



Huawei Network Administrator

Group Name:
R3_DEPI3_ONL3_ISS5_S2 Huawei
Network Administrator

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Enterprise Network Design and Configuration Report

Project Overview

This project builds a multi-site enterprise design.

The topology uses:

- ISP router
- HQ router
- Firewall
- Core1 and Core2 switches
- Department VLANs
- OSPF routing
- Private link between HQ and Firewall
- Public link between ISP and HQ

Your goals:

- Route traffic between all networks
 - Secure inbound and outbound traffic
 - Test reachability end-to-end
 - Validate configuration using show commands
-

Network Topology Summary

Routers

ISP Router

- GE0/0/0 → HQ (public link)
- GE0/0/1 → Internet cloud

HQ Router

- GE0/0/1 → ISP
- GE0/0/0 → Firewall
- VLAN interfaces for departments if needed

Firewall

- GE0/0/0 → HQ
- GE0/0/2 → CORE2
- Has zones, policies, and NAT

Switches

CORE1

- VLAN 10, 20
- Gateway 192.168.10.1, 192.168.20.1
- Uplink to HQ

CORE2

- VLAN 50, 60, 99, 101
- Gateway 192.168.50.1, .60.1, .99.2, .101
- Uplink to Firewall

HQ Router Re-Configuration

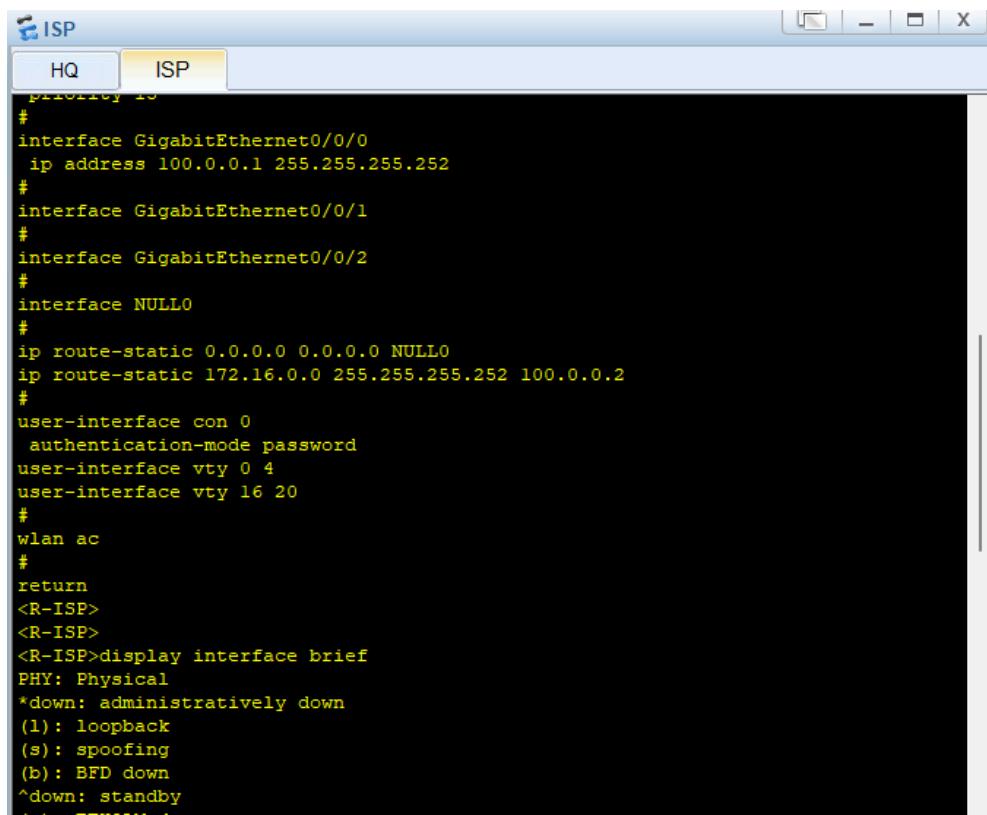
HQ

```
set cpu usage threshold 80 restore 75
#
aaa
authentication-scheme default
authorization-scheme default
accounting-scheme default
domain default
domain default_admin
local-user admin password cipher %%%K8m.Nt84DZ)e#<0`8bmE3Uw}%%%$%
local-user admin service-type http
#
firewall zone Local
priority 15
#
interface GigabitEthernet0/0/0
ip address 172.16.0.1 255.255.255.252
#
interface GigabitEthernet0/0/1
ip address 100.0.0.2 255.255.255.252
#
interface GigabitEthernet0/0/2
#
interface NULL0
#
ip route-static 0.0.0.0 0.0.0.0 100.0.0.1
ip route-static 192.168.0.0 255.255.0.0 172.16.0.2
#
user-interface con 0
authentication-mode password
user-interface vty 0 4
user-interface vty 16 20
```

