SPOTO CCIE EI Lab S2 DOO RS Solution

VERSION	V1.3		
LEVEL	☐OPEN	☐ INTER	☑SECRET
TYPE	☐DISCUSS	☑BETA	☐RELEASE

Revision History				
Date.	**Author**	**Version**	**Reviewer**	**Note.**
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2024-09-09	Lambert	1.3		Update some questions and answers

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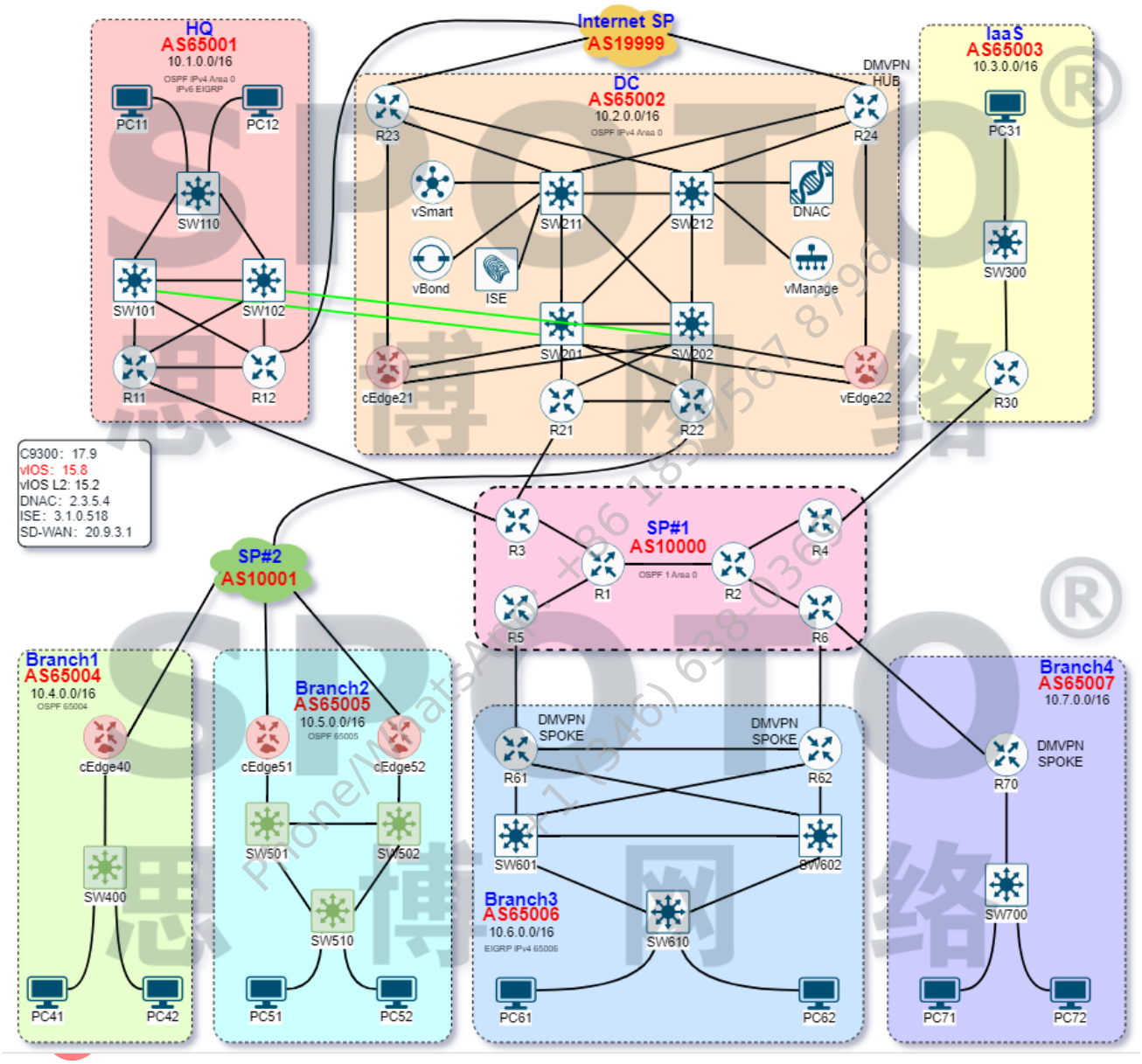
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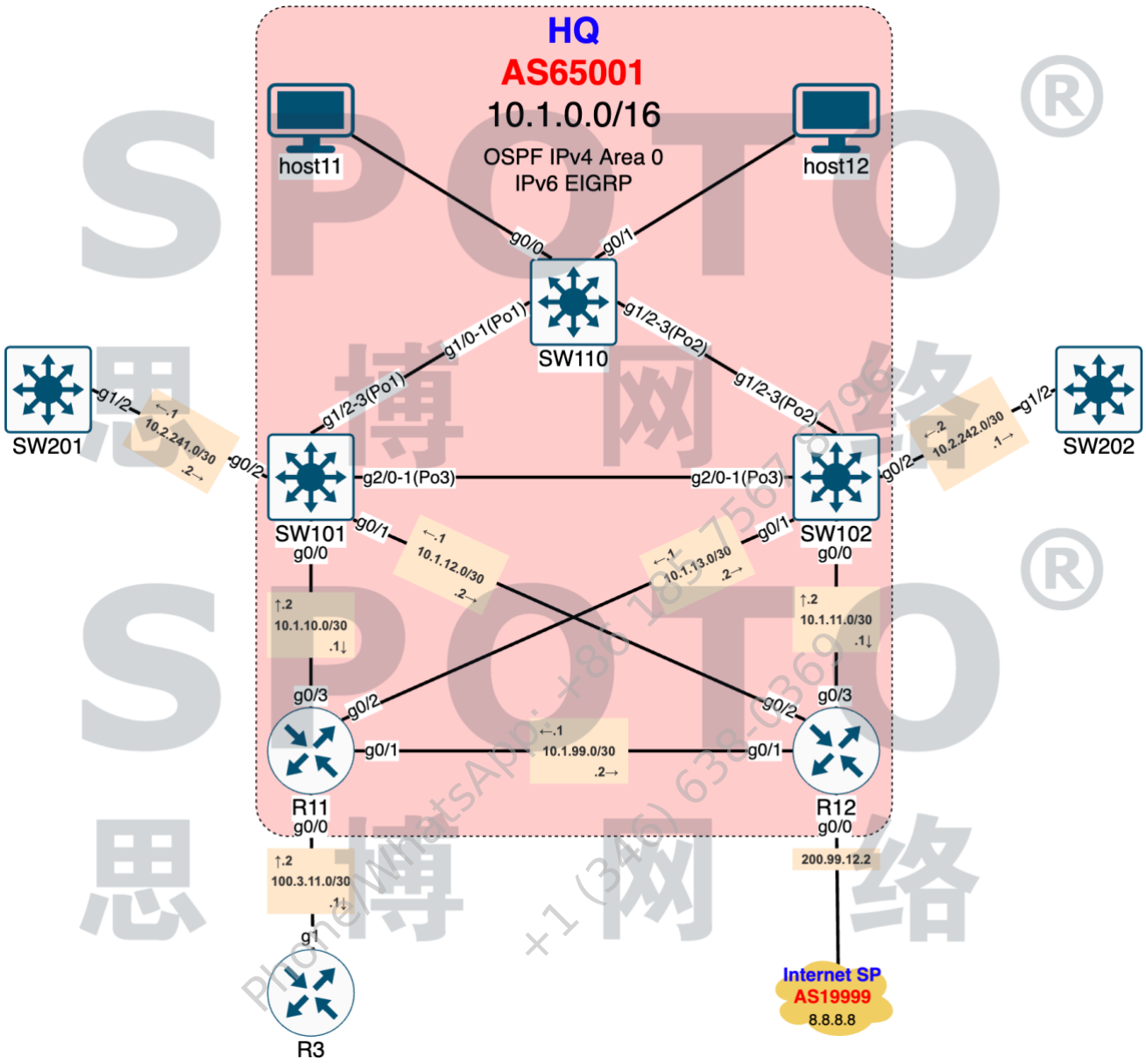
Lab Topology

