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ENTERPRISE NETWORK DESIGN AND IMPLEMENTATION USING HUAWEI DATACOM TECHNOLOGIES (NET FUSION)

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SPECIAL THANKS TO OUR SUPERVISIOR ENG.SAMAH EISSA

HUAWEI ENSP SIMULATION

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TEAM MEMBERS

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ZAINAB KHAMIS

05

TEAM MEMBER
AFNAN ASHRAF

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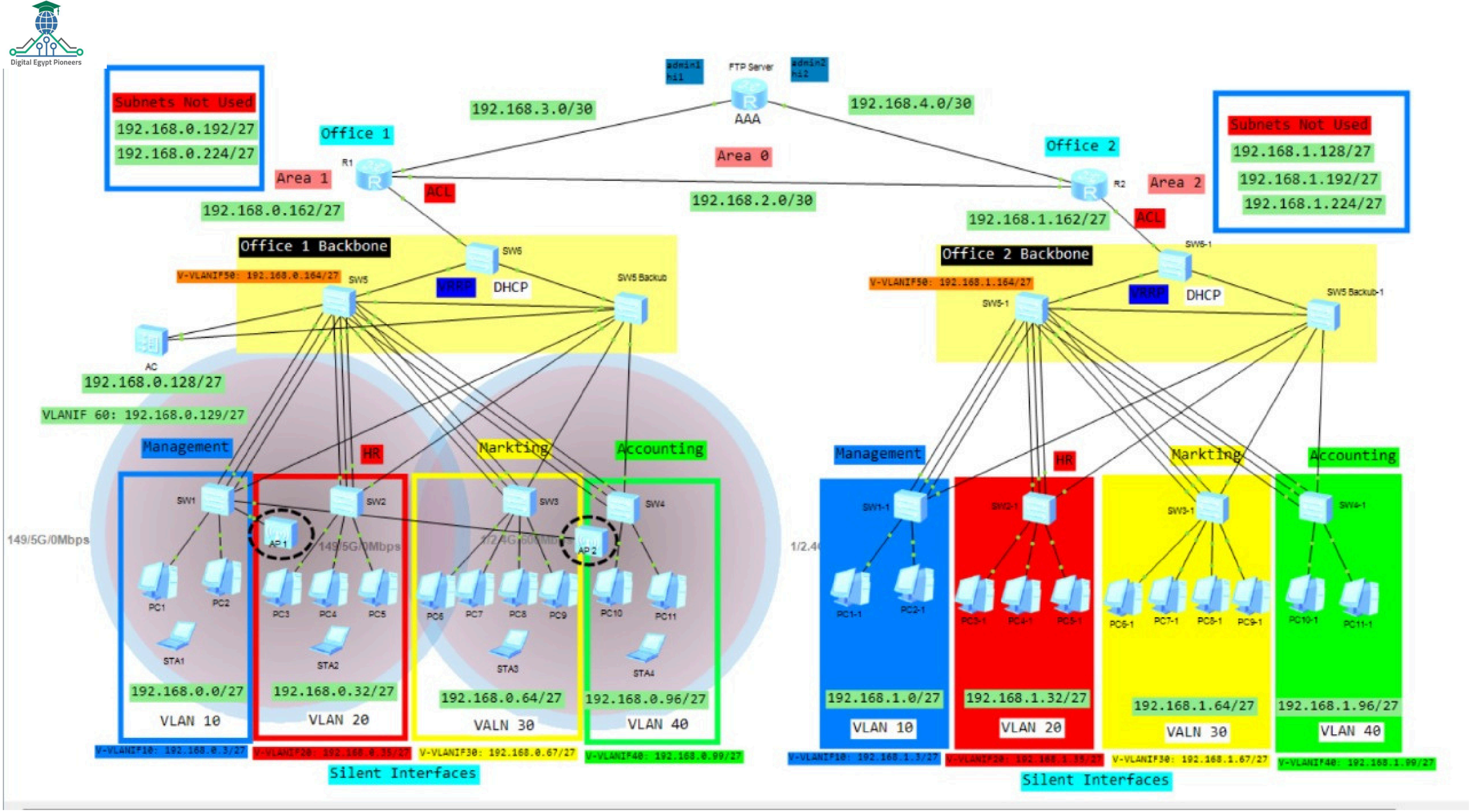
PROJECT OVERVIEW

Project Objective:

Design a large scale campus network for two different offices to enable secure and efficient communication.

Implemented Services:

- FTP Service
- VRRP
- STP
- WLAN
- AAA
- ACL
- OSPF
- DHCP



OUR TOPOLOGY

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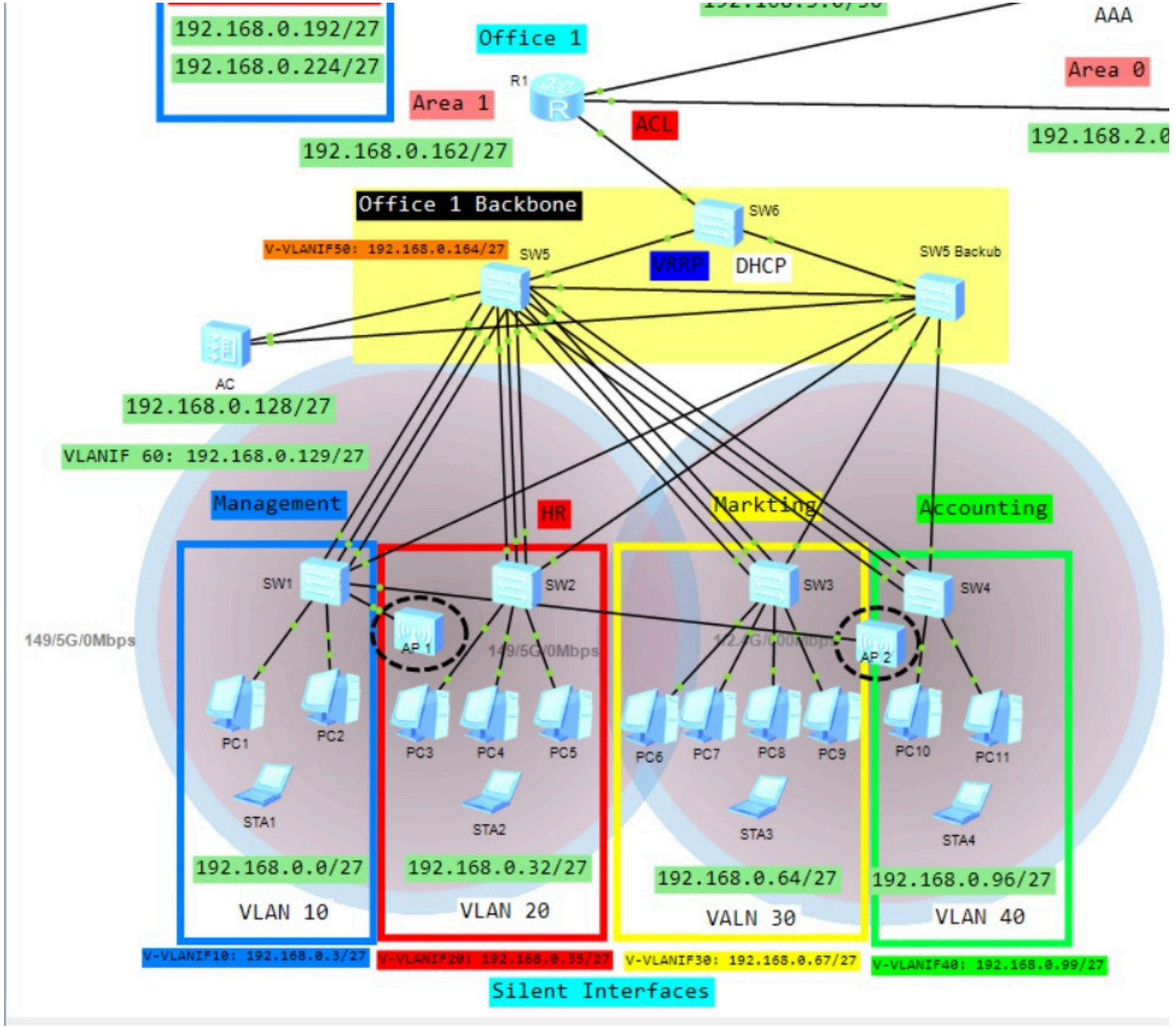

