clns route-cache
124 frame-relay intf-type dce
125 frame-relay route 301 interface Serial1/4 103
126 frame-relay route 302 interface Serial1/5 203
127 !
128 interface Serial1/7
129 description 401
130 no ip address
131 encapsulation frame-relay
132 clockrate 64000
133 no clns route-cache
134 frame-relay intf-type dce
135 frame-relay route 401 interface Serial1/4 104
136 !
137 no ip http server
138 ip classless
139 !
140 !
141 no cdp run
142 !
```

```

143 !
144 !
145 !
146 !
147 !
148 line con 0
149 line aux 0
150 line vty 0 4
151 login
152 !
153 !
154 end

```

### A.5.2. IP Interfaces

```

1 CCNA-CCNP-FRSwitch#show ip interface brief
2 Interface      IP-Address  OK? Method Status      Protocol
3 Ethernet0/0    unassigned YES NVRAM  administratively down down
4 Ethernet0/1    unassigned YES NVRAM  administratively down down
5 Serial1/0      unassigned YES NVRAM  up          up
6 Serial1/1      unassigned YES NVRAM  up          up
7 Serial1/2      unassigned YES NVRAM  down        down
8 Serial1/3      unassigned YES manual up          up
9 Serial1/4      unassigned YES NVRAM  down        down
10 Serial1/5      unassigned YES NVRAM  down        down
11 Serial1/6      unassigned YES NVRAM  down        down
12 Serial1/7      unassigned YES NVRAM  down        down

```

### A.5.3. Interface Status

```

1 CCNA-CCNP-FRSwitch>show interface status
2 ^
3 % Invalid input detected at '^' marker.

```

### A.5.4. Interface Trunk

```

1 CCNA-CCNP-FRSwitch>show interface trunk
2 ^
3 % Invalid input detected at '^' marker.

```

### A.5.5. Neighbors

```

1 CCNA-CCNP-FRSwitch#show cdp neighbors
2 % CDP is not enabled
3 CCNA-CCNP-FRSwitch#

```

### A.5.6. IP Route

```

1 CCNA-CCNP-FRSwitch>show ip route
2 Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
3         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

```

```

4      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5      E1 - OSPF external type 1, E2 - OSPF external type 2
6      i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7      ia - IS-IS inter area, * - candidate default, U - per-user static route
8      o - ODR, P - periodic downloaded static route
9
10 Gateway of last resort is not set

```

### A.5.7. Spanning Tree

```

1 CCNA-CCNP-FRSwitch>show spanning
2
3 No spanning tree instances exist.

```

### A.5.8. VLAN

```

1 CCNA-CCNP-FRSwitch>show vlan
2
3 No Virtual LANs configured.

```

## A.6. HQ-FRR (HQ FrameRelay Router)

### A.6.1. Running Configuration

```

1 HQ_FRR#show run
2
3 Building configuration...
4
5
6 Current configuration : 1810 bytes
7 !
8 ! Last configuration change at 22:56:57 UTC Thu Sep 22 2016
9 version 15.1
10 service timestamps debug datetime msec
11 service timestamps log datetime msec
12 no service password-encryption
13 !
14 hostname HQ_FRR
15 !
16 boot-start-marker
17 boot-end-marker
18 !
19 !
20 enable secret 5 $1$FscR$wXNeNkzJuiZqfM2mESMKM/
21 !
22 no aaa new-model
23 !
24 memory-size iomem 10
25 !
26 dot11 syslog
27 ip source-route
28 !
29 !
30 ip cef
31 !
32 !

```



```
33 | !
34 | no ipv6 cef
35 | !
36 | multilink bundle-name authenticated
37 | !
38 | !
39 | !
40 | !
41 | !
42 | !
43 | !
44 | !
45 | !
46 | !
47 | !
48 | voice-card 0
49 | !
50 | crypto pki token default removal timeout 0
51 | !
52 | !
53 | !
54 | !
55 | license udi pid CISC02811 sn FCZ1432207U
56 | archive
57 |   log config
58 |   hidekeys
59 | !
60 | redundancy
61 | !
62 | !
63 | !
64 | !
65 | !
66 | !
67 | !
68 | !
69 | !
70 | !
71 | interface FastEthernet0/0
72 |   ip address 172.16.254.62 255.255.255.252
73 |   ip ospf 1 area 0
74 |   duplex auto
75 |   speed auto
76 | !
77 | interface FastEthernet0/1
78 |   no ip address
79 |   shutdown
80 |   duplex auto
81 |   speed auto
82 | !
83 | interface Serial0/0/0
84 |   no ip address
85 |   encapsulation frame-relay
86 |   no fair-queue
87 |   frame-relay lmi-type cisco
88 | !
89 | interface Serial0/0/0.123 multipoint
90 |   ip address 172.16.252.1 255.255.255.0
91 |   ip ospf network point-to-multipoint
92 |   ip ospf 1 area 0
93 |   snmp trap link-status
94 |   frame-relay map ip 172.16.252.3 103 broadcast
```

```
95 frame-relay map ip 172.16.252.4 104 broadcast
96 frame-relay map ip 172.16.252.2 102 broadcast
97 !
98 interface Serial0/0/1
99 no ip address
100 shutdown
101 clock rate 2000000
102 !
103 interface Serial1/0
104 no ip address
105 shutdown
106 !
107 interface Serial1/1
108 no ip address
109 shutdown
110 !
111 interface Serial1/2
112 no ip address
113 shutdown
114 !
115 interface Serial1/3
116 no ip address
117 shutdown
118 !
119 router ospf 1
120 !
121 ip forward-protocol nd
122 ip http server
123 no ip http secure-server
124 !
125 !
126 !
127 !
128 !
129 !
130 !
131 snmp-server community public R0
132 snmp-server community private RW
133 !
134 !
135 control-plane
136 !
137 !
138 !
139 !
140 mgcp profile default
141 !
142 !
143 !
144 !
145 !
146 !
147 line con 0
148 line aux 0
149 line vty 0 4
150 password ins@lab
151 login
152 transport input all
153 !
154 scheduler allocate 20000 1000
155 end R S I 2811 Fas 0/1
156 HQ_FRR#
```

### A.6.2. IP Interfaces

```

1 HQ_FRR#show ip interface brief
2 Interface          IP-Address OK? Method Status      Protocol
3 FastEthernet0/0     172.16.254.62 YES manual up          up
4 FastEthernet0/1     unassigned YES unset administratively down down
5 Serial0/0/0         unassigned YES unset up          up
6 Serial0/0/0.123     172.16.252.1 YES manual up          up
7 Serial0/0/1         unassigned YES unset administratively down down
8 Serial1/0           unassigned YES unset administratively down down
9 Serial1/1           unassigned YES unset administratively down down
10 Serial1/2           unassigned YES unset administratively down down
11 Serial1/3           unassigned YES unset administratively down down

```

### A.6.3. Interface Status

```

1 HQ_FRR>show interface status

```

### A.6.4. Interface Trunk

```

1 HQ_FRR>show interface trunk

```

### A.6.5. Neighbors

```

1 HQ_FRR#show cdp neighbors
2 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
3                   S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
4                   D - Remote, C - CVTA, M - Two-port Mac Relay
5
6 Device ID    Local Intfcae Holdtme Capability Platform Port ID
7 HQ_WER1     Fas 0/0      145

```

### A.6.6. IP Route

```

1 HQ_FRR>show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4         N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5         E1 - OSPF external type 1, E2 - OSPF external type 2
6         i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7         ia - IS-IS inter area, * - candidate default, U - per-user static route
8         o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9         + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13     172.16.0.0/16 is variably subnetted, 33 subnets, 4 masks
14 0       172.16.17.0/24 [110/5] via 172.16.254.61, 3d06h, FastEthernet0/0
15 0       172.16.18.0/24 [110/4] via 172.16.254.61, 3d06h, FastEthernet0/0
16 0       172.16.19.0/24 [110/4] via 172.16.254.61, 3d06h, FastEthernet0/0

```

```

17 0      172.16.25.1/32 [110/4] via 172.16.254.61, 3d06h, FastEthernet0/0
18 0      172.16.25.2/32 [110/3] via 172.16.254.61, 3d06h, FastEthernet0/0
19 0      172.16.25.3/32 [110/5] via 172.16.254.61, 3d06h, FastEthernet0/0
20 0      172.16.25.4/32 [110/6] via 172.16.254.61, 3d06h, FastEthernet0/0
21 0      172.16.25.5/32 [110/5] via 172.16.254.61, 3d06h, FastEthernet0/0
22 0      172.16.25.6/32 [110/4] via 172.16.254.61, 3d06h, FastEthernet0/0
23 0      172.16.25.7/32 [110/6] via 172.16.254.61, 3d06h, FastEthernet0/0
24 0      172.16.100.0/24 [110/65] via 172.16.252.2, 3d06h, Serial0/0/0.123
25 0      172.16.101.0/24 [110/66] via 172.16.252.2, 3d06h, Serial0/0/0.123
26 0      172.16.102.0/24 [110/1004] via 172.16.254.61, 3d06h, FastEthernet0/0
27 C      172.16.252.0/24 is directly connected, Serial0/0/0.123
28 L      172.16.252.1/32 is directly connected, Serial0/0/0.123
29 0      172.16.252.2/32 [110/64] via 172.16.252.2, 3d13h, Serial0/0/0.123
30 0      172.16.252.3/32 [110/1003] via 172.16.254.61, 3d06h, FastEthernet0/0
31 0      172.16.254.0/30 [110/3] via 172.16.254.61, 3d06h, FastEthernet0/0
32 0      172.16.254.4/30 [110/4] via 172.16.254.61, 3d06h, FastEthernet0/0
33 0      172.16.254.8/30 [110/5] via 172.16.254.61, 3d06h, FastEthernet0/0
34 0      172.16.254.12/30 [110/12] via 172.16.254.61, 3d06h, FastEthernet0/0
35 0      172.16.254.16/30 [110/6] via 172.16.254.61, 3d06h, FastEthernet0/0
36 0      172.16.254.20/30 [110/5] via 172.16.254.61, 3d06h, FastEthernet0/0
37 0      172.16.254.32/29 [110/6] via 172.16.254.61, 3d06h, FastEthernet0/0
38 0      172.16.254.40/29 [110/4] via 172.16.254.61, 3d06h, FastEthernet0/0
39 0      172.16.254.48/29 [110/3] via 172.16.254.61, 3d06h, FastEthernet0/0
40 0      172.16.254.56/30 [110/2] via 172.16.254.61, 3d06h, FastEthernet0/0
41 C      172.16.254.60/30 is directly connected, FastEthernet0/0
42 L      172.16.254.62/32 is directly connected, FastEthernet0/0
43 0      172.16.254.64/30 [110/3] via 172.16.254.61, 3d06h, FastEthernet0/0
44 0      172.16.255.0/30 [110/1003] via 172.16.254.61, 3d06h, FastEthernet0/0
45 0      172.16.255.4/30 [110/1003] via 172.16.254.61, 3d06h, FastEthernet0/0
46 0      172.16.255.8/30 [110/1003] via 172.16.254.61, 3d06h, FastEthernet0/0
47 200.200.200.0/28 is subnetted, 1 subnets
48 0      200.200.200.0 [110/4] via 172.16.254.61, 3d06h, FastEthernet0/0

```

### A.6.7. Spanning Tree

```

1 HQ_FRR>show spanning
2
3 No spanning tree instances exist.

```

### A.6.8. VLAN

```

1 HQ_FRR>show vlan
2 % Ambiguous command: "show vlan"

```

## A.7. HQ-WER1

### A.7.1. Running Configuration

```

1 HQ_WER1#show running-config
2 Building configuration...
3
4
5 Current configuration : 1524 bytes
6 !
7 ! Last configuration change at 23:58:14 UTC Thu Sep 22 2016
8 version 15.1

```

```
 9 service timestamps debug datetime msec
10 service timestamps log datetime msec
11 no service password-encryption
12 !
13 hostname HQ_WER1
14 !
15 boot-start-marker
16 boot-end-marker
17 !
18 !
19 enable secret 5 $1$RJx0$6QppMo5PI1VrlwnDvu//l1
20 !
21 no aaa new-model
22 !
23 memory-size iomem 10
24 !
25 dot11 syslog
26 ip source-route
27 !
28 !
29 ip cef
30 !
31 !
32 !
33 no ipv6 cef
34 !
35 multilink bundle-name authenticated
36 !
37 !
38 !
39 !
40 !
41 !
42 !
43 !
44 !
45 !
46 !
47 voice-card 0
48 !
49 crypto pki token default removal timeout 0
50 !
51 !
52 !
53 !
54 license udi pid CISC02811 sn FCZ104770XM
55 archive
56   log config
57   hidekeys
58 !
59 redundancy
60 !
61 !
62 !
63 !
64 !
65 !
66 !
67 !
68 !
69 !
70 interface FastEthernet0/0
```

```
71 ip address 172.16.254.58 255.255.255.252
72 ip ospf 1 area 0
73 duplex auto
74 speed auto
75 !
76 interface FastEthernet0/1
77 ip address 172.16.254.61 255.255.255.252
78 ip ospf 1 area 0
79 duplex auto
80 speed auto
81 !
82 interface Serial0/0/0
83 no ip address
84 shutdown
85 no fair-queue
86 clock rate 2000000
87 !
88 interface Serial0/0/1
89 no ip address
90 shutdown
91 clock rate 2000000
92 !
93 interface Serial1/0
94 no ip address
95 shutdown
96 !
97 interface Serial1/1
98 no ip address
99 shutdown
100 !
101 interface Serial1/2
102 no ip address
103 shutdown
104 !
105 interface Serial1/3
106 no ip address
107 shutdown
108 !
109 router ospf 1
110 !
111 ip forward-protocol nd
112 ip http server
113 no ip http secure-server
114 !
115 !
116 !
117 !
118 !
119 !
120 !
121 snmp-server community public R0
122 snmp-server community private RW
123 !
124 !
125 control-plane
126 !
127 !
128 !
129 !
130 mgcp profile default
131 !
132 !
```

```

133 !
134 !
135 !
136 !
137 line con 0
138 line aux 0
139 line vty 0 4
140 password ins@lab
141 login
142 transport input all
143 !
144 scheduler allocate 20000 1000
145 end

```

### A.7.2. IP Interfaces

```

1 HQ_WER1#show ip interface brief
2 Interface IP-Address OK? Method Status Protocol
3 FastEthernet0/0 172.16.254.58 YES manual up up
4 FastEthernet0/1 172.16.254.61 YES manual up up
5 Serial0/0/0 unassigned YES unset administratively down down
6 Serial0/0/1 unassigned YES unset administratively down down
7 Serial1/0 unassigned YES unset administratively down down
8 Serial1/1 unassigned YES unset administratively down down
9 Serial1/2 unassigned YES unset administratively down down
10 Serial1/3 unassigned YES unset administratively down down

```

### A.7.3. Interface Status

```

1 HQ_WER1>show interface status

```

### A.7.4. Interface Trunk

```

1 HQ_WER1>show interface trunk

```

### A.7.5. Neighbors

```

1 HQ_WER1#show cdp neighbors
2 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
3 S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
4 D - Remote, C - CVTA, M - Two-port Mac Relay
5
6 Device ID Local Intrfce Holdtme Capability Platform Port ID
7 HQ_FRR Fas 0/1 125 R S I 2811 Fas 0/0
8 HQ_CS2 Fas 0/0 155 R S I WS-C3560V Fas 0/21

```

### A.7.6. IP Route

```

1 HQ_WER1>show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

```

```

4      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5      E1 - OSPF external type 1, E2 - OSPF external type 2
6      i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7      ia - IS-IS inter area, * - candidate default, U - per-user static route
8      o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9      + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13      172.16.0.0/16 is variably subnetted, 33 subnets, 4 masks
14      0       172.16.17.0/24 [110/4] via 172.16.254.57, 3d06h, FastEthernet0/0
15      0       172.16.18.0/24 [110/3] via 172.16.254.57, 3d06h, FastEthernet0/0
16      0       172.16.19.0/24 [110/3] via 172.16.254.57, 3d06h, FastEthernet0/0
17      0       172.16.25.1/32 [110/3] via 172.16.254.57, 3d06h, FastEthernet0/0
18      0       172.16.25.2/32 [110/2] via 172.16.254.57, 3d06h, FastEthernet0/0
19      0       172.16.25.3/32 [110/4] via 172.16.254.57, 3d06h, FastEthernet0/0
20      0       172.16.25.4/32 [110/5] via 172.16.254.57, 3d06h, FastEthernet0/0
21      0       172.16.25.5/32 [110/4] via 172.16.254.57, 3d06h, FastEthernet0/0
22      0       172.16.25.6/32 [110/3] via 172.16.254.57, 3d06h, FastEthernet0/0
23      0       172.16.25.7/32 [110/5] via 172.16.254.57, 3d06h, FastEthernet0/0
24      0       172.16.100.0/24 [110/66] via 172.16.254.62, 3d06h, FastEthernet0/1
25      0       172.16.101.0/24 [110/67] via 172.16.254.62, 3d06h, FastEthernet0/1
26      0       172.16.102.0/24 [110/1003] via 172.16.254.57, 3d06h, FastEthernet0/0
27      0       172.16.252.1/32 [110/1] via 172.16.254.62, 3d14h, FastEthernet0/1
28      0       172.16.252.2/32 [110/65] via 172.16.254.62, 3d13h, FastEthernet0/1
29      0       172.16.252.3/32 [110/1002] via 172.16.254.57, 3d06h, FastEthernet0/0
30      0       172.16.254.0/30 [110/2] via 172.16.254.57, 3d06h, FastEthernet0/0
31      0       172.16.254.4/30 [110/3] via 172.16.254.57, 3d06h, FastEthernet0/0
32      0       172.16.254.8/30 [110/4] via 172.16.254.57, 3d06h, FastEthernet0/0
33      0       172.16.254.12/30 [110/11] via 172.16.254.57, 3d06h, FastEthernet0/0
34      0       172.16.254.16/30 [110/5] via 172.16.254.57, 3d06h, FastEthernet0/0
35      0       172.16.254.20/30 [110/4] via 172.16.254.57, 3d06h, FastEthernet0/0
36      0       172.16.254.32/29 [110/5] via 172.16.254.57, 3d06h, FastEthernet0/0
37      0       172.16.254.40/29 [110/3] via 172.16.254.57, 3d06h, FastEthernet0/0
38      0       172.16.254.48/29 [110/2] via 172.16.254.57, 3d06h, FastEthernet0/0
39      C       172.16.254.56/30 is directly connected, FastEthernet0/0
40      L       172.16.254.58/32 is directly connected, FastEthernet0/0
41      C       172.16.254.60/30 is directly connected, FastEthernet0/1
42      L       172.16.254.61/32 is directly connected, FastEthernet0/1
43      0       172.16.254.64/30 [110/2] via 172.16.254.57, 3d06h, FastEthernet0/0
44      0       172.16.255.0/30 [110/1002] via 172.16.254.57, 3d06h, FastEthernet0/0
45      0       172.16.255.4/30 [110/1002] via 172.16.254.57, 3d06h, FastEthernet0/0
46      0       172.16.255.8/30 [110/1002] via 172.16.254.57, 3d06h, FastEthernet0/0
47      200.200.200.0/28 is subnetted, 1 subnets
48      0       200.200.200.0 [110/3] via 172.16.254.57, 3d06h, FastEthernet0/0

```

### A.7.7. Spanning Tree

```

1 HQ_WER1>show spanning
2
3 No spanning tree instances exist.

```

### A.7.8. VLAN

```

1 HQ_WER1>show vlan
2 % Ambiguous command: "show vlan"

```



## A.8. HQ-IER1

### A.8.1. Running Configuration

```
1 HQ_IER1#show running-config
2 Building configuration...
3
4
5 Current configuration : 1977 bytes
6 !
7 ! Last configuration change at 17:14:57 UTC Mon Jan 2 2006
8 version 15.1
9 service timestamps debug datetime msec
10 service timestamps log datetime msec
11 no service password-encryption
12 !
13 hostname HQ_IER1
14 !
15 boot-start-marker
16 boot-end-marker
17 !
18 !
19 enable secret 5 $1$59bw$.eTpV8UBqKkJfmSRZCWHH/
20 !
21 no aaa new-model
22 !
23 memory-size iomem 10
24 !
25 dot11 syslog
26 ip source-route
27 !
28 !
29 ip cef
30 !
31 !
32 !
33 no ipv6 cef
34 !
35 multilink bundle-name authenticated
36 !
37 !
38 !
39 !
40 !
41 !
42 !
43 !
44 !
45 !
46 !
47 voice-card 0
48 !
49 crypto pki token default removal timeout 0
50 !
51 !
52 !
53 !
54 license udi pid CISC02811 sn FGL154811KR
55 archive
56   log config
57   hidekeys
58 !
```

```
59 redundancy
60 !
61 !
62 !
63 !
64 !
65 !
66 !
67 !
68 !
69 !
70 interface Tunnel0
71 ip address 172.16.255.1 255.255.255.252
72 ip ospf 1 area 0
73 tunnel source 200.200.200.1
74 tunnel destination 200.200.200.2
75 !
76 interface Tunnel1
77 ip address 172.16.255.5 255.255.255.252
78 ip ospf 1 area 0
79 tunnel source 200.200.200.1
80 tunnel destination 200.200.200.3
81 !
82 interface Tunnel2
83 ip address 172.16.255.9 255.255.255.252
84 ip ospf 1 area 0
85 tunnel source 200.200.200.1
86 tunnel destination 200.200.200.4
87 !
88 interface FastEthernet0/0
89 ip address 172.16.254.66 255.255.255.252
90 ip ospf 1 area 0
91 duplex auto
92 speed auto
93 !
94 interface FastEthernet0/1
95 ip address 200.200.200.1 255.255.255.240
96 ip ospf 1 area 0
97 duplex auto
98 speed auto
99 !
100 interface Serial0/0/0
101 no ip address
102 shutdown
103 no fair-queue
104 clock rate 2000000
105 !
106 interface Serial0/0/1
107 no ip address
108 shutdown
109 clock rate 2000000
110 !
111 interface Serial0/1/0
112 no ip address
113 shutdown
114 clock rate 2000000
115 !
116 interface Serial0/1/1
117 no ip address
118 shutdown
119 clock rate 2000000
120 !
```

```

121 interface FastEthernet1/0
122   no ip address
123   shutdown
124   duplex auto
125   speed auto
126   !
127   router ospf 1
128   !
129   ip forward-protocol nd
130   ip http server
131   no ip http secure-server
132   !
133   !
134   !
135   !
136   !
137   !
138   !
139   snmp-server community public R0
140   snmp-server community private RW
141   !
142   !
143   control-plane
144   !
145   !
146   !
147   !
148   mgcp profile default
149   !
150   !
151   !
152   !
153   !
154   !
155   line con 0
156   line aux 0
157   line vty 0 4
158     password ins@lab
159     login
160     transport input all
161   !
162   scheduler allocate 20000 1000
163 end

```

### A.8.2. IP Interfaces