Diagram 01: Complete Topology

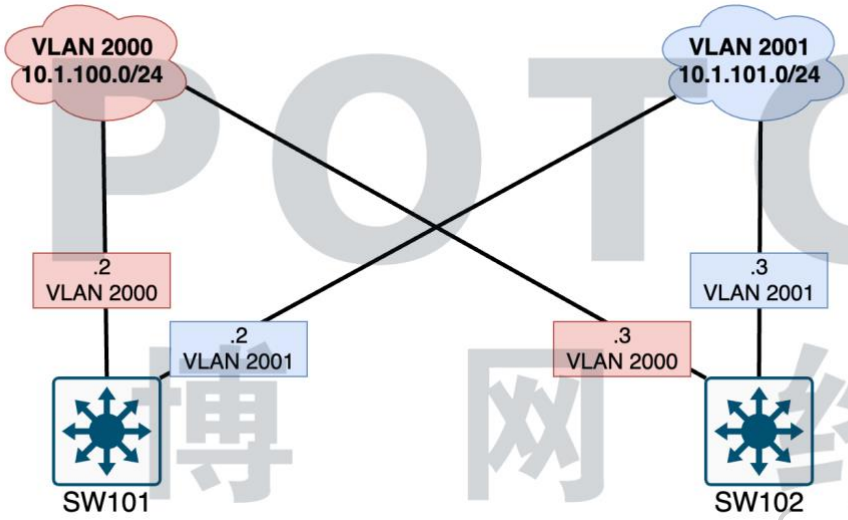


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Diagram 02: HQ



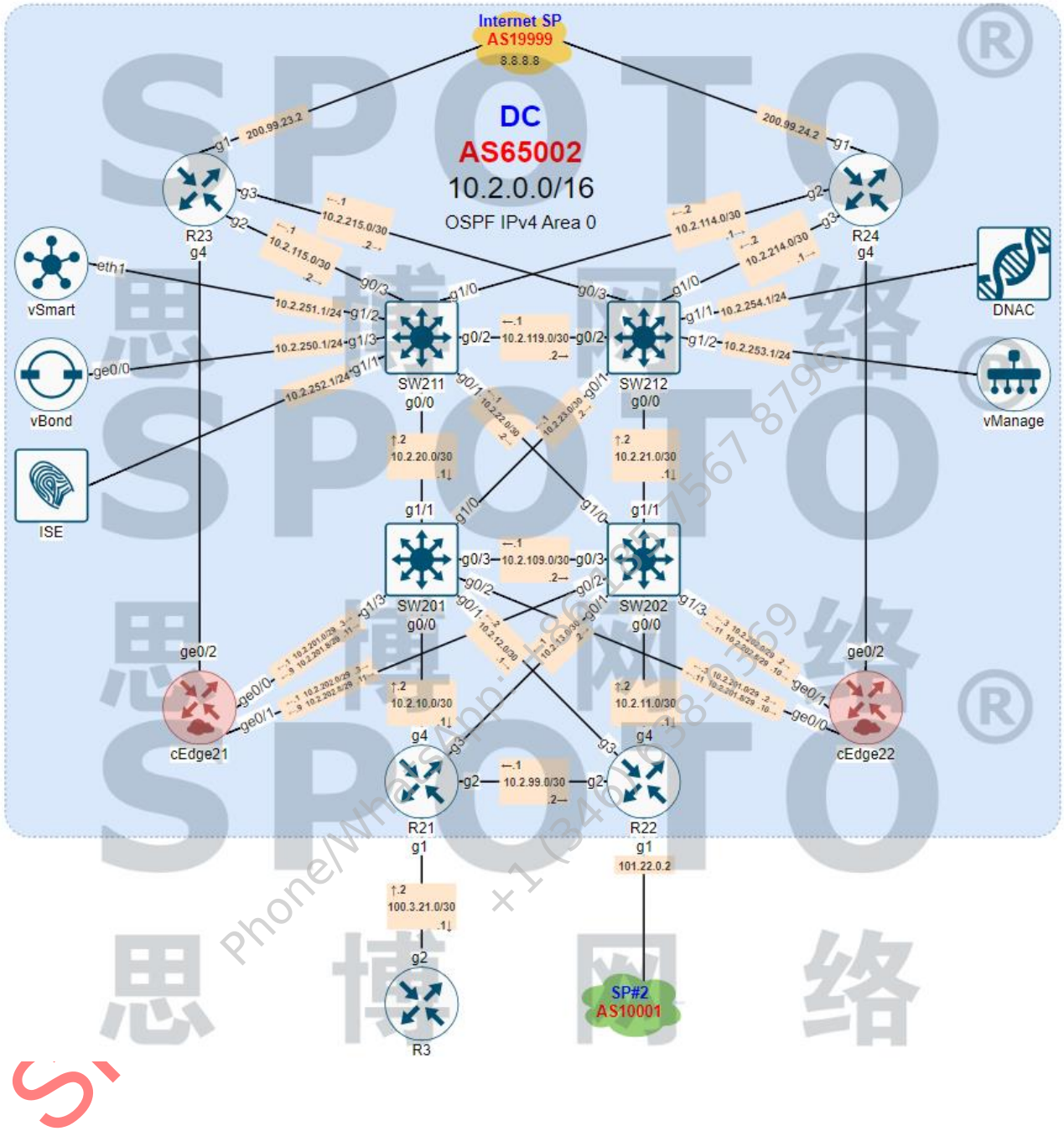