OFFICE 1

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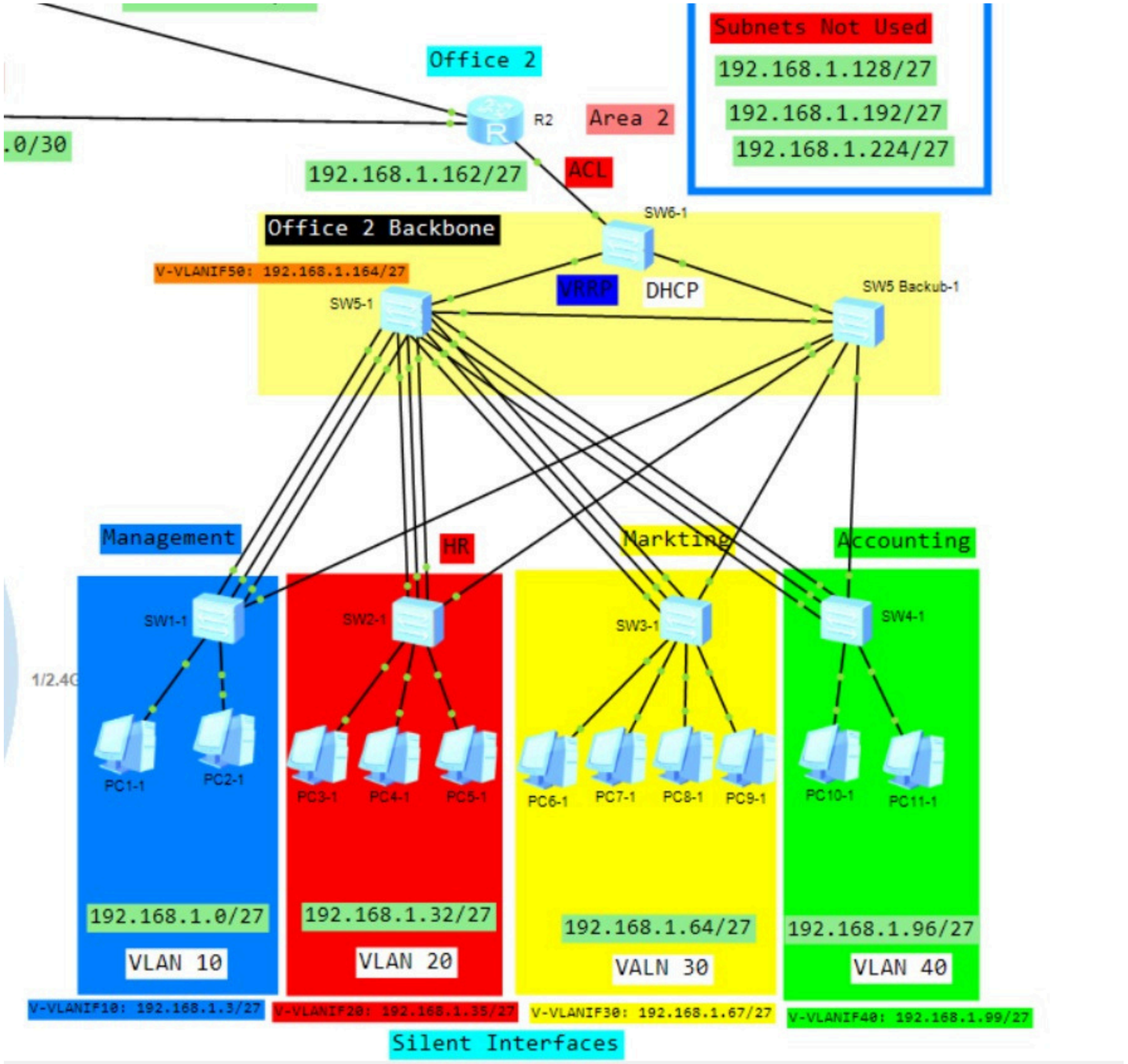

OFFICE 2

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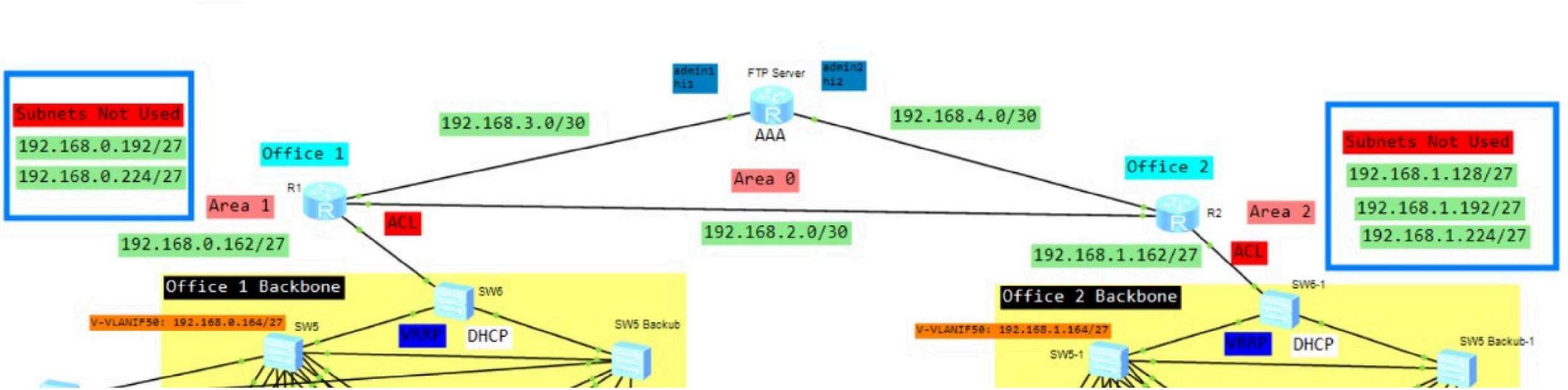

FTP SERVER AND OSPF ON ROUTERS AND SW5 AND ITS BACKUP

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ACL

ACL :

Managers in two Offices can only ping each other and can't ping to another sections HR, Accounting and Marketing.

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ACL

PC1

Basic Config | Command | MCPacket | UdpPacket | Console

```
PC>ping 192.168.1.62

Ping 192.168.1.62: 32 data bytes, Press Ctrl_C to break
Request timeout!
Request timeout!
Request timeout!
Request timeout!
Request timeout!

--- 192.168.1.62 ping statistics ---
  5 packet(s) transmitted
  0 packet(s) received
  100.00% packet loss

PC>ping 192.168.1.126

Ping 192.168.1.126: 32 data bytes, Press Ctrl_C to break
Request timeout!
Request timeout!
Request timeout!
Request timeout!
Request timeout!

--- 192.168.1.126 ping statistics ---
  5 packet(s) transmitted
  0 packet(s) received
```

Manager ping to another Manager

PC1

Basic Config | Command | MCPacket | UdpPacket | Console

```
PC>ping 192.168.1.30

Ping 192.168.1.30: 32 data bytes, Press Ctrl_C to break
From 192.168.1.30: bytes=32 seq=1 ttl=124 time=187 ms
From 192.168.1.30: bytes=32 seq=2 ttl=124 time=204 ms
From 192.168.1.30: bytes=32 seq=3 ttl=124 time=156 ms
From 192.168.1.30: bytes=32 seq=4 ttl=124 time=156 ms
From 192.168.1.30: bytes=32 seq=5 ttl=124 time=125 ms

--- 192.168.1.30 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 125/165/204 ms

PC>ping 192.168.1.92

Ping 192.168.1.92: 32 data bytes, Press Ctrl_C to break
Request timeout!
Request timeout!
Request timeout!
Request timeout!
Request timeout!

--- 192.168.1.92 ping statistics ---
  5 packet(s) transmitted
```