HQ ISP

```
<R-HQ>
<R-HQ>display interface brief
PHY: Physical
*down: administratively down
(l): loopback
(s): spoofing
(b): BFD down
^down: standby
(e): ETHOAM down
(d): Dampening Suppressed
InUti/OutUti: input utility/output utility
Interface          PHY    Protocol InUti OutUti   inErrors  outErrors
GigabitEthernet0/0/0    up      up        0%    0%       0         0
GigabitEthernet0/0/1    up      up        0%    0%       0         0
GigabitEthernet0/0/2    down    down      0%    0%       0         0
NULL0                  up      up(s)     0%    0%       0         0
<R-HQ>
<R-HQ>
<R-HQ>display arp
IP ADDRESS      MAC ADDRESS      EXPIRE(M)  TYPE      INTERFACE  VPN-INSTANCE
VLAN/CEVLAN PVC
-----
172.16.0.1      00e0-fc52-6e62      I -        GEO/0/0
100.0.0.2      00e0-fc52-6e63      I -        GEO/0/1
-----
Total:2      Dynamic:0      Static:0      Interface:2
<R-HQ>
```

ISP Router



The screenshot shows a terminal window titled "ISP". The tab bar has two tabs: "HQ" and "ISP", with "ISP" being the active tab. The window contains the following configuration and interface status:

```
# priority 15
#
interface GigabitEthernet0/0/0
 ip address 100.0.0.1 255.255.255.252
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
#
interface NULL0
#
ip route-static 0.0.0.0 0.0.0.0 NULL0
ip route-static 172.16.0.0 255.255.255.252 100.0.0.2
#
user-interface con 0
 authentication-mode password
user-interface vty 0 4
user-interface vty 16 20
#
wlan ac
#
return
<R-ISP>
<R-ISP>
<R-ISP>display interface brief
PHY: Physical
*down: administratively down
(1): loopback
(s): spoofing
(b): BFD down
^down: standby
```

```
ISP
HQ ISP
Interface          PHY  Protocol InUti OutUti   inErrors  outErrors
GigabitEthernet0/0/0    up    up      0%   0%       0        0
GigabitEthernet0/0/1    down   down    0%   0%       0        0
GigabitEthernet0/0/2    down   down    0%   0%       0        0
NULL0                  up    up(s)  0%   0%       0        0
<R-ISP>
<R-ISP>display ip interface brief
*down: administratively down
^down: standby
(l): loopback
(s): spoofing
The number of interface that is UP in Physical is 2
The number of interface that is DOWN in Physical is 2
The number of interface that is UP in Protocol is 2
The number of interface that is DOWN in Protocol is 2

Interface          IP Address/Mask    Physical  Protocol
GigabitEthernet0/0/0 100.0.0.1/30     up        up
GigabitEthernet0/0/1 unassigned        down      down
GigabitEthernet0/0/2 unassigned        down      down
NULL0              unassigned        up        up(s)
<R-ISP>
<R-ISP>display arp
IP ADDRESS      MAC ADDRESS      EXPIRE(M) TYPE      INTERFACE  VPN-INSTANCE
VLAN/CEVLAN PVC
-----
100.0.0.1        00e0-fc91-2179      I -        GE0/0/0
-----
Total:1          Dynamic:0          Static:0    Interface:1
<R-ISP>
<R-ISP>
```