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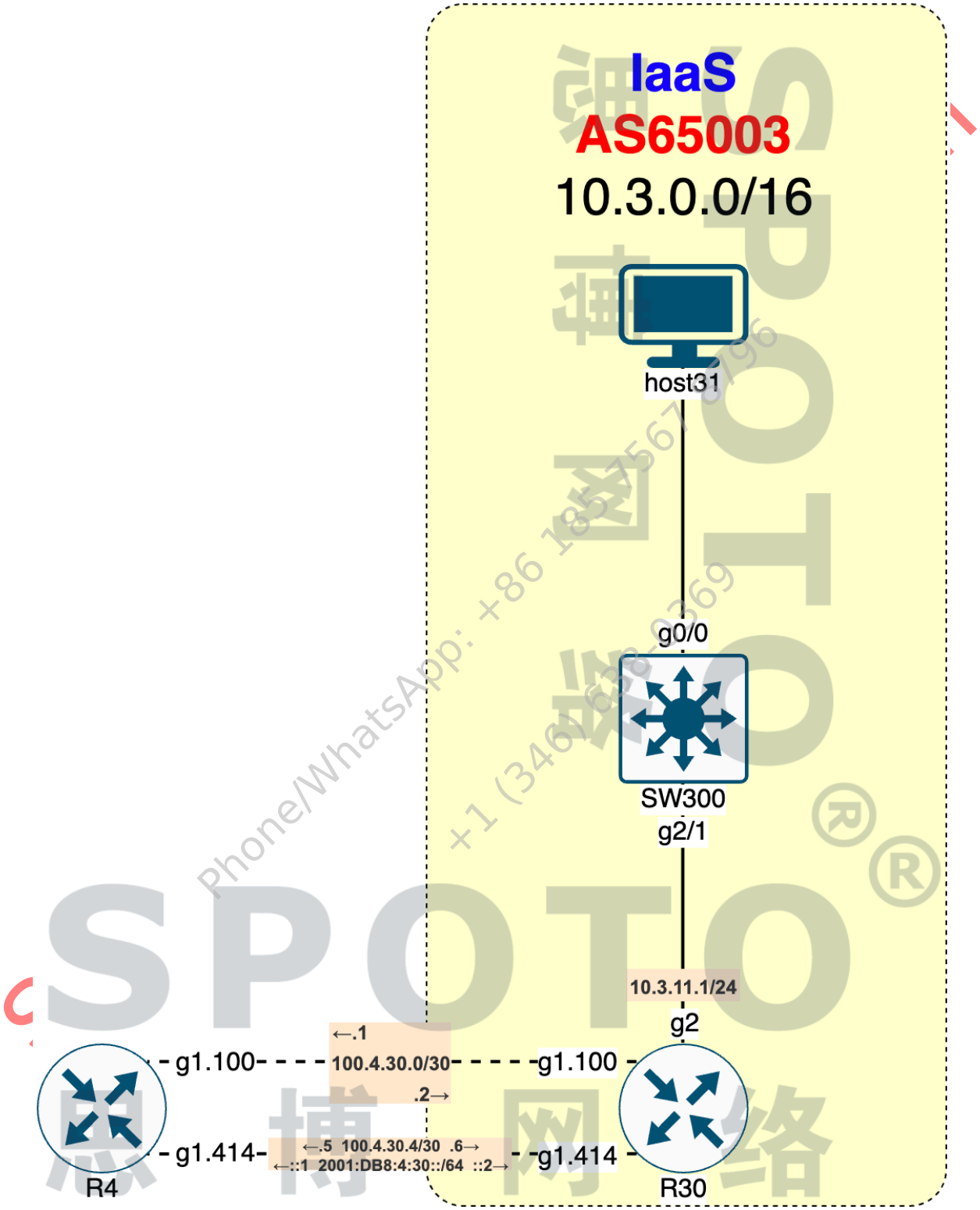
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Diagram 03: DC