```

1 HQ_IER1#show ip interface brief
2 Interface IP-Address OK? Method Status Protocol
3 FastEthernet0/0 172.16.254.66 YES manual up up
4 FastEthernet0/1 200.200.200.1 YES manual up up
5 Serial0/0/0 unassigned YES unset administratively down down
6 Serial0/0/1 unassigned YES unset administratively down down
7 Serial0/1/0 unassigned YES unset administratively down down
8 Serial0/1/1 unassigned YES unset administratively down down
9 FastEthernet1/0 unassigned YES unset administratively down down
10 Tunnel0 172.16.255.1 YES manual up up
11 Tunnel1 172.16.255.5 YES manual up up
12 Tunnel2 172.16.255.9 YES manual up up

```

**A.8.3. Interface Status**

```

1 HQ_IER1#show interface stat
2 FastEthernet0/0
3     Switching path Pkts In Chars In Pkts Out Chars Out
4     Processor      62819 11889872 79578 8858519
5     Route cache    6340  389026  4122  366141
6     Total          69159 12278898 83700 9224660
7 FastEthernet0/1
8     Switching path Pkts In Chars In Pkts Out Chars Out
9     Processor      96159 13859220 179286 18716338
10    Route cache    4174  471502  6340  473164
11    Total          100333 14330722 185626 19189502
12 Interface Serial0/0/0 is disabled
13
14 Interface Serial0/0/1 is disabled
15
16 Interface Serial0/1/0 is disabled
17
18 Interface Serial0/1/1 is disabled
19
20 Interface FastEthernet1/0 is disabled
21
22 Tunnel0
23     Switching path Pkts In Chars In Pkts Out Chars Out
24     Processor      35006 3645775 36571 3887455
25     Route cache    0      0      13  1612
26     Total          35006 3645775 36584 3889067
27 Tunnel1
28     Switching path Pkts In Chars In Pkts Out Chars Out
29     Processor      34746 3621587 36701 3900323
30     Route cache    4122  407361  4715  315131
31     Total          38868 4028948 41416 4215454
32 Tunnel2
33     Switching path Pkts In Chars In Pkts Out Chars Out
34     Processor      0      0      32357 3235391
35     Route cache    0      0      0      0
36     Total          0      0      32357 3235391

```

**A.8.4. Interface Trunk****A.8.5. Neighbors**

```

1 BR1_R1#show cdp neighbors
2 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
3     S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
4     D - Remote, C - CVTA, M - Two-port Mac Relay
5
6 Device ID    Local Intfcae Holdtme Capability Platform Port ID
7 BR1_S1      Fas 0/1      143      R S I WS-C3560- Fas 0/1
8 Switch      Fas 0/0      133      S I WS-C2960- Fas 0/2
9 BR1_R1#

```

**A.8.6. IP Route****A.8.7. Spanning Tree****A.8.8. VLAN****A.9. Provider Switch****A.9.1. Running Configuration**

```
1 Switch#show run
2 Building configuration...
3
4 Current configuration : 1222 bytes
5 !
6 version 15.0
7 no service pad
8 service timestamps debug datetime msec
9 service timestamps log datetime msec
10 no service password-encryption
11 !
12 hostname Switch
13 !
14 boot-start-marker
15 boot-end-marker
16 !
17 !
18 no aaa new-model
19 system mtu routing 1500
20 !
21 !
22 !
23 !
24 !
25 !
26 !
27 !
28 !
29 !
30 spanning-tree mode pvst
31 spanning-tree extend system-id
32 !
33 vlan internal allocation policy ascending
34 !
35 !
36 !
37 !
38 !
39 !
40 interface FastEthernet0/1
41 !
42 interface FastEthernet0/2
43 !
44 interface FastEthernet0/3
45 !
46 interface FastEthernet0/4
47 !
48 interface FastEthernet0/5
49 !
50 interface FastEthernet0/6
51 !
```

```

52 interface FastEthernet0/7
53 !
54 interface FastEthernet0/8
55 !
56 interface FastEthernet0/9
57 !
58 interface FastEthernet0/10
59 !
60 interface FastEthernet0/11
61 !
62 interface FastEthernet0/12
63 !
64 interface FastEthernet0/13
65 !
66 interface FastEthernet0/14
67 !
68 interface FastEthernet0/15
69 !
70 interface FastEthernet0/16
71 !
72 interface FastEthernet0/17
73 !
74 interface FastEthernet0/18
75 !
76 interface FastEthernet0/19
77 !
78 interface FastEthernet0/20
79 !
80 interface FastEthernet0/21
81 !
82 interface FastEthernet0/22
83 !
84 interface FastEthernet0/23
85 !
86 interface FastEthernet0/24
87 !
88 interface GigabitEthernet0/1
89 !
90 interface GigabitEthernet0/2
91 !
92 interface Vlan1
93 no ip address
94 !
95 ip http server
96 ip http secure-server
97 !
98 !
99 line con 0
100 line vty 5 15
101 !
102 end

```

### A.9.2. IP Interfaces

```

1 Switch#show ip interface brief
2 Interface      IP-Address  OK? Method Status  Protocol
3 Vlan1          unassigned YES unset  up      up
4 FastEthernet0/1 unassigned YES unset  up      up
5 FastEthernet0/2 unassigned YES unset  up      up
6 FastEthernet0/3 unassigned YES unset  up      up

```

7	FastEthernet0/4	unassigned	YES	unset	down	down
8	FastEthernet0/5	unassigned	YES	unset	down	down
9	FastEthernet0/6	unassigned	YES	unset	down	down
10	FastEthernet0/7	unassigned	YES	unset	down	down
11	FastEthernet0/8	unassigned	YES	unset	down	down
12	FastEthernet0/9	unassigned	YES	unset	down	down
13	FastEthernet0/10	unassigned	YES	unset	down	down
14	FastEthernet0/11	unassigned	YES	unset	down	down
15	FastEthernet0/12	unassigned	YES	unset	down	down
16	FastEthernet0/13	unassigned	YES	unset	down	down
17	FastEthernet0/14	unassigned	YES	unset	down	down
18	FastEthernet0/15	unassigned	YES	unset	down	down
19	FastEthernet0/16	unassigned	YES	unset	down	down
20	FastEthernet0/17	unassigned	YES	unset	down	down
21	FastEthernet0/18	unassigned	YES	unset	down	down
22	FastEthernet0/19	unassigned	YES	unset	down	down
23	FastEthernet0/20	unassigned	YES	unset	down	down
24	FastEthernet0/21	unassigned	YES	unset	down	down
25	FastEthernet0/22	unassigned	YES	unset	down	down
26	FastEthernet0/23	unassigned	YES	unset	down	down
27	FastEthernet0/24	unassigned	YES	unset	down	down
28	GigabitEthernet0/1	unassigned	YES	unset	down	down
29	GigabitEthernet0/2	unassigned	YES	unset	down	down

### A.9.3. Interface Status

1	Switch# show <b>interface</b> status						
2							
3	Port	Name	Status	Vlan	Duplex	Speed	Type
4	Fa0/1		connected	1	a-full	a-100	10/100BaseTX
5	Fa0/2		connected	1	a-full	a-100	10/100BaseTX
6	Fa0/3		connected	1	a-full	a-100	10/100BaseTX
7	Fa0/4		notconnect	1	auto	auto	10/100BaseTX
8	Fa0/5		notconnect	1	auto	auto	10/100BaseTX
9	Fa0/6		notconnect	1	auto	auto	10/100BaseTX
10	Fa0/7		notconnect	1	auto	auto	10/100BaseTX
11	Fa0/8		notconnect	1	auto	auto	10/100BaseTX
12	Fa0/9		notconnect	1	auto	auto	10/100BaseTX
13	Fa0/10		notconnect	1	auto	auto	10/100BaseTX
14	Fa0/11		notconnect	1	auto	auto	10/100BaseTX
15	Fa0/12		notconnect	1	auto	auto	10/100BaseTX
16	Fa0/13		notconnect	1	auto	auto	10/100BaseTX
17	Fa0/14		notconnect	1	auto	auto	10/100BaseTX
18	Fa0/15		notconnect	1	auto	auto	10/100BaseTX
19	Fa0/16		notconnect	1	auto	auto	10/100BaseTX
20	Fa0/17		notconnect	1	auto	auto	10/100BaseTX
21	Fa0/18		notconnect	1	auto	auto	10/100BaseTX
22	Fa0/19		notconnect	1	auto	auto	10/100BaseTX
23	Fa0/20		notconnect	1	auto	auto	10/100BaseTX
24	Fa0/21		notconnect	1	auto	auto	10/100BaseTX
25							
26	Port	Name	Status	Vlan	Duplex	Speed	Type
27	Fa0/22		notconnect	1	auto	auto	10/100BaseTX
28	Fa0/23		notconnect	1	auto	auto	10/100BaseTX
29	Fa0/24		notconnect	1	auto	auto	10/100BaseTX
30	Gi0/1		notconnect	1	auto	auto	Not Present
31	Gi0/2		notconnect	1	auto	auto	Not Present

#### A.9.4. Interface Trunk

```
1 Switch# show interface trunk
```

#### A.9.5. Neighbors

```
1 Switch# show cdp neighbors
2 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
3                   S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
4                   D - Remote, C - CVTA, M - Two-port Mac Relay
5
6 Device ID    Local Intrfce Holdtme Capability Platform Port ID
7 BR1_R1      Fas 0/2      129      R S I 2811  Fas 0/0
8 BR2_R1      Fas 0/3      141      R S I 2811  Fas 0/0
9 HQ_IER1     Fas 0/1      142      R S I 2811  Fas 0/1
```

#### A.9.6. IP Route

```
1 Switch#show ip route
2      ^
3 % Invalid input detected at '^' marker.
```

#### A.9.7. Spanning Tree

```
1 Switch#show spanning
2
3 VLAN0001
4   Spanning tree enabled protocol ieee
5   Root ID Priority 32769
6       Address f025.72d1.8700
7       This bridge is the root
8       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
9
10  Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
11      Address f025.72d1.8700
12      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
13      Aging Time 300 sec
14
15 Interface      Role Sts Cost Prio.Nbr Type
16 -----
17 Fa0/1           Desg FWD 19   128.1 P2p
18 Fa0/2           Desg FWD 19   128.2 P2p
19 Fa0/3           Desg FWD 19   128.3 P2p
```

#### A.9.8. VLAN

```
1 Switch#show vlan
2
3 VLAN Name                Status Ports
4 -----
5 1 default                 active Fa0/1, Fa0/2, Fa0/3, Fa0/4
6                           Fa0/5, Fa0/6, Fa0/7, Fa0/8
7                           Fa0/9, Fa0/10, Fa0/11, Fa0/12
```



```

8                                     Fa0/13, Fa0/14, Fa0/15, Fa0/16
9                                     Fa0/17, Fa0/18, Fa0/19, Fa0/20
10                                    Fa0/21, Fa0/22, Fa0/23, Fa0/24
11                                    Gi0/1, Gi0/2
12 1002 fddi-default                act/unsup
13 1003 token-ring-default          act/unsup
14 1004 fddinet-default            act/unsup
15 1005 trnet-default              act/unsup
16
17 VLAN Type SAID  MTU  Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
18 -----
19 1    enet 100001 1500 -    -    -    -    -    0      0
20 1002 fddi 101002 1500 -    -    -    -    -    0      0
21 1003 tr  101003 1500 -    -    -    -    -    0      0
22 1004 fdnet 101004 1500 -    -    -    ieee -    0      0
23 1005 trnet 101005 1500 -    -    -    ibm  -    0      0
24
25 Remote SPAN VLANs
26 -----
27
28
29 Primary Secondary Type      Ports
30 -----

```

## A.10. HQ CS1

### A.10.1. Running Configuration

```

1
2 !
3 ! Last configuration change at 07:31:17 UTC Mon Mar 1 1993
4 !
5 version 15.0
6 no service pad
7 service timestamps debug datetime msec
8 service timestamps log datetime msec
9 no service password-encryption
10 service sequence-numbers
11 !
12 hostname HQ_CS1
13 !
14 boot-start-marker
15 boot-end-marker
16 !
17 enable secret 5 $1$sMhJ$dd5KAmhu1twZd0/DAD/Lm/
18 !
19 username ins password 0 ins@lab
20 no aaa new-model
21 system mtu routing 1500
22 ip routing
23 no ip domain-lookup
24 !
25 !
26 !
27 !
28 crypto pki trustpoint HTTPS_SS_CERT_KEYPAIR
29 enrollment selfsigned
30 serial-number
31 revocation-check none
32 rsakeypair HTTPS_SS_CERT_KEYPAIR

```

```
33 | !
34 | !
35 | crypto pki certificate chain HTTPS_SS_CERT_KEYPAIR
36 |   certificate self-signed 01
37 |     quit
38 | !
39 | !
40 | !
41 | !
42 | !
43 | spanning-tree mode pvst
44 | spanning-tree extend system-id
45 | !
46 | vlan internal allocation policy ascending
47 | !
48 | !
49 | !
50 | !
51 | !
52 | !
53 | !
54 | !
55 | !
56 | !
57 | !
58 | !
59 | !
60 | !
61 | interface Loopback100
62 |   ip address 172.16.25.1 255.255.255.0
63 |   ip ospf 1 area 0
64 | !
65 | interface Port-channel1
66 |   no switchport
67 |   ip address 172.16.254.1 255.255.255.252
68 |   ip ospf 1 area 0
69 | !
70 | interface Port-channel2
71 |   no switchport
72 |   ip address 172.16.254.5 255.255.255.252
73 |   ip ospf 1 area 0
74 | !
75 | interface Port-channel3
76 |   no switchport
77 |   bandwidth 10000
78 |   ip address 172.16.254.33 255.255.255.248
79 |   ip ospf mtu-ignore
80 |   ip ospf 1 area 0
81 |   speed 10
82 | !
83 | interface Port-channel4
84 |   no switchport
85 |   bandwidth 100000
86 |   ip address 172.16.254.41 255.255.255.248
87 |   ip ospf mtu-ignore
88 |   ip ospf 1 area 0
89 |   speed 100
90 |   duplex half
91 | !
92 | interface FastEthernet0/1
93 |   no switchport
94 |   no ip address
```

```
95 | channel-group 1 mode on
96 | !
97 | interface FastEthernet0/2
98 | no switchport
99 | no ip address
100 | channel-group 1 mode on
101 | !
102 | interface FastEthernet0/3
103 | no switchport
104 | no ip address
105 | channel-group 1 mode on
106 | !
107 | interface FastEthernet0/4
108 | no switchport
109 | no ip address
110 | channel-group 1 mode on
111 | !
112 | interface FastEthernet0/5
113 | no switchport
114 | no ip address
115 | channel-group 2 mode on
116 | !
117 | interface FastEthernet0/6
118 | no switchport
119 | no ip address
120 | channel-group 2 mode on
121 | !
122 | interface FastEthernet0/7
123 | no switchport
124 | no ip address
125 | channel-group 2 mode on
126 | !
127 | interface FastEthernet0/8
128 | no switchport
129 | no ip address
130 | channel-group 2 mode on
131 | !
132 | interface FastEthernet0/9
133 | !
134 | interface FastEthernet0/10
135 | !
136 | interface FastEthernet0/11
137 | !
138 | interface FastEthernet0/12
139 | !
140 | interface FastEthernet0/13
141 | no switchport
142 | no ip address
143 | speed 10
144 | channel-group 3 mode on
145 | !
146 | interface FastEthernet0/14
147 | no switchport
148 | no ip address
149 | speed 10
150 | channel-group 3 mode on
151 | !
152 | interface FastEthernet0/15
153 | no switchport
154 | no ip address
155 | speed 10
156 | channel-group 3 mode on
```

```
157 !
158 interface FastEthernet0/16
159 no switchport
160 no ip address
161 speed 10
162 channel-group 3 mode on
163 !
164 interface FastEthernet0/17
165 no switchport
166 no ip address
167 speed 100
168 duplex half
169 channel-group 4 mode on
170 !
171 interface FastEthernet0/18
172 no switchport
173 no ip address
174 speed 100
175 duplex half
176 channel-group 4 mode on
177 !
178 interface FastEthernet0/19
179 no switchport
180 no ip address
181 speed 100
182 duplex half
183 channel-group 4 mode on
184 !
185 interface FastEthernet0/20
186 no switchport
187 no ip address
188 speed 100
189 duplex half
190 channel-group 4 mode on
191 !
192 interface FastEthernet0/21
193 !
194 interface FastEthernet0/22
195 !
196 interface FastEthernet0/23
197 !
198 interface FastEthernet0/24
199 !
200 interface GigabitEthernet0/1
201 !
202 interface GigabitEthernet0/2
203 !
204 interface Vlan1
205 no ip address
206 !
207 router ospf 1
208 !
209 ip http server
210 ip http secure-server
211 !
212 !
213 ip sla enable reaction-alerts
214 snmp-server community public R0
215 snmp-server community private RW
216 !
217 !
218 line con 0
```

```

219 logging synchronous
220 line vty 0 4
221 password cisco
222 login
223 line vty 5 15
224 password cisco
225 login
226 !
227 end

```

### A.10.2. IP Interfaces

Interface	IP-Address	OK?	Method	Status	Protocol
Vlan1	unassigned	YES	unset	up	down
FastEthernet0/1	unassigned	YES	manual	up	up
FastEthernet0/2	unassigned	YES	manual	up	up
FastEthernet0/3	unassigned	YES	manual	up	up
FastEthernet0/4	unassigned	YES	manual	up	up
FastEthernet0/5	unassigned	YES	manual	up	up
FastEthernet0/6	unassigned	YES	manual	up	up
FastEthernet0/7	unassigned	YES	manual	up	up
FastEthernet0/8	unassigned	YES	manual	up	up
FastEthernet0/9	unassigned	YES	unset	down	down
FastEthernet0/10	unassigned	YES	unset	down	down
FastEthernet0/11	unassigned	YES	unset	down	down
FastEthernet0/12	unassigned	YES	unset	down	down
FastEthernet0/13	unassigned	YES	manual	up	up
FastEthernet0/14	unassigned	YES	manual	up	up
FastEthernet0/15	unassigned	YES	manual	up	up
FastEthernet0/16	unassigned	YES	manual	up	up
FastEthernet0/17	unassigned	YES	manual	up	up
FastEthernet0/18	unassigned	YES	manual	up	up
FastEthernet0/19	unassigned	YES	manual	up	up
FastEthernet0/20	unassigned	YES	manual	up	up
FastEthernet0/21	unassigned	YES	unset	down	down
FastEthernet0/22	unassigned	YES	unset	down	down
FastEthernet0/23	unassigned	YES	unset	down	down
FastEthernet0/24	unassigned	YES	unset	down	down
GigabitEthernet0/1	unassigned	YES	unset	down	down
GigabitEthernet0/2	unassigned	YES	unset	down	down
Port-channel1	172.16.254.1	YES	manual	up	up
Port-channel2	172.16.254.5	YES	manual	up	up
Port-channel3	172.16.254.33	YES	manual	up	up
Port-channel4	172.16.254.41	YES	manual	up	up
Loopback100	172.16.25.1	YES	manual	up	up

### A.10.3. Interface Status

```

1 HQ_CS1#show interface status
2
3 Port      Name      Status    Vlan    Duplex Speed Type
4 Fa0/1     connected routed    a-full a-100  10/100BaseTX
5 Fa0/2     connected routed    a-full a-100  10/100BaseTX
6 Fa0/3     connected routed    a-full a-100  10/100BaseTX
7 Fa0/4     connected routed    a-full a-100  10/100BaseTX
8 Fa0/5     connected routed    a-full a-100  10/100BaseTX
9 Fa0/6     connected routed    a-full a-100  10/100BaseTX
10 Fa0/7     connected routed    a-full a-100  10/100BaseTX

```

```

11 Fa0/8          connected routed a-full a-100 10/100BaseTX
12 Fa0/9          notconnect 1      auto auto 10/100BaseTX
13 Fa0/10         notconnect 1      auto auto 10/100BaseTX
14 Fa0/11         notconnect 1      auto auto 10/100BaseTX
15 Fa0/12         notconnect 1      auto auto 10/100BaseTX
16 Fa0/13         connected routed a-full 10 10/100BaseTX
17 Fa0/14         connected routed a-full 10 10/100BaseTX
18 Fa0/15         connected routed a-full 10 10/100BaseTX
19 Fa0/16         connected routed a-full 10 10/100BaseTX
20 Fa0/17         connected routed half 100 10/100BaseTX
21 Fa0/18         connected routed half 100 10/100BaseTX
22 Fa0/19         connected routed half 100 10/100BaseTX
23 Fa0/20         connected routed half 100 10/100BaseTX
24 Fa0/21         notconnect 1      auto auto 10/100BaseTX
25
26 Port    Name      Status    Vlan    Duplex Speed Type
27 Fa0/22   notconnect 1         auto   auto 10/100BaseTX
28 Fa0/23   notconnect 1         auto   auto 10/100BaseTX
29 Fa0/24   notconnect 1         auto   auto 10/100BaseTX
30 Gi0/1    notconnect 1         auto   auto Not Present
31 Gi0/2    notconnect 1         auto   auto Not Present
32 Po1      connected routed a-full a-100
33 Po2      connected routed a-full a-100
34 Po3      connected routed a-full 10
35 Po4      connected routed half 100

```

#### A.10.4. Interface Trunk

```

1 wurde nichts angezeigt

```

#### A.10.5. Neighbors

```

1 Device ID      Local Intrfce Holdtme Capability Platform Port ID
2 HQ_DS1        Fas 0/16      175          R S I WS-C3560V Fas 0/4
3 HQ_DS1        Fas 0/15      175          R S I WS-C3560V Fas 0/3
4 HQ_DS1        Fas 0/14      175          R S I WS-C3560V Fas 0/2
5 HQ_DS1        Fas 0/13      160          R S I WS-C3560V Fas 0/1
6 HQ_DS2        Fas 0/20      160          R S I WS-C3560V Fas 0/8
7 HQ_DS2        Fas 0/19      160          R S I WS-C3560V Fas 0/7
8 HQ_DS2        Fas 0/18      160          R S I WS-C3560V Fas 0/6
9 HQ_DS2        Fas 0/17      160          R S I WS-C3560V Fas 0/5
10 HQ_CS2        Fas 0/4       170          R S I WS-C3560V Fas 0/4
11 HQ_CS2        Fas 0/3       159          R S I WS-C3560V Fas 0/3
12 HQ_CS2        Fas 0/2       159          R S I WS-C3560V Fas 0/2
13 HQ_CS2        Fas 0/1       159          R S I WS-C3560V Fas 0/1
14 HQ_CS3        Fas 0/8       178          R S I WS-C3560- Fas 0/8
15 HQ_CS3        Fas 0/6       178          R S I WS-C3560- Fas 0/6
16 HQ_CS3        Fas 0/7       178          R S I WS-C3560- Fas 0/7
17 HQ_CS3        Fas 0/5       178          R S I WS-C3560- Fas 0/5

```

#### A.10.6. IP Route