Ping to HR or Marketing or Accounting

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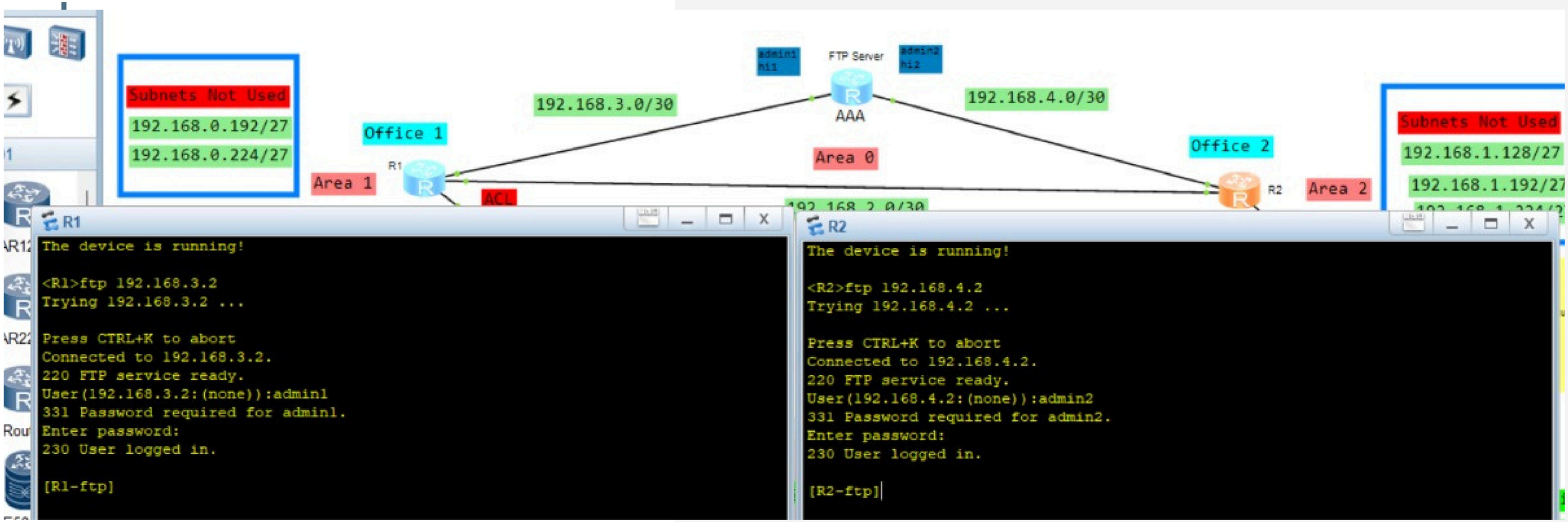
AAA AND FTP SERVER



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VRRP SETUP

Goal: High Availability

- Core Switch + Backup Switch
- 10 seconds delay before failover
- Automatic takeover on failure

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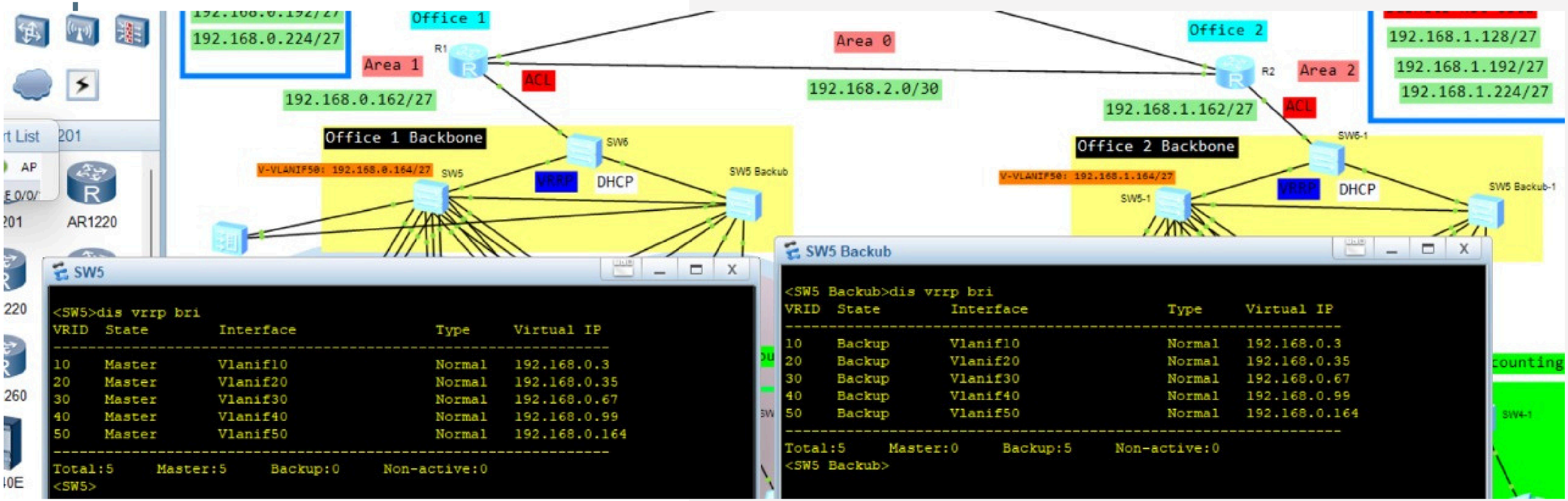
VRRP WHEN SW5 IS ON



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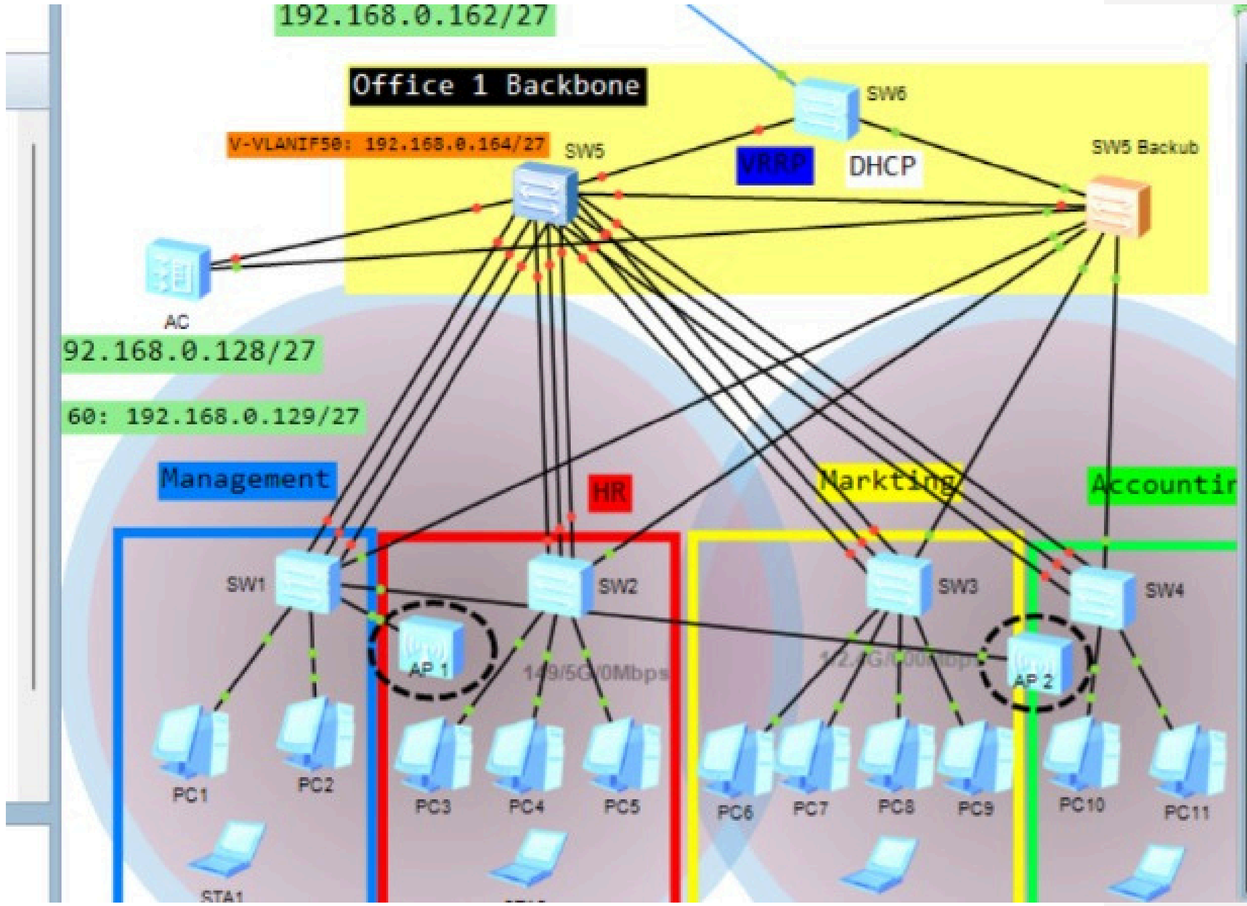