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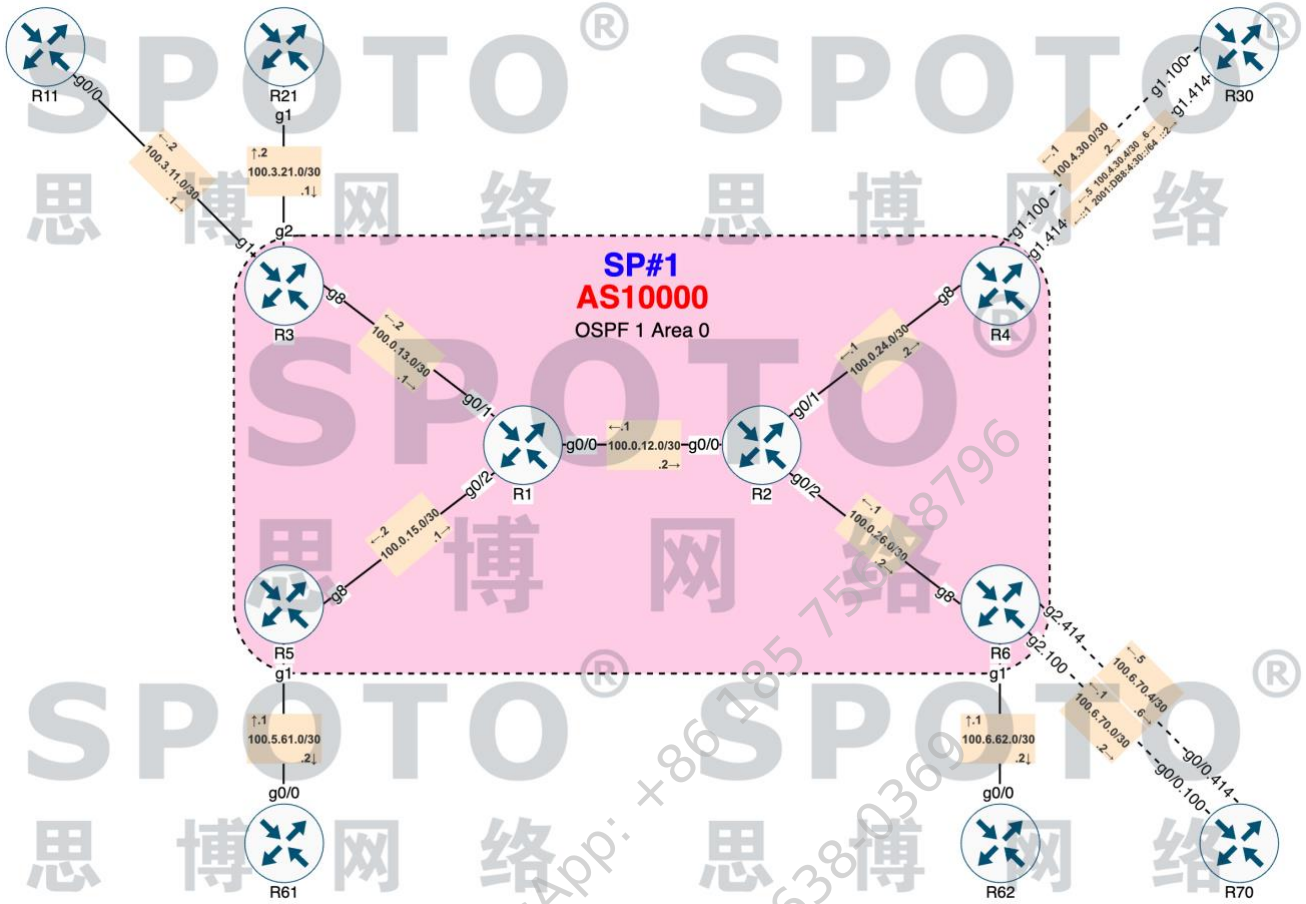
Diagram 04: IaaS