```

1 HQ_CS1#show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4         N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

```

```

5      E1 - OSPF external type 1, E2 - OSPF external type 2
6      i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7      ia - IS-IS inter area, * - candidate default, U - per-user static route
8      o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9      + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13      172.16.0.0/16 is variably subnetted, 36 subnets, 4 masks
14 O      172.16.17.0/24 [110/3] via 172.16.254.42, 3d05h, Port-channel4
15 O      172.16.18.0/24 [110/2] via 172.16.254.42, 3d05h, Port-channel4
16 O      172.16.19.0/24 [110/2] via 172.16.254.42, 3d05h, Port-channel4
17 C      172.16.25.0/24 is directly connected, Loopback100
18 L      172.16.25.1/32 is directly connected, Loopback100
19 O      172.16.25.2/32 [110/2] via 172.16.254.2, 3d05h, Port-channel1
20 O      172.16.25.3/32 [110/2] via 172.16.254.6, 3d13h, Port-channel2
21 O      172.16.25.4/32 [110/3] via 172.16.254.6, 3d13h, Port-channel2
22 O      172.16.25.5/32 [110/3] via 172.16.254.42, 3d05h, Port-channel4
23 O      172.16.25.6/32 [110/2] via 172.16.254.42, 3d05h, Port-channel4
24 O      172.16.25.7/32 [110/3] via 172.16.254.6, 3d13h, Port-channel2
25 O      172.16.100.0/24 [110/68] via 172.16.254.2, 3d05h, Port-channel1
26 O      172.16.101.0/24 [110/69] via 172.16.254.2, 3d05h, Port-channel1
27 O      172.16.102.0/24 [110/1003] via 172.16.254.2, 3d05h, Port-channel1
28 O      172.16.252.1/32 [110/3] via 172.16.254.2, 3d05h, Port-channel1
29 O      172.16.252.2/32 [110/67] via 172.16.254.2, 3d05h, Port-channel1
30 O      172.16.252.3/32 [110/1002] via 172.16.254.2, 3d05h, Port-channel1
31 C      172.16.254.0/30 is directly connected, Port-channel1
32 L      172.16.254.1/32 is directly connected, Port-channel1
33 C      172.16.254.4/30 is directly connected, Port-channel2
34 L      172.16.254.5/32 is directly connected, Port-channel2
35 O      172.16.254.8/30 [110/2] via 172.16.254.6, 3d13h, Port-channel2
36 O      172.16.254.12/30 [110/11] via 172.16.254.2, 3d05h, Port-channel1
37 O      172.16.254.16/30 [110/3] via 172.16.254.6, 3d13h, Port-channel2
38 O      172.16.254.20/30 [110/2] via 172.16.254.6, 3d13h, Port-channel2
39 C      172.16.254.32/29 is directly connected, Port-channel3
40 L      172.16.254.33/32 is directly connected, Port-channel3
41 C      172.16.254.40/29 is directly connected, Port-channel4
42 L      172.16.254.41/32 is directly connected, Port-channel4
43 O      172.16.254.48/29 [110/2] via 172.16.254.42, 3d05h, Port-channel4
44      [110/2] via 172.16.254.2, 3d05h, Port-channel1
45 O      172.16.254.56/30 [110/2] via 172.16.254.2, 3d05h, Port-channel1
46 O      172.16.254.60/30 [110/3] via 172.16.254.2, 3d05h, Port-channel1
47 O      172.16.254.64/30 [110/2] via 172.16.254.2, 3d05h, Port-channel1
48 O      172.16.255.0/30 [110/1002] via 172.16.254.2, 3d05h, Port-channel1
49 O      172.16.255.4/30 [110/1002] via 172.16.254.2, 3d05h, Port-channel1
50 O      172.16.255.8/30 [110/1002] via 172.16.254.2, 3d05h, Port-channel1
51      200.200.200.0/28 is subnetted, 1 subnets
52 O      200.200.200.0 [110/3] via 172.16.254.2, 3d05h, Port-channel1

```

### A.10.7. Spanning Tree

```

1 HQ_CS1# show spanning-tree
2
3 No spanning tree instance exists.

```

### A.10.8. VLAN

```

1 HQ_CS1#show vlan

```

VLAN Name	Status	Ports
1 <b>default</b>	active	Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/21, Fa0/22, Fa0/23, Fa0/24 Gi0/1, Gi0/2
1002 fddi- <b>default</b>	act/unsup	
1003 token-ring- <b>default</b>	act/unsup	
1004 fddinet- <b>default</b>	act/unsup	
1005 trnet- <b>default</b>	act/unsup	
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2		
1 enet 100001 1500 - - - - - 0 0		
1002 fddi 101002 1500 - - - - - 0 0		
1003 tr 101003 1500 - - - - - 0 0		
1004 fdnet 101004 1500 - - - ieee - 0 0		
1005 trnet 101005 1500 - - - ibm - 0 0		
Remote SPAN VLANs		
Primary Secondary Type Ports		

## A.11. HQ CS2

### A.11.1. Running Configuration

```

1
2 !
3 ! Last configuration change at 08:38:55 UTC Mon Mar 1 1993
4 !
5 version 15.0
6 no service pad
7 service timestamps debug datetime msec
8 service timestamps log datetime msec
9 no service password-encryption
10 service sequence-numbers
11 !
12 hostname HQ_CS2
13 !
14 boot-start-marker
15 boot-end-marker
16 !
17 enable secret 5 $1$2GLo$vSF1.pg28M8/YjQJtzH.r/
18 !
19 username ins password 0 ins@lab
20 no aaa new-model
21 system mtu routing 1500
22 ip routing
23 no ip domain-lookup
24 !
25 !
26 !
27 !
28 crypto pki trustpoint HTTPS_SS_CERT_KEYPAIR
29 enrollment selfsigned
30 serial-number

```



```
31 revocation-check none
32 rsa-keypair HTTPS_SS_CERT_KEYPAIR
33 !
34 !
35 crypto pki certificate chain HTTPS_SS_CERT_KEYPAIR
36 certificate self-signed 01
37     quit
38 !
39 !
40 !
41 !
42 !
43 spanning-tree mode pvst
44 spanning-tree extend system-id
45 !
46 vlan internal allocation policy ascending
47 !
48 !
49 !
50 !
51 !
52 !
53 !
54 !
55 !
56 !
57 !
58 !
59 !
60 !
61 interface Loopback100
62 ip address 172.16.25.2 255.255.255.0
63 ip ospf 1 area 0
64 !
65 interface Port-channel1
66 no switchport
67 ip address 172.16.254.2 255.255.255.252
68 ip ospf mtu-ignore
69 ip ospf 1 area 0
70 !
71 interface Port-channel2
72 no switchport
73 bandwidth 10000
74 ip address 172.16.254.13 255.255.255.252
75 ip ospf mtu-ignore
76 ip ospf 1 area 0
77 speed 10
78 !
79 interface Port-channel3
80 no switchport
81 ip address 172.16.254.50 255.255.255.248
82 ip ospf mtu-ignore
83 ip ospf 1 area 0
84 !
85 interface FastEthernet0/1
86 no switchport
87 no ip address
88 channel-group 1 mode on
89 !
90 interface FastEthernet0/2
91 no switchport
92 no ip address
```

```
93 | channel-group 1 mode on
94 | !
95 | interface FastEthernet0/3
96 | no switchport
97 | no ip address
98 | channel-group 1 mode on
99 | !
100 | interface FastEthernet0/4
101 | no switchport
102 | no ip address
103 | channel-group 1 mode on
104 | !
105 | interface FastEthernet0/5
106 | no switchport
107 | no ip address
108 | speed 10
109 | channel-group 2 mode on
110 | !
111 | interface FastEthernet0/6
112 | no switchport
113 | no ip address
114 | speed 10
115 | channel-group 2 mode on
116 | !
117 | interface FastEthernet0/7
118 | no switchport
119 | no ip address
120 | speed 10
121 | channel-group 2 mode on
122 | !
123 | interface FastEthernet0/8
124 | no switchport
125 | no ip address
126 | speed 10
127 | channel-group 2 mode on
128 | !
129 | interface FastEthernet0/9
130 | !
131 | interface FastEthernet0/10
132 | !
133 | interface FastEthernet0/11
134 | !
135 | interface FastEthernet0/12
136 | !
137 | interface FastEthernet0/13
138 | no switchport
139 | no ip address
140 | ip ospf mtu-ignore
141 | ip ospf 1 area 0
142 | channel-group 3 mode on
143 | !
144 | interface FastEthernet0/14
145 | no switchport
146 | no ip address
147 | ip ospf mtu-ignore
148 | ip ospf 1 area 0
149 | channel-group 3 mode on
150 | !
151 | interface FastEthernet0/15
152 | no switchport
153 | no ip address
154 | ip ospf mtu-ignore
```

```
155 ip ospf 1 area 0
156 channel-group 3 mode on
157 !
158 interface FastEthernet0/16
159 no switchport
160 no ip address
161 ip ospf mtu-ignore
162 ip ospf 1 area 0
163 channel-group 3 mode on
164 !
165 interface FastEthernet0/17
166 !
167 interface FastEthernet0/18
168 !
169 interface FastEthernet0/19
170 !
171 interface FastEthernet0/20
172 !
173 interface FastEthernet0/21
174 no switchport
175 ip address 172.16.254.57 255.255.255.252
176 ip ospf 1 area 0
177 !
178 interface FastEthernet0/22
179 no switchport
180 ip address 172.16.254.65 255.255.255.252
181 ip ospf 1 area 0
182 !
183 interface FastEthernet0/23
184 !
185 interface FastEthernet0/24
186 !
187 interface GigabitEthernet0/1
188 !
189 interface GigabitEthernet0/2
190 !
191 interface Vlan1
192 no ip address
193 shutdown
194 !
195 router ospf 1
196 !
197 ip http server
198 ip http secure-server
199 !
200 !
201 ip sla enable reaction-alerts
202 snmp-server community public R0
203 snmp-server community private RW
204 !
205 !
206 line con 0
207 logging synchronous
208 line vty 0 4
209 password cisco
210 login
211 line vty 5 15
212 password cisco
213 login
214 !
215 end
```

### A.11.2. IP Interfaces

	Interface	IP-Address	OK?	Method	Status	Protocol
1	Vlan1	unassigned	YES	unset	administratively down	down
2						
3	FastEthernet0/1	unassigned	YES	manual	up	up
4	FastEthernet0/2	unassigned	YES	manual	up	up
5	FastEthernet0/3	unassigned	YES	manual	up	up
6	FastEthernet0/4	unassigned	YES	manual	up	up
7	FastEthernet0/5	unassigned	YES	manual	up	up
8	FastEthernet0/6	unassigned	YES	manual	up	up
9	FastEthernet0/7	unassigned	YES	manual	up	up
10	FastEthernet0/8	unassigned	YES	manual	up	up
11	FastEthernet0/9	unassigned	YES	unset	down	down
12	FastEthernet0/10	unassigned	YES	unset	down	down
13	FastEthernet0/11	unassigned	YES	unset	down	down
14	FastEthernet0/12	unassigned	YES	unset	down	down
15	FastEthernet0/13	unassigned	YES	manual	up	up
16	FastEthernet0/14	unassigned	YES	manual	up	up
17	FastEthernet0/15	unassigned	YES	manual	up	up
18	FastEthernet0/16	unassigned	YES	manual	up	up
19	FastEthernet0/17	unassigned	YES	unset	down	down
20	FastEthernet0/18	unassigned	YES	unset	down	down
21	FastEthernet0/19	unassigned	YES	unset	down	down
22	FastEthernet0/20	unassigned	YES	unset	down	down
23	FastEthernet0/21	172.16.254.57	YES	manual	up	up
24	FastEthernet0/22	172.16.254.65	YES	manual	up	up
25	FastEthernet0/23	unassigned	YES	unset	down	down
26	FastEthernet0/24	unassigned	YES	unset	down	down
27	GigabitEthernet0/1	unassigned	YES	unset	down	down
28	GigabitEthernet0/2	unassigned	YES	unset	down	down
29	Port-channel1	172.16.254.2	YES	manual	up	up
30	Port-channel2	172.16.254.13	YES	manual	up	up
31	Port-channel3	172.16.254.50	YES	manual	up	up
32	Loopback100	172.16.25.2	YES	manual	up	up

### A.11.3. Interface Status

1	HQ_CS2>show int status						
2							
3	Port	Name	Status	Vlan	Duplex	Speed	Type
4	Fa0/1		connected	routed	a-full	a-100	10/100BaseTX
5	Fa0/2		connected	routed	a-full	a-100	10/100BaseTX
6	Fa0/3		connected	routed	a-full	a-100	10/100BaseTX
7	Fa0/4		connected	routed	a-full	a-100	10/100BaseTX
8	Fa0/5		connected	routed	a-full	10	10/100BaseTX
9	Fa0/6		connected	routed	a-full	10	10/100BaseTX
10	Fa0/7		connected	routed	a-full	10	10/100BaseTX
11	Fa0/8		connected	routed	a-full	10	10/100BaseTX
12	Fa0/9		notconnect	1	auto	auto	10/100BaseTX
13	Fa0/10		notconnect	1	auto	auto	10/100BaseTX
14	Fa0/11		notconnect	1	auto	auto	10/100BaseTX
15	Fa0/12		notconnect	1	auto	auto	10/100BaseTX
16	Fa0/13		connected	routed	a-full	a-100	10/100BaseTX
17	Fa0/14		connected	routed	a-full	a-100	10/100BaseTX
18	Fa0/15		connected	routed	a-full	a-100	10/100BaseTX
19	Fa0/16		connected	routed	a-full	a-100	10/100BaseTX
20	Fa0/17		notconnect	1	auto	auto	10/100BaseTX
21	Fa0/18		notconnect	1	auto	auto	10/100BaseTX
22	Fa0/19		notconnect	1	auto	auto	10/100BaseTX

```

23 Fa0/20          notconnect 1      auto auto 10/100BaseTX
24 Fa0/21          connected routed a-full a-100 10/100BaseTX
25
26 Port    Name      Status    Vlan    Duplex Speed Type
27 Fa0/22    connected routed    a-full a-100 10/100BaseTX
28 Fa0/23    notconnect 1        auto auto 10/100BaseTX
29 Fa0/24    notconnect 1        auto auto 10/100BaseTX
30 Gi0/1     notconnect 1        auto auto Not Present
31 Gi0/2     notconnect 1        auto auto Not Present
32 Po1       connected routed    a-full a-100
33 Po2       connected routed    a-full 10
34 Po3       connected routed    a-full a-100

```

#### A.11.4. Interface Trunk

```

1 wurde nichts angezeigt

```

#### A.11.5. Neighbors

```

1 Device ID      Local Intrfce Holdtme Capability Platform Port ID
2 HQ_IER1        Fas 0/22      130          R S I 2811  Fas 0/0
3 HQ_WER1        Fas 0/21      157          R S I 2811  Fas 0/0
4 HQ_CS4         Fas 0/8       148          R S I WS-C3560- Fas 0/8
5 HQ_CS4         Fas 0/7       148          R S I WS-C3560- Fas 0/7
6 HQ_CS4         Fas 0/6       148          R S I WS-C3560- Fas 0/6
7 HQ_CS4         Fas 0/5       148          R S I WS-C3560- Fas 0/5
8 HQ_DS2         Fas 0/16      159          R S I WS-C3560V Fas 0/4
9 HQ_DS2         Fas 0/15      159          R S I WS-C3560V Fas 0/3
10 HQ_DS2        Fas 0/14      159          R S I WS-C3560V Fas 0/2
11 HQ_DS2        Fas 0/13      159          R S I WS-C3560V Fas 0/1
12 HQ_CS1         Fas 0/3       167          R S I WS-C3560V Fas 0/3
13 HQ_CS1         Fas 0/4       167          R S I WS-C3560V Fas 0/4
14 HQ_CS1         Fas 0/1       167          R S I WS-C3560V Fas 0/1
15 HQ_CS1         Fas 0/2       167          R S I WS-C3560V Fas 0/2

```

#### A.11.6. IP Route

```

1 HQ_CS2> show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4         N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5         E1 - OSPF external type 1, E2 - OSPF external type 2
6         i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7         ia - IS-IS inter area, * - candidate default, U - per-user static route
8         o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9         + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13     172.16.0.0/16 is variably subnetted, 37 subnets, 4 masks
14 O       172.16.17.0/24 [110/3] via 172.16.254.49, 3d06h, Port-channel3
15 O       172.16.18.0/24 [110/2] via 172.16.254.49, 3d06h, Port-channel3
16 O       172.16.19.0/24 [110/2] via 172.16.254.49, 3d06h, Port-channel3
17 C       172.16.25.0/24 is directly connected, Loopback100
18 O       172.16.25.1/32 [110/2] via 172.16.254.1, 3d06h, Port-channel1
19 L       172.16.25.2/32 is directly connected, Loopback100

```

```

20 0      172.16.25.3/32 [110/3] via 172.16.254.1, 3d06h, Port-channel1
21 0      172.16.25.4/32 [110/4] via 172.16.254.1, 3d06h, Port-channel1
22 0      172.16.25.5/32 [110/3] via 172.16.254.49, 3d06h, Port-channel3
23 0      172.16.25.6/32 [110/2] via 172.16.254.49, 3d06h, Port-channel3
24 0      172.16.25.7/32 [110/4] via 172.16.254.1, 3d06h, Port-channel1
25 0      172.16.100.0/24 [110/67] via 172.16.254.58, 3d05h, FastEthernet0/21
26 0      172.16.101.0/24 [110/68] via 172.16.254.58, 3d05h, FastEthernet0/21
27 0      172.16.102.0/24 [110/1002] via 172.16.254.66, 3d05h, FastEthernet0/22
28 0      172.16.252.1/32 [110/2] via 172.16.254.58, 3d06h, FastEthernet0/21
29 0      172.16.252.2/32 [110/66] via 172.16.254.58, 3d06h, FastEthernet0/21
30 0      172.16.252.3/32 [110/1001] via 172.16.254.66, 3d05h, FastEthernet0/22
31 C      172.16.254.0/30 is directly connected, Port-channel1
32 L      172.16.254.2/32 is directly connected, Port-channel1
33 0      172.16.254.4/30 [110/2] via 172.16.254.1, 3d06h, Port-channel1
34 0      172.16.254.8/30 [110/3] via 172.16.254.1, 3d06h, Port-channel1
35 C      172.16.254.12/30 is directly connected, Port-channel2
36 L      172.16.254.13/32 is directly connected, Port-channel2
37 0      172.16.254.16/30 [110/4] via 172.16.254.1, 3d06h, Port-channel1
38 0      172.16.254.20/30 [110/3] via 172.16.254.1, 3d06h, Port-channel1
39 0      172.16.254.32/29 [110/4] via 172.16.254.49, 3d06h, Port-channel3
40 0      172.16.254.40/29 [110/2] via 172.16.254.49, 3d06h, Port-channel3
41      [110/2] via 172.16.254.1, 3d06h, Port-channel1
42 C      172.16.254.48/29 is directly connected, Port-channel3
43 L      172.16.254.50/32 is directly connected, Port-channel3
44 C      172.16.254.56/30 is directly connected, FastEthernet0/21
45 L      172.16.254.57/32 is directly connected, FastEthernet0/21
46 0      172.16.254.60/30 [110/2] via 172.16.254.58, 3d06h, FastEthernet0/21
47 C      172.16.254.64/30 is directly connected, FastEthernet0/22
48 L      172.16.254.65/32 is directly connected, FastEthernet0/22
49 0      172.16.255.0/30 [110/1001] via 172.16.254.66, 3d06h, FastEthernet0/22
50 0      172.16.255.4/30 [110/1001] via 172.16.254.66, 3d06h, FastEthernet0/22
51 0      172.16.255.8/30 [110/1001] via 172.16.254.66, 3d06h, FastEthernet0/22
52 200.200.200.0/28 is subnetted, 1 subnets
53 0      200.200.200.0 [110/2] via 172.16.254.66, 3d06h, FastEthernet0/22

```

### A.11.7. Spanning Tree

```

1 HQ_CS2# show spanning-tree
2
3 No spanning tree instance exists.

```

### A.11.8. VLAN

```

1 HQ_CS2>show vlan
2
3 VLAN Name                Status Ports
4 -----
5 1  default                 active Fa0/9, Fa0/10, Fa0/11, Fa0/12
6                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
7                                Fa0/23, Fa0/24, Gi0/1, Gi0/2
8 1002 fddi-default         act/unsup
9 1003 token-ring-default   act/unsup
10 1004 fddinet-default      act/unsup
11 1005 trnet-default        act/unsup
12
13 VLAN Type SAID    MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
14 -----
15 1  enet 100001 1500 - - - - - 0 0

```

```

16 1002 fddi 101002 1500 - - - - - 0 0
17 1003 tr 101003 1500 - - - - - 0 0
18 1004 fdnet 101004 1500 - - - ieee - 0 0
19 1005 trnet 101005 1500 - - - ibm - 0 0

```

Remote SPAN VLANs

```

21 -----
22
23
24
25 Primary Secondary Type      Ports
26 -----

```

## A.12. HQ CS3

### A.12.1. Running Configuration

```

1  !
2  version 12.2
3  no service pad
4  service timestamps debug datetime msec
5  service timestamps log datetime msec
6  no service password-encryption
7  service sequence-numbers
8  !
9  hostname HQ_CS3
10 !
11 boot-start-marker
12 boot-end-marker
13 !
14 enable secret 5 $1$vTJp$Y2wL0oVslvo0aBBNAr1oX0
15 !
16 username ins password 0 ins@lab
17 !
18 !
19 no aaa new-model
20 system mtu routing 1500
21 vtp mode transparent
22 ip routing
23 !
24 !
25 !
26 !
27 !
28 crypto pki trustpoint TP-self-signed-789190400
29   enrollment selfsigned
30   subject-name cn=IOS-Self-Signed-Certificate-789190400
31   revocation-check none
32   rsa-keypair TP-self-signed-789190400
33 !
34 !
35 crypto pki certificate chain TP-self-signed-789190400
36   certificate self-signed 01
37     3082023D 308201A6 A0030201 02020101 300D0609 2A864886 F70D0101 04050030
38     30312E30 2C060355 04031325 494F532D 53656C66 2D536967 6E65642D 43657274
39     69666963 6174652D 37383931 39303430 30301E17 0D393330 33303130 35343835
40     315A170D 32303031 30313030 30303030 5A303031 2E302C06 03550403 1325494F
41     532D5365 6C662D53 69676E65 642D4365 72746966 69636174 652D3738 39313930
42     34303030 819F300D 06092A86 4886F70D 01010105 0003818D 00308189 02818100
43     C6C5446B BBCF34FF 439D0799 2EB637D6 822843B1 3A8D9AE5 4E1BCE76 6BA2FC1D
44     2E4B00FE 98620634 368959FB 97A92D32 9128ED2B A06BAAA8 D597C7A2 83918ECB

```

