

DHCP Option 82

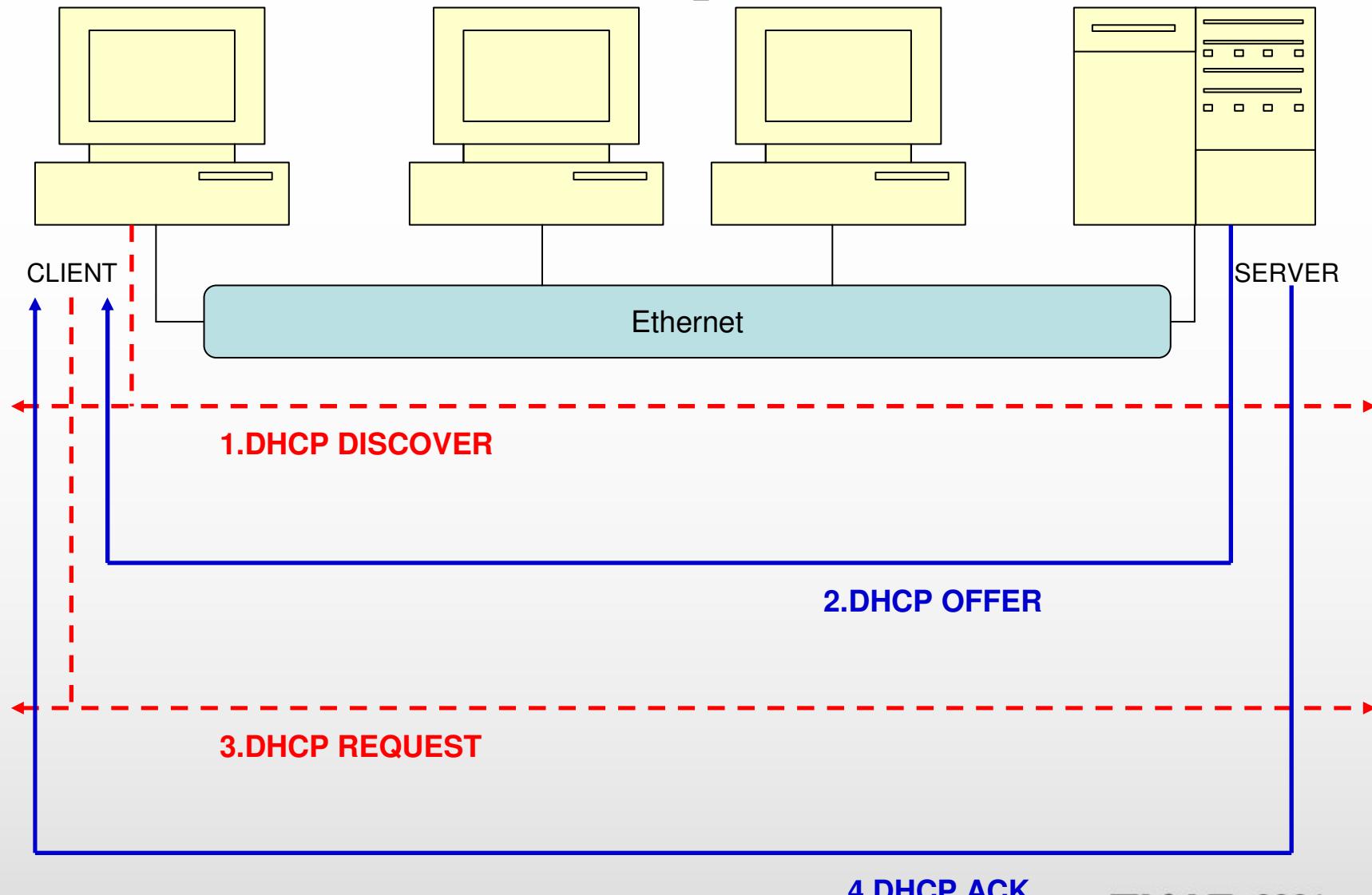
Ken 2007/10/30



DHCP Operation Phase

- Four phases of DHCP operation.
 - DHCP discover
 - DHCP offer
 - DHCP request
 - DHCP ack

DHCP Operation



DHCP Relay Information Option In DHCP Snooping

- DHCP Relay Information Option 82 is an extension to the Dynamic Host Configuration Protocol (DHCP), and is defined in RFC 3046 and RFC 3993.
- DHCP can centrally manage the IP address assignments for a large number of subscribers. When the DHCP option 82 feature is enabled on the switch, a subscriber device is identified by the switch port through which it connects to the network (in addition to its MAC address).