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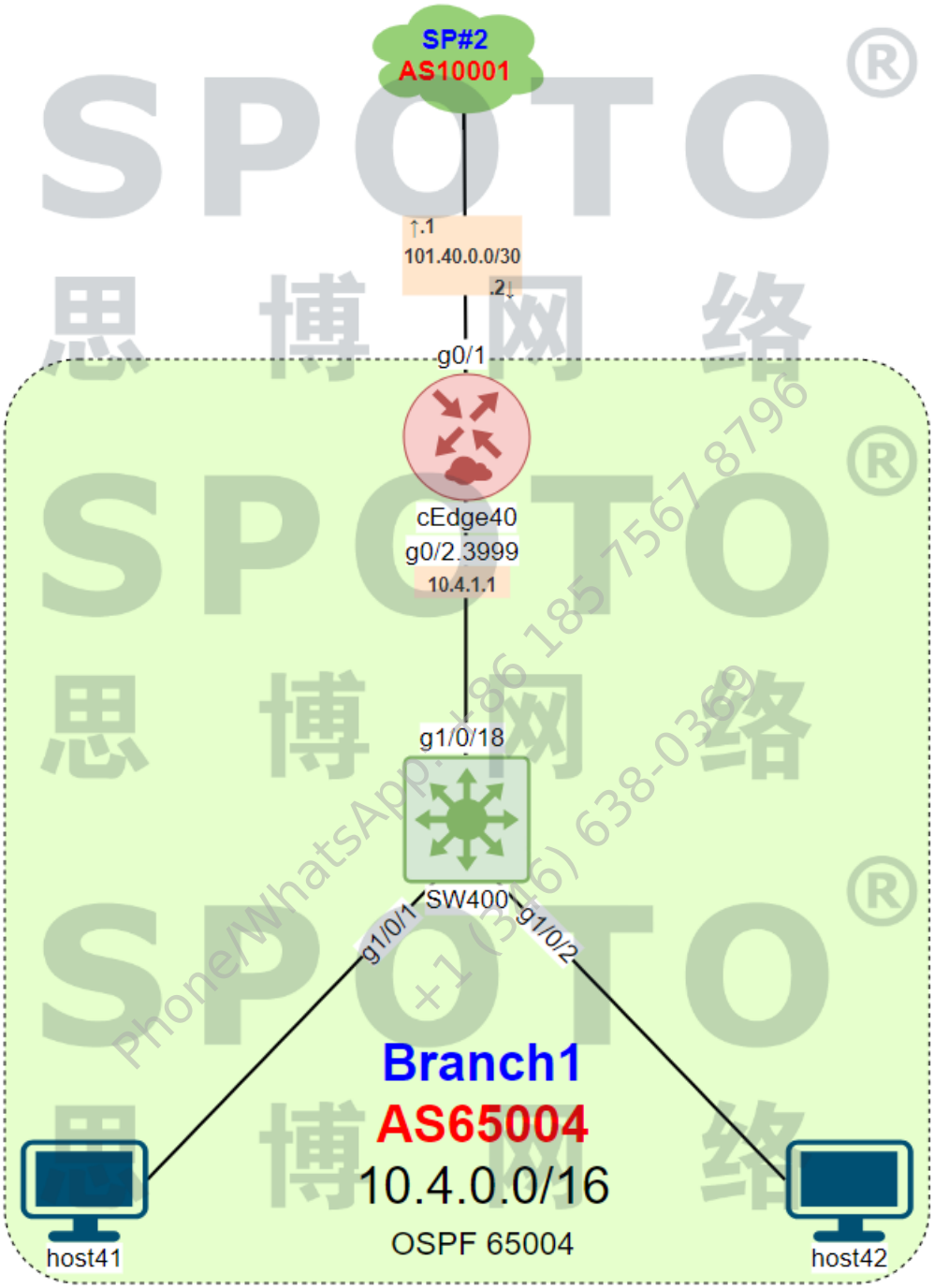
Diagram 05: SP#1



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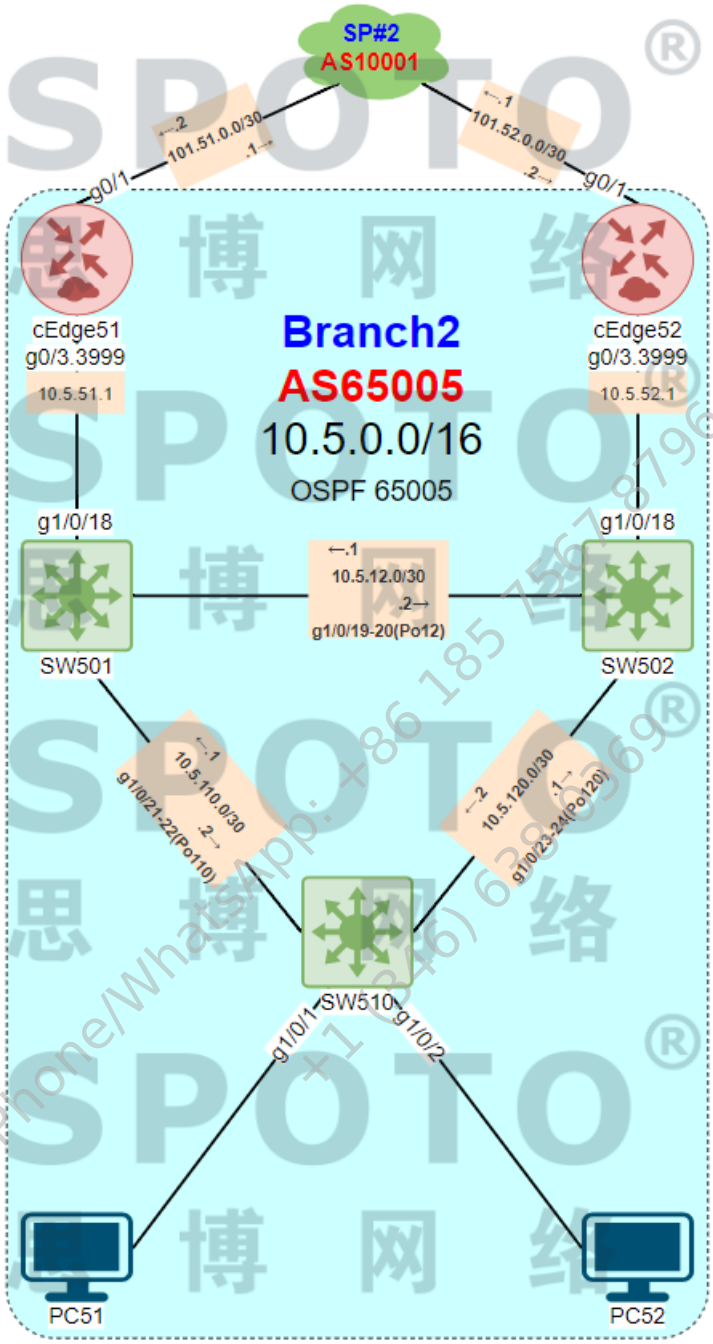
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Diagram 06: Branch#1