```
45 0CFBCFA3 C5655F94 530C8875 DF278C94 37D7CDC4 50A60294 170E9EDE 42D9F5AF
46 4BB1C6EC D12E59BD 7B813469 2C2CE6E0 160347A3 B33953FF E1B41BBE 63B967EF
47 02030100 01A36730 65300F06 03551D13 0101FF04 05300301 01FF3012 0603551D
48 11040B30 09820748 515F4353 332E301F 0603551D 23041830 168014C9 52E60A9F
49 D61C6333 B57971FA 63F81D9E 1E6ED830 1D060355 1D0E0416 0414C952 E60A9FD6
50 1C6333B5 7971FA63 F81D9E1E 6ED8300D 06092A86 4886F70D 01010405 00038181
51 005EEE8C 4FD31148 0FDC9155 BFAE63D4 0C28666B 1B9B3504 3E0353AF 124EF810
52 1E13F6D9 5F080222 433F481F 82B2EC7D 564A5EFA 0693404A C1B2F33A 6421460A
53 D05C704A DCA0D681 8A3D3D22 956F4BFC CBEE4EAD 9A51EB53 802FF1E0 81DFCBF6
54 A8AF70AE 785BECB2 3D02114C 43138B7E CC472238 98501F4B 936FED21 C53F0293 D1
55 quit
56 !
57 !
58 !
59 spanning-tree mode pvst
60 spanning-tree extend system-id
61 !
62 vlan internal allocation policy ascending
63 !
64 vlan 99
65   name mgmt
66 !
67 vlan 100
68   name staff
69 !
70 vlan 150
71   name iwas
72 !
73 vlan 200
74   name students
75 !
76 !
77 !
78 !
79 interface Loopback100
80   ip address 172.16.25.3 255.255.255.0
81   ip ospf 1 area 0
82 !
83 interface Port-channel1
84   no switchport
85   ip address 172.16.254.9 255.255.255.252
86   ip ospf mtu-ignore
87   ip ospf 1 area 0
88 !
89 interface Port-channel2
90   no switchport
91   ip address 172.16.254.6 255.255.255.252
92   ip ospf mtu-ignore
93   ip ospf 1 area 0
94 !
95 interface Port-channel3
96   no switchport
97   ip address 172.16.254.21 255.255.255.252
98   ip ospf mtu-ignore
99   ip ospf 1 area 0
100 !
101 interface FastEthernet0/1
102   no switchport
103   no ip address
104   channel-group 1 mode on
105 !
106 interface FastEthernet0/2
```



```
107 no switchport
108 no ip address
109 channel-group 1 mode on
110 !
111 interface FastEthernet0/3
112 no switchport
113 no ip address
114 channel-group 1 mode on
115 !
116 interface FastEthernet0/4
117 no switchport
118 no ip address
119 channel-group 1 mode on
120 !
121 interface FastEthernet0/5
122 no switchport
123 no ip address
124 channel-group 2 mode on
125 !
126 interface FastEthernet0/6
127 no switchport
128 no ip address
129 channel-group 2 mode on
130 !
131 interface FastEthernet0/7
132 no switchport
133 no ip address
134 channel-group 2 mode on
135 !
136 interface FastEthernet0/8
137 no switchport
138 no ip address
139 channel-group 2 mode on
140 !
141 interface FastEthernet0/9
142 !
143 interface FastEthernet0/10
144 !
145 interface FastEthernet0/11
146 !
147 interface FastEthernet0/12
148 !
149 interface FastEthernet0/13
150 no switchport
151 no ip address
152 channel-group 3 mode on
153 !
154 interface FastEthernet0/14
155 no switchport
156 no ip address
157 channel-group 3 mode on
158 !
159 interface FastEthernet0/15
160 no switchport
161 no ip address
162 channel-group 3 mode on
163 !
164 interface FastEthernet0/16
165 no switchport
166 no ip address
167 channel-group 3 mode on
168 !
```

```

169 interface FastEthernet0/17
170 !
171 interface FastEthernet0/18
172 !
173 interface FastEthernet0/19
174 !
175 interface FastEthernet0/20
176 !
177 interface FastEthernet0/21
178 !
179 interface FastEthernet0/22
180 !
181 interface FastEthernet0/23
182 !
183 interface FastEthernet0/24
184 !
185 interface GigabitEthernet0/1
186 !
187 interface GigabitEthernet0/2
188 !
189 interface Vlan1
190   no ip address
191   shutdown
192 !
193 router ospf 1
194   log-adjacency-changes
195 !
196 ip classless
197 ip http server
198 ip http secure-server
199 !
200 !
201 ip sla enable reaction-alerts
202 !
203 snmp-server community public R0
204 snmp-server community private RW
205 !
206 !
207 line con 0
208 line vty 0 4
209   password cisco
210   login
211 line vty 5 15
212   password cisco
213   login
214 !
215 end

```

### A.12.2. IP Interfaces

	Interface	IP-Address	OK?	Method	Status	Protocol
1	Vlan1	unassigned	YES	manual	administratively down	down
2	FastEthernet0/1	unassigned	YES	manual	up	up
3	FastEthernet0/2	unassigned	YES	manual	up	up
4	FastEthernet0/3	unassigned	YES	manual	up	up
5	FastEthernet0/4	unassigned	YES	manual	up	up
6	FastEthernet0/5	unassigned	YES	manual	up	up
7	FastEthernet0/6	unassigned	YES	manual	up	up
8	FastEthernet0/7	unassigned	YES	manual	up	up
9	FastEthernet0/8	unassigned	YES	manual	up	up
10	FastEthernet0/8	unassigned	YES	manual	up	up

```

11 FastEthernet0/9 unassigned YES unset down down
12 FastEthernet0/10 unassigned YES unset down down
13 FastEthernet0/11 unassigned YES unset down down
14 FastEthernet0/12 unassigned YES unset down down
15 FastEthernet0/13 unassigned YES manual up up
16 FastEthernet0/14 unassigned YES manual up up
17 FastEthernet0/15 unassigned YES manual up up
18 FastEthernet0/16 unassigned YES manual up up
19 FastEthernet0/17 unassigned YES unset down down
20 FastEthernet0/18 unassigned YES unset down down
21 FastEthernet0/19 unassigned YES unset down down
22 FastEthernet0/20 unassigned YES unset down down
23 FastEthernet0/21 unassigned YES unset down down
24 FastEthernet0/22 unassigned YES unset down down
25 FastEthernet0/23 unassigned YES unset down down
26 FastEthernet0/24 unassigned YES unset down down
27 GigabitEthernet0/1 unassigned YES unset down down
28 GigabitEthernet0/2 unassigned YES unset down down
29 Port-channel1 172.16.254.9 YES manual up up
30 Port-channel2 172.16.254.6 YES manual up up
31 Port-channel3 172.16.254.21 YES manual up up
32 Loopback100 172.16.25.3 YES manual up up

```

### A.12.3. Interface Status

```

1 HQ_CS3>show interface status
2
3
4 Port      Name      Status    Vlan    Duplex Speed Type
5 Fa0/1     connected routed    a-full a-100 10/100BaseTX
6 Fa0/2     connected routed    a-full a-100 10/100BaseTX
7 Fa0/3     connected routed    a-full a-100 10/100BaseTX
8 Fa0/4     connected routed    a-full a-100 10/100BaseTX
9 Fa0/5     connected routed    a-full a-100 10/100BaseTX
10 Fa0/6     connected routed    a-full a-100 10/100BaseTX
11 Fa0/7     connected routed    a-full a-100 10/100BaseTX
12 Fa0/8     connected routed    a-full a-100 10/100BaseTX
13 Fa0/9     notconnect 1        auto auto 10/100BaseTX
14 Fa0/10    notconnect 1        auto auto 10/100BaseTX
15 Fa0/11    notconnect 1        auto auto 10/100BaseTX
16 Fa0/12    notconnect 1        auto auto 10/100BaseTX
17 Fa0/13    connected routed    a-full a-100 10/100BaseTX
18 Fa0/14    connected routed    a-full a-100 10/100BaseTX
19 Fa0/15    connected routed    a-full a-100 10/100BaseTX
20 Fa0/16    connected routed    a-full a-100 10/100BaseTX
21 Fa0/17    notconnect 1        auto auto 10/100BaseTX
22 Fa0/18    notconnect 1        auto auto 10/100BaseTX
23 Fa0/19    notconnect 1        auto auto 10/100BaseTX
24 Fa0/20    notconnect 1        auto auto 10/100BaseTX
25 Fa0/21    notconnect 1        auto auto 10/100BaseTX
26
27 Port      Name      Status    Vlan    Duplex Speed Type
28 Fa0/22    notconnect 1        auto auto 10/100BaseTX
29 Fa0/23    notconnect 1        auto auto 10/100BaseTX
30 Fa0/24    notconnect 1        auto auto 10/100BaseTX
31 Gi0/1     notconnect 1        auto auto Not Present
32 Gi0/2     notconnect 1        auto auto Not Present
33 Po1       connected routed    a-full a-100
34 Po2       connected routed    a-full a-100
35 Po3       connected routed    a-full a-100

```

#### A.12.4. Interface Trunk

```
1 wurde nichts angezeigt
```

#### A.12.5. Neighbors

```
1 Device ID      Local Intfcae Holtdtme Capability Platform Port ID
2 HQ_CS4        Fas 0/4        140          R S I WS-C3560- Fas 0/4
3 HQ_CS4        Fas 0/2        170          R S I WS-C3560- Fas 0/2
4 HQ_CS4        Fas 0/1        170          R S I WS-C3560- Fas 0/1
5 HQ_DS3        Fas 0/16       160          R S I WS-C3560- Fas 0/4
6 HQ_DS3        Fas 0/15       160          R S I WS-C3560- Fas 0/3
7 HQ_DS3        Fas 0/14       160          R S I WS-C3560- Fas 0/2
8 HQ_DS3        Fas 0/13       153          R S I WS-C3560- Fas 0/1
9 HQ_CS4        Fas 0/3        153          R S I WS-C3560- Fas 0/3
10 HQ_CS1        Fas 0/5        140          R S I WS-C3560V Fas 0/5
11 HQ_CS1        Fas 0/8        129          R S I WS-C3560V Fas 0/8
12 HQ_CS1        Fas 0/7        129          R S I WS-C3560V Fas 0/7
13 HQ_CS1        Fas 0/6        153          R S I WS-C3560V Fas 0/6
```

#### A.12.6. IP Route

```
1 HQ_CS3>show ip route
2 Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
3       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5       E1 - OSPF external type 1, E2 - OSPF external type 2
6       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7       ia - IS-IS inter area, * - candidate default, U - per-user static route
8       o - ODR, P - periodic downloaded static route
9
10 Gateway of last resort is not set
11
12 200.200.200.0/28 is subnetted, 1 subnets
13 O    200.200.200.0 [110/4] via 172.16.254.5, 3d05h, Port-channel2
14 172.16.0.0/16 is variably subnetted, 31 subnets, 4 masks
15 O    172.16.254.64/30 [110/3] via 172.16.254.5, 3d05h, Port-channel2
16 O    172.16.252.1/32 [110/4] via 172.16.254.5, 3d05h, Port-channel2
17 O    172.16.254.0/30 [110/2] via 172.16.254.5, 3d05h, Port-channel2
18 O    172.16.252.2/32 [110/68] via 172.16.254.5, 3d05h, Port-channel2
19 O    172.16.255.0/30 [110/1003] via 172.16.254.5, 3d05h, Port-channel2
20 O    172.16.252.3/32 [110/1003] via 172.16.254.5, 3d05h, Port-channel2
21 C    172.16.254.4/30 is directly connected, Port-channel2
22 O    172.16.255.4/30 [110/1003] via 172.16.254.5, 3d05h, Port-channel2
23 C    172.16.254.8/30 is directly connected, Port-channel1
24 O    172.16.255.8/30 [110/1003] via 172.16.254.5, 3d05h, Port-channel2
25 O    172.16.254.12/30 [110/11] via 172.16.254.10, 3d05h, Port-channel1
26 O    172.16.254.16/30 [110/2] via 172.16.254.22, 3d05h, Port-channel3
27      [110/2] via 172.16.254.10, 3d05h, Port-channel1
28 C    172.16.254.20/30 is directly connected, Port-channel3
29 O    172.16.254.32/29 [110/5] via 172.16.254.5, 3d05h, Port-channel2
30 O    172.16.254.40/29 [110/2] via 172.16.254.5, 3d05h, Port-channel2
31 O    172.16.254.48/29 [110/3] via 172.16.254.5, 3d05h, Port-channel2
32 O    172.16.254.56/30 [110/3] via 172.16.254.5, 3d05h, Port-channel2
33 O    172.16.254.60/30 [110/4] via 172.16.254.5, 3d05h, Port-channel2
34 O    172.16.25.5/32 [110/4] via 172.16.254.5, 3d05h, Port-channel2
35 O    172.16.25.4/32 [110/2] via 172.16.254.10, 3d05h, Port-channel1
```

```

36 0 172.16.25.7/32 [110/2] via 172.16.254.22, 3d05h, Port-channel3
37 0 172.16.25.6/32 [110/3] via 172.16.254.5, 3d05h, Port-channel2
38 0 172.16.25.1/32 [110/2] via 172.16.254.5, 3d05h, Port-channel2
39 C 172.16.25.0/24 is directly connected, Loopback100
40 0 172.16.25.2/32 [110/3] via 172.16.254.5, 3d05h, Port-channel2
41 0 172.16.17.0/24 [110/4] via 172.16.254.5, 3d05h, Port-channel2
42 0 172.16.18.0/24 [110/3] via 172.16.254.5, 3d05h, Port-channel2
43 0 172.16.19.0/24 [110/3] via 172.16.254.5, 3d05h, Port-channel2
44 0 172.16.100.0/24 [110/69] via 172.16.254.5, 3d05h, Port-channel2
45 0 172.16.101.0/24 [110/70] via 172.16.254.5, 3d05h, Port-channel2
46 0 172.16.102.0/24 [110/1004] via 172.16.254.5, 3d05h, Port-channel2

```

### A.12.7. Spanning Tree

```

1 HQ_CS3# show spanning-tree
2
3 No spanning tree instance exists.

```

### A.12.8. VLAN

```

1 HQ_CS3>show vlan
2
3 VLAN Name                Status Ports
4 -----
5 1  default                active Fa0/9, Fa0/10, Fa0/11, Fa0/12
6                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
7                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
8                                Gi0/1, Gi0/2
9 99 mgmt                  active
10 100 staff                active
11 150 iwas                 active
12 200 students            active
13 1002 fddi-default        act/unsup
14 1003 token-ring-default  act/unsup
15 1004 fddinet-default     act/unsup
16 1005 trnet-default       act/unsup
17
18 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
19 -----
20 1  enet 100001 1500 - - - - - 0 0
21 99 enet 100099 1500 - - - - - 0 0
22 100 enet 100100 1500 - - - - - 0 0
23 150 enet 100150 1500 - - - - - 0 0
24 200 enet 100200 1500 - - - - - 0 0
25
26 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
27 -----
28 1002 fddi 101002 1500 - - - - - 0 0
29 1003 tr 101003 1500 - - - - - 0 0
30 1004 fdnet 101004 1500 - - - ieee - 0 0
31 1005 trnet 101005 1500 - - - ibm - 0 0
32
33 Remote SPAN VLANs
34 -----
35
36 Primary Secondary Type    Ports
37 -----
38

```

## A.13. HQ CS4

### A.13.1. Running Configuration

```

1  !
2  !
3  version 12.2
4  no service pad
5  service timestamps debug datetime msec
6  service timestamps log datetime msec
7  no service password-encryption
8  service sequence-numbers
9  !
10 hostname HQ_CS4
11 !
12 boot-start-marker
13 boot-end-marker
14 !
15 enable secret 5 $1$N5nF$HEL..CSYKgf7JWvzQ3nmT.
16 !
17 username ins password 0 ins@lab
18 !
19 !
20 no aaa new-model
21 system mtu routing 1500
22 ip routing
23 !
24 !
25 !
26 !
27 crypto pki trustpoint TP-self-signed-802424960
28   enrollment selfsigned
29   subject-name cn=IOS-Self-Signed-Certificate-802424960
30   revocation-check none
31   rsakeypair TP-self-signed-802424960
32 !
33 crypto pki trustpoint TP-self-signed-802432128
34   enrollment selfsigned
35   subject-name cn=IOS-Self-Signed-Certificate-802432128
36   revocation-check none
37   rsakeypair TP-self-signed-802432128
38 !
39 !
40 crypto pki certificate chain TP-self-signed-802424960
41   certificate self-signed 01
42     3082023D 308201A6 A0030201 02020101 300D0609 2A864886 F70D0101 04050030
43     30312E30 2C060355 04031325 494F532D 53656C66 2D536967 6E65642D 43657274
44     69666963 6174652D 38303234 32343936 30301E17 0D393330 33303130 34333535
45     305A170D 32303031 30313030 30303030 5A303031 2E302C06 03550403 1325494F
46     532D5365 6C662D53 69676E65 642D4365 72746966 69636174 652D3830 32343234
47     39363030 819F300D 06092A86 4886F70D 01010105 0003818D 00308189 02818100
48     A9193D67 CE1F2E8A 7AB17D29 9971816E 22E047F8 2955A0D1 AD5C07B1 0F1E57B8
49     297A57E3 C9FB80F0 F4F23D41 D5BC46A8 89AF0D40 1635CEFC F5E11F87 299918FF
50     0F96B019 93ACF31B 25B150C5 5EAB53F0 896D3798 79654043 2C7D0198 038E1461
51     CF40C791 4672B925 F378404B 82044B68 2736E846 10BACD2B 32B6DA93 4C87F97D
52     02030100 01A36730 65300F06 03551D13 0101FF04 05300301 01FF3012 0603551D
53     11040B30 09820748 515F4353 342E301F 0603551D 23041830 168014E7 AA5F970C
54     25B6B81A 35D4F86C 77D83F5B 9C913330 1D060355 1D0E0416 0414E7AA 5F970C25
55     B6B81A35 D4F86C77 D83F5B9C 9133300D 06092A86 4886F70D 01010405 00038181
56     0077A6C0 DC369CBE 5624731D 5D458961 E5FAC002 CCF40AD5 620A07F6 6CF9AD29
57     0EE5B0B9 4AEA8804 33220FD7 31159C38 2898D38B E236DD1 9ADACEFC 4FCD32D9
58     6A3B8351 8A5BBFA3 BB1DFA0C 63E93422 94290CE6 D8015255 7D7BF9FA AC8D5D4E

```

```
59 67D63E98 B31EA49E 2F79E42D 77F10414 A245B30D 49D95466 9873C600 EED03BBD 5B
60 quit
61 crypto pki certificate chain TP-self-signed-802432128
62 !
63 !
64 !
65 spanning-tree mode pvst
66 spanning-tree extend system-id
67 !
68 vlan internal allocation policy ascending
69 !
70 !
71 !
72 !
73 interface Loopback100
74 ip address 172.16.25.4 255.255.255.0
75 ip ospf 1 area 0
76 !
77 interface Port-channel1
78 no switchport
79 ip address 172.16.254.10 255.255.255.252
80 ip ospf mtu-ignore
81 ip ospf 1 area 0
82 !
83 interface Port-channel2
84 no switchport
85 bandwidth 10000
86 ip address 172.16.254.14 255.255.255.252
87 ip ospf mtu-ignore
88 ip ospf 1 area 0
89 speed 10
90 !
91 interface Port-channel3
92 !
93 interface Port-channel4
94 no switchport
95 ip address 172.16.254.17 255.255.255.252
96 ip ospf mtu-ignore
97 ip ospf 1 area 0
98 !
99 interface FastEthernet0/1
100 no switchport
101 no ip address
102 channel-group 1 mode on
103 !
104 interface FastEthernet0/2
105 no switchport
106 no ip address
107 channel-group 1 mode on
108 !
109 interface FastEthernet0/3
110 no switchport
111 no ip address
112 channel-group 1 mode on
113 !
114 interface FastEthernet0/4
115 no switchport
116 no ip address
117 channel-group 1 mode on
118 !
119 interface FastEthernet0/5
120 no switchport
```

```
121 no ip address
122 speed 10
123 channel-group 2 mode on
124 !
125 interface FastEthernet0/6
126 no switchport
127 no ip address
128 speed 10
129 channel-group 2 mode on
130 !
131 interface FastEthernet0/7
132 no switchport
133 no ip address
134 speed 10
135 channel-group 2 mode on
136 !
137 interface FastEthernet0/8
138 no switchport
139 no ip address
140 speed 10
141 channel-group 2 mode on
142 !
143 interface FastEthernet0/9
144 !
145 interface FastEthernet0/10
146 !
147 interface FastEthernet0/11
148 !
149 interface FastEthernet0/12
150 !
151 interface FastEthernet0/13
152 no switchport
153 no ip address
154 channel-group 4 mode on
155 !
156 interface FastEthernet0/14
157 no switchport
158 no ip address
159 channel-group 4 mode on
160 !
161 interface FastEthernet0/15
162 no switchport
163 no ip address
164 channel-group 4 mode on
165 !
166 interface FastEthernet0/16
167 no switchport
168 no ip address
169 channel-group 4 mode on
170 !
171 interface FastEthernet0/17
172 !
173 interface FastEthernet0/18
174 !
175 interface FastEthernet0/19
176 !
177 interface FastEthernet0/20
178 !
179 interface FastEthernet0/21
180 !
181 interface FastEthernet0/22
182 !
```