DHCP Relay Information Option In DHCP Snooping

- A layer 2 switch can insert the Option 82 information into the DHCP packets (if DHCP Snooping is enabled).
- If the DHCP server is option-82-capable, it can use the remote ID, the circuit ID, or both to assign IP addresses and implement policies, such as restricting the number of IP addresses that can be assigned to a single remote ID or circuit ID. Then the DHCP server echoes the option-82 field in the DHCP reply.

The Format of Option 82

- The format of the option is shown below:

Code Len Agent Information Field

- The sub-options within the DHCP option are constructed as follows:

SubOpt Len Sub-option Value

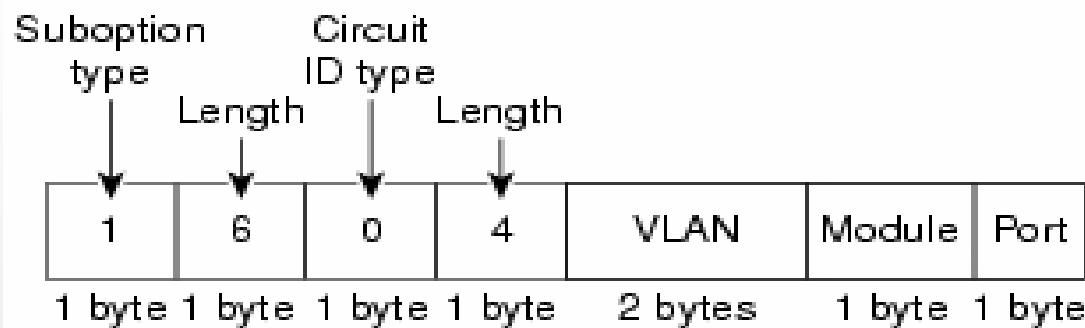
SubOpt Len Sub-option Value

2	N	i1	i2	i3	i4			iN	

The Format of Option 82 - Circuit ID Suboption

- The circuit ID suboption contains the VLAN-unit-port information from which the packet is received.

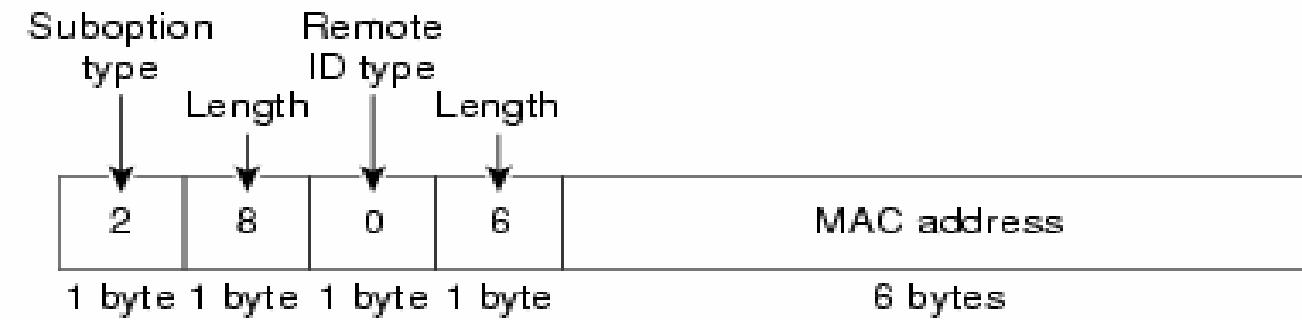
Circuit ID Suboption Frame Format



The Format of Option 82 - Remote ID Suboption

- The remote ID suboption contains the switch's MAC address.

