

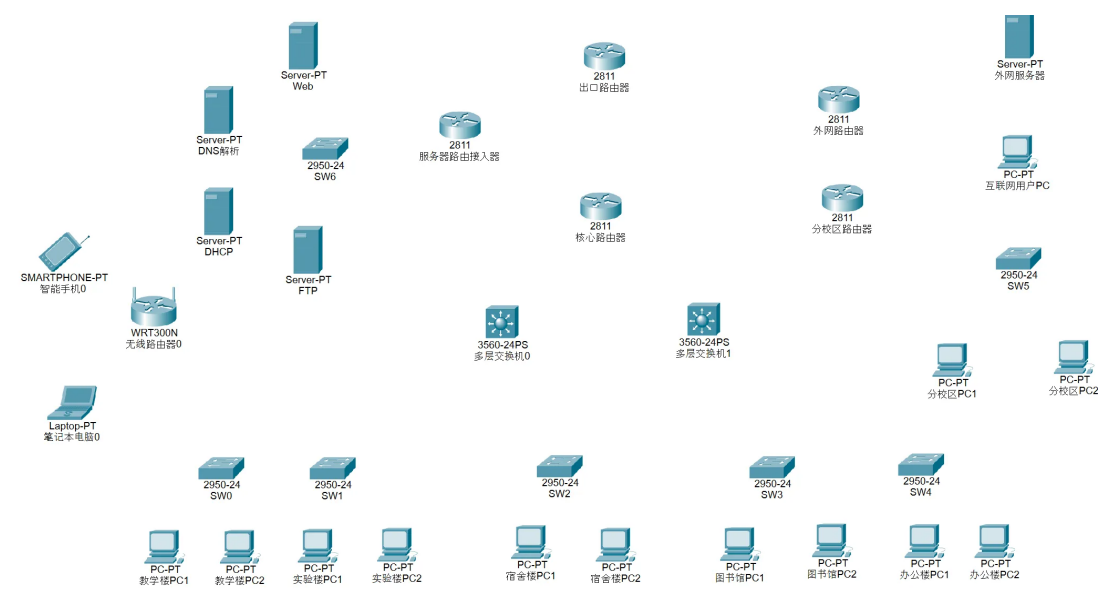
思科校园网搭建

校园拓扑图

配置

- 服务器接入路由器（192.168.8.0/24 内网服务器区
- 出口路由器（连接外网）
- 核心路由器
- 分校区接入路由器
- 核心交换机1（带 HSRP）
- 核心交换机2（带 HSRP）
- 外网路由器
- i层交换机（i从1到5）
- 结果展示