```

183 interface FastEthernet0/23
184 !
185 interface FastEthernet0/24
186 !
187 interface GigabitEthernet0/1
188 !
189 interface GigabitEthernet0/2
190 !
191 interface Vlan1
192   no ip address
193   shutdown
194 !
195 router ospf 1
196   log-adjacency-changes
197 !
198 ip classless
199 ip http server
200 ip http secure-server
201 !
202 !
203 ip sla enable reaction-alerts
204 !
205 snmp-server community public R0
206 snmp-server community private RW
207 !
208 !
209 line con 0
210 line vty 0 4
211   password cisco
212   login
213 line vty 5 15
214   password cisco
215   login
216 !
217 end

```

### A.13.2. IP Interfaces

	Interface	IP-Address	OK?	Method	Status	Protocol
1	Vlan1	unassigned	YES	manual	administratively down	down
2	FastEthernet0/1	unassigned	YES	manual	up	up
3	FastEthernet0/2	unassigned	YES	manual	up	up
4	FastEthernet0/3	unassigned	YES	manual	up	up
5	FastEthernet0/4	unassigned	YES	manual	up	up
6	FastEthernet0/5	unassigned	YES	manual	up	up
7	FastEthernet0/6	unassigned	YES	manual	up	up
8	FastEthernet0/7	unassigned	YES	manual	up	up
9	FastEthernet0/8	unassigned	YES	manual	up	up
10	FastEthernet0/9	unassigned	YES	unset	down	down
11	FastEthernet0/10	unassigned	YES	unset	down	down
12	FastEthernet0/11	unassigned	YES	unset	down	down
13	FastEthernet0/12	unassigned	YES	unset	down	down
14	FastEthernet0/13	unassigned	YES	manual	up	up
15	FastEthernet0/14	unassigned	YES	manual	up	up
16	FastEthernet0/15	unassigned	YES	manual	up	up
17	FastEthernet0/16	unassigned	YES	manual	up	up
18	FastEthernet0/17	unassigned	YES	unset	down	down
19	FastEthernet0/18	unassigned	YES	unset	down	down
20	FastEthernet0/19	unassigned	YES	unset	down	down
21	FastEthernet0/20	unassigned	YES	unset	down	down
22						

```

23 FastEthernet0/21 unassigned YES unset down down
24 FastEthernet0/22 unassigned YES unset down down
25 FastEthernet0/23 unassigned YES unset down down
26 FastEthernet0/24 unassigned YES unset down down
27 GigabitEthernet0/1 unassigned YES unset down down
28 GigabitEthernet0/2 unassigned YES unset down down
29 Port-channel1 172.16.254.10 YES manual up up
30 Port-channel2 172.16.254.14 YES manual up up
31 Port-channel3 unassigned YES unset down down
32 Port-channel4 172.16.254.17 YES manual up up
33 Loopback100 172.16.25.4 YES manual up up

```

### A.13.3. Interface Status

```

1 HQ_CS4>show int status
2
3 Port      Name      Status    Vlan    Duplex  Speed  Type
4 Fa0/1     connected routed    a-full  a-100  10/100BaseTX
5 Fa0/2     connected routed    a-full  a-100  10/100BaseTX
6 Fa0/3     connected routed    a-full  a-100  10/100BaseTX
7 Fa0/4     connected routed    a-full  a-100  10/100BaseTX
8 Fa0/5     connected routed    a-full  10     10/100BaseTX
9 Fa0/6     connected routed    a-full  10     10/100BaseTX
10 Fa0/7     connected routed    a-full  10     10/100BaseTX
11 Fa0/8     connected routed    a-full  10     10/100BaseTX
12 Fa0/9     notconnect 1        auto    auto    10/100BaseTX
13 Fa0/10    notconnect 1        auto    auto    10/100BaseTX
14 Fa0/11    notconnect 1        auto    auto    10/100BaseTX
15 Fa0/12    notconnect 1        auto    auto    10/100BaseTX
16 Fa0/13    connected routed    a-full  a-100  10/100BaseTX
17 Fa0/14    connected routed    a-full  a-100  10/100BaseTX
18 Fa0/15    connected routed    a-full  a-100  10/100BaseTX
19 Fa0/16    connected routed    a-full  a-100  10/100BaseTX
20 Fa0/17    notconnect 1        auto    auto    10/100BaseTX
21 Fa0/18    notconnect 1        auto    auto    10/100BaseTX
22 Fa0/19    notconnect 1        auto    auto    10/100BaseTX
23 Fa0/20    notconnect 1        auto    auto    10/100BaseTX
24 Fa0/21    notconnect 1        auto    auto    10/100BaseTX
25
26 Port      Name      Status    Vlan    Duplex  Speed  Type
27 Fa0/22    notconnect 1        auto    auto    10/100BaseTX
28 Fa0/23    notconnect 1        auto    auto    10/100BaseTX
29 Fa0/24    notconnect 1        auto    auto    10/100BaseTX
30 Gi0/1     notconnect 1        auto    auto    Not Present
31 Gi0/2     notconnect 1        auto    auto    Not Present
32 Po1       connected routed    a-full  a-100
33 Po2       connected routed    a-full  10
34 Po3       notconnect unassigned auto    auto
35 Po4       connected routed    a-full  a-100

```

### A.13.4. Interface Trunk

```

1 wurde nichts angezeigt

```

### A.13.5. Neighbors

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
HQ_DS3	Fas 0/16	156	R S I WS-C3560-	Fas 0/8	
HQ_DS3	Fas 0/15	156	R S I WS-C3560-	Fas 0/7	
HQ_DS3	Fas 0/14	156	R S I WS-C3560-	Fas 0/6	
HQ_DS3	Fas 0/13	156	R S I WS-C3560-	Fas 0/5	
HQ_CS2	Fas 0/8	140	R S I WS-C3560V	Fas 0/8	
HQ_CS2	Fas 0/7	140	R S I WS-C3560V	Fas 0/7	
HQ_CS2	Fas 0/6	140	R S I WS-C3560V	Fas 0/6	
HQ_CS2	Fas 0/5	140	R S I WS-C3560V	Fas 0/5	
HQ_CS3	Fas 0/3	148	R S I WS-C3560-	Fas 0/3	
HQ_CS3	Fas 0/4	148	R S I WS-C3560-	Fas 0/4	
HQ_CS3	Fas 0/2	148	R S I WS-C3560-	Fas 0/2	
HQ_CS3	Fas 0/1	148	R S I WS-C3560-	Fas 0/1	

### A.13.6. IP Route

```

1 HQ_CS4>show ip route
2 Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
3       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5       E1 - OSPF external type 1, E2 - OSPF external type 2
6       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7       ia - IS-IS inter area, * - candidate default, U - per-user static route
8       o - ODR, P - periodic downloaded static route
9
10 Gateway of last resort is not set
11
12   200.200.200.0/28 is subnetted, 1 subnets
13   O    200.200.200.0 [110/5] via 172.16.254.9, 3d06h, Port-channel1
14   172.16.0.0/16 is variably subnetted, 31 subnets, 4 masks
15   O    172.16.254.64/30 [110/4] via 172.16.254.9, 3d06h, Port-channel1
16   O    172.16.252.1/32 [110/5] via 172.16.254.9, 3d06h, Port-channel1
17   O    172.16.254.0/30 [110/3] via 172.16.254.9, 3d06h, Port-channel1
18   O    172.16.252.2/32 [110/69] via 172.16.254.9, 3d06h, Port-channel1
19   O    172.16.255.0/30 [110/1004] via 172.16.254.9, 3d06h, Port-channel1
20   O    172.16.252.3/32 [110/1004] via 172.16.254.9, 3d06h, Port-channel1
21   O    172.16.254.4/30 [110/2] via 172.16.254.9, 3d06h, Port-channel1
22   O    172.16.255.4/30 [110/1004] via 172.16.254.9, 3d06h, Port-channel1
23   C    172.16.254.8/30 is directly connected, Port-channel1
24   O    172.16.255.8/30 [110/1004] via 172.16.254.9, 3d06h, Port-channel1
25   C    172.16.254.12/30 is directly connected, Port-channel2
26   C    172.16.254.16/30 is directly connected, Port-channel4
27   O    172.16.254.20/30 [110/2] via 172.16.254.18, 3d06h, Port-channel4
28       [110/2] via 172.16.254.9, 3d06h, Port-channel1
29   O    172.16.254.32/29 [110/6] via 172.16.254.9, 3d06h, Port-channel1
30   O    172.16.254.40/29 [110/3] via 172.16.254.9, 3d06h, Port-channel1
31   O    172.16.254.48/29 [110/4] via 172.16.254.9, 3d06h, Port-channel1
32   O    172.16.254.56/30 [110/4] via 172.16.254.9, 3d06h, Port-channel1
33   O    172.16.254.60/30 [110/5] via 172.16.254.9, 3d06h, Port-channel1
34   O    172.16.25.5/32 [110/5] via 172.16.254.9, 3d06h, Port-channel1
35   O    172.16.25.7/32 [110/2] via 172.16.254.18, 3d06h, Port-channel4
36   O    172.16.25.6/32 [110/4] via 172.16.254.9, 3d06h, Port-channel1
37   O    172.16.25.1/32 [110/3] via 172.16.254.9, 3d06h, Port-channel1
38   C    172.16.25.0/24 is directly connected, Loopback100
39   O    172.16.25.3/32 [110/2] via 172.16.254.9, 3d06h, Port-channel1
40   O    172.16.25.2/32 [110/4] via 172.16.254.9, 3d06h, Port-channel1
41   O    172.16.17.0/24 [110/5] via 172.16.254.9, 3d06h, Port-channel1
42   O    172.16.18.0/24 [110/4] via 172.16.254.9, 3d06h, Port-channel1
43   O    172.16.19.0/24 [110/4] via 172.16.254.9, 3d06h, Port-channel1

```

```

44 0    172.16.100.0/24 [110/70] via 172.16.254.9, 3d06h, Port-channel1
45 0    172.16.101.0/24 [110/71] via 172.16.254.9, 3d06h, Port-channel1
46 0    172.16.102.0/24 [110/1005] via 172.16.254.9, 3d06h, Port-channel1

```

### A.13.7. Spanning Tree

```

1 HQ_CS4# show spanning-tree
2
3 No spanning tree instance exists.

```

### A.13.8. VLAN

```

1 HQ_CS4>show vlan
2
3 VLAN Name                Status Ports
4 -----
5 1  default                active Fa0/9, Fa0/10, Fa0/11, Fa0/12
6                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
7                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
8                                Gi0/1, Gi0/2
9 1002 fddi-default        act/unsup
10 1003 token-ring-default  act/unsup
11 1004 fddinet-default     act/unsup
12 1005 trnet-default       act/unsup
13
14 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
15 -----
16 1  enet 100001 1500 -    -    -    -    -    0    0
17 1002 fddi 101002 1500 -    -    -    -    -    0    0
18 1003 tr 101003 1500 -    -    -    -    -    0    0
19 1004 fdnet 101004 1500 -    -    -    ieee -    0    0
20 1005 trnet 101005 1500 -    -    -    ibm  -    0    0
21
22 Remote SPAN VLANs
23 -----
24
25 Primary Secondary Type    Ports
26 -----
27

```

## A.14. HQ DS1

### A.14.1. Running Configuration

```

1 !
2 !
3 ! Last configuration change at 07:40:47 UTC Mon Mar 1 1993
4 !
5 version 15.0
6 no service pad
7 service timestamps debug datetime msec
8 service timestamps log datetime msec
9 no service password-encryption
10 service sequence-numbers
11 !
12 hostname HQ_DS1

```

```
13 |  
14 | boot-start-marker  
15 | boot-end-marker  
16 |  
17 | enable secret 5 $1$ajf9$7aDklFhjLgZzrC095VIDm0  
18 |  
19 | username cisco password 0 cisco  
20 | username ins password 0 ins@lab  
21 | aaa new-model  
22 |  
23 |  
24 |  
25 |  
26 |  
27 |  
28 |  
29 |  
30 | aaa session-id common  
31 | system mtu routing 1500  
32 | ip routing  
33 | no ip domain-lookup  
34 | ip dhcp excluded-address 172.16.16.1  
35 | ip dhcp excluded-address 172.16.16.10 172.16.16.12  
36 | ip dhcp excluded-address 172.16.17.1  
37 | ip dhcp excluded-address 172.16.17.10 172.16.17.12  
38 | ip dhcp excluded-address 172.16.18.250 172.16.18.254  
39 | ip dhcp excluded-address 172.16.18.10 172.16.18.12  
40 | ip dhcp excluded-address 172.16.19.250 172.16.19.254  
41 | ip dhcp excluded-address 172.16.19.10 172.16.19.12  
42 |  
43 | ip dhcp pool IT  
44 |   network 172.16.16.0 255.255.255.0  
45 |   default-router 172.16.16.1  
46 |  
47 | ip dhcp pool SERVER  
48 |   network 172.16.17.0 255.255.255.0  
49 |   default-router 172.16.17.1  
50 |  
51 | ip dhcp pool MARKETING  
52 |   network 172.16.18.0 255.255.255.0  
53 |   default-router 172.16.18.254  
54 |  
55 | ip dhcp pool SALES  
56 |   network 172.16.19.0 255.255.255.0  
57 |   default-router 172.16.19.254  
58 |  
59 |  
60 |  
61 |  
62 | crypto pki trustpoint HTTPS_SS_CERT_KEYPAIR  
63 |   enrollment selfsigned  
64 |   serial-number  
65 |   revocation-check none  
66 |   rsa-keypair HTTPS_SS_CERT_KEYPAIR  
67 |  
68 |  
69 | crypto pki certificate chain HTTPS_SS_CERT_KEYPAIR  
70 |   certificate self-signed 01  
71 |   quit  
72 |  
73 |  
74 |
```

```
75 | !
76 | !
77 | spanning-tree mode pvst
78 | spanning-tree extend system-id
79 | !
80 | vlan internal allocation policy ascending
81 | !
82 | !
83 | !
84 | !
85 | !
86 | !
87 | !
88 | !
89 | !
90 | !
91 | !
92 | !
93 | !
94 | !
95 | interface Loopback100
96 |   ip address 172.16.25.5 255.255.255.0
97 |   ip ospf 1 area 0
98 | !
99 | interface Port-channel1
100 |   switchport trunk encapsulation dot1q
101 |   switchport mode trunk
102 | !
103 | interface Port-channel2
104 |   switchport trunk encapsulation dot1q
105 |   switchport mode trunk
106 | !
107 | interface Port-channel3
108 |   no switchport
109 |   ip address 172.16.254.38 255.255.255.248
110 |   ip ospf mtu-ignore
111 |   ip ospf 1 area 0
112 | !
113 | interface Port-channel4
114 |   switchport trunk encapsulation dot1q
115 |   switchport mode trunk
116 | !
117 | interface Port-channel5
118 |   switchport trunk encapsulation dot1q
119 |   switchport mode trunk
120 | !
121 | interface Port-channel6
122 |   switchport trunk encapsulation dot1q
123 |   switchport mode trunk
124 | !
125 | interface FastEthernet0/1
126 |   no switchport
127 |   no ip address
128 |   channel-group 3 mode on
129 | !
130 | interface FastEthernet0/2
131 |   no switchport
132 |   no ip address
133 |   channel-group 3 mode on
134 | !
135 | interface FastEthernet0/3
136 |   no switchport
```

```
137 no ip address
138 channel-group 3 mode on
139 !
140 interface FastEthernet0/4
141 no switchport
142 no ip address
143 channel-group 3 mode on
144 !
145 interface FastEthernet0/5
146 switchport trunk encapsulation dot1q
147 switchport mode trunk
148 channel-group 5 mode on
149 !
150 interface FastEthernet0/6
151 switchport trunk encapsulation dot1q
152 switchport mode trunk
153 channel-group 5 mode on
154 !
155 interface FastEthernet0/7
156 switchport trunk encapsulation dot1q
157 switchport mode trunk
158 !
159 interface FastEthernet0/8
160 switchport trunk encapsulation dot1q
161 switchport mode trunk
162 !
163 interface FastEthernet0/9
164 switchport trunk encapsulation dot1q
165 switchport mode trunk
166 !
167 interface FastEthernet0/10
168 switchport trunk encapsulation dot1q
169 switchport mode trunk
170 !
171 interface FastEthernet0/11
172 switchport trunk encapsulation dot1q
173 switchport mode trunk
174 channel-group 4 mode on
175 !
176 interface FastEthernet0/12
177 switchport trunk encapsulation dot1q
178 switchport mode trunk
179 channel-group 4 mode on
180 !
181 interface FastEthernet0/13
182 switchport trunk encapsulation dot1q
183 switchport mode trunk
184 !
185 interface FastEthernet0/14
186 switchport trunk encapsulation dot1q
187 switchport mode trunk
188 !
189 interface FastEthernet0/15
190 switchport trunk encapsulation dot1q
191 switchport mode trunk
192 channel-group 6 mode on
193 !
194 interface FastEthernet0/16
195 switchport trunk encapsulation dot1q
196 switchport mode trunk
197 channel-group 6 mode on
198 !
```

```
199 interface FastEthernet0/17
200 !
201 interface FastEthernet0/18
202 !
203 interface FastEthernet0/19
204 !
205 interface FastEthernet0/20
206 !
207 interface FastEthernet0/21
208   switchport trunk encapsulation dot1q
209   switchport mode trunk
210   channel-group 1 mode on
211 !
212 interface FastEthernet0/22
213   switchport trunk encapsulation dot1q
214   switchport mode trunk
215   channel-group 1 mode on
216 !
217 interface FastEthernet0/23
218   switchport trunk encapsulation dot1q
219   switchport mode trunk
220   channel-group 1 mode on
221 !
222 interface FastEthernet0/24
223   switchport trunk encapsulation dot1q
224   switchport mode trunk
225   channel-group 1 mode on
226 !
227 interface GigabitEthernet0/1
228 !
229 interface GigabitEthernet0/2
230 !
231 interface Vlan1
232   no ip address
233   shutdown
234 !
235 interface Vlan21
236   ip address 172.16.16.1 255.255.255.0
237   standby 40 preempt
238   ip ospf mtu-ignore
239   ip ospf 1 area 0
240 !
241 interface Vlan30
242   ip address 172.16.17.1 255.255.255.0
243   ip ospf mtu-ignore
244   ip ospf 1 area 0
245 !
246 interface Vlan40
247   ip address 172.16.18.252 255.255.255.0
248   standby 40 ip 172.16.18.254
249   standby 40 priority 150
250   standby 40 preempt
251   ip ospf mtu-ignore
252   ip ospf 1 area 0
253 !
254 interface Vlan41
255   ip address 172.16.19.252 255.255.255.0
256   standby 41 ip 172.16.19.254
257   standby 41 preempt
258   ip ospf mtu-ignore
259   ip ospf 1 area 0
260 !
```



```

261 interface Vlan100
262 ip address 172.16.20.1 255.255.255.0
263 ip ospf mtu-ignore
264 ip ospf 1 area 0
265 !
266 router ospf 1
267 !
268 ip http server
269 ip http secure-server
270 !
271 !
272 ip sla enable reaction-alerts
273 snmp-server community public R0
274 snmp-server community private RW
275 !
276 !
277 !
278 !
279 line con 0
280 line vty 0 4
281 password cisco
282 line vty 5 15
283 password cisco
284 !
285 end

```

#### A.14.2. IP Interfaces

	Interface	IP-Address	OK?	Method	Status	Protocol
1	Vlan1	unassigned	YES	unset	administratively down	down
2	Vlan21	172.16.16.1	YES	manual	down	down
3	Vlan30	172.16.17.1	YES	manual	up	up
4	Vlan40	172.16.18.252	YES	manual	up	up
5	Vlan41	172.16.19.252	YES	manual	up	up
6	Vlan100	172.16.20.1	YES	manual	down	down
7	FastEthernet0/1	unassigned	YES	manual	up	up
8	FastEthernet0/2	unassigned	YES	manual	up	up
9	FastEthernet0/3	unassigned	YES	manual	up	up
10	FastEthernet0/4	unassigned	YES	manual	up	up
11	FastEthernet0/5	unassigned	YES	unset	up	up
12	FastEthernet0/6	unassigned	YES	unset	up	up
13	FastEthernet0/7	unassigned	YES	unset	up	up
14	FastEthernet0/8	unassigned	YES	unset	up	up
15	FastEthernet0/9	unassigned	YES	unset	up	up
16	FastEthernet0/10	unassigned	YES	unset	down	down
17	FastEthernet0/11	unassigned	YES	unset	up	up
18	FastEthernet0/12	unassigned	YES	unset	up	up
19	FastEthernet0/13	unassigned	YES	unset	up	up
20	FastEthernet0/14	unassigned	YES	unset	up	up
21	FastEthernet0/15	unassigned	YES	unset	down	down
22	FastEthernet0/16	unassigned	YES	unset	down	down
23	FastEthernet0/17	unassigned	YES	unset	down	down
24	FastEthernet0/18	unassigned	YES	unset	down	down
25	FastEthernet0/19	unassigned	YES	unset	down	down
26	FastEthernet0/20	unassigned	YES	unset	down	down
27	FastEthernet0/21	unassigned	YES	unset	down	down
28	FastEthernet0/22	unassigned	YES	unset	down	down
29	FastEthernet0/23	unassigned	YES	unset	down	down
30	FastEthernet0/24	unassigned	YES	unset	down	down
31	GigabitEthernet0/1	unassigned	YES	unset	down	down
32						

```

33 GigabitEthernet0/2 unassigned YES unset down down
34 Port-channel1 unassigned YES unset down down
35 Port-channel2 unassigned YES unset down down
36 Port-channel3 172.16.254.38 YES manual up up
37 Port-channel4 unassigned YES unset up up
38 Port-channel5 unassigned YES unset up up
39 Port-channel6 unassigned YES unset down down
40 Loopback100 172.16.25.5 YES manual up up

```

### A.14.3. Interface Status

```

1 HQ_DS1>show interface status
2
3 Port      Name      Status    Vlan    Duplex Speed Type
4 Fa0/1     connected routed    a-full a-10  10/100BaseTX
5 Fa0/2     connected routed    a-full a-10  10/100BaseTX
6 Fa0/3     connected routed    a-full a-10  10/100BaseTX
7 Fa0/4     connected routed    a-full a-10  10/100BaseTX
8 Fa0/5     connected trunk    a-full a-100 10/100BaseTX
9 Fa0/6     connected trunk    a-full a-100 10/100BaseTX
10 Fa0/7     connected trunk    a-full a-100 10/100BaseTX
11 Fa0/8     connected trunk    a-full a-100 10/100BaseTX
12 Fa0/9     connected trunk    a-full a-100 10/100BaseTX
13 Fa0/10    notconnect 1        auto auto 10/100BaseTX
14 Fa0/11    connected trunk    a-full a-100 10/100BaseTX
15 Fa0/12    connected trunk    a-full a-100 10/100BaseTX
16 Fa0/13    connected trunk    a-full a-100 10/100BaseTX
17 Fa0/14    connected trunk    a-full a-100 10/100BaseTX
18 Fa0/15    notconnect 1        auto auto 10/100BaseTX
19 Fa0/16    notconnect 1        auto auto 10/100BaseTX
20 Fa0/17    notconnect 1        auto auto 10/100BaseTX
21 Fa0/18    notconnect 1        auto auto 10/100BaseTX
22 Fa0/19    notconnect 1        auto auto 10/100BaseTX
23 Fa0/20    notconnect 1        auto auto 10/100BaseTX
24 Fa0/21    notconnect 1        auto auto 10/100BaseTX
25
26 Port      Name      Status    Vlan    Duplex Speed Type
27 Fa0/22    notconnect 1        auto auto 10/100BaseTX
28 Fa0/23    notconnect 1        auto auto 10/100BaseTX
29 Fa0/24    notconnect 1        auto auto 10/100BaseTX
30 Gi0/1     notconnect 1        auto auto Not Present
31 Gi0/2     notconnect 1        auto auto Not Present
32 Po1      notconnect unassigned auto auto
33 Po2      notconnect unassigned auto auto
34 Po3      connected routed    a-full a-10
35 Po4      connected trunk    a-full a-100
36 Po5      connected trunk    a-full a-100
37 Po6      notconnect unassigned auto auto

```

### A.14.4. Interface Trunk