HQ Firewall (Huawei USG / FW-HQ)

FW2

HQ ISP FW2

```
Om CONSOLE
<FW-HQ>HQ Firewall (Huawei USG / FW-HQ)
^
Error: Wrong parameter found at '^' position.
<FW-HQ>clear
^
Error: Wrong parameter found at '^' position.
<FW-HQ>display current-configuration
00:37:48 2025/12/01
#
stp region-configuration
region-name 40aac15c00a
active region-configuration
#
acl number 2001
rule 5 permit source 192.168.0.0 0.0.255.255
#
acl number 3000
rule 5 permit ip source 172.16.2.2 0 destination 172.16.2.1 0
rule 10 permit ip source 172.16.2.1 0 destination 172.16.2.2 0
#
interface GigabitEthernet0/0/0
alias GEO/MGMT
ip address 172.16.0.2 255.255.255.252
#
interface GigabitEthernet0/0/1
ip address 172.16.1.1 255.255.255.252
#
interface GigabitEthernet0/0/2
ip address 172.16.2.1 255.255.255.252
#
```

FW2

HQ ISP FW2

```
Error: Wrong parameter found at '^' position.
[FW-HQ]display interface
00:38:40 2025/12/01
GigabitEthernet0/0/0 current state : UP
Line protocol current state : UP
GigabitEthernet0/0/0 current firewall zone : trust
Description : Huawei, SRG Series, GigabitEthernet0/0/0 Interface, Route Port
The Maximum Transmit Unit is 1500 bytes, Hold timer is 10(sec)
Internet Address is 172.16.0.2/30
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 0000-00da-a200
QoS max-bandwidth : 1000000 Kbps
Output queue : (Urgent queue : Size/Length/Discards) 0/50/0
Output queue : (Frag queue : Size/Length/Discards) 0/1000/0
Output queue : (Protocol queue : Size/Length/Discards) 0/1000/0
Output queue : (FIFO queue : Size/Length/Discards) 0/256/0

GigabitEthernet0/0/1 current state : UP
Line protocol current state : UP
GigabitEthernet0/0/1 current firewall zone : trust
Description : Huawei, SRG Series, GigabitEthernet0/0/1 Interface, Route Port
The Maximum Transmit Unit is 1500 bytes, Hold timer is 10(sec)
Internet Address is 172.16.1.1/30
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 0000-00da-a201
QoS max-bandwidth : 1000000 Kbps
Output queue : (Urgent queue : Size/Length/Discards) 0/50/0
Output queue : (Frag queue : Size/Length/Discards) 0/1000/0
Output queue : (Protocol queue : Size/Length/Discards) 0/1000/0
Output queue : (FIFO queue : Size/Length/Discards) 0/256/0

---- More ----
```