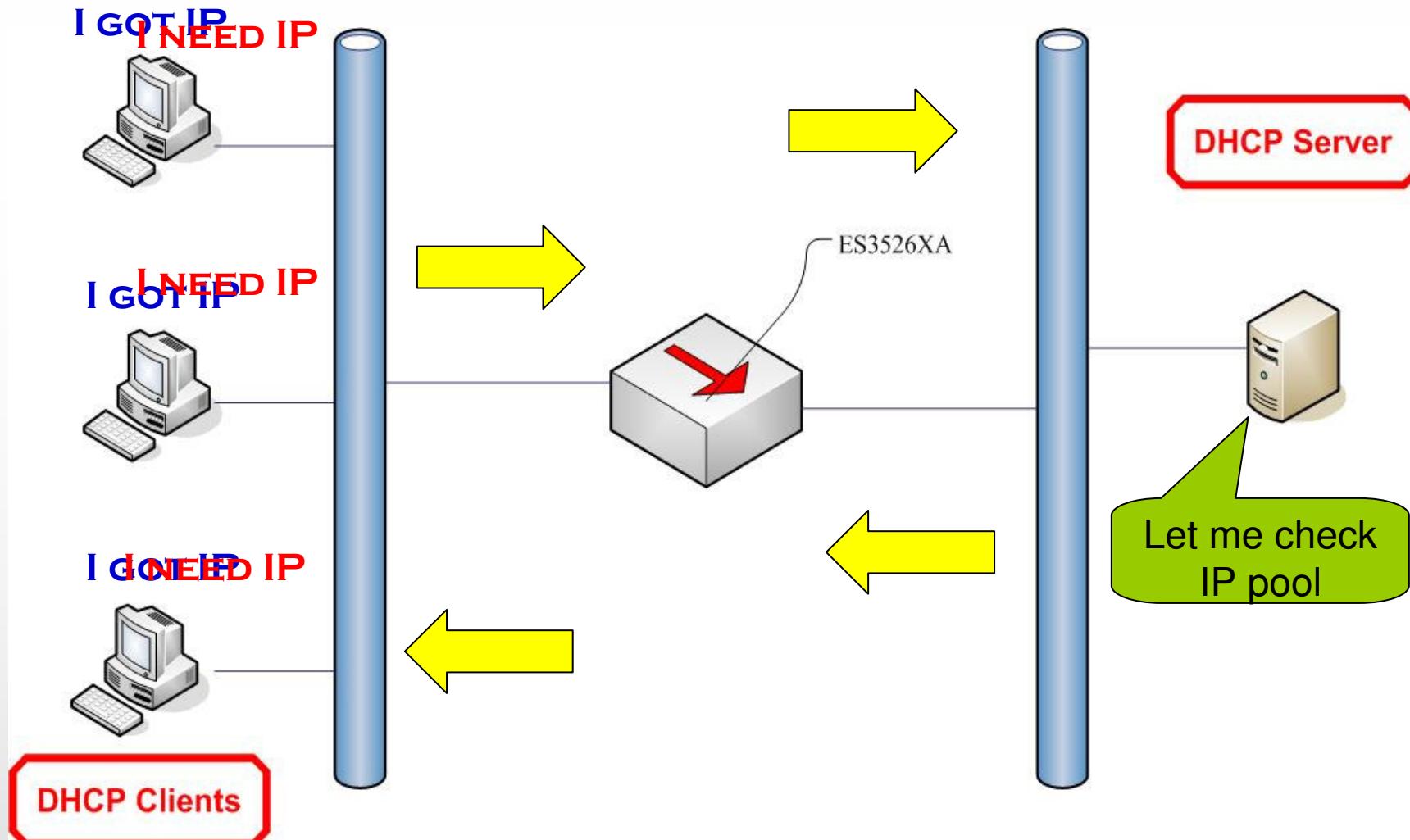
Remote ID Suboption Frame Format



Definitions

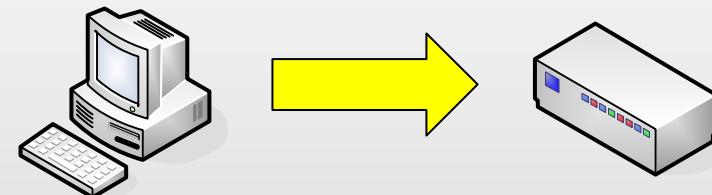
- DHCP – A protocol, a mechanism for an end device to request its IP address.
- Client – Device making a DCHP request (end nodes)
- Relay Agent – A device which takes the broadcast DHCP request packet and directs it to a specific DHCP server.
- Server – A device generating the reply to a DHCP request base on option 82 information.