```

1 HQ_DS1> show interface trunk
2
3 Port      Mode      Encapsulation Status Native vlan
4 Fa0/7     on        802.1q      trunking 1
5 Fa0/8     on        802.1q      trunking 1
6 Fa0/9     on        802.1q      trunking 1
7 Fa0/13    on        802.1q      trunking 1

```

```

8 Fa0/14 on 802.1q trunking 1
9 Po4 on 802.1q trunking 1
10 Po5 on 802.1q trunking 1
11
12 Port Vlans allowed on trunk
13 Fa0/7 1-4094
14 Fa0/8 1-4094
15 Fa0/9 1-4094
16 Fa0/13 1-4094
17 Fa0/14 1-4094
18 Po4 1-4094
19 Po5 1-4094
20
21 Port Vlans allowed and active in management domain
22 Fa0/7 1,10,20,30,40-41,99
23 Fa0/8 1,10,20,30,40-41,99
24 Fa0/9 1,10,20,30,40-41,99
25
26 Port Vlans allowed and active in management domain
27 Fa0/13 1,10,20,30,40-41,99
28 Fa0/14 1,10,20,30,40-41,99
29 Po4 1,10,20,30,40-41,99
30 Po5 1,10,20,30,40-41,99
31
32 Port Vlans in spanning tree forwarding state and not pruned
33 Fa0/7 1,10,20,30,40-41,99
34 Fa0/8 1,10,20,30,40-41,99
35 Fa0/9 1,10,20,30,40-41,99
36 Fa0/13 1,10,20,30,40-41,99
37 Fa0/14 1,10,20,30,40-41,99
38 Po4 1,10,20,30,40-41,99
39 Po5 1,10,20,30,40-41,99

```

#### A.14.5. Neighbors

```

1 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
2 S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
3 D - Remote, C - CVTA, M - Two-port Mac Relay
4
5 Device ID Local Intrfce Holdtme Capability Platform Port ID
6 HQ_AS4 Fas 0/5 163 S I WS-C2960- Fas 0/3
7 HQ_AS4 Fas 0/6 126 S I WS-C2960- Fas 0/4
8 HQ_AS5 Fas 0/8 126 S I WS-C2960- Fas 0/4
9 HQ_AS5 Fas 0/7 126 S I WS-C2960- Fas 0/3
10 HQ_AS1 Fas 0/9 126 S I WS-C3560- Fas 0/1
11 HQ_AS2 Fas 0/12 127 S I WS-C3560- Fas 0/2
12 HQ_AS2 Fas 0/11 127 S I WS-C3560- Fas 0/1
13 HQ_CS1 Fas 0/4 162 R S I WS-C3560V Fas 0/16
14 HQ_CS1 Fas 0/3 162 R S I WS-C3560V Fas 0/15
15 HQ_CS1 Fas 0/2 162 R S I WS-C3560V Fas 0/14
16 HQ_CS1 Fas 0/1 162 R S I WS-C3560V Fas 0/13
17 HQ_AS3 Fas 0/14 126 S I WS-C2960- Fas 0/2
18 HQ_AS3 Fas 0/13 126 S I WS-C2960- Fas 0/1
19 HQ_DS1#

```

#### A.14.6. IP Route

```

1 HQ_DS1> show ip route

```

```

2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5       E1 - OSPF external type 1, E2 - OSPF external type 2
6       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7       ia - IS-IS inter area, * - candidate default, U - per-user static route
8       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9       + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13       172.16.0.0/16 is variably subnetted, 36 subnets, 4 masks
14 C       172.16.17.0/24 is directly connected, Vlan30
15 L       172.16.17.1/32 is directly connected, Vlan30
16 C       172.16.18.0/24 is directly connected, Vlan40
17 L       172.16.18.252/32 is directly connected, Vlan40
18 C       172.16.19.0/24 is directly connected, Vlan41
19 L       172.16.19.252/32 is directly connected, Vlan41
20 C       172.16.25.0/24 is directly connected, Loopback100
21 O       172.16.25.1/32 [110/3] via 172.16.254.33, 3d06h, Port-channel3
22         [110/3] via 172.16.19.253, 3d06h, Vlan41
23         [110/3] via 172.16.18.253, 3d06h, Vlan40
24 O       172.16.25.2/32 [110/3] via 172.16.19.253, 3d06h, Vlan41
25         [110/3] via 172.16.18.253, 3d06h, Vlan40
26 O       172.16.25.3/32 [110/4] via 172.16.254.33, 3d06h, Port-channel3
27         [110/4] via 172.16.19.253, 3d06h, Vlan41
28         [110/4] via 172.16.18.253, 3d06h, Vlan40
29 O       172.16.25.4/32 [110/5] via 172.16.254.33, 3d06h, Port-channel3
30         [110/5] via 172.16.19.253, 3d06h, Vlan41
31         [110/5] via 172.16.18.253, 3d06h, Vlan40
32 L       172.16.25.5/32 is directly connected, Loopback100
33 O       172.16.25.6/32 [110/2] via 172.16.19.253, 3d06h, Vlan41
34         [110/2] via 172.16.18.253, 3d06h, Vlan40
35 O       172.16.25.7/32 [110/5] via 172.16.254.33, 3d06h, Port-channel3
36         [110/5] via 172.16.19.253, 3d06h, Vlan41
37         [110/5] via 172.16.18.253, 3d06h, Vlan40
38 O       172.16.100.0/24 [110/69] via 172.16.19.253, 3d06h, Vlan41
39         [110/69] via 172.16.18.253, 3d06h, Vlan40
40 O       172.16.101.0/24 [110/70] via 172.16.19.253, 3d06h, Vlan41
41         [110/70] via 172.16.18.253, 3d06h, Vlan40
42 O       172.16.102.0/24 [110/1004] via 172.16.19.253, 3d06h, Vlan41
43         [110/1004] via 172.16.18.253, 3d06h, Vlan40
44 O       172.16.252.1/32 [110/4] via 172.16.19.253, 3d06h, Vlan41
45         [110/4] via 172.16.18.253, 3d06h, Vlan40
46 O       172.16.252.2/32 [110/68] via 172.16.19.253, 3d06h, Vlan41
47         [110/68] via 172.16.18.253, 3d06h, Vlan40
48 O       172.16.252.3/32 [110/1003] via 172.16.19.253, 3d06h, Vlan41
49         [110/1003] via 172.16.18.253, 3d06h, Vlan40
50 O       172.16.254.0/30 [110/3] via 172.16.254.33, 3d06h, Port-channel3
51         [110/3] via 172.16.19.253, 3d06h, Vlan41
52         [110/3] via 172.16.18.253, 3d06h, Vlan40
53 O       172.16.254.4/30 [110/3] via 172.16.254.33, 3d06h, Port-channel3
54         [110/3] via 172.16.19.253, 3d06h, Vlan41
55         [110/3] via 172.16.18.253, 3d06h, Vlan40
56 O       172.16.254.8/30 [110/4] via 172.16.254.33, 3d06h, Port-channel3
57         [110/4] via 172.16.19.253, 3d06h, Vlan41
58         [110/4] via 172.16.18.253, 3d06h, Vlan40
59 O       172.16.254.12/30 [110/12] via 172.16.19.253, 3d06h, Vlan41
60         [110/12] via 172.16.18.253, 3d06h, Vlan40
61 O       172.16.254.16/30 [110/5] via 172.16.254.33, 3d06h, Port-channel3
62         [110/5] via 172.16.19.253, 3d06h, Vlan41
63         [110/5] via 172.16.18.253, 3d06h, Vlan40

```

```

64 0      172.16.254.20/30 [110/4] via 172.16.254.33, 3d06h, Port-channel3
65      [110/4] via 172.16.19.253, 3d06h, Vlan41
66      [110/4] via 172.16.18.253, 3d06h, Vlan40
67 C      172.16.254.32/29 is directly connected, Port-channel3
68 L      172.16.254.38/32 is directly connected, Port-channel3
69 0      172.16.254.40/29 [110/2] via 172.16.19.253, 3d06h, Vlan41
70      [110/2] via 172.16.18.253, 3d06h, Vlan40
71 0      172.16.254.48/29 [110/2] via 172.16.19.253, 3d06h, Vlan41
72      [110/2] via 172.16.18.253, 3d06h, Vlan40
73 0      172.16.254.56/30 [110/3] via 172.16.19.253, 3d06h, Vlan41
74      [110/3] via 172.16.18.253, 3d06h, Vlan40
75 0      172.16.254.60/30 [110/4] via 172.16.19.253, 3d06h, Vlan41
76      [110/4] via 172.16.18.253, 3d06h, Vlan40
77 0      172.16.254.64/30 [110/3] via 172.16.19.253, 3d06h, Vlan41
78      [110/3] via 172.16.18.253, 3d06h, Vlan40
79 0      172.16.255.0/30 [110/1003] via 172.16.19.253, 3d06h, Vlan41
80      [110/1003] via 172.16.18.253, 3d06h, Vlan40
81 0      172.16.255.4/30 [110/1003] via 172.16.19.253, 3d06h, Vlan41
82      [110/1003] via 172.16.18.253, 3d06h, Vlan40
83 0      172.16.255.8/30 [110/1003] via 172.16.19.253, 3d06h, Vlan41
84      [110/1003] via 172.16.18.253, 3d06h, Vlan40
85      200.200.200.0/28 is subnetted, 1 subnets
86 0      200.200.200.0 [110/4] via 172.16.19.253, 3d06h, Vlan41
87      [110/4] via 172.16.18.253, 3d06h, Vlan40

```

#### A.14.7. Spanning Tree

```

1  HQ_DS1>show spanning
2
3  VLAN0001
4  Spanning tree enabled protocol ieee
5  Root ID Priority 32769
6      Address 001a.2fa8.ea80
7      Cost    19
8      Port    11 (FastEthernet0/9)
9      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
10
11  Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
12      Address 24b6.572a.da00
13      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
14      Aging Time 300 sec
15
16  Interface      Role Sts Cost Prio.Nbr Type
17  -----
18  Fa0/7          Desg FWD 19   128.9  P2p
19  Fa0/8          Desg FWD 19   128.10 P2p
20  Fa0/9          Root FWD 19   128.11 P2p
21  Fa0/13         Desg FWD 19   128.15 P2p
22  Fa0/14         Desg FWD 19   128.16 P2p
23  Po4            Desg FWD 12   128.88 P2p
24  Po5            Desg FWD 12   128.96 P2p
25
26
27
28  VLAN0010
29  Spanning tree enabled protocol ieee
30  Root ID Priority 32778
31      Address 001a.2fa8.ea80
32      Cost    19
33      Port    11 (FastEthernet0/9)

```

```

34         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
35
36     Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
37         Address 24b6.572a.da00
38         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
39         Aging Time 300 sec

```

```

40
41 Interface      Role Sts Cost Prio.Nbr Type
42 -----
43 Fa0/7          Desg FWD 19   128.9  P2p
44 Fa0/8          Desg FWD 19   128.10 P2p
45 Fa0/9          Root FWD 19   128.11 P2p
46 Fa0/13         Desg FWD 19   128.15 P2p
47 Fa0/14         Desg FWD 19   128.16 P2p
48 Po4           Desg FWD 12   128.88 P2p
49 Po5           Desg FWD 12   128.96 P2p

```

```

50
51
52
53 VLAN0020
54     Spanning tree enabled protocol ieee
55     Root ID Priority 32788
56         Address 001a.2fa8.ea80
57         Cost 19
58         Port 11 (FastEthernet0/9)
59         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
60
61     Bridge ID Priority 32788 (priority 32768 sys-id-ext 20)
62         Address 24b6.572a.da00
63         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
64         Aging Time 300 sec

```

```

65
66 Interface      Role Sts Cost Prio.Nbr Type
67 -----
68 Fa0/7          Desg FWD 19   128.9  P2p
69 Fa0/8          Desg FWD 19   128.10 P2p
70 Fa0/9          Root FWD 19   128.11 P2p
71 Fa0/13         Desg FWD 19   128.15 P2p
72 Fa0/14         Desg FWD 19   128.16 P2p
73 Po4           Desg FWD 12   128.88 P2p
74 Po5           Desg FWD 12   128.96 P2p

```

```

75
76
77
78 VLAN0030
79     Spanning tree enabled protocol ieee
80     Root ID Priority 32798
81         Address 001a.2fa8.ea80
82         Cost 19
83         Port 11 (FastEthernet0/9)
84         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
85
86     Bridge ID Priority 32798 (priority 32768 sys-id-ext 30)
87         Address 24b6.572a.da00
88         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
89         Aging Time 300 sec

```

```

90
91 Interface      Role Sts Cost Prio.Nbr Type
92 -----
93 Fa0/7          Desg FWD 19   128.9  P2p
94 Fa0/8          Desg FWD 19   128.10 P2p
95 Fa0/9          Root FWD 19   128.11 P2p

```

```

96 Fa0/13      Desg FWD 19   128.15 P2p
97 Fa0/14      Desg FWD 19   128.16 P2p
98 Po4        Desg FWD 12   128.88 P2p
99 Po5        Desg FWD 12   128.96 P2p
100
101
102
103 VLAN0040
104   Spanning tree enabled protocol ieee
105   Root ID Priority 32808
106       Address 001a.2fa8.ea80
107       Cost    19
108       Port    11 (FastEthernet0/9)
109       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
110
111   Bridge ID Priority 32808 (priority 32768 sys-id-ext 40)
112       Address 24b6.572a.da00
113       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
114       Aging Time 300 sec
115
116 Interface      Role Sts Cost Prio.Nbr Type
117 -----
118 Fa0/7          Desg FWD 19   128.9  P2p
119 Fa0/8          Desg FWD 19   128.10 P2p
120 Fa0/9          Root FWD 19   128.11 P2p
121 Fa0/13         Desg FWD 19   128.15 P2p
122 Fa0/14         Desg FWD 19   128.16 P2p
123 Po4           Desg FWD 12   128.88 P2p
124 Po5           Desg FWD 12   128.96 P2p
125
126
127
128 VLAN0041
129   Spanning tree enabled protocol ieee
130   Root ID Priority 32809
131       Address 001a.2fa8.ea80
132       Cost    19
133       Port    11 (FastEthernet0/9)
134       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
135
136   Bridge ID Priority 32809 (priority 32768 sys-id-ext 41)
137       Address 24b6.572a.da00
138       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
139       Aging Time 300 sec
140
141 Interface      Role Sts Cost Prio.Nbr Type
142 -----
143 Fa0/7          Desg FWD 19   128.9  P2p
144 Fa0/8          Desg FWD 19   128.10 P2p
145 Fa0/9          Root FWD 19   128.11 P2p
146 Fa0/13         Desg FWD 19   128.15 P2p
147 Fa0/14         Desg FWD 19   128.16 P2p
148 Po4           Desg FWD 12   128.88 P2p
149 Po5           Desg FWD 12   128.96 P2p
150
151
152
153 VLAN0099
154   Spanning tree enabled protocol ieee
155   Root ID Priority 32867
156       Address 001a.2fa8.ea80
157       Cost    19

```

```

158      Port      11 (FastEthernet0/9)
159      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
160
161      Bridge ID Priority 32867 (priority 32768 sys-id-ext 99)
162      Address 24b6.572a.da00
163      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
164      Aging Time 300 sec
165
166      Interface      Role Sts Cost  Prio.Nbr Type
167      -----
168      Fa0/7          Desg FWD 19   128.9  P2p
169      Fa0/8          Desg FWD 19   128.10 P2p
170      Fa0/9          Root FWD 19   128.11 P2p
171      Fa0/13         Desg FWD 19   128.15 P2p
172      Fa0/14         Desg FWD 19   128.16 P2p
173      Po4            Desg FWD 12   128.88 P2p
174      Po5            Desg FWD 12   128.96 P2p

```

#### A.14.8. VLAN

```

1  HQ_DS1>show vlan
2
3  VLAN Name                Status Ports
4  -----
5  1  default                 active Fa0/10, Fa0/15, Fa0/16, Fa0/17
6                                Fa0/18, Fa0/19, Fa0/20, Fa0/21
7                                Fa0/22, Fa0/23, Fa0/24, Gi0/1
8                                Gi0/2
9  10 VLAN0010               active
10 20 VLAN0020               active
11 30 VLAN0030               active
12 40 VLAN0040               active
13 41 VLAN0041               active
14 99 Management             active
15 1002 fddi-default         act/unsup
16 1003 trcrf-default        act/unsup
17 1004 fdnet-default        act/unsup
18 1005 trbrf-default        act/unsup
19
20 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
21 -----
22 1  enet 100001 1500 -  -  -  -  -  0  0
23 10 enet 100010 1500 -  -  -  -  -  0  0
24 20 enet 100020 1500 -  -  -  -  -  0  0
25
26 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
27 -----
28 30 enet 100030 1500 -  -  -  -  -  0  0
29 40 enet 100040 1500 -  -  -  -  -  0  0
30 41 enet 100041 1500 -  -  -  -  -  0  0
31 99 enet 100099 1500 -  -  -  -  -  0  0
32 1002 fddi 101002 1500 -  -  -  -  -  0  0
33 1003 trcrf 101003 4472 1005 3276 -  -  srb  0  0
34 1004 fdnet 101004 1500 -  -  -  -  ieee -  0  0
35 1005 trbrf 101005 4472 -  -  15  -  ibm  -  0  0
36
37
38 VLAN AREHops STEHops Backup CRF
39 -----
40 1003 7 7 off

```



41	Remote SPAN VLANs		
42	-----		
43			
44			
45			
46	Primary	Secondary	Type Ports
47	-----	-----	-----

## A.15. HQ DS2

### A.15.1. Running Configuration

```

1  !
2  !
3  ! Last configuration change at 08:47:52 UTC Mon Mar 1 1993
4  !
5  version 15.0
6  no service pad
7  service timestamps debug datetime msec
8  service timestamps log datetime msec
9  no service password-encryption
10 service sequence-numbers
11 !
12 hostname HQ_DS2
13 !
14 boot-start-marker
15 boot-end-marker
16 !
17 enable secret 5 $1$Gfma$G0lb8g0YFbxMJ8FjtkmpF/
18 !
19 username ins password 0 ins@lab
20 no aaa new-model
21 system mtu routing 1504
22 ip routing
23 no ip domain-lookup
24 ip dhcp excluded-address 172.16.18.250 172.16.18.254
25 ip dhcp excluded-address 172.16.18.10 172.16.18.12
26 ip dhcp excluded-address 172.16.19.250 172.16.19.254
27 ip dhcp excluded-address 172.16.19.10 172.16.19.12
28 !
29 ip dhcp pool MARKETING
30 network 172.16.18.0 255.255.255.0
31 default-router 172.16.18.254
32 !
33 ip dhcp pool SALES
34 network 172.16.19.0 255.255.255.0
35 default-router 172.16.19.254
36 !
37 !
38 !
39 !
40 crypto pki trustpoint HTTPS_SS_CERT_KEYPAIR
41 enrollment selfsigned
42 serial-number
43 revocation-check none
44 rsa-keypair HTTPS_SS_CERT_KEYPAIR
45 !
46 !
47 crypto pki certificate chain HTTPS_SS_CERT_KEYPAIR
48 certificate self-signed 01

```

```
49      quit
50      !
51      !
52      !
53      !
54      !
55      spanning-tree mode pvst
56      spanning-tree extend system-id
57      !
58      vlan internal allocation policy ascending
59      !
60      !
61      !
62      !
63      !
64      !
65      !
66      !
67      !
68      !
69      !
70      !
71      !
72      !
73      interface Loopback100
74      ip address 172.16.25.6 255.255.255.0
75      ip ospf 1 area 0
76      !
77      interface Port-channel1
78      switchport trunk encapsulation dot1q
79      switchport mode trunk
80      !
81      interface Port-channel3
82      no switchport
83      ip address 172.16.254.49 255.255.255.248
84      ip ospf mtu-ignore
85      ip ospf 1 area 0
86      !
87      interface Port-channel4
88      no switchport
89      ip address 172.16.254.42 255.255.255.248
90      ip ospf mtu-ignore
91      ip ospf 1 area 0
92      !
93      interface FastEthernet0/1
94      no switchport
95      no ip address
96      channel-group 3 mode on
97      !
98      interface FastEthernet0/2
99      no switchport
100     no ip address
101     channel-group 3 mode on
102     !
103     interface FastEthernet0/3
104     no switchport
105     no ip address
106     channel-group 3 mode on
107     !
108     interface FastEthernet0/4
109     no switchport
110     no ip address
```

```
111 | channel-group 3 mode on
112 | !
113 | interface FastEthernet0/5
114 | no switchport
115 | no ip address
116 | channel-group 4 mode on
117 | !
118 | interface FastEthernet0/6
119 | no switchport
120 | no ip address
121 | channel-group 4 mode on
122 | !
123 | interface FastEthernet0/7
124 | no switchport
125 | no ip address
126 | channel-group 4 mode on
127 | !
128 | interface FastEthernet0/8
129 | no switchport
130 | no ip address
131 | channel-group 4 mode on
132 | !
133 | interface FastEthernet0/9
134 | !
135 | interface FastEthernet0/10
136 | !
137 | interface FastEthernet0/11
138 | !
139 | interface FastEthernet0/12
140 | !
141 | interface FastEthernet0/13
142 | !
143 | interface FastEthernet0/14
144 | !
145 | interface FastEthernet0/15
146 | !
147 | interface FastEthernet0/16
148 | !
149 | interface FastEthernet0/17
150 | !
151 | interface FastEthernet0/18
152 | !
153 | interface FastEthernet0/19
154 | !
155 | interface FastEthernet0/20
156 | !
157 | interface FastEthernet0/21
158 | switchport trunk encapsulation dot1q
159 | switchport mode trunk
160 | channel-group 1 mode on
161 | !
162 | interface FastEthernet0/22
163 | switchport trunk encapsulation dot1q
164 | switchport mode trunk
165 | channel-group 1 mode on
166 | !
167 | interface FastEthernet0/23
168 | switchport trunk encapsulation dot1q
169 | switchport mode trunk
170 | channel-group 1 mode on
171 | !
172 | interface FastEthernet0/24
```