SW5 Backub

```
<SW5 Backub>dis vrrp bri
VRID  State        Interface                     Type     Virtual IP
------------------------------------------------------------------------------
10    Backup       Vlanif10                      Normal   192.168.0.3
20    Backup       Vlanif20                      Normal   192.168.0.35
30    Backup       Vlanif30                      Normal   192.168.0.67
40    Backup       Vlanif40                      Normal   192.168.0.99
50    Backup       Vlanif50                      Normal   192.168.0.164
------------------------------------------------------------------------------
Total:5     Master:0     Backup:5     Non-active:0
<SW5 Backub>
<SW5 Backub>dis vrrp bri
VRID  State        Interface                     Type     Virtual IP
------------------------------------------------------------------------------
10    Master       Vlanif10                      Normal   192.168.0.3
20    Master       Vlanif20                      Normal   192.168.0.35
30    Master       Vlanif30                      Normal   192.168.0.67
40    Master       Vlanif40                      Normal   192.168.0.99
50    Master       Vlanif50                      Normal   192.168.0.164
------------------------------------------------------------------------------
Total:5     Master:5     Backup:0     Non-active:0
<SW5 Backub>
```

VRRP WHEN SW5 IS FAIL (SW5 BACKUB BECOME THE MASTER)

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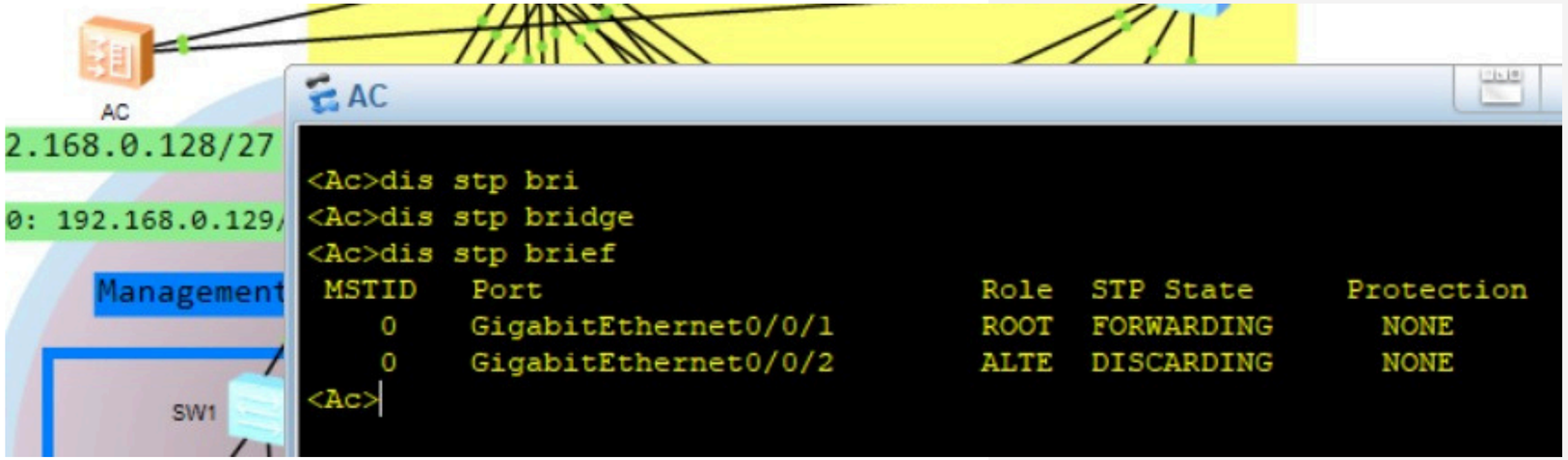
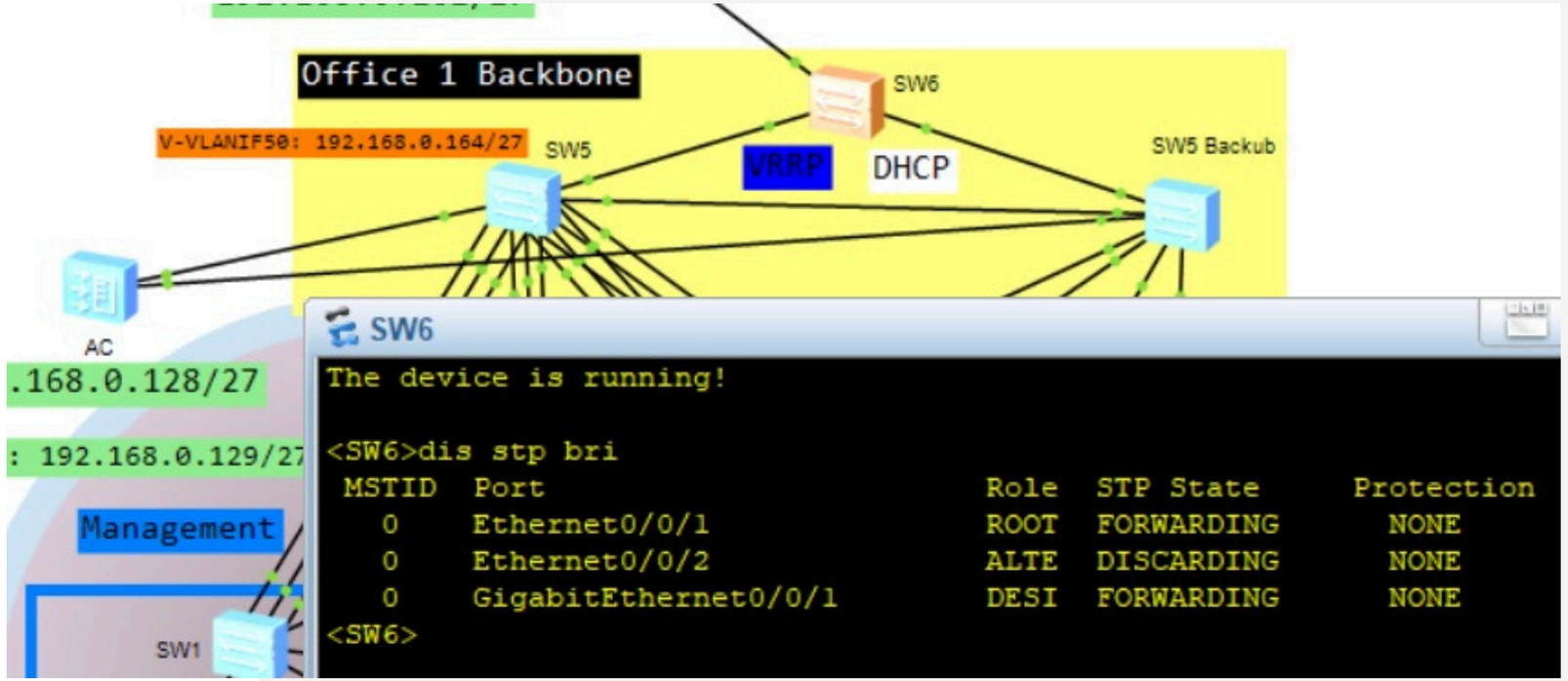
STP, VLAN REDUNDANCY & ETH-TRUNK

- STP prevents loops
- VLAN redundancy between main & backup switches
- Eth-Trunk provides bandwidth aggregation & redundancy

STP IN SWITCHES AND AC





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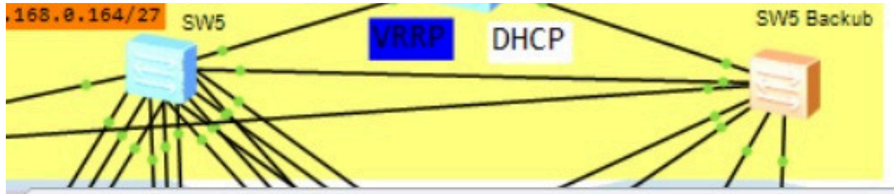
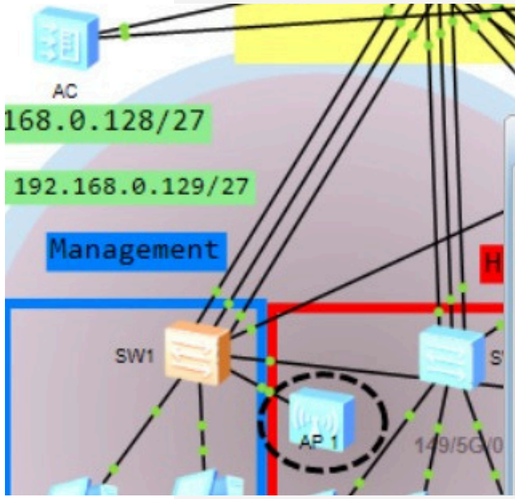
STP IN SWITCHES AND AC