DHCP Option 82 Operation



Relay Agent Inbound Operations

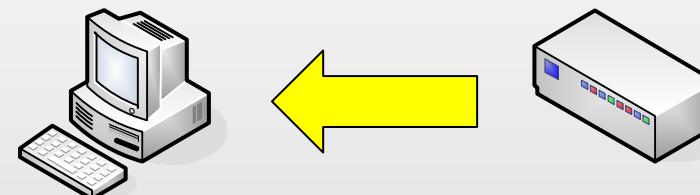
- 1) Intercept all broadcast based DHCPDISCOVER or DHCPREQUEST messages
- 2) Prevent flooding to local access ports
- 3) Determine if the Relay Agent and Option 82 fields are already filled in
- 4) Skip the next step if they are
- 5) Fill in CID, RID, and the appropriate Relay Agent fields
- 6) Send the message to the DHCP server via Unicast message



Relay Agent's Outbound Operations

The following steps should be performed by the DHCP Relay Agent outbound in response to a DHCPREPLY message:

- 1) Remove the Option 82 fields
- 2) Direct the Unicast DHCPREPLY message to the appropriate requesting host.



How to Configure Option 82 In DHCP Snooping I.

```
Console(config)*#ip dhcp snooping information option
Console(config)*#end
Console#
Console#
Console#show ip dhcp snooping
Global DHCP Snooping status: enable
DHCP Snooping Information Option Status: enable
DHCP Snooping Information Policy: replace
DHCP Snooping is configured on the following VLANs:
  1.
Verify Source Mac-Address: enable
Interface      Trusted
-----
Eth 1/1          No
Eth 1/2          No
```

- ***ip dhcp snooping information option*** – Enable relay information option (option 82) function
- ***no ip dhcp snooping information option*** – Disable option 82 function

How to Configure Option 82 In DHCP Snooping II.

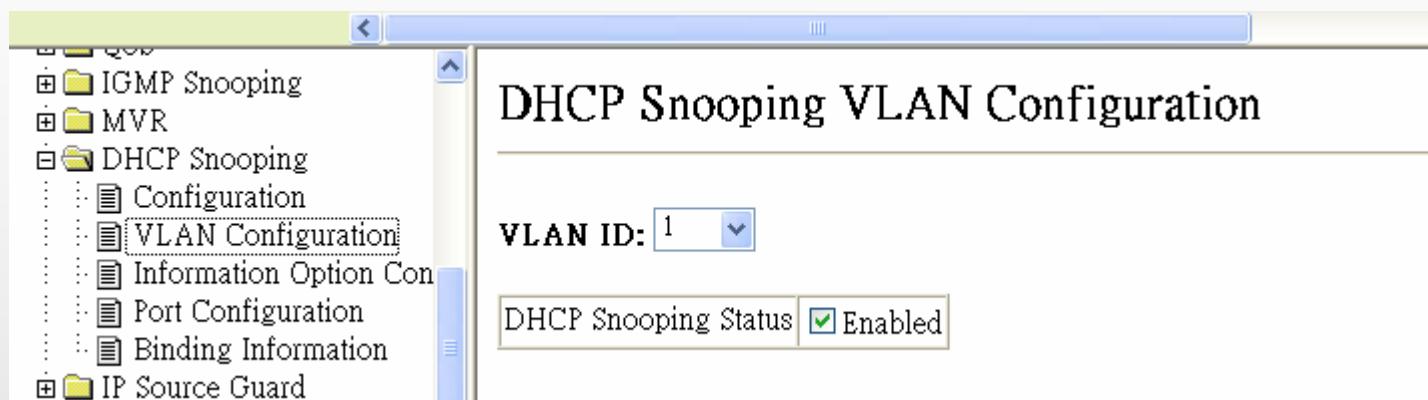