```
173 switchport trunk encapsulation dot1q
174 switchport mode trunk
175 channel-group 1 mode on
176 !
177 interface GigabitEthernet0/1
178 !
179 interface GigabitEthernet0/2
180 !
181 interface Vlan1
182 no ip address
183 shutdown
184 !
185 interface Vlan21
186 no ip address
187 ip ospf mtu-ignore
188 !
189 interface Vlan30
190 no ip address
191 ip ospf mtu-ignore
192 !
193 interface Vlan40
194 ip address 172.16.18.253 255.255.255.0
195 standby 40 ip 172.16.18.254
196 standby 40 preempt
197 ip ospf mtu-ignore
198 ip ospf 1 area 0
199 !
200 interface Vlan41
201 ip address 172.16.19.253 255.255.255.0
202 standby 41 ip 172.16.19.254
203 standby 41 priority 150
204 standby 41 preempt
205 ip ospf 1 area 0
206 !
207 interface Vlan100
208 ip address 172.16.20.2 255.255.255.0
209 ip ospf mtu-ignore
210 ip ospf 1 area 0
211 !
212 router ospf 1
213 !
214 ip http server
215 ip http secure-server
216 !
217 !
218 ip sla enable reaction-alerts
219 snmp-server community public R0
220 snmp-server community private RW
221 !
222 !
223 line con 0
224 line vty 0 4
225 password cisco
226 login
227 line vty 5 15
228 password cisco
229 login
230 !
231 end
```

### A.15.2. IP Interfaces

	Interface	IP-Address	OK?	Method	Status	Protocol
1	Vlan1	unassigned	YES	unset	administratively down	down
2	Vlan21	unassigned	YES	unset	down	down
3	Vlan30	unassigned	YES	unset	up	up
4	Vlan40	172.16.18.253	YES	manual	up	up
5	Vlan41	172.16.19.253	YES	manual	up	up
6	Vlan100	172.16.20.2	YES	manual	down	down
7	FastEthernet0/1	unassigned	YES	manual	up	up
8	FastEthernet0/2	unassigned	YES	manual	up	up
9	FastEthernet0/3	unassigned	YES	manual	up	up
10	FastEthernet0/4	unassigned	YES	manual	up	up
11	FastEthernet0/5	unassigned	YES	manual	up	up
12	FastEthernet0/6	unassigned	YES	manual	up	up
13	FastEthernet0/7	unassigned	YES	manual	up	up
14	FastEthernet0/8	unassigned	YES	manual	up	up
15	FastEthernet0/9	unassigned	YES	unset	up	up
16	FastEthernet0/10	unassigned	YES	unset	up	up
17	FastEthernet0/11	unassigned	YES	unset	up	up
18	FastEthernet0/12	unassigned	YES	unset	up	up
19	FastEthernet0/13	unassigned	YES	unset	up	up
20	FastEthernet0/14	unassigned	YES	unset	up	up
21	FastEthernet0/15	unassigned	YES	unset	down	down
22	FastEthernet0/16	unassigned	YES	unset	down	down
23	FastEthernet0/17	unassigned	YES	unset	down	down
24	FastEthernet0/18	unassigned	YES	unset	down	down
25	FastEthernet0/19	unassigned	YES	unset	down	down
26	FastEthernet0/20	unassigned	YES	unset	down	down
27	FastEthernet0/21	unassigned	YES	unset	down	down
28	FastEthernet0/22	unassigned	YES	unset	down	down
29	FastEthernet0/23	unassigned	YES	unset	down	down
30	FastEthernet0/24	unassigned	YES	unset	down	down
31	GigabitEthernet0/1	unassigned	YES	unset	down	down
32	GigabitEthernet0/2	unassigned	YES	unset	down	down
33	Port-channel1	unassigned	YES	unset	down	down
34	Port-channel3	172.16.254.49	YES	manual	up	up
35	Port-channel4	172.16.254.42	YES	manual	up	up
36	Loopback100	172.16.25.6	YES	manual	up	up
37						

### A.15.3. Interface Status

1	HQ_DS2>show interface status						
2							
3	Port	Name	Status	Vlan	Duplex	Speed	Type
4	Fa0/1		connected	routed	a-full	a-100	10/100BaseTX
5	Fa0/2		connected	routed	a-full	a-100	10/100BaseTX
6	Fa0/3		connected	routed	a-full	a-100	10/100BaseTX
7	Fa0/4		connected	routed	a-full	a-100	10/100BaseTX
8	Fa0/5		connected	routed	a-half	a-100	10/100BaseTX
9	Fa0/6		connected	routed	a-half	a-100	10/100BaseTX
10	Fa0/7		connected	routed	a-half	a-100	10/100BaseTX
11	Fa0/8		connected	routed	a-half	a-100	10/100BaseTX
12	Fa0/9		connected	trunk	a-full	a-100	10/100BaseTX
13	Fa0/10		connected	trunk	a-full	a-100	10/100BaseTX
14	Fa0/11		connected	trunk	a-full	a-100	10/100BaseTX
15	Fa0/12		connected	trunk	a-full	a-100	10/100BaseTX
16	Fa0/13		connected	trunk	a-full	a-100	10/100BaseTX
17	Fa0/14		connected	trunk	a-full	a-100	10/100BaseTX

```

18 Fa0/15          notconnect 1      auto auto 10/100BaseTX
19 Fa0/16          notconnect 1      auto auto 10/100BaseTX
20 Fa0/17          notconnect 1      auto auto 10/100BaseTX
21 Fa0/18          notconnect 1      auto auto 10/100BaseTX
22 Fa0/19          notconnect 1      auto auto 10/100BaseTX
23 Fa0/20          notconnect 1      auto auto 10/100BaseTX
24 Fa0/21          err-disabled 1    auto auto 10/100BaseTX
25
26 Port   Name      Status   Vlan    Duplex Speed Type
27 Fa0/22          err-disabled 1      auto auto 10/100BaseTX
28 Fa0/23          err-disabled 1      auto auto 10/100BaseTX
29 Fa0/24          err-disabled 1      auto auto 10/100BaseTX
30 Gi0/1          notconnect 1      auto auto Not Present
31 Gi0/2          notconnect 1      auto auto Not Present
32 Po1           err-disabled 1      auto auto
33 Po3           connected routed a-full a-100
34 Po4           connected routed a-half a-100

```

#### A.15.4. Interface Trunk

```

1 HQ_DS2>show interface trunk
2
3 Port      Mode      Encapsulation Status Native vlan
4 Fa0/9     auto      n-802.1q    trunking 1
5 Fa0/10    auto      n-802.1q    trunking 1
6 Fa0/11    auto      n-802.1q    trunking 1
7 Fa0/12    auto      n-802.1q    trunking 1
8 Fa0/13    auto      n-802.1q    trunking 1
9 Fa0/14    auto      n-802.1q    trunking 1
10
11 Port      Vlans allowed on trunk
12 Fa0/9     1-4094
13 Fa0/10    1-4094
14 Fa0/11    1-4094
15 Fa0/12    1-4094
16 Fa0/13    1-4094
17 Fa0/14    1-4094
18
19 Port      Vlans allowed and active in management domain
20 Fa0/9     1,10,20,30,40-41,99
21 Fa0/10    1,10,20,30,40-41,99
22 Fa0/11    1,10,20,30,40-41,99
23 Fa0/12    1,10,20,30,40-41,99
24 Fa0/13    1,10,20,30,40-41,99
25
26 Port      Vlans allowed and active in management domain
27 Fa0/14    1,10,20,30,40-41,99
28
29 Port      Vlans in spanning tree forwarding state and not pruned
30 Fa0/9     1,10,20,30,40-41,99
31 Fa0/10    1,10,20,30,40-41,99
32 Fa0/11    none
33 Fa0/12    none
34 Fa0/13    1,10,20,30,40-41,99
35 Fa0/14    none

```

#### A.15.5. Neighbors

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
HQ_AS4	Fas 0/13	166	S I	WS-C2960-	Fas 0/1
HQ_AS4	Fas 0/14	166	S I	WS-C2960-	Fas 0/2
HQ_AS5	Fas 0/11	158	S I	WS-C2960-	Fas 0/1
HQ_AS5	Fas 0/12	158	S I	WS-C2960-	Fas 0/2
HQ_AS6	Fas 0/9	133	S I	WS-C2960-	Fas 0/1
HQ_AS6	Fas 0/10	133	S I	WS-C2960-	Fas 0/2
HQ_CS2	Fas 0/1	123	R S I	WS-C3560V	Fas 0/13
HQ_CS2	Fas 0/4	123	R S I	WS-C3560V	Fas 0/16
HQ_CS2	Fas 0/3	123	R S I	WS-C3560V	Fas 0/15
HQ_CS2	Fas 0/2	123	R S I	WS-C3560V	Fas 0/14
HQ_CS1	Fas 0/8	169	R S I	WS-C3560V	Fas 0/20
HQ_CS1	Fas 0/7	169	R S I	WS-C3560V	Fas 0/19
HQ_CS1	Fas 0/6	169	R S I	WS-C3560V	Fas 0/18
HQ_CS1	Fas 0/5	169	R S I	WS-C3560V	Fas 0/17

### A.15.6. IP Route

```

1 HQ_DS2>show ip route
2 Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
3         D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4         N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5         E1 - OSPF external type 1, E2 - OSPF external type 2
6         i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7         ia - IS-IS inter area, * - candidate default, U - per-user static route
8         o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
9         + - replicated route, % - next hop override
10
11 Gateway of last resort is not set
12
13     172.16.0.0/16 is variably subnetted, 36 subnets, 4 masks
14 O    172.16.17.0/24 [110/2] via 172.16.19.252, 3d06h, Vlan41
15     [110/2] via 172.16.18.252, 3d06h, Vlan40
16 C    172.16.18.0/24 is directly connected, Vlan40
17 L    172.16.18.253/32 is directly connected, Vlan40
18 C    172.16.19.0/24 is directly connected, Vlan41
19 L    172.16.19.253/32 is directly connected, Vlan41
20 C    172.16.25.0/24 is directly connected, Loopback100
21 O    172.16.25.1/32 [110/2] via 172.16.254.41, 3d06h, Port-channel4
22 O    172.16.25.2/32 [110/2] via 172.16.254.50, 3d06h, Port-channel3
23 O    172.16.25.3/32 [110/3] via 172.16.254.41, 3d06h, Port-channel4
24 O    172.16.25.4/32 [110/4] via 172.16.254.41, 3d06h, Port-channel4
25 O    172.16.25.5/32 [110/2] via 172.16.19.252, 3d06h, Vlan41
26     [110/2] via 172.16.18.252, 3d06h, Vlan40
27 L    172.16.25.6/32 is directly connected, Loopback100
28 O    172.16.25.7/32 [110/4] via 172.16.254.41, 3d06h, Port-channel4
29 O    172.16.100.0/24 [110/68] via 172.16.254.50, 3d06h, Port-channel3
30 O    172.16.101.0/24 [110/69] via 172.16.254.50, 3d06h, Port-channel3
31 O    172.16.102.0/24 [110/1003] via 172.16.254.50, 3d06h, Port-channel3
32 O    172.16.252.1/32 [110/3] via 172.16.254.50, 3d06h, Port-channel3
33 O    172.16.252.2/32 [110/67] via 172.16.254.50, 3d06h, Port-channel3
34 O    172.16.252.3/32 [110/1002] via 172.16.254.50, 3d06h, Port-channel3
35 O    172.16.254.0/30 [110/2] via 172.16.254.50, 3d06h, Port-channel3
36     [110/2] via 172.16.254.41, 3d06h, Port-channel4
37 O    172.16.254.4/30 [110/2] via 172.16.254.41, 3d06h, Port-channel4
38 O    172.16.254.8/30 [110/3] via 172.16.254.41, 3d06h, Port-channel4
39 O    172.16.254.12/30 [110/11] via 172.16.254.50, 3d06h, Port-channel3
40 O    172.16.254.16/30 [110/4] via 172.16.254.41, 3d06h, Port-channel4
41 O    172.16.254.20/30 [110/3] via 172.16.254.41, 3d06h, Port-channel4

```

```

42 O      172.16.254.32/29 [110/3] via 172.16.19.252, 3d06h, Vlan41
43      [110/3] via 172.16.18.252, 3d06h, Vlan40
44 C      172.16.254.40/29 is directly connected, Port-channel4
45 L      172.16.254.42/32 is directly connected, Port-channel4
46 C      172.16.254.48/29 is directly connected, Port-channel3
47 L      172.16.254.49/32 is directly connected, Port-channel3
48 O      172.16.254.56/30 [110/2] via 172.16.254.50, 3d06h, Port-channel3
49 O      172.16.254.60/30 [110/3] via 172.16.254.50, 3d06h, Port-channel3
50 O      172.16.254.64/30 [110/2] via 172.16.254.50, 3d06h, Port-channel3
51 O      172.16.255.0/30 [110/1002] via 172.16.254.50, 3d06h, Port-channel3
52 O      172.16.255.4/30 [110/1002] via 172.16.254.50, 3d06h, Port-channel3
53 O      172.16.255.8/30 [110/1002] via 172.16.254.50, 3d06h, Port-channel3
54      200.200.200.0/28 is subnetted, 1 subnets
55 O      200.200.200.0 [110/3] via 172.16.254.50, 3d06h, Port-channel3

```

### A.15.7. Spanning Tree

```

1 HQ_DS2> show spanning
2
3
4 VLAN0001
5   Spanning tree enabled protocol ieee
6   Root ID Priority 32769
7       Address 001a.2fa8.ea80
8       Cost    50
9       Port    15 (FastEthernet0/13)
10      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
11
12      Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
13      Address 24b6.5725.d200
14      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
15      Aging Time 300 sec
16
17      Interface      Role Sts Cost Prio.Nbr Type
18      -----
19      Fa0/9          Desg FWD 19   128.11 P2p
20      Fa0/10         Desg FWD 19   128.12 P2p
21      Fa0/11         Altn BLK 19   128.13 P2p
22      Fa0/12         Altn BLK 19   128.14 P2p
23      Fa0/13         Root FWD 19   128.15 P2p
24      Fa0/14         Altn BLK 19   128.16 P2p
25
26
27
28 VLAN0010
29   Spanning tree enabled protocol ieee
30   Root ID Priority 32778
31       Address 001a.2fa8.ea80
32       Cost    50
33       Port    15 (FastEthernet0/13)
34      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
35
36      Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
37      Address 24b6.5725.d200
38      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
39      Aging Time 300 sec
40
41      Interface      Role Sts Cost Prio.Nbr Type
42      -----
43      Fa0/9          Desg FWD 19   128.11 P2p

```



```

44 Fa0/10      Desg FWD 19   128.12 P2p
45 Fa0/11      Altn BLK 19   128.13 P2p
46 Fa0/12      Altn BLK 19   128.14 P2p
47 Fa0/13      Root FWD 19   128.15 P2p
48 Fa0/14      Altn BLK 19   128.16 P2p
49
50
51
52 VLAN0020
53   Spanning tree enabled protocol ieee
54   Root ID Priority 32788
55       Address 001a.2fa8.ea80
56       Cost    50
57       Port    15 (FastEthernet0/13)
58       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
59
60   Bridge ID Priority 32788 (priority 32768 sys-id-ext 20)
61       Address 24b6.5725.d200
62       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
63       Aging Time 300 sec
64
65   Interface      Role Sts Cost Prio.Nbr Type
66   -----
67   Fa0/9          Desg FWD 19   128.11 P2p
68   Fa0/10         Desg FWD 19   128.12 P2p
69   Fa0/11         Altn BLK 19   128.13 P2p
70   Fa0/12         Altn BLK 19   128.14 P2p
71   Fa0/13         Root FWD 19   128.15 P2p
72   Fa0/14         Altn BLK 19   128.16 P2p
73
74
75
76 VLAN0030
77   Spanning tree enabled protocol ieee
78   Root ID Priority 32798
79       Address 001a.2fa8.ea80
80       Cost    50
81       Port    15 (FastEthernet0/13)
82       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
83
84   Bridge ID Priority 32798 (priority 32768 sys-id-ext 30)
85       Address 24b6.5725.d200
86       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
87       Aging Time 300 sec
88
89   Interface      Role Sts Cost Prio.Nbr Type
90   -----
91   Fa0/9          Desg FWD 19   128.11 P2p
92   Fa0/10         Desg FWD 19   128.12 P2p
93   Fa0/11         Altn BLK 19   128.13 P2p
94   Fa0/12         Altn BLK 19   128.14 P2p
95   Fa0/13         Root FWD 19   128.15 P2p
96   Fa0/14         Altn BLK 19   128.16 P2p
97
98
99
100 VLAN0040
101   Spanning tree enabled protocol ieee
102   Root ID Priority 32808
103       Address 001a.2fa8.ea80
104       Cost    50
105       Port    15 (FastEthernet0/13)

```

```

106         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
107
108     Bridge ID Priority 32808 (priority 32768 sys-id-ext 40)
109         Address 24b6.5725.d200
110         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
111         Aging Time 300 sec

```

```

112
113 Interface      Role Sts Cost Prio.Nbr Type
114 -----
115 Fa0/9          Desg FWD 19   128.11 P2p
116 Fa0/10         Desg FWD 19   128.12 P2p
117 Fa0/11         Altn BLK 19   128.13 P2p
118 Fa0/12         Altn BLK 19   128.14 P2p
119 Fa0/13         Root FWD 19   128.15 P2p
120 Fa0/14         Altn BLK 19   128.16 P2p

```

```

121
122
123
124 VLAN0041
125     Spanning tree enabled protocol ieee
126     Root ID Priority 32809
127         Address 001a.2fa8.ea80
128         Cost 50
129         Port 15 (FastEthernet0/13)
130         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

```

```

131
132     Bridge ID Priority 32809 (priority 32768 sys-id-ext 41)
133         Address 24b6.5725.d200
134         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
135         Aging Time 300 sec

```

```

136
137 Interface      Role Sts Cost Prio.Nbr Type
138 -----
139 Fa0/9          Desg FWD 19   128.11 P2p
140 Fa0/10         Desg FWD 19   128.12 P2p
141 Fa0/11         Altn BLK 19   128.13 P2p
142 Fa0/12         Altn BLK 19   128.14 P2p
143 Fa0/13         Root FWD 19   128.15 P2p
144 Fa0/14         Altn BLK 19   128.16 P2p

```

```

145
146
147
148 VLAN0099
149     Spanning tree enabled protocol ieee
150     Root ID Priority 32867
151         Address 001a.2fa8.ea80
152         Cost 50
153         Port 15 (FastEthernet0/13)
154         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

```

```

155
156     Bridge ID Priority 32867 (priority 32768 sys-id-ext 99)
157         Address 24b6.5725.d200
158         Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
159         Aging Time 300 sec

```

```

160
161 Interface      Role Sts Cost Prio.Nbr Type
162 -----
163 Fa0/9          Desg FWD 19   128.11 P2p
164 Fa0/10         Desg FWD 19   128.12 P2p
165 Fa0/11         Altn BLK 19   128.13 P2p
166 Fa0/12         Altn BLK 19   128.14 P2p
167 Fa0/13         Root FWD 19   128.15 P2p

```

168 Fa0/14 Altn BLK 19 128.16 P2p

### A.15.8. VLAN

```

1 HQ_DS2>show vlan
2
3 VLAN Name                Status Ports
4 -----
5 1  default                active Fa0/15, Fa0/16, Fa0/17, Fa0/18
6                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
7                                Fa0/23, Fa0/24, Gi0/1, Gi0/2
8 10 VLAN0010              active
9 20 VLAN0020              active
10 30 VLAN0030              active
11 40 VLAN0040              active
12 41 VLAN0041              active
13 99 Management            active
14 1002 fddi-default        act/unsup
15 1003 trcrf-default        act/unsup
16 1004 fddinet-default      act/unsup
17 1005 trbrf-default        act/unsup
18
19 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
20 -----
21 1  enet 100001 1500 -   -   -   -   -   0   0
22 10 enet 100010 1500 -   -   -   -   -   0   0
23 20 enet 100020 1500 -   -   -   -   -   0   0
24 30 enet 100030 1500 -   -   -   -   -   0   0
25
26 VLAN Type SAID    MTU  Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
27 -----
28 40 enet 100040 1500 -   -   -   -   -   0   0
29 41 enet 100041 1500 -   -   -   -   -   0   0
30 99 enet 100099 1500 -   -   -   -   -   0   0
31 1002 fddi 101002 1500 -   -   -   -   -   0   0
32 1003 trcrf 101003 4472 1005 3276 -   -   srb   0   0
33 1004 fdnet 101004 1500 -   -   -   ieee -   0   0
34 1005 trbrf 101005 4472 -   -   15   ibm -   0   0
35
36
37 VLAN AREHops STEHops Backup CRF
38 -----
39 1003 7      7      off
40
41 Remote SPAN VLANs
42 -----
43
44
45 Primary Secondary Type      Ports
46 -----

```

## A.16. HQ DS3

### A.16.1. Running Configuration

```

1 !
2 version 12.2
3

```

```

4 no service pad
5 service timestamps debug datetime msec
6 service timestamps log datetime msec
7 no service password-encryption
8 service sequence-numbers
9 !
10 hostname HQ_DS3
11 !
12 boot-start-marker
13 boot-end-marker
14 !
15 enable secret 5 $1$ys7e$..Pxw.v7DcwVg.V9ngdUH0
16 !
17 username ins password 0 ins@lab
18 !
19 !
20 no aaa new-model
21 system mtu routing 1500
22 ip routing
23 ip dhcp excluded-address 172.16.1.1
24 ip dhcp excluded-address 172.16.1.10 172.16.1.12
25 ip dhcp excluded-address 172.16.2.1
26 ip dhcp excluded-address 172.16.2.10 172.16.2.12
27 ip dhcp excluded-address 172.16.3.1
28 ip dhcp excluded-address 172.16.3.10 172.16.3.12
29 ip dhcp excluded-address 172.16.4.1
30 ip dhcp excluded-address 172.16.4.10 172.16.4.12
31 !
32 ip dhcp pool HR
33     network 172.16.1.0 255.255.255.0
34     default-router 172.16.1.1
35 !
36 ip dhcp pool Engineering
37     network 172.16.2.0 255.255.255.0
38     default-router 172.16.2.1
39 !
40 ip dhcp pool Production
41     network 172.16.3.0 255.255.255.0
42     default-router 172.16.3.1
43 !
44 ip dhcp pool Finance
45     network 172.16.4.0 255.255.255.0
46     default-router 172.16.4.1
47 !
48 !
49 !
50 !
51 crypto pki trustpoint TP-self-signed-802439168
52     enrollment selfsigned
53     subject-name cn=IOS-Self-Signed-Certificate-802439168
54     revocation-check none
55     rsa-keypair TP-self-signed-802439168
56 !
57 !
58 crypto pki certificate chain TP-self-signed-802439168
59     certificate self-signed 01
60         3082023D 308201A6 A0030201 02020101 300D0609 2A864886 F70D0101 04050030
61         30312E30 2C060355 04031325 494F532D 53656C66 2D536967 6E65642D 43657274
62         69666963 6174652D 38303234 33393136 38301E17 0D393330 33303130 34333931
63         305A170D 32303031 30313030 30303030 5A303031 2E302C06 03550403 1325494F
64         532D5365 6C662D53 69676E65 642D4365 72746966 69636174 652D3830 32343339
65         31363830 819F300D 06092A86 4886F70D 01010105 0003818D 00308189 02818100

```