校园拓扑图



连线：

核心路由器加

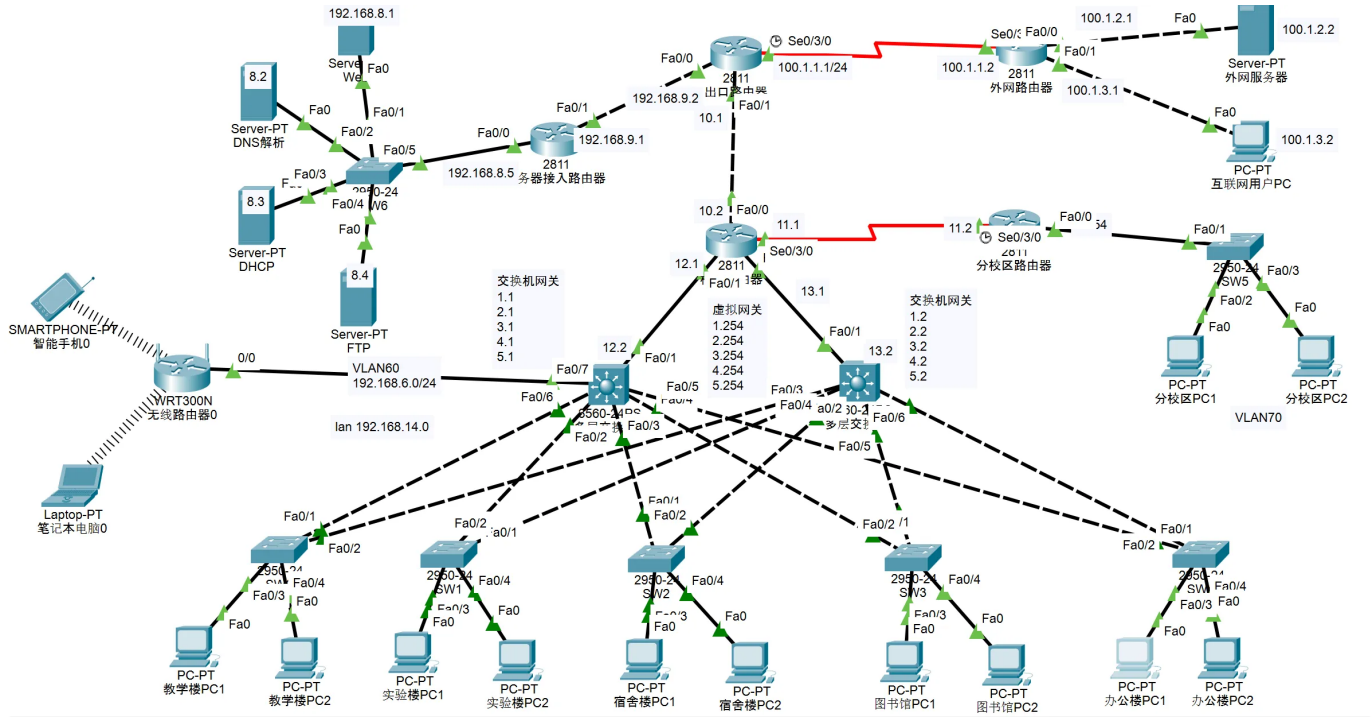
物理配置CLI属性

模块
NM-1E
NM-1E2W
NM-1FE-FX
NM-1FE-TX
NM-1FE2W
NM-2E2W
NM-2FE2W

物理设备视图

放大原始尺寸缩小

NM-2FE2W接口



配置

服务器接入路由器（192.168.8.0/24 内网服务器区

```
1  en
2  conf t
3  int f0/0
4    ip address 192.168.8.5 255.255.255.0
5    no shutdown
6  int f0/1
7    ip address 192.168.9.1 255.255.255.0
8    no shutdown
9    ip helper-address 192.168.8.3
10 exit
11 router rip
12   version 2
13   no auto-summary
14   network 192.168.8.0
15   network 192.168.9.0
16
```

连接服务器区（DNS/DHCP/FTP）与出口路由器，启动 RIP V2，DHCP 通过 helper 转发

出口路由器（连接外网）

```
1  en
2  conf t
3  int f0/0
4    ip address 192.168.9.2 255.255.255.0
5    no shutdown
6  int f0/1
7    ip address 192.168.10.1 255.255.255.0
8    no shutdown
9  int s0/3/0
10   ip address 100.1.1.1 255.255.255.0
11   clock rate 64000
12   no shutdown
13  exit
14
15  # NAT 配置
16  int f0/0
17    ip nat inside
18  int f0/1
19    ip nat inside
20  int s0/3/0
21    ip nat outside
22  exit
23
24  ip nat pool DZC 100.1.1.3 100.1.1.10 netmask 255.255.255.0
25  access-list 1 permit 192.168.0.0 0.0.255.255
26  ip nat inside source list 1 pool DZC overload
27
28  # 路由配置
29  router rip
30    version 2
31    no auto-summary
32    network 192.168.9.0
33    network 192.168.10.0
34    default-information originate
35  exit
36  ip route 0.0.0.0 0.0.0.0 100.1.1.2
37
```

实现 NAT 出口 (inside → outside) , RIP 发布内网路由, 默认路由指向外网路由器 100.1.1.2。

核心路由器

```
1  en
2  conf t
3  int f0/0
4    ip address 192.168.10.2 255.255.255.0
5    no shutdown
6  int f0/1
7    ip address 192.168.12.1 255.255.255.0
8    ip helper-address 192.168.8.3
9    no shutdown
10 int f1/0
11   ip address 192.168.13.1 255.255.255.0
12   ip helper-address 192.168.8.3
13   no shutdown
14 int s0/3/0
15   ip address 192.168.11.1 255.255.255.0
16   ip helper-address 192.168.8.3
17   no shutdown
18 exit
19
20 router rip
21   version 2
22   no auto-summary
23   network 192.168.10.0
24   network 192.168.11.0
25   network 192.168.12.0
26   network 192.168.13.0
27
```

核心层路由器，负责连接出口路由器、核心交换机、分校区，支持 DHCP 转发。

分校区接入路由器

```
1  en
2  conf t
3  int f0/0
4    ip address 192.168.7.254 255.255.255.0
5    no shutdown
6  int s0/3/0
7    ip address 192.168.11.2 255.255.255.0
8    clock rate 64000
9    no shutdown
10 exit
11
12 router rip
13   version 2
14   no auto-summary
15   network 192.168.7.0
16   network 192.168.11.0
17
```