CORE1 / CORE2 Switches

Core 1:

```
CORE 1
HQ ISP FW2 CORE 1
20 common TG:GE0/0/2(U) GE0/0/3(U)
30 common TG:GE0/0/2(U) GE0/0/3(U)
40 common TG:GE0/0/2(U) GE0/0/3(U)
50 common TG:GE0/0/2(U) GE0/0/3(U)
60 common TG:GE0/0/2(U) GE0/0/3(U)
99 common TG:GE0/0/2(U) GE0/0/3(U)
100 common UT:GE0/0/1(U)
TG:GE0/0/2(U) GE0/0/3(U)

VID Status Property MAC-LRN Statistics Description
-----
1 enable default enable disable VLAN 0001
10 enable default enable disable VLAN 0010
20 enable default enable disable VLAN 0020
30 enable default enable disable VLAN 0030
40 enable default enable disable VLAN 0040
50 enable default enable disable VLAN 0050
60 enable default enable disable VLAN 0060
99 enable default enable disable VLAN 0099
100 enable default enable disable VLAN 0100
<CORE1>

<CORE1>display stp brief
MSTID Port Role STP State Protection
0 GigabitEthernet0/0/1 DESI FORWARDING NONE
0 GigabitEthernet0/0/2 DESI FORWARDING NONE
0 GigabitEthernet0/0/3 ROOT FORWARDING NONE
<CORE1>
```

```
<CORE1>display ospf routing

    OSPF Process 1 with Router ID 192.168.10.1
        Routing Tables

    Routing for Network
    Destination      Cost  Type      NextHop      AdvRouter      Area
    172.16.1.0/30    1     Transit   172.16.1.2   192.168.10.1  0.0.0.0
    192.168.10.0/24  1     Stub      192.168.10.1  192.168.10.1  0.0.0.0
    192.168.20.0/24  1     Stub      192.168.20.1  192.168.10.1  0.0.0.0
    192.168.30.0/24  1     Stub      192.168.30.1  192.168.10.1  0.0.0.0
    192.168.40.0/24  1     Stub      192.168.40.1  192.168.10.1  0.0.0.0
    192.168.99.0/24  1     Stub      192.168.99.1  192.168.10.1  0.0.0.0
    172.16.0.0/30    2     Stub      172.16.1.1   172.16.2.1   0.0.0.0
    172.16.2.0/30    2     Stub      172.16.1.1   172.16.2.1   0.0.0.0

    Total Nets: 8
    Intra Area: 8  Inter Area: 0  ASE: 0  NSSA: 0
```

Core 2:

CORE 2

HQ	ISP	FW2	CORE 1	CORE 2
#: ProtocolTransparent-vlan; *: Management-vlan;				

VID	Type	Ports		

1	common	UT:GE0/0/2(U) GE0/0/6(D) GE0/0/10(D) GE0/0/14(D) GE0/0/18(D) GE0/0/22(D)	GE0/0/3(U) GE0/0/7(D) GE0/0/11(D) GE0/0/15(D) GE0/0/19(D) GE0/0/23(D)	GE0/0/4(D) GE0/0/8(D) GE0/0/12(D) GE0/0/16(D) GE0/0/20(D) GE0/0/24(D)
50	common	TG:GE0/0/3(U)		
60	common	TG:GE0/0/2(U)		
99	common	TG:GE0/0/2(U)	GE0/0/3(U)	
101	common	UT:GE0/0/1(U)		
VID Status Property MAC-LRN Statistics Description				

1	enable	default	enable	disable VLAN 0001
50	enable	default	enable	disable VLAN 0050
60	enable	default	enable	disable VLAN 0060
99	enable	default	enable	disable VLAN 0099
101	enable	default	enable	disable VLAN 0101

<CORE2>

MSTID	Port	Role	STP State	Protection
0	GigabitEthernet0/0/1	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/2	DESI	FORWARDING	NONE
0	GigabitEthernet0/0/3	DESI	FORWARDING	NONE

<CORE2>

```

<CORE2>display ospf routing

    OSPF Process 1 with Router ID 192.168.50.1
        Routing Tables

    Routing for Network
    Destination      Cost   Type      NextHop      AdvRouter      Area
    172.16.2.0/30    1      Stub      172.16.2.2    192.168.50.1  0.0.0.0
    192.168.50.0/24  1      Stub      192.168.50.1   192.168.50.1  0.0.0.0
    192.168.60.0/24  1      Stub      192.168.60.1   192.168.50.1  0.0.0.0
    192.168.99.0/24  1      Stub      192.168.99.2   192.168.50.1  0.0.0.0

    Total Nets: 4
    Intra Area: 4  Inter Area: 0  ASE: 0  NSSA: 0

```

Access Switches

```

ACC1
HQ ISP FW2 CORE 1 CORE 2 ACC1

domain default
domain default_admin
local-user admin password simple admin
local-user admin service-type http
#
interface Vlanif1
#
interface Vlanif99
    ip address 192.168.99.11 255.255.255.0
#
interface MEth0/0/1
#
interface GigabitEthernet0/0/1
    description TO-Dist1
    port link-type trunk
    port trunk allow-pass vlan 10 99
#
interface GigabitEthernet0/0/2
    port link-type access
    port default vlan 10
#
interface GigabitEthernet0/0/3
    port link-type access
    port default vlan 10
#
interface GigabitEthernet0/0/4
    port link-type access
    port default vlan 10
#