```

66 9AA9B98F 41CCCEEB 5C4D40C1 79B15141 B62D29CC DF4C1A50 645C0DB0 12FE530C
67 B7A75864 117CD82B 55B196FC 7A5F0245 EF5C9DEF 107AA59A 19F235E7 B9E879B0
68 FFEC9A80 BB1C4716 46290B09 3215925B A19F9254 F8FE1C44 91E394BC 536F7626
69 30954CBD 01B12522 9AD8BDFB 9D4F1BB3 DDA34F1C 703C2F5C B0BD9E5E 01D9CD23
70 02030100 01A36730 65300F06 03551D13 0101FF04 05300301 01FF3012 0603551D
71 11040B30 09820748 515F4453 332E301F 0603551D 23041830 168014E0 7465A734
72 D841B9DA 9031A687 77121B5B D3CB4D30 1D060355 1D0E0416 0414E074 65A734D8
73 41B9DA90 31A68777 121B5BD3 CB4D300D 06092A86 4886F70D 01010405 00038181
74 006E1C1B 5B43389D 40C1A70A DCE625B9 613DC29A D7E8FF96 CAA00071 3CFDBA11
75 2907ED48 2473DFE1 85F93637 ED4E9468 2A7D70B8 4998FA1F 8B1F3FBA 42FC454B
76 A4311370 F188DD94 C70C2B12 D183FF82 CA18C95C 5362ADB2 EAB29A82 99CD4A9C
77 F21FFE7B 8581E8DE 53517CD2 B428193D BD936ADB 9DD0147B E02773BE E2577379 26
78 quit
79 !
80 !
81 !
82 spanning-tree mode pvst
83 spanning-tree extend system-id
84 !
85 vlan internal allocation policy ascending
86 !
87 !
88 !
89 !
90 interface Loopback100
91 ip address 172.16.25.7 255.255.255.0
92 ip ospf 1 area 0
93 !
94 interface Port-channel1
95 switchport trunk encapsulation dot1q
96 switchport mode trunk
97 !
98 interface Port-channel2
99 switchport trunk encapsulation dot1q
100 switchport mode trunk
101 !
102 interface Port-channel3
103 no switchport
104 ip address 172.16.254.22 255.255.255.252
105 ip ospf mtu-ignore
106 ip ospf 1 area 0
107 !
108 interface Port-channel4
109 no switchport
110 ip address 172.16.254.18 255.255.255.252
111 ip ospf mtu-ignore
112 ip ospf 1 area 0
113 !
114 interface Port-channel5
115 switchport trunk encapsulation dot1q
116 switchport mode trunk
117 !
118 interface Port-channel15
119 switchport trunk encapsulation dot1q
120 switchport mode trunk
121 !
122 interface FastEthernet0/1
123 no switchport
124 no ip address
125 channel-group 3 mode on
126 !
127 interface FastEthernet0/2

```

```
128 | no switchport
129 | no ip address
130 | channel-group 3 mode on
131 | !
132 | interface FastEthernet0/3
133 | no switchport
134 | no ip address
135 | channel-group 3 mode on
136 | !
137 | interface FastEthernet0/4
138 | no switchport
139 | no ip address
140 | channel-group 3 mode on
141 | !
142 | interface FastEthernet0/5
143 | no switchport
144 | no ip address
145 | channel-group 4 mode on
146 | !
147 | interface FastEthernet0/6
148 | no switchport
149 | no ip address
150 | channel-group 4 mode on
151 | !
152 | interface FastEthernet0/7
153 | no switchport
154 | no ip address
155 | channel-group 4 mode on
156 | !
157 | interface FastEthernet0/8
158 | no switchport
159 | no ip address
160 | channel-group 4 mode on
161 | !
162 | interface FastEthernet0/9
163 | !
164 | interface FastEthernet0/10
165 | !
166 | interface FastEthernet0/11
167 | !
168 | interface FastEthernet0/12
169 | !
170 | interface FastEthernet0/13
171 | switchport trunk encapsulation dot1q
172 | switchport mode trunk
173 | !
174 | interface FastEthernet0/14
175 | switchport trunk encapsulation dot1q
176 | switchport mode trunk
177 | !
178 | interface FastEthernet0/15
179 | switchport trunk encapsulation dot1q
180 | switchport mode trunk
181 | channel-group 1 mode on
182 | !
183 | interface FastEthernet0/16
184 | switchport trunk encapsulation dot1q
185 | switchport mode trunk
186 | channel-group 1 mode on
187 | !
188 | interface FastEthernet0/17
189 | switchport trunk encapsulation dot1q
```

```
190 | switchport mode trunk
191 | !
192 | interface FastEthernet0/18
193 | switchport trunk encapsulation dot1q
194 | switchport mode trunk
195 | !
196 | interface FastEthernet0/19
197 | switchport trunk encapsulation dot1q
198 | switchport mode trunk
199 | channel-group 2 mode on
200 | !
201 | interface FastEthernet0/20
202 | switchport trunk encapsulation dot1q
203 | switchport mode trunk
204 | channel-group 2 mode on
205 | !
206 | interface FastEthernet0/21
207 | switchport trunk encapsulation dot1q
208 | switchport mode trunk
209 | !
210 | interface FastEthernet0/22
211 | switchport trunk encapsulation dot1q
212 | switchport mode trunk
213 | channel-group 5 mode on
214 | !
215 | interface FastEthernet0/23
216 | switchport trunk encapsulation dot1q
217 | switchport mode trunk
218 | channel-group 5 mode on
219 | !
220 | interface FastEthernet0/24
221 | switchport trunk encapsulation dot1q
222 | switchport mode trunk
223 | !
224 | interface GigabitEthernet0/1
225 | !
226 | interface GigabitEthernet0/2
227 | !
228 | interface Vlan1
229 | no ip address
230 | shutdown
231 | !
232 | interface Vlan10
233 | ip address 172.16.1.1 255.255.255.0
234 | ip ospf 1 area 0
235 | !
236 | interface Vlan11
237 | ip address 172.16.2.1 255.255.255.0
238 | ip ospf 1 area 0
239 | !
240 | interface Vlan20
241 | no ip address
242 | !
243 | router ospf 1
244 | log-adjacency-changes
245 | !
246 | ip classless
247 | ip http server
248 | ip http secure-server
249 | !
250 | !
251 | ip sla enable reaction-alerts
```

```

252 !
253 snmp-server community public R0
254 snmp-server community private RW
255 !
256 !
257 line con 0
258 line vty 0 4
259 password cisco
260 login
261 line vty 5 15
262 password cisco
263 login
264 !
265 end

```

### A.16.2. IP Interfaces

Interface	IP-Address	OK?	Method	Status	Protocol
Vlan1	unassigned	YES	manual	administratively down	down
Vlan10	172.16.1.1	YES	manual	down	down
Vlan11	172.16.2.1	YES	manual	down	down
Vlan20	unassigned	YES	unset	down	down
FastEthernet0/1	unassigned	YES	manual	up	up
FastEthernet0/2	unassigned	YES	manual	up	up
FastEthernet0/3	unassigned	YES	manual	up	up
FastEthernet0/4	unassigned	YES	manual	up	up
FastEthernet0/5	unassigned	YES	manual	up	up
FastEthernet0/6	unassigned	YES	manual	up	up
FastEthernet0/7	unassigned	YES	manual	up	up
FastEthernet0/8	unassigned	YES	manual	up	up
FastEthernet0/9	unassigned	YES	unset	down	down
FastEthernet0/10	unassigned	YES	unset	down	down
FastEthernet0/11	unassigned	YES	unset	down	down
FastEthernet0/12	unassigned	YES	unset	down	down
FastEthernet0/13	unassigned	YES	unset	up	up
FastEthernet0/14	unassigned	YES	unset	up	up
FastEthernet0/15	unassigned	YES	unset	up	up
FastEthernet0/16	unassigned	YES	unset	up	up
FastEthernet0/17	unassigned	YES	unset	up	up
FastEthernet0/18	unassigned	YES	unset	up	up
FastEthernet0/19	unassigned	YES	unset	up	up
FastEthernet0/20	unassigned	YES	unset	up	up
FastEthernet0/21	unassigned	YES	unset	up	up
FastEthernet0/22	unassigned	YES	unset	up	up
FastEthernet0/23	unassigned	YES	unset	up	up
FastEthernet0/24	unassigned	YES	unset	up	up
GigabitEthernet0/1	unassigned	YES	unset	down	down
GigabitEthernet0/2	unassigned	YES	unset	down	down
Port-channel1	unassigned	YES	unset	up	up
Port-channel2	unassigned	YES	unset	up	up
Port-channel3	172.16.254.22	YES	manual	up	up
Port-channel4	172.16.254.18	YES	manual	up	up
Port-channel5	unassigned	YES	unset	up	up
Port-channel15	unassigned	YES	unset	down	down
Loopback100	172.16.25.7	YES	manual	up	up

### A.16.3. Interface Status



```

1 HQ_DS3>show interface status
2
3 Port      Name      Status    Vlan    Duplex  Speed  Type
4 Fa0/1     connected routed    a-full  a-100  10/100BaseTX
5 Fa0/2     connected routed    a-full  a-100  10/100BaseTX
6 Fa0/3     connected routed    a-full  a-100  10/100BaseTX
7 Fa0/4     connected routed    a-full  a-100  10/100BaseTX
8 Fa0/5     connected routed    a-full  a-100  10/100BaseTX
9 Fa0/6     connected routed    a-full  a-100  10/100BaseTX
10 Fa0/7     connected routed    a-full  a-100  10/100BaseTX
11 Fa0/8     connected routed    a-full  a-100  10/100BaseTX
12 Fa0/9     notconnect 1        auto    auto    10/100BaseTX
13 Fa0/10    notconnect 1        auto    auto    10/100BaseTX
14 Fa0/11    notconnect 1        auto    auto    10/100BaseTX
15 Fa0/12    notconnect 1        auto    auto    10/100BaseTX
16 Fa0/13    connected trunk    a-full  a-100  10/100BaseTX
17 Fa0/14    connected trunk    a-full  a-100  10/100BaseTX
18 Fa0/15    connected trunk    a-full  a-100  10/100BaseTX
19 Fa0/16    connected trunk    a-full  a-100  10/100BaseTX
20 Fa0/17    connected trunk    a-full  a-100  10/100BaseTX
21 Fa0/18    connected trunk    a-full  a-100  10/100BaseTX
22 Fa0/19    connected trunk    a-full  a-100  10/100BaseTX
23 Fa0/20    connected trunk    a-full  a-100  10/100BaseTX
24 Fa0/21    connected trunk    a-full  a-100  10/100BaseTX
25
26 Port      Name      Status    Vlan    Duplex  Speed  Type
27 Fa0/22    connected trunk    a-full  a-100  10/100BaseTX
28 Fa0/23    connected trunk    a-full  a-100  10/100BaseTX
29 Fa0/24    connected trunk    a-full  a-100  10/100BaseTX
30 Gi0/1     notconnect 1        auto    auto    Not Present
31 Gi0/2     notconnect 1        auto    auto    Not Present
32 Po1       connected trunk    a-full  a-100
33 Po2       connected trunk    a-full  a-100
34 Po3       connected routed    a-full  a-100
35 Po4       connected routed    a-full  a-100
36 Po5       connected trunk    a-full  a-100
37 Po15      notconnect unassigned auto    auto

```

#### A.16.4. Interface Trunk

```

1 HQ_DS3> show interface trunk
2
3 Port      Mode      Encapsulation Status  Native vlan
4 Fa0/13    on        802.1q    trunking 1
5 Fa0/14    on        802.1q    trunking 1
6 Fa0/17    on        802.1q    trunking 1
7 Fa0/18    on        802.1q    trunking 1
8 Fa0/21    on        802.1q    trunking 1
9 Fa0/24    on        802.1q    trunking 1
10 Po1       on        802.1q    trunking 1
11 Po2       on        802.1q    trunking 1
12 Po5       on        802.1q    trunking 1
13
14 Port      Vlans allowed on trunk
15 Fa0/13    1-4094
16 Fa0/14    1-4094
17 Fa0/17    1-4094
18 Fa0/18    1-4094
19 Fa0/21    1-4094

```

```

20 Fa0/24 1-4094
21 Po1 1-4094
22 Po2 1-4094
23 Po5 1-4094
24
25 Port Vlans allowed and active in management domain
26 Fa0/13 1,31
27 Fa0/14 1,31
28 Fa0/17 1,31
29 Fa0/18 1,31
30 Fa0/21 1,31
31 Fa0/24 1,31
32 Po1 1,31
33 Po2 1,31
34 Po5 1,31
35
36 Port Vlans in spanning tree forwarding state and not pruned
37 Fa0/13 1,31
38 Fa0/14 1,31
39 Fa0/17 1,31
40 Fa0/18 1,31
41 Fa0/21 1,31
42 Fa0/24 1,31
43 Po1 1,31
44 Po2 1,31
45 Po5 1,31

```

### A.16.5. Neighbors

```

1 Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
2                   S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone,
3                   D - Remote, C - CVTA, M - Two-port Mac Relay
4
5 Device ID      Local Intrfce Holdtme Capability Platform Port ID
6 HQ_AS11      Fas 0/22      132          S I WS-C2960- Fas 0/2
7 HQ_AS11      Fas 0/21      132          S I WS-C2960- Fas 0/1
8 HQ_AS10      Fas 0/20      142          S I WS-C3560V Fas 0/2
9 HQ_AS10      Fas 0/19      142          S I WS-C3560V Fas 0/1
10 HQ_AS12      Fas 0/24      159          S I WS-C2960- Fas 0/2
11 HQ_AS12      Fas 0/23      159          S I WS-C2960- Fas 0/1
12 HQ_CS4       Fas 0/6       172          R S I WS-C3560- Fas 0/14
13 HQ_CS4       Fas 0/7       172          R S I WS-C3560- Fas 0/15
14 HQ_CS4       Fas 0/8       172          R S I WS-C3560- Fas 0/16
15 HQ_CS4       Fas 0/5       172          R S I WS-C3560- Fas 0/13
16 HQ_AS7       Fas 0/14      145          S I WS-C2960- Fas 0/2
17 HQ_AS7       Fas 0/13      145          S I WS-C2960- Fas 0/1
18 HQ_CS3       Fas 0/1       155          R S I WS-C3560- Fas 0/13
19 HQ_CS3       Fas 0/4       155          R S I WS-C3560- Fas 0/16
20 HQ_CS3       Fas 0/3       155          R S I WS-C3560- Fas 0/15
21 HQ_CS3       Fas 0/2       155          R S I WS-C3560- Fas 0/14
22 HQ_AS8       Fas 0/16      166          S I WS-C2960- Fas 0/2
23 HQ_AS8       Fas 0/15      166          S I WS-C2960- Fas 0/1
24 HQ_AS9       Fas 0/18      150          S I WS-C3560V Fas 0/2
25 HQ_AS9       Fas 0/17      150          S I WS-C3560V Fas 0/1

```

### A.16.6. IP Route

```

1 HQ_DS3>show ip route

```

```

2 Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
3       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
4       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
5       E1 - OSPF external type 1, E2 - OSPF external type 2
6       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
7       ia - IS-IS inter area, * - candidate default, U - per-user static route
8       o - ODR, P - periodic downloaded static route
9
10 Gateway of last resort is not set
11
12     200.200.200.0/28 is subnetted, 1 subnets
13     O    200.200.200.0 [110/5] via 172.16.254.21, 3d06h, Port-channel3
14     172.16.0.0/16 is variably subnetted, 31 subnets, 4 masks
15     O    172.16.254.64/30 [110/4] via 172.16.254.21, 3d06h, Port-channel3
16     O    172.16.252.1/32 [110/5] via 172.16.254.21, 3d06h, Port-channel3
17     O    172.16.254.0/30 [110/3] via 172.16.254.21, 3d06h, Port-channel3
18     O    172.16.252.2/32 [110/69] via 172.16.254.21, 3d06h, Port-channel3
19     O    172.16.255.0/30 [110/1004] via 172.16.254.21, 3d06h, Port-channel3
20     O    172.16.252.3/32 [110/1004] via 172.16.254.21, 3d06h, Port-channel3
21     O    172.16.254.4/30 [110/2] via 172.16.254.21, 3d06h, Port-channel3
22     O    172.16.255.4/30 [110/1004] via 172.16.254.21, 3d06h, Port-channel3
23     O    172.16.254.8/30 [110/2] via 172.16.254.21, 3d06h, Port-channel3
24         [110/2] via 172.16.254.17, 3d06h, Port-channel4
25     O    172.16.255.8/30 [110/1004] via 172.16.254.21, 3d06h, Port-channel3
26     O    172.16.254.12/30 [110/11] via 172.16.254.17, 3d06h, Port-channel4
27     C    172.16.254.16/30 is directly connected, Port-channel4
28     C    172.16.254.20/30 is directly connected, Port-channel3
29     O    172.16.254.32/29 [110/6] via 172.16.254.21, 3d06h, Port-channel3
30     O    172.16.254.40/29 [110/3] via 172.16.254.21, 3d06h, Port-channel3
31     O    172.16.254.48/29 [110/4] via 172.16.254.21, 3d06h, Port-channel3
32     O    172.16.254.56/30 [110/4] via 172.16.254.21, 3d06h, Port-channel3
33     O    172.16.254.60/30 [110/5] via 172.16.254.21, 3d06h, Port-channel3
34     O    172.16.25.5/32 [110/5] via 172.16.254.21, 3d06h, Port-channel3
35     O    172.16.25.4/32 [110/2] via 172.16.254.17, 3d06h, Port-channel4
36     O    172.16.25.6/32 [110/4] via 172.16.254.21, 3d06h, Port-channel3
37     O    172.16.25.1/32 [110/3] via 172.16.254.21, 3d06h, Port-channel3
38     C    172.16.25.0/24 is directly connected, Loopback100
39     O    172.16.25.3/32 [110/2] via 172.16.254.21, 3d06h, Port-channel3
40     O    172.16.25.2/32 [110/4] via 172.16.254.21, 3d06h, Port-channel3
41     O    172.16.17.0/24 [110/5] via 172.16.254.21, 3d06h, Port-channel3
42     O    172.16.18.0/24 [110/4] via 172.16.254.21, 3d06h, Port-channel3
43     O    172.16.19.0/24 [110/4] via 172.16.254.21, 3d06h, Port-channel3
44     O    172.16.100.0/24 [110/70] via 172.16.254.21, 3d06h, Port-channel3
45     O    172.16.101.0/24 [110/71] via 172.16.254.21, 3d06h, Port-channel3
46     O    172.16.102.0/24 [110/1005] via 172.16.254.21, 3d06h, Port-channel3

```

### A.16.7. Spanning Tree

```

1 HQ_DS3> show spanning
2
3 VLAN0001
4   Spanning tree enabled protocol ieee
5   Root ID Priority 32769
6       Address 001a.2fd4.4000
7       This bridge is the root
8       Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
9
10  Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
11      Address 001a.2fd4.4000
12      Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

```

13	Aging Time 300 sec						
14							
15	Interface	Role	Sts	Cost	Prio.Nbr	Type	
16	-----						
17	Fa0/13	Desg	FWD	19	128.15	P2p	
18	Fa0/14	Desg	FWD	19	128.16	P2p	
19	Fa0/17	Desg	FWD	19	128.19	P2p	
20	Fa0/18	Desg	FWD	19	128.20	P2p	
21	Fa0/21	Desg	FWD	19	128.23	P2p	
22	Fa0/24	Desg	FWD	19	128.26	P2p	
23	Po1	Desg	FWD	12	128.56	P2p	
24	Po2	Desg	FWD	12	128.64	P2p	
25							
26	Interface	Role	Sts	Cost	Prio.Nbr	Type	
27	-----						
28							
29	Po5	Desg	FWD	12	128.88	P2p	
30							
31							
32	VLAN0031						
33	Spanning tree enabled protocol ieee						
34	Root ID Priority 32799						
35	Address 001a.2fd4.4000						
36	This bridge is the root						
37	Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec						
38							
39							
40	Bridge ID Priority 32799 (priority 32768 sys-id-ext 31)						
41	Address 001a.2fd4.4000						
42	Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec						
43	Aging Time 300 sec						
44							
45	Interface	Role	Sts	Cost	Prio.Nbr	Type	
46	-----						
47	Fa0/13	Desg	FWD	19	128.15	P2p	
48	Fa0/14	Desg	FWD	19	128.16	P2p	
49	Fa0/17	Desg	FWD	19	128.19	P2p	
50	Fa0/18	Desg	FWD	19	128.20	P2p	
51	Fa0/21	Desg	FWD	19	128.23	P2p	
52	Fa0/24	Desg	FWD	19	128.26	P2p	
53	Po1	Desg	FWD	12	128.56	P2p	
54	Po2	Desg	FWD	12	128.64	P2p	
55							
56	Interface	Role	Sts	Cost	Prio.Nbr	Type	
57	-----						
58							
59	Po5	Desg	FWD	12	128.88	P2p	

### A.16.8. VLAN

1	HQ_DS3> show vlan		
2			
3	VLAN Name	Status	Ports
4	-----		
5	1 default	active	Fa0/9, Fa0/10, Fa0/11, Fa0/12
6			Gi0/1, Gi0/2
7	31 VLAN0031	active	
8	1002 fddi-default	act/unsup	
9	1003 token-ring-default	act/unsup	
10	1004 fddinet-default	act/unsup	

11	1005	trnet- <b>default</b>						act/unsup		
12										
13	VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1 Trans2
14	-----									
15	1	enet	100001	1500	-	-	-	-	0	0
16	31	enet	100031	1500	-	-	-	-	0	0
17	1002	fddi	101002	1500	-	-	-	-	0	0
18	1003	tr	101003	1500	-	-	-	srb	0	0
19	1004	fdnet	101004	1500	-	-	-	ieee	-	0
20	1005	trnet	101005	1500	-	-	-	ibm	-	0
21										
22	Remote SPAN VLANs									
23	-----									
24										
25										
26	Primary	Secondary	Type					Ports		
27	-----									

## **B. Messungen**

### **B.1. Von X nach Y**