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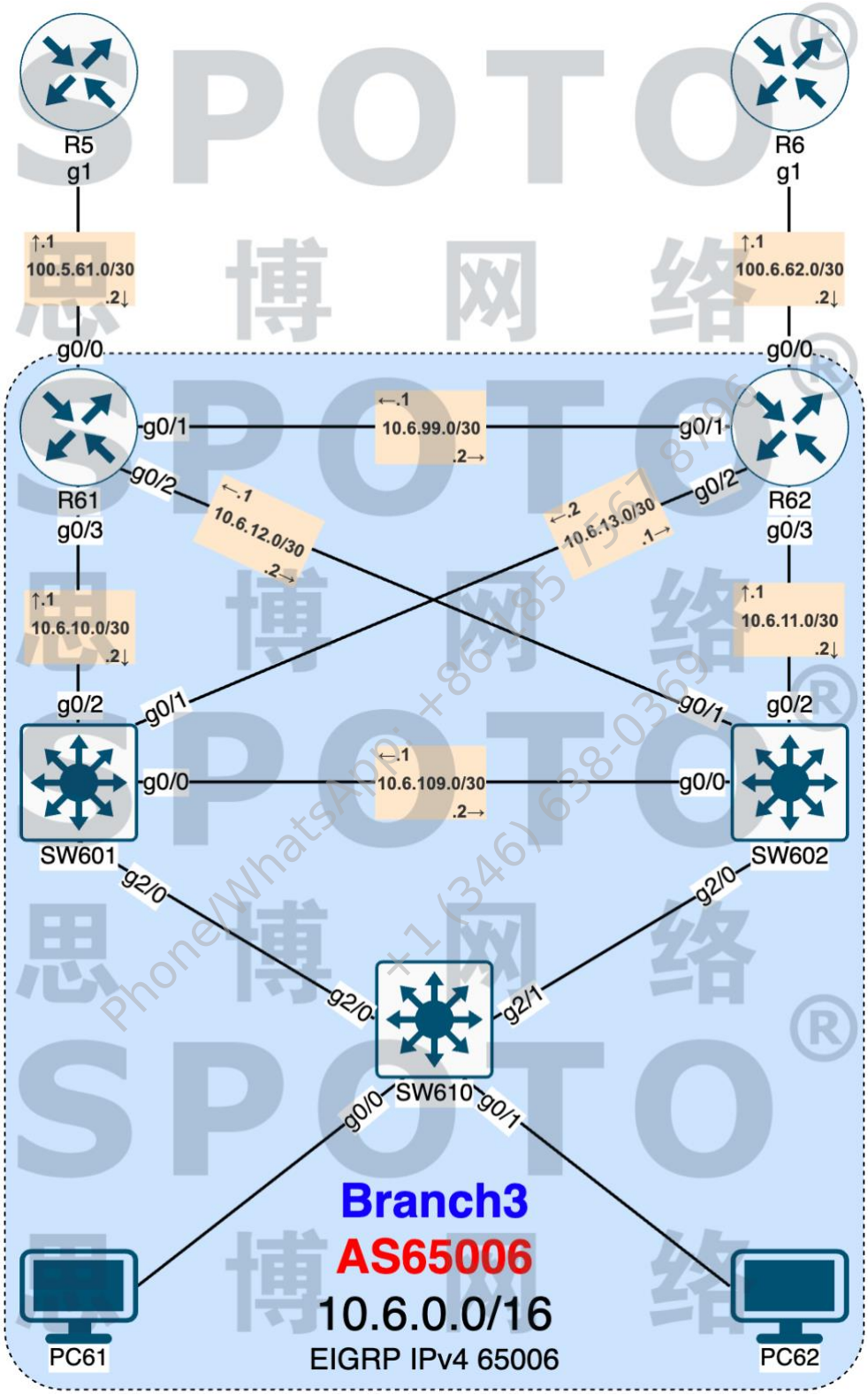
Diagram 07: Branch#2