```

ACC1

HQ ISP FW2 CORE 1 CORE 2 ACC1

```
<ACC1>display vlan
The total number of vlans is : 3

U: Up; D: Down; TG: Tagged; UT: Untagged;
MP: Vlan-mapping; ST: Vlan-stacking;
#: ProtocolTransparent-vlan; *: Management-vlan;

VID Type Ports
-----
1 common UT:GE0/0/1(U) GE0/0/6(D) GE0/0/7(D) GE0/0/8(D)
          GE0/0/9(D) GE0/0/10(D) GE0/0/11(D) GE0/0/12(D)
          GE0/0/13(D) GE0/0/14(D) GE0/0/15(D) GE0/0/16(D)
          GE0/0/17(D) GE0/0/18(D) GE0/0/19(D) GE0/0/20(D)
          GE0/0/21(D) GE0/0/22(D) GE0/0/23(D) GE0/0/24(D)

10 common UT:GE0/0/2(U) GE0/0/3 (U) GE0/0/4 (U) GE0/0/5 (U)
          TG:GE0/0/1(U)

99 common TG:GE0/0/1(U)

VID Status Property MAC-LRN Statistics Description
-----
1 enable default enable disable VLAN 0001
10 enable default enable disable VLAN 0010
99 enable default enable disable VLAN 0099
<ACC1>
```

```
<ACC1>display mac-address
MAC address table of slot 0:

MAC Address VLAN/ PEVLAN CEVLAN Port Type LSP/LSR-ID
          VSI/SI
          MAC-Tunnel

4clf-cc14-1213 99 - - GE0/0/1 dynamic 0/-
4clf-ccaa-15f9 10 - - GE0/0/1 dynamic 0/-
4clf-ccaa-15f9 99 - - GE0/0/1 dynamic 0/-
4clf-ccfb-7725 99 - - GE0/0/1 dynamic 0/-
4clf-cc7a-4f34 99 - - GE0/0/1 dynamic 0/-
4clf-cc2c-601f 99 - - GE0/0/1 dynamic 0/-
4clf-cc43-552b 99 - - GE0/0/1 dynamic 0/-

Total matching items on slot 0 displayed = 7
```

Ping tests:

From ISP Router:

```
<R-ISP>ping 100.0.0.2
PING 100.0.0.2: 56 data bytes, press CTRL_C to break
Reply from 100.0.0.2: bytes=56 Sequence=1 ttl=255 time=70 ms
Reply from 100.0.0.2: bytes=56 Sequence=2 ttl=255 time=10 ms
Reply from 100.0.0.2: bytes=56 Sequence=3 ttl=255 time=10 ms
Reply from 100.0.0.2: bytes=56 Sequence=4 ttl=255 time=20 ms
Reply from 100.0.0.2: bytes=56 Sequence=5 ttl=255 time=30 ms

--- 100.0.0.2 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 10/28/70 ms

<R-ISP>|
```

```
<R-ISP>[]ping 172.16.0.1
PING 172.16.0.1: 56 data bytes, press CTRL_C to break
Reply from 172.16.0.1: bytes=56 Sequence=1 ttl=255 time=20 ms
Reply from 172.16.0.1: bytes=56 Sequence=2 ttl=255 time=20 ms
Reply from 172.16.0.1: bytes=56 Sequence=3 ttl=255 time=10 ms
Reply from 172.16.0.1: bytes=56 Sequence=4 ttl=255 time=20 ms
Reply from 172.16.0.1: bytes=56 Sequence=5 ttl=255 time=20 ms

--- 172.16.0.1 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 10/18/20 ms
```

