



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

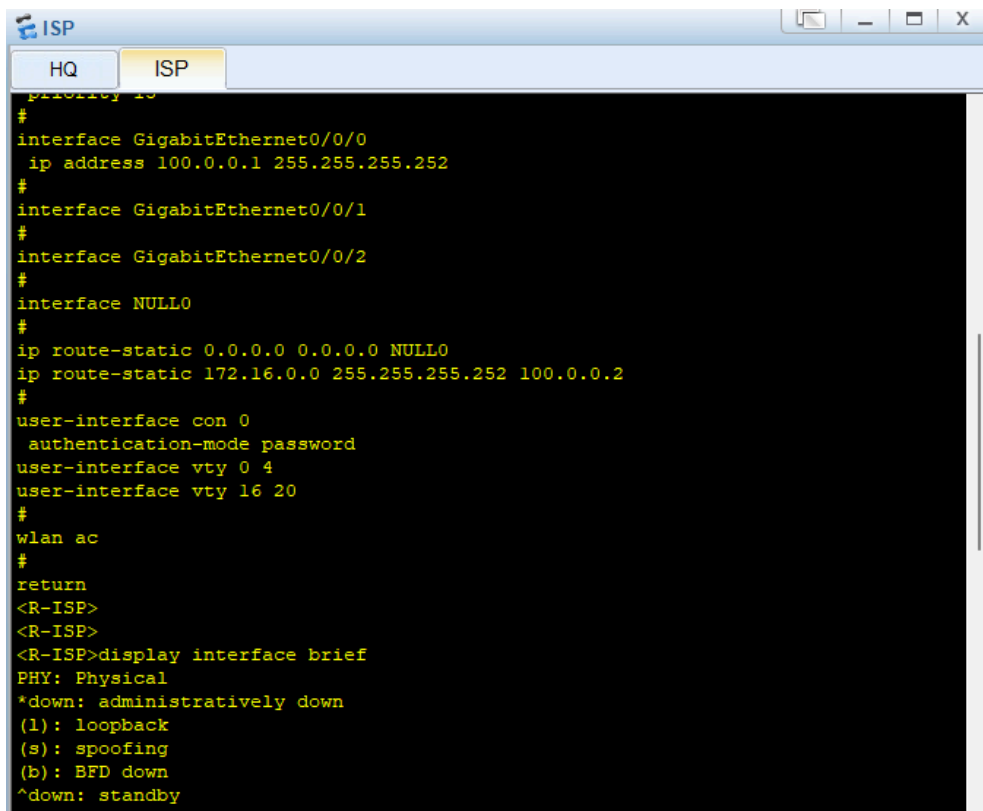
- VLAN 50, 60, 99, 101
- Gateway 192.168.50.1, .60.1, .99.2, .101
- Uplink to Firewall

HQ Router Re-Configuration

```
HQ
#
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
                    MAC ADDRESS          TYPE          VLAN/CEVLAN  PVC
-----
172.16.0.1           00e0-fc52-6e62        I -         GE0/0/0
100.0.0.2            00e0-fc52-6e63        I -         GE0/0/1
-----
Total:2              Dynamic:0              Static:0      Interface:2
<R-HQ>
```

ISP Router



The screenshot shows a network configuration window titled "ISP" with two tabs: "HQ" and "ISP". The "ISP" tab is active, displaying a configuration script for a router. The script includes interface definitions for GigabitEthernet0/0/0, GigabitEthernet0/0/1, GigabitEthernet0/0/2, and NULL0. It also sets static routes, user interfaces for console and vty, and WLAN AC settings. The configuration is followed by a return statement and a display command to show interface details.

```
ISP
HQ  ISP
#
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
(l): loopback
(s): spoofing
(b): BFD down
^down: standby
```

```
ISP
HQ  ISP
Interface          PHY  Protocol InUtl OutUtl  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
FW2
<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 40aaccl5c00a
 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 GE0/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
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)    GE0/0/3 (U)    GE0/0/4 (D)    GE0/0/5 (D)
                        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)

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>
```

```
<CORE2>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  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
#
interface GigabitEthernet0/0/5

```

```

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
-----
4c1f-cc14-1213 99      -      -      GE0/0/1  dynamic  0/-
4c1f-ccaa-15f9 10      -      -      GE0/0/1  dynamic  0/-
4c1f-ccaa-15f9 99      -      -      GE0/0/1  dynamic  0/-
4c1f-ccfb-7725 99      -      -      GE0/0/1  dynamic  0/-
4c1f-cc7a-4f34 99      -      -      GE0/0/1  dynamic  0/-
4c1f-cc2c-601f 99      -      -      GE0/0/1  dynamic  0/-
4c1f-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
```