SW5 Backub

```
<SW5 Backub>dis stp bri
 MSTID  Port                        Role  STP State     Protection
   0    Ethernet0/0/6               DESI  FORWARDING      NONE
   0    Ethernet0/0/7               DESI  FORWARDING      NONE
   0    Ethernet0/0/11              DESI  FORWARDING      NONE
   0    Ethernet0/0/12              DESI  FORWARDING      NONE
   0    Ethernet0/0/22              ROOT  FORWARDING      NONE
   0    GigabitEthernet0/0/1        DESI  FORWARDING      NONE
   0    GigabitEthernet0/0/2        DESI  FORWARDING      NONE
<SW5 Backub>
```



SW1

```
<SW1>dis stp bri
 MSTID  Port                        Role  STP State     Protection
   0    Ethernet0/0/4               DESI  FORWARDING      NONE
   0    Ethernet0/0/5               DESI  FORWARDING      NONE
   0    Ethernet0/0/6               DESI  FORWARDING      NONE
   0    Ethernet0/0/7               ALTE  DISCARDING      NONE
   0    GigabitEthernet0/0/1        DESI  FORWARDING      NONE
   0    Eth-Trunk1                  ROOT  FORWARDING      NONE
<SW1>
```

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ETH-TRUNK

SW5

```
<SW5>dis int bri
PHY: Physical
*down: administratively down
(l): loopback
(s): spoofing
(b): BFD down
(e): ETHOAM down
(dl): DLDP down
(d): Dampening Suppressed
InUti/OutUti: input utility/output utility
Interface                   PHY    Protocol InUti OutUti   inErrors  outErrors
Eth-Trunk1                  up     up           0%     0%          0          0
  Ethernet0/0/1             up     up           0%     0%          0          0
  Ethernet0/0/4             up     up           0%     0%          0          0
  Ethernet0/0/5             up     up           0%     0%          0          0
Eth-Trunk2                  up     up           0%     0%          0          0
  Ethernet0/0/2             up     up           0%     0%          0          0
  Ethernet0/0/8             up     up           0%     0%          0          0
  Ethernet0/0/9             up     up           0%     0%          0          0
Eth-Trunk3                  up     up           0%     0%          0          0
  Ethernet0/0/3             up     up           0%     0%          0          0
  Ethernet0/0/6             up     up           0%     0%          0          0
  Ethernet0/0/7             up     up           0%     0%          0          0
Eth-Trunk4                  up     up           0%     0%          0          0
  Ethernet0/0/13            up     up           0%     0%          0          0
  Ethernet0/0/14            up     up           0%     0%          0          0
  Ethernet0/0/15            up     up           0%     0%          0          0
Ethernet0/0/10              down   down         0%     0%          0          0
Ethernet0/0/11              down   down         0%     0%          0          0
Ethernet0/0/12              down   down         0%     0%          0          0
Ethernet0/0/16              up     up           0%     0%          0          0
Ethernet0/0/17              down   down         0%     0%          0          0
Ethernet0/0/18              down   down         0%     0%          0          0
Ethernet0/0/19              down   down         0%     0%          0          0
Ethernet0/0/20              down   down         0%     0%          0          0
Ethernet0/0/21              down   down         0%     0%          0          0
Ethernet0/0/22              up     up           0%     0%          0          0
GigabitEthernet0/0/1        up     up           0%     0%          0          0
GigabitEthernet0/0/2        down   down         0%     0%          0          0
MEth0/0/1                   down   down         0%     0%          0          0
NULL0                       up     up(s)        0%     0%          0          0
Vlanif1                     up     down         --     --          0          0
Vlanif10                    up     up           --     --          0          0
Vlanif20                    up     up           --     --          0          0
Vlanif30                    up     up           --     --          0          0
Vlanif40                    up     up           --     --          0          0
Vlanif50                    up     up           --     --          0          0
<SW5>
```

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VLANS AND INTER-VLANS

SW5

```
<SW5>dis vl
<SW5>dis vlan
<SW5>dis vll
<SW5>dis int
<SW5>dis interface
<SW5>dis interface vl
<SW5>dis interface Vlanif
Vlanif1 current state : UP
Line protocol current state : DOWN
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet protocol processing : disabled
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-12-02 01:18:01-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --

Vlanif10 current state : UP
Line protocol current state : UP
Last line protocol up time : 2025-12-02 01:01:13 UTC-08:00
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet Address is 192.168.0.1/27
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-12-02 01:18:02-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --

Vlanif20 current state : UP
Line protocol current state : UP
Last line protocol up time : 2025-12-02 01:01:13 UTC-08:00
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet Address is 192.168.0.33/27
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-12-02 01:18:02-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --
```

```
Vlanif30 current state : UP
Line protocol current state : UP
Last line protocol up time : 2025-12-02 01:01:13 UTC-08:00
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet Address is 192.168.0.65/27
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-12-02 01:18:03-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --

Vlanif40 current state : UP
Line protocol current state : UP
Last line protocol up time : 2025-12-02 01:01:13 UTC-08:00
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet Address is 192.168.0.97/27
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-12-02 01:18:03-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --

Vlanif50 current state : UP
Line protocol current state : UP
Last line protocol up time : 2025-12-02 01:01:13 UTC-08:00
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet Address is 192.168.0.161/27
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-12-02 01:18:03-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --
```

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VLANS AND INTER-VLANS

SW5

```
<SW5>
<SW5>dis vla
<SW5>dis vlan
The total number of vlans is : 7
--------------------------------------------------------------------------------
U: Up;         D: Down;         TG: Tagged;         UT: Untagged;
MP: Vlan-mapping;               ST: Vlan-stacking;
#: ProtocolTransparent-vlan;    *: Management-vlan;
--------------------------------------------------------------------------------

VID  Type    Ports
--------------------------------------------------------------------------------
1    common  UT:Eth0/0/10(D)    Eth0/0/11(D)    Eth0/0/12(D)    Eth0/0/16(U)
                Eth0/0/17(D)    Eth0/0/18(D)    Eth0/0/19(D)    Eth0/0/20(D)
                Eth0/0/21(D)    Eth0/0/22(U)    GE0/0/2(D)      Eth-Trunk1(U)
                Eth-Trunk2(U)   Eth-Trunk3(U)   Eth-Trunk4(U)

10   common  TG:Eth0/0/16(U)    Eth0/0/22(U)    Eth-Trunk1(U)

20   common  TG:Eth0/0/16(U)    Eth0/0/22(U)    Eth-Trunk2(U)

30   common  TG:Eth0/0/16(U)    Eth0/0/22(U)    Eth-Trunk3(U)

40   common  TG:Eth0/0/16(U)    Eth0/0/22(U)    Eth-Trunk4(U)

50   common  UT:GE0/0/1(U)

             TG:Eth0/0/16(U)    Eth0/0/22(U)

60   common  TG:Eth0/0/16(U)    Eth0/0/22(U)    Eth-Trunk1(U)   Eth-Trunk2(U)

                Eth-Trunk3(U)   Eth-Trunk4(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
<SW5>
```

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VLANS AND INTER-VLANS

```
Vlanif40 current state : UP
Line protocol current state : UP
Last line protocol up time : 2025-11-29 19:32:24 UTC-08:00
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet Address is 192.168.0.97/27
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-11-29 19:53:06-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --

Vlanif50 current state : UP
Line protocol current state : UP
Last line protocol up time : 2025-11-29 19:32:24 UTC-08:00
Description:
Route Port,The Maximum Transmit Unit is 1500
Internet Address is 192.168.0.161/27
IP Sending Frames' Format is PKTFMT_ETHNT_2, Hardware address is 4c1f-cca0-4844
Current system time: 2025-11-29 19:53:08-08:00
    Input bandwidth utilization  : --
    Output bandwidth utilization : --
```

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OSPF ROUTING PROTOCOL

SW5

```
<SW5>dis ospf lsdb

      OSPF Process 1 with Router ID 1.5.5.5
            Link State Database

                  Area: 0.0.0.1
 Type      LinkState ID    AdvRouter       Age  Len   Sequence   Metric
 Router    2.5.5.5         2.5.5.5         101  84    80000038      1
 Router    1.5.5.5         1.5.5.5         100  144   8000001A      1
 Router    1.1.1.1         1.1.1.1         100  36    8000001B      1
 Network   192.168.0.163   2.5.5.5         101  36    80000016      0
 Sum-Net   192.168.4.0     1.1.1.1         101  28    80000006      2
 Sum-Net   192.168.3.0     1.1.1.1         101  28    80000006      1
 Sum-Net   192.168.2.0     1.1.1.1         101  28    80000006      1
 Sum-Net   192.168.1.96    1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.99    1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.64    1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.67    1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.32    1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.35    1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.0     1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.3     1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.164   1.1.1.1         101  28    80000004      3
 Sum-Net   192.168.1.160   1.1.1.1         101  28    80000006      2
```

SW5 Backub

```
      OSPF Process 1 with Router ID 2.5.5.5
            Link State Database

                  Area: 0.0.0.1
 Type      LinkState ID    AdvRouter       Age  Len   Sequence   Metric
 Router    2.5.5.5         2.5.5.5         130  84    80000038      1
 Router    1.5.5.5         1.5.5.5         131  144   8000001A      1
 Router    1.1.1.1         1.1.1.1         130  36    8000001B      1
 Network   192.168.0.163   2.5.5.5         130  36    80000016      0
 Sum-Net   192.168.4.0     1.1.1.1         131  28    80000006      2
 Sum-Net   192.168.3.0     1.1.1.1         131  28    80000006      1
 Sum-Net   192.168.2.0     1.1.1.1         131  28    80000006      1
 Sum-Net   192.168.1.96    1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.99    1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.64    1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.67    1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.32    1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.35    1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.0     1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.3     1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.164   1.1.1.1         131  28    80000004      3
 Sum-Net   192.168.1.160   1.1.1.1         131  28    80000006      2


<SW5 Backub>
```

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OSPF ROUTING PROTOCOL

R2

```
                Area: 0.0.0.0
Type       LinkState ID    AdvRouter          Age  Len   Sequence   Metric
Router     2.2.2.2         2.2.2.2            959  48    8000000C      1
Router     1.1.1.1         1.1.1.1            962  48    8000000B      1
Router     3.3.3.3         3.3.3.3            959  48    8000000C      1
Network    192.168.3.2     3.3.3.3            959  32    80000006      0
Network    192.168.4.2     3.3.3.3           1015  32    80000006      0
Network    192.168.2.2     2.2.2.2            959  32    80000006      0
Sum-Net    192.168.1.96    2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.99    2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.64    2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.67    2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.32    2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.35    2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.0     2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.3     2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.164   2.2.2.2            811  28    80000003      2
Sum-Net    192.168.1.160   2.2.2.2           1060  28    80000005      1
Sum-Net    192.168.0.96    1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.99    1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.64    1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.67    1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.32    1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.35    1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.0     1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.3     1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.164   1.1.1.1             73  28    80000001      2
Sum-Net    192.168.0.160   1.1.1.1             85  28    80000007      1

                Area: 0.0.0.2
Type       LinkState ID    AdvRouter          Age  Len   Sequence   Metric
Router     2.5.5.5         2.5.5.5            815  84    80000023      1
Router     2.2.2.2         2.2.2.2            814  36    8000000F      1
Router     1.5.5.5         1.5.5.5            840  144   8000001E      1
Network    192.168.1.163   2.5.5.5            815  36    8000000D      0
Sum-Net    192.168.4.0     2.2.2.2           1062  28    80000005      1
Sum-Net    192.168.3.0     2.2.2.2            966  28    80000006      2
Sum-Net    192.168.2.0     2.2.2.2           1009  28    80000005      1
Sum-Net    192.168.0.96    2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.99    2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.64    2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.67    2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.32    2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.35    2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.0     2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.3     2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.164   2.2.2.2             74  28    80000001      3
Sum-Net    192.168.0.160   2.2.2.2             84  28    80000007      2
```

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OSPF ROUTING PROTOCOL

R1

```
      OSPF Process 1 with Router ID 1.1.1.1
            Link State Database

                  Area: 0.0.0.0
Type      LinkState ID    AdvRouter         Age  Len   Sequence   Metric
Router    2.2.2.2         2.2.2.2           921  48    8000000C      1
Router    1.1.1.1         1.1.1.1           921  48    8000000B      1
Router    3.3.3.3         3.3.3.3           919  48    8000000C      1
Network   192.168.3.2     3.3.3.3           919  32    80000006      0
Network   192.168.4.2     3.3.3.3           975  32    80000006      0
Network   192.168.2.2     2.2.2.2           921  32    80000006      0
Sum-Net   192.168.1.96    2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.99    2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.64    2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.67    2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.32    2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.35    2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.0     2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.3     2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.164   2.2.2.2           773  28    80000003      2
Sum-Net   192.168.1.160   2.2.2.2          1022  28    80000005      1
Sum-Net   192.168.0.96    1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.99    1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.64    1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.67    1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.32    1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.35    1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.0     1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.3     1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.164   1.1.1.1            33  28    80000001      2
Sum-Net   192.168.0.160   1.1.1.1            46  28    80000007      1

                  Area: 0.0.0.1
Type      LinkState ID    AdvRouter         Age  Len   Sequence   Metric
Router    2.5.5.5         2.5.5.5            37  84    80000038      1
Router    1.5.5.5         1.5.5.5            37  144   8000001A      1
Router    1.1.1.1         1.1.1.1            35  36    8000001B      1
Network   192.168.0.163   2.5.5.5            37  36    80000016      0
Sum-Net   192.168.4.0     1.1.1.1            36  28    80000006      2
Sum-Net   192.168.3.0     1.1.1.1            36  28    80000006      1
Sum-Net   192.168.2.0     1.1.1.1            36  28    80000006      1
Sum-Net   192.168.1.96    1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.99    1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.64    1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.67    1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.32    1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.35    1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.0     1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.3     1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.164   1.1.1.1            36  28    80000004      3
Sum-Net   192.168.1.160   1.1.1.1            36  28    80000006      2
```

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DHCP SERVICE

Enable DHCP service on the device

Create DHCP pools for each VLAN

- Configure:

– Network address

– Subnet mask

– Default gateway (VLANIF interface)

Ensure APs and wireless clientsreceive correct IP addresses

Test DHCP by releasing andrenewing IP on end devices

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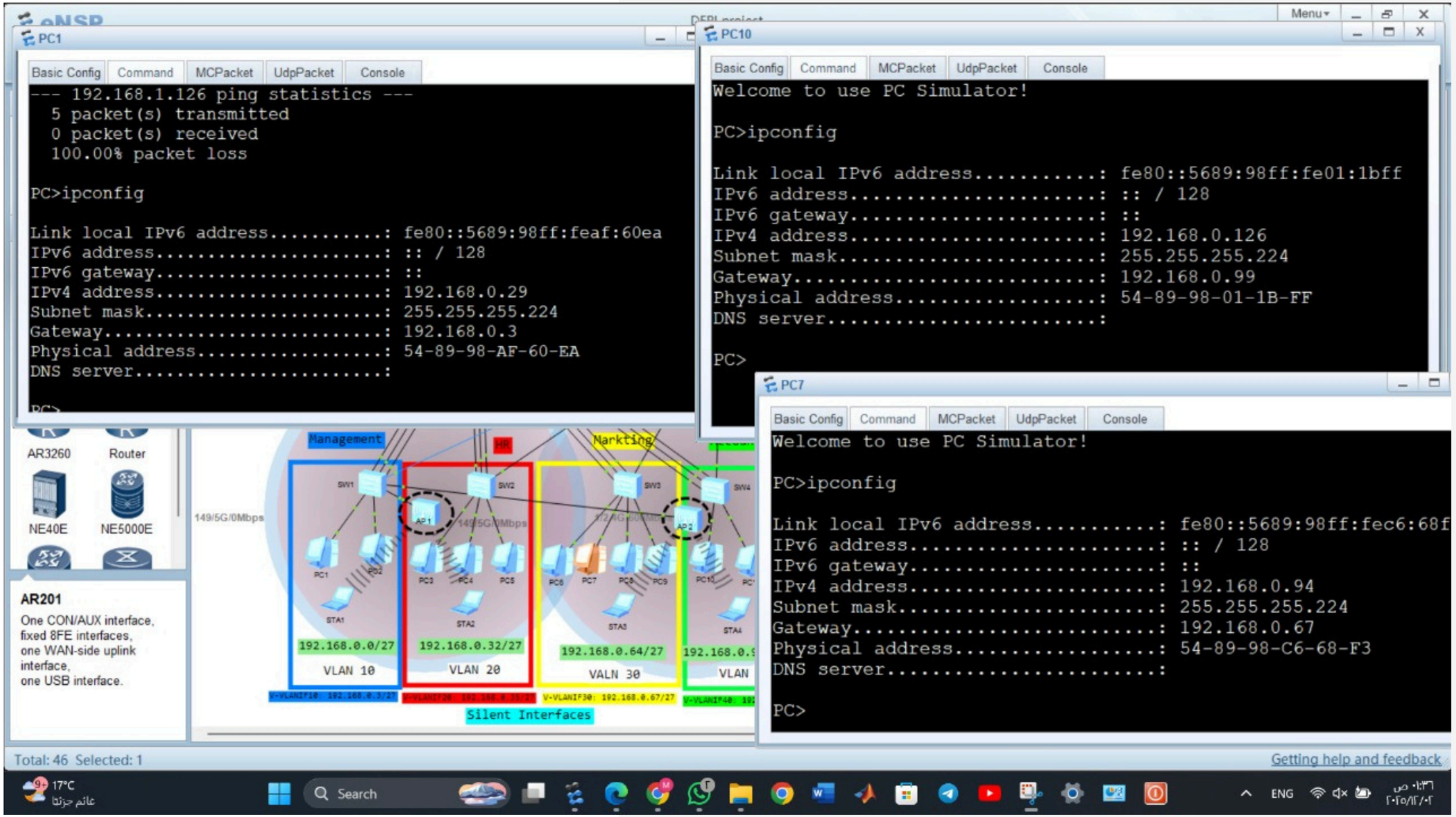
DHCP SERVER



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DHCP SERVER

SW5

```
#
interface Vlanif10
 ip address 192.168.0.1 255.255.255.224
 vrrp vrid 10 virtual-ip 192.168.0.3
 vrrp vrid 10 priority 120
 vrrp vrid 10 preempt-mode timer delay 5
 vrrp vrid 10 track interface GigabitEthernet0/0/1 reduced 30
 dhcp select global
#
interface Vlanif20
 ip address 192.168.0.33 255.255.255.224
 vrrp vrid 20 virtual-ip 192.168.0.35
 vrrp vrid 20 priority 120
 vrrp vrid 20 preempt-mode timer delay 5
 vrrp vrid 20 track interface GigabitEthernet0/0/1 reduced 30
 dhcp select global
#
interface Vlanif30
 ip address 192.168.0.65 255.255.255.224
 vrrp vrid 30 virtual-ip 192.168.0.67
 vrrp vrid 30 priority 120
 vrrp vrid 30 preempt-mode timer delay 5
 vrrp vrid 30 track interface GigabitEthernet0/0/1 reduced 30
 dhcp select global
#
interface Vlanif40
 ip address 192.168.0.97 255.255.255.224
 vrrp vrid 40 virtual-ip 192.168.0.99
 vrrp vrid 40 priority 120
 vrrp vrid 40 preempt-mode timer delay 5
 vrrp vrid 40 track interface GigabitEthernet0/0/1 reduced 30
 dhcp select global
#
interface Vlanif50
 ip address 192.168.0.161 255.255.255.224
 vrrp vrid 50 virtual-ip 192.168.0.164
 vrrp vrid 50 priority 120
 vrrp vrid 50 preempt-mode timer delay 5
 vrrp vrid 50 track interface GigabitEthernet0/0/1 reduced 30
#
```

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WLAN CONFIGURATION

- Wireless communication between buildings
- Access Points for user connectivity
- Secure traffic management

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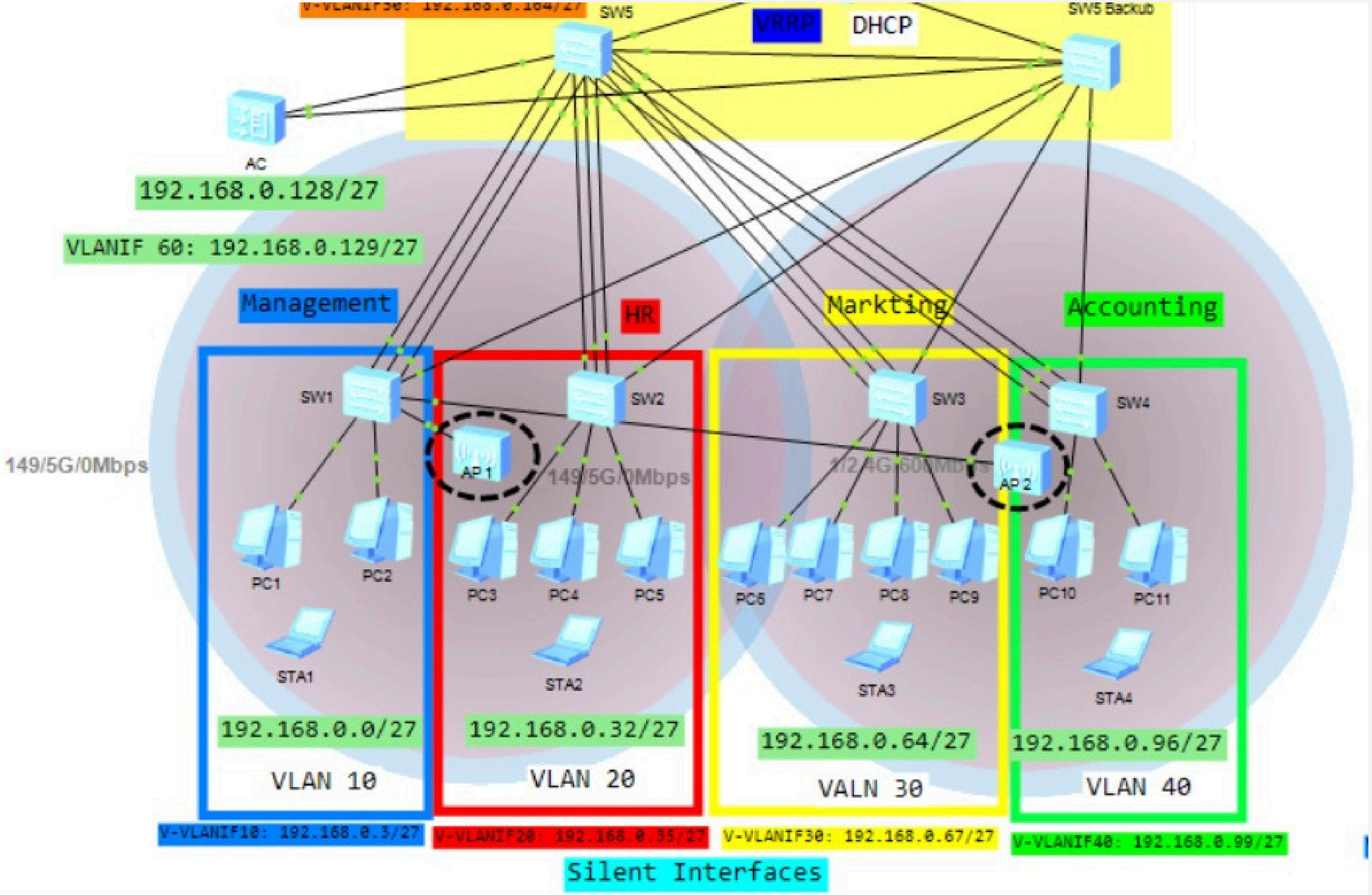
WLAN