From HQ Router:

```
<R-HQ>ping 100.0.0.1
PING 100.0.0.1: 56 data bytes, press CTRL_C to break
Reply from 100.0.0.1: bytes=56 Sequence=1 ttl=255 time=20 ms
Reply from 100.0.0.1: bytes=56 Sequence=2 ttl=255 time=20 ms
Reply from 100.0.0.1: bytes=56 Sequence=3 ttl=255 time=30 ms
Reply from 100.0.0.1: bytes=56 Sequence=4 ttl=255 time=20 ms
Reply from 100.0.0.1: bytes=56 Sequence=5 ttl=255 time=20 ms

--- 100.0.0.1 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 20/22/30 ms
```

```
<R-HQ>ping 172.16.0.2
PING 172.16.0.2: 56 data bytes, press CTRL_C to break
  Reply from 172.16.0.2: bytes=56 Sequence=1 ttl=255 time=30 ms
  Reply from 172.16.0.2: bytes=56 Sequence=2 ttl=255 time=290 ms
  Reply from 172.16.0.2: bytes=56 Sequence=3 ttl=255 time=50 ms
  Reply from 172.16.0.2: bytes=56 Sequence=4 ttl=255 time=300 ms
  Reply from 172.16.0.2: bytes=56 Sequence=5 ttl=255 time=20 ms

--- 172.16.0.2 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 20/138/300 ms
```

From Firewall:

```
[FW-HQ]ping 172.16.0.1
00:46:21 2025/12/01
PING 172.16.0.1: 56 data bytes, press CTRL_C to break
  Reply from 172.16.0.1: bytes=56 Sequence=1 ttl=255 time=60 ms
  Reply from 172.16.0.1: bytes=56 Sequence=2 ttl=255 time=80 ms
  Reply from 172.16.0.1: bytes=56 Sequence=3 ttl=255 time=160 ms
  Reply from 172.16.0.1: bytes=56 Sequence=4 ttl=255 time=110 ms
  Reply from 172.16.0.1: bytes=56 Sequence=5 ttl=255 time=80 ms

--- 172.16.0.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 60/98/160 ms
```

```
[FW-HQ]ping 172.16.1.2
00:46:35 2025/12/01
PING 172.16.1.2: 56 data bytes, press CTRL_C to break
  Reply from 172.16.1.2: bytes=56 Sequence=1 ttl=255 time=120 ms
  Reply from 172.16.1.2: bytes=56 Sequence=2 ttl=255 time=100 ms
  Reply from 172.16.1.2: bytes=56 Sequence=3 ttl=255 time=80 ms
  Reply from 172.16.1.2: bytes=56 Sequence=4 ttl=255 time=70 ms
  Reply from 172.16.1.2: bytes=56 Sequence=5 ttl=255 time=30 ms

--- 172.16.1.2 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 30/80/120 ms
```

From Cores:

```
<CORE1>ping 192.168.10.1
PING 192.168.10.1: 56 data bytes, press CTRL_C to break
Reply from 192.168.10.1: bytes=56 Sequence=1 ttl=255 time=40 ms
Reply from 192.168.10.1: bytes=56 Sequence=2 ttl=255 time=10 ms
Reply from 192.168.10.1: bytes=56 Sequence=3 ttl=255 time=30 ms
Reply from 192.168.10.1: bytes=56 Sequence=4 ttl=255 time=1 ms
Reply from 192.168.10.1: bytes=56 Sequence=5 ttl=255 time=30 ms

--- 192.168.10.1 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 1/22/40 ms

<CORE1>
```

Devices:

```
PC>ping 192.168.10.12
Ping 192.168.10.12: 32 data bytes, Press Ctrl_C to break
From 192.168.10.12: bytes=32 seq=1 ttl=128 time=47 ms
From 192.168.10.12: bytes=32 seq=2 ttl=128 time=31 ms
From 192.168.10.12: bytes=32 seq=3 ttl=128 time=47 ms
From 192.168.10.12: bytes=32 seq=4 ttl=128 time=47 ms
From 192.168.10.12: bytes=32 seq=5 ttl=128 time=31 ms

--- 192.168.10.12 ping statistics ---
5 packet(s) transmitted
5 packet(s) received
0.00% packet loss
round-trip min/avg/max = 31/40/47 ms
```