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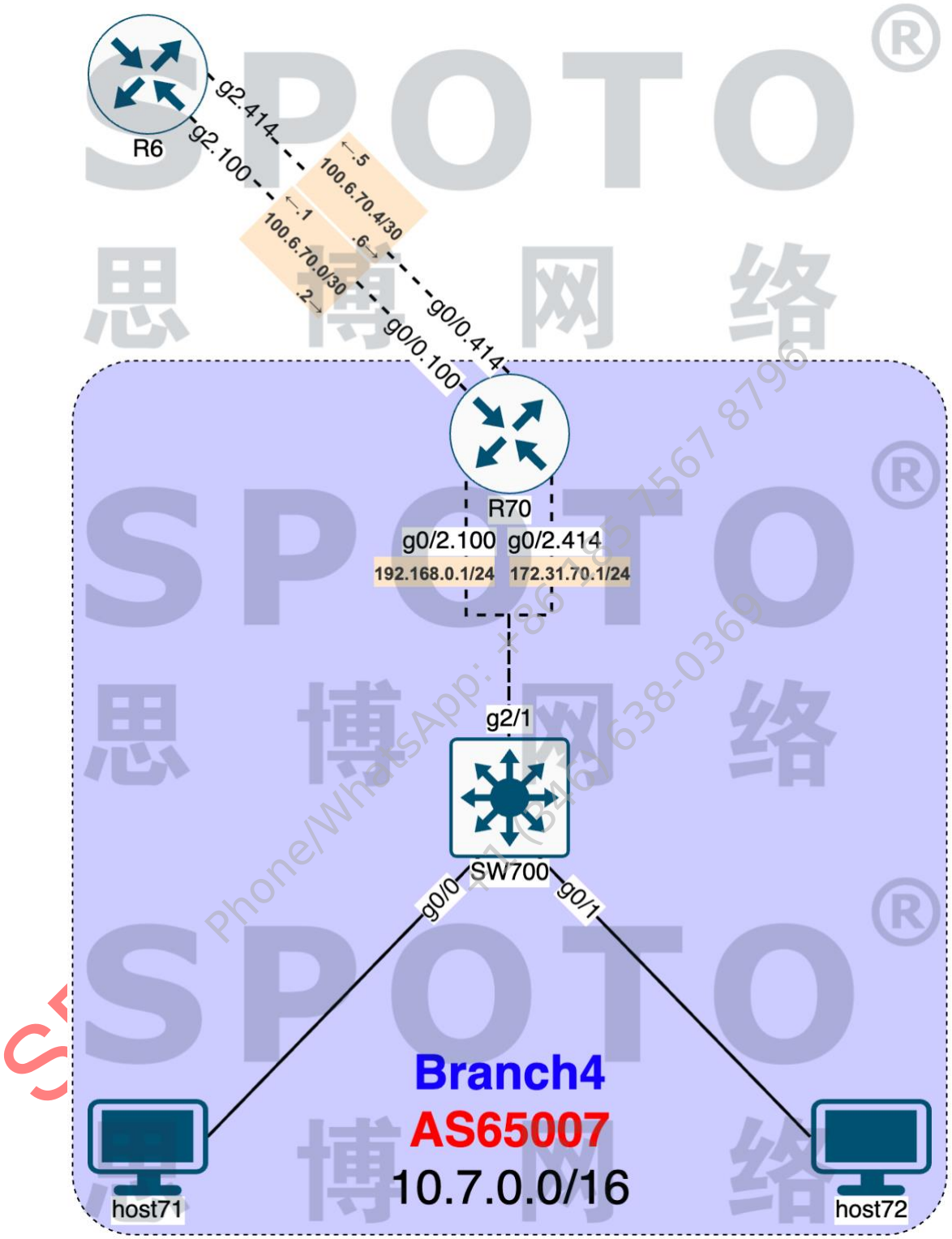
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Diagram 08: Branch#3



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Diagram 09: Branch#4



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1. Existing Network Review and Tuning

1.1 Introduction

Welcome to the Deploy, Operate, Optimize (DOO) module for XANDER Pharmaceuticals.

The topology you will be working with will be similar, but not necessarily identical to the network that was designed in the previous module and may include technologies and feature sets not touched upon previously.

The best of success!

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1.2 Configure VLANs

Ensure that the VLANs and forwarding are configured on all switches and switchports according to the following table:

Site	VLAN	Switch	Port(s)	802.1Q Tagged
HQ	2000	sw101	PO1, PO3	Yes
HQ	2000	sw102	PO2, PO3	Yes
HQ	2000	sw110	PO1, PO2	Yes
HQ	2000	sw110	GE0/0	No
HQ	2001	sw101	PO1, PO3	Yes
HQ	2001	sw102	PO2, PO3	Yes
HQ	2001	sw110	PO1, PO2	Yes
HQ	2001	sw110	GE0/1	No
Branch#3	2000	sw601	GE2/0	Yes
Branch#3	2000	sw602	GE2/0	Yes
Branch#3	2000	sw610	GE2/0-1	Yes
Branch#3	2000	sw610	GE0/0	No
Branch#3	2001	sw601	GE2/0	Yes
Branch#3	2001	sw602	GE2/0	Yes
Branch#3	2001	sw610	GE2/0-1	Yes
Branch#3	2001	sw610	GE0/1	No

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Solution

SW110

```
interface GigabitEthernet0/0
 switchport
 switchport mode access
 switchport access vlan 2000

interface GigabitEthernet0/1
 switchport
 switchport mode access
 switchport access vlan 2001
```


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SW610

```
vlan 2000

interface range GigabitEthernet 2/0-1
 switchport
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport trunk allowed vlan add 2001

interface GigabitEthernet0/0
 switchport mode access
 switchport access vlan 2000

interface GigabitEthernet0/1
 switchport
 switchport mode access
 switchport access vlan 2001
```

SW601/SW602

```
interface GigabitEthernet 2/0
 switchport
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport trunk allowed vlan 1,2000,2001
```

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1.3 Layer 2 Technologies In HQ

Ensure that the EtherChannel links are configured on the switches at Headquarters according to the following table:

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EtherChannel ID	Switch A	Switchports	Switch B	Switchports	Type
1	sw101	GE1/2-3	sw110	GE1/0-1	802.3ad
2	sw102	GE1/2-3	sw110	GE1/2-3	802.3ad
3	sw101	GE2/0-1	sw102	GE2/0-1	802.3ad

Ensure the STP features are configured on the switches at Headquarters according to the following requirements:

- The protocol must support a separate instance for each VLAN.
- The protocol must support only three possible states.
- all access ports must immediately translation to the forwarding state up on link up and they must still participate in STP.
- Sw101 must be the root bridge for VLANs 2000-2001. with SW102 as the secondary Use the lowest possible priority values to achieve this.
- SW101 and SW102 must ignore superior BPDUs for the other switches at Headquarters. While superior BPDUs are received. traffic must not be forwarded on the receiving port.