分校区接入路由器，RIP 与核心路由互通。

核心交换机1（带 HSRP）

```
1  en
2  conf t
3  vlan 10
4  vlan 20
5  vlan 30
6  vlan 40
7  vlan 50
8  vlan 60
9  exit
10
11 int vlan 10
12   ip address 192.168.1.1 255.255.255.0
13   ip helper-address 192.168.8.3
14   standby 10 ip 192.168.1.254
15   standby 10 priority 101
16   standby 10 preempt
17   standby 10 track f0/1
18 int vlan 20
19   ip address 192.168.2.1 255.255.255.0
20   ip helper-address 192.168.8.3
21   standby 20 ip 192.168.2.254
22   standby 20 preempt
23   standby 20 track f0/1
24 int vlan 30
25   ip address 192.168.3.1 255.255.255.0
26   ip helper-address 192.168.8.3
27   standby 30 ip 192.168.3.254
28 int vlan 40
29   ip address 192.168.4.1 255.255.255.0
30   ip helper-address 192.168.8.3
31   standby 40 ip 192.168.4.254
32 int vlan 50
33   ip address 192.168.5.1 255.255.255.0
34   ip helper-address 192.168.8.3
35   standby 50 ip 192.168.5.254
36 int vlan 60
37   ip address 192.168.6.254 255.255.255.0
38   ip helper-address 192.168.8.3
39 exit
40
41 ip routing
42 int f0/1
43   no switchport
44   ip address 192.168.12.2 255.255.255.0
45   no shutdown
```

```
46 int f0/2
47     switchport trunk encapsulation dot1q
48     switchport mode trunk
49 int f0/3
50     switchport trunk encapsulation dot1q
51     switchport mode trunk
52 int f0/4
53     switchport trunk encapsulation dot1q
54     switchport mode trunk
55 int f0/5
56     switchport trunk encapsulation dot1q
57     switchport mode trunk
58 int f0/6
59     switchport trunk encapsulation dot1q
60     switchport mode trunk
61 int f0/7
62     switchport mode access
63     switchport access vlan 60
64 exit
65
66 router rip
67     version 2
68     no auto-summary
69     network 192.168.1.0
70     network 192.168.2.0
71     network 192.168.3.0
72     network 192.168.4.0
73     network 192.168.5.0
74     network 192.168.6.0
75     network 192.168.12.0
```

核心交换机 1，承担 VLAN 网关，支持 HSRP 虚拟网关冗余，RIP 通告 VLAN 网段

核心交换机2（带 HSRP）


```
1  en
2  conf t
3  vlan 10
4  vlan 20
5  vlan 30
6  vlan 40
7  vlan 50
8  exit
9
10 int vlan 10
11   ip address 192.168.1.2 255.255.255.0
12   ip helper-address 192.168.8.3
13   standby 10 ip 192.168.1.254
14 int vlan 20
15   ip address 192.168.2.2 255.255.255.0
16   ip helper-address 192.168.8.3
17   standby 20 ip 192.168.2.254
18 int vlan 30
19   ip address 192.168.3.2 255.255.255.0
20   ip helper-address 192.168.8.3
21   standby 30 ip 192.168.3.254
22   standby 30 priority 101
23   standby 30 preempt
24   standby 30 track f0/1
25 int vlan 40
26   ip address 192.168.4.2 255.255.255.0
27   ip helper-address 192.168.8.3
28   standby 40 ip 192.168.4.254
29   standby 40 priority 101
30   standby 40 preempt
31   standby 40 track f0/1
32 int vlan 50
33   ip address 192.168.5.2 255.255.255.0
34   ip helper-address 192.168.8.3
35   standby 50 ip 192.168.5.254
36   standby 50 priority 101
37   standby 50 preempt
38   standby 50 track f0/1
39 exit
40
41 ip routing
42 int f0/1
43   no switchport
44   ip address 192.168.13.2 255.255.255.0
45   no shutdown
```

```

46 int f0/2
47     switchport trunk encapsulation dot1q
48     switchport mode trunk
49 int f0/3
50     switchport trunk encapsulation dot1q
51     switchport mode trunk
52 int f0/4
53     switchport trunk encapsulation dot1q
54     switchport mode trunk
55 int f0/5
56     switchport trunk encapsulation dot1q
57     switchport mode trunk
58 int f0/6
59     switchport trunk encapsulation dot1q
60     switchport mode trunk
61 exit
62
63 router rip
64     version 2
65     no auto-summary
66     network 192.168.1.0
67     network 192.168.2.0
68     network 192.168.3.0
69     network 192.168.4.0
70     network 192.168.5.0
71     network 192.168.13.0

```

核心交换机 2，作为 HSRP 备份/主设备，负责 VLAN 冗余与路由

外网路由器

```

1  en
2  conf t
3  int f0/0
4      ip address 100.1.2.1 255.255.255.0
5      no shutdown
6  int f0/1
7      ip address 100.1.3.1 255.255.255.0
8      no shutdown
9  int s0/3/0
10     ip address 100.1.1.2 255.255.255.0
11     no shutdown

```

与出口路由器相连，负责外网服务器、互联网用户 PC

i层交换机（i从1到5）

```
▼ ArkTS |
1  en
2  conf t
3  vlan 20
4  vlan i0
5  exit
6  int f0/1
7  switch mode trunk
8  int f0/4
9  switch mode trunk
10 int f0/2
11 switch mode trunk
12 switch access vlan i0
13 int f0/3
14 switch access vlan i0
```

- VLAN 划分 + HSRP 冗余网关
- 核心交换机路由转发
- 出口 NAT（多用户共享公网 IP 段）
- RIP V2 动态路由互通
- DHCP 中继（helper-address）
- 分校区互联 + 外网访问

结果展示

```
C:\>ping 100.1.2.2

Pinging 100.1.2.2 with 32 bytes of
data:

Request timed out.
Request timed out.
Reply from 100.1.2.2: bytes=32
time=1ms TTL=124
Reply from 100.1.2.2: bytes=32
time=1ms TTL=124

Ping statistics for 100.1.2.2:
    Packets: Sent = 4, Received = 2,
Lost = 2 (50% loss),
Approximate round trip times in milli-
seconds:
```

ping 100.1.2.2成功