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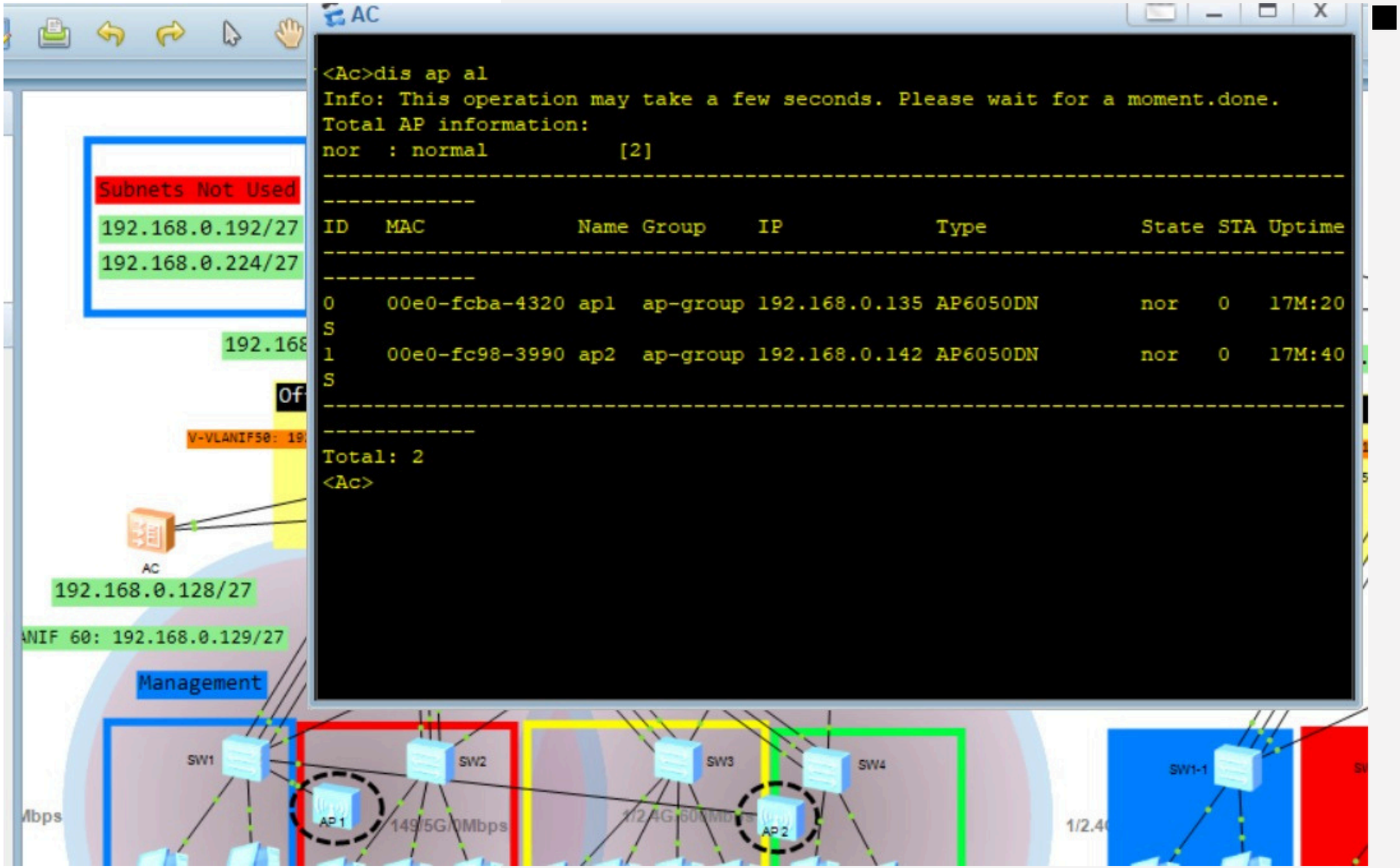
WLAN



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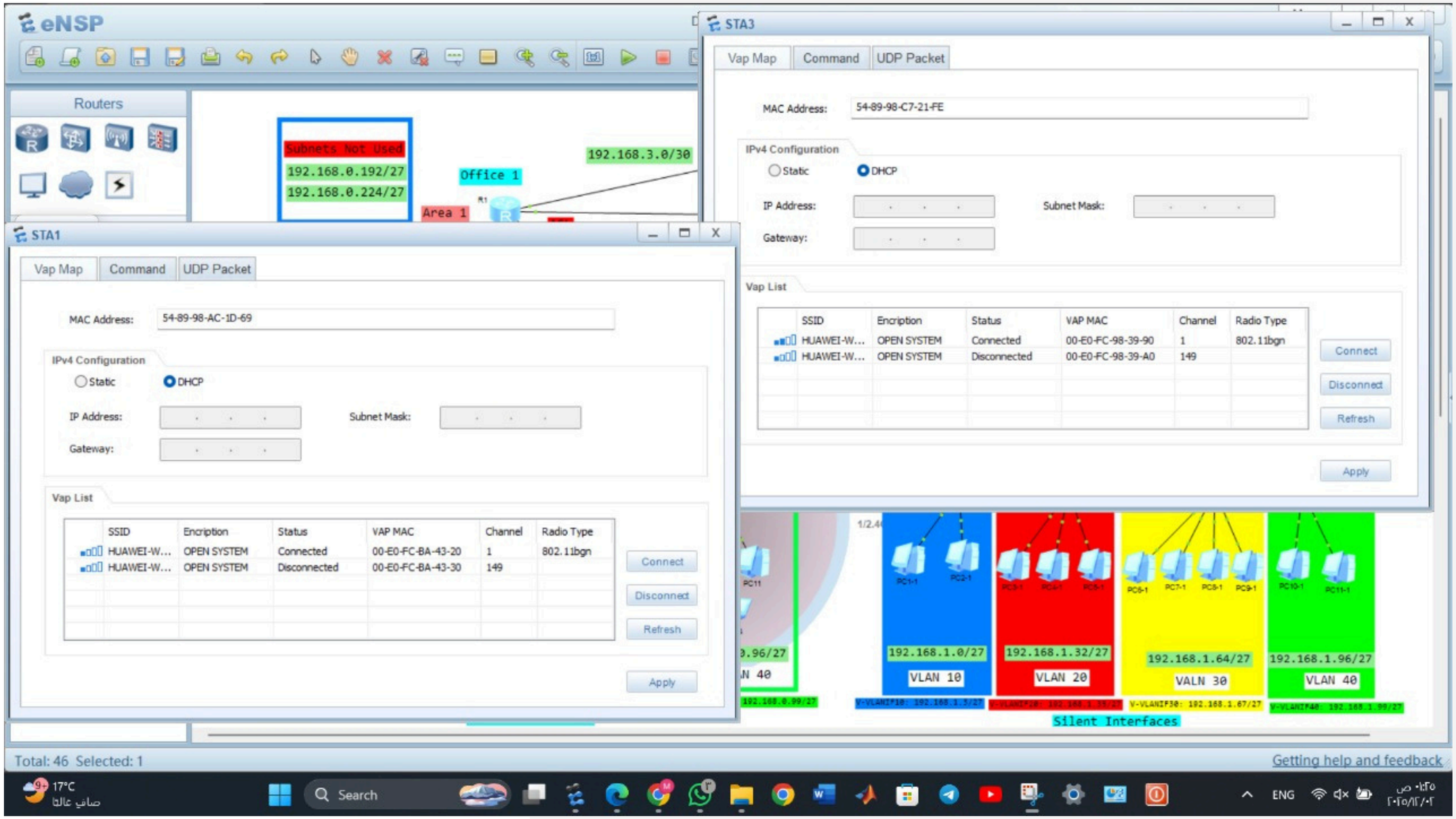
WLAN



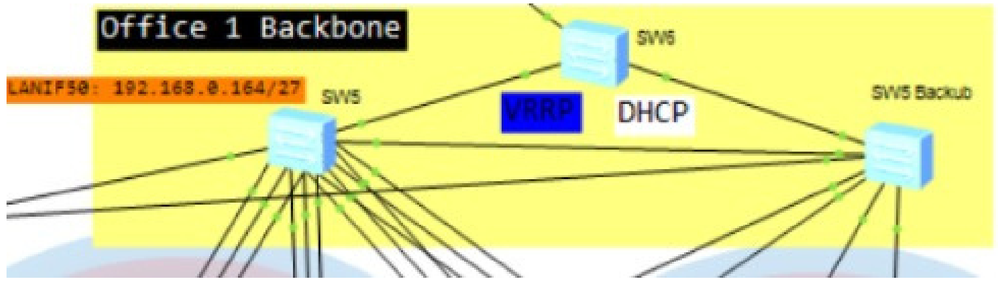
OFFICES BACKBONE

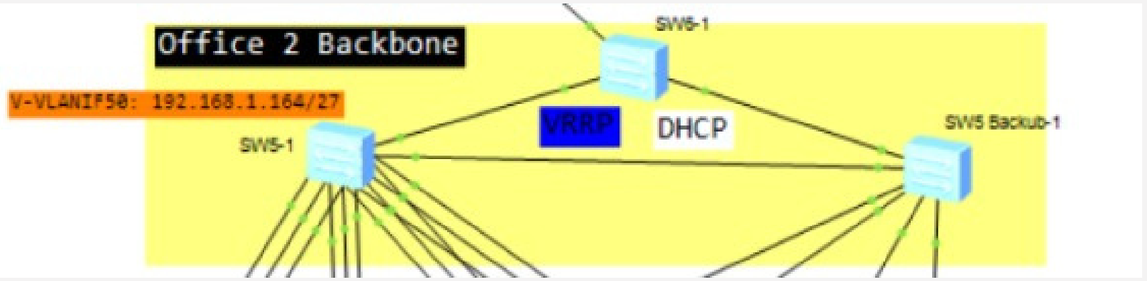
One of the most important parts that has to be highlighted in the project

Offices Backbone:

This name refers to the area in the topology at which almost all the configurations

and features were applied on





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SUMMARY / KEY POINTS

- Network secured with ACL & AAA
- High availability using VRRP
- VLANs & STP ensure continuity
- Eth-Trunk improves bandwidth & redundancy
- Inter-building communication via routers

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THANK YOU

Any Questions?

30 Nov, 2025