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Solution

SW101

```
no interface port-channel 1
no interface port-channel 3

interface range GigabitEthernet 1/2-3
  switchport
  switchport trunk encapsulation dot1q
  switchport mod trunk
  switchport trunk allowed vlan 1,2000,2001
```


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```
  no shutdown
  channel-group 1 mode active

interface range GigabitEthernet 2/0-1
  switchport
  switchport trunk encapsulation dot1q
  switchport mod trunk
  switchport trunk allowed vlan 1,2000,2001
  no shutdown
  channel-group 3 mode active

spanning-tree mode rapid-pvst
spanning-tree vlan 1, 2000-2001 priority 0
spanning-tree portfast edge default

interface range port-channel 1, port-channel 3
 spanning-tree guard root

interface range GigabitEthernet 0/3, GigabitEthernet 1/0-3, GigabitEthernet 2/0-1
 spanning-tree guard root
```

SW102

```
no interface port-channel 2
no interface port-channel 3

interface range GigabitEthernet 1/2-3
 switchport
 switchport trunk encapsulation dot1q
 switchport mod trunk
 switchport trunk allowed vlan 1,2000,2001
 no shutdown
 channel-group 2 mode active

interface range GigabitEthernet 2/0-1
```

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```
 switchport
 switchport trunk encapsulation dot1q
 switchport mod trunk
 switchport trunk allowed vlan 1,2000,2001
 no shutdown
 channel-group 3 mode active

spanning-tree mode rapid-pvst
spanning-tree vlan 1, 2000,2001 priority 4096
spanning-tree portfast edge default

interface port-channel 2
 spanning-tree guard root
Interface range GigabitEthernet 0/3, GigabitEthernet 1/0-3
 spanning-tree guard root
```

SW110

```
no interface port-channel 1
no interface port-channel 2

interface range GigabitEthernet 1/0-1
   switchport
   switchport trunk encapsulation dot1q
   switchport mod trunk
   switchport trunk allowed vlan 1,2000,2001
   no shutdown
   channel-group 1 mode active

interface range GigabitEthernet 1/2-3
   switchport
   switchport trunk encapsulation dot1q
   switchport mod trunk
   switchport trunk allowed vlan 1,2000,2001
   no shutdown
```

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```
 channel-group 2 mode active

spanning-tree mode rapid-pvst
spanning-tree portfast edge default
```

PS: If the port-channel interface is not up, you can use *shutdown* and *no shutdown* to bring it up.

1.4 First Hop Redundancy Protocol in HQ

For IPv4, implement an FHRP mechanism on sw101 and sw102 for VLANs 2000 and 2001 according to these requirements:

VLAN	Subnet	Default Gateway	DHCP Server
2000	10.1.100.0/24	10.1.100.1	10.2.255.211
2001	10.1.101.0/24	10.1.101.1	10.2.255.211

- Gateway virtual MAC address for VLAN 2000 must be 0000.0c9f.f0d2
- Gateway virtual MAC address for VLAN 2001 must be 0000.0c9f.f0dc
- The active gateway must send periodic packets three times faster than default.
- Failure of the peer must be detected two times faster than default.
- Configure authentication using the most secure method and a simple key-string of CC!E!nfr4
- SW101 must be active and have a priority of 10 above the default.
- SW102 must be standby and have the default priority.
- Both first-hop gateway switches must transition to active if their priority becomes superior. Ensure a minimal delay before transition to active state of 15 seconds.
- The first-hop gateway must monitor the DHCP server reachability with ICMP echoes and failover if it is not available. To do so, decrement priority by 20 automatically.

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- DHCP requests message must be received by both first-hop gateway switches

Solution

SW101

```
ip dhcp relay information option
ip dhcp relay information trust-all

ip sla 1
 icmp-echo 10.2.255.211
 exit
track 1 ip sla 1 reachability

interface vlan 2000
 ip helper-address 10.2.255.211
 standby version 2
 standby 210 ip 10.1.100.1
 standby 210 timers 1 5
 standby 210 priority 110
 standby 210 preempt delay minimum 15
 standby 210 authentication md5 key-string CC!E!nfr4
 standby 210 track 1 decrement 20

interface vlan 2001
 ip helper-address 10.1.255.211
 standby version 2
 standby 220 ip 10.1.101.1
 standby 220 timers 1 5
 standby 220 priority 110
 standby 220 preempt delay minimum 15
 standby 220 authentication md5 key-string CC!E!nfr4
 standby 220 track 1 decrement 20
```

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SW102

```
ip dhcp relay information option
ip dhcp relay information trust-all

ip sla 1
 icmp-echo 10.2.255.211
 exit
track 1 ip sla 1 reachability

interface vlan 2000
 ip helper-address 10.2.255.211
 standby version 2
 standby 210 ip 10.1.100.1
 standby 210 preempt delay minimum 15
 standby 210 authentication md5 key-string CC!E!nfr4
 standby 210 track 1 decrement 20

interface vlan 2001
 ip helper-address 10.1.255.211
 standby version 2
 standby 220 ip 10.1.101.1
 standby 220 preempt delay minimum 15
 standby 220 authentication md5 key-string CC!E!nfr4
 standby 220 track 1 decrement 20
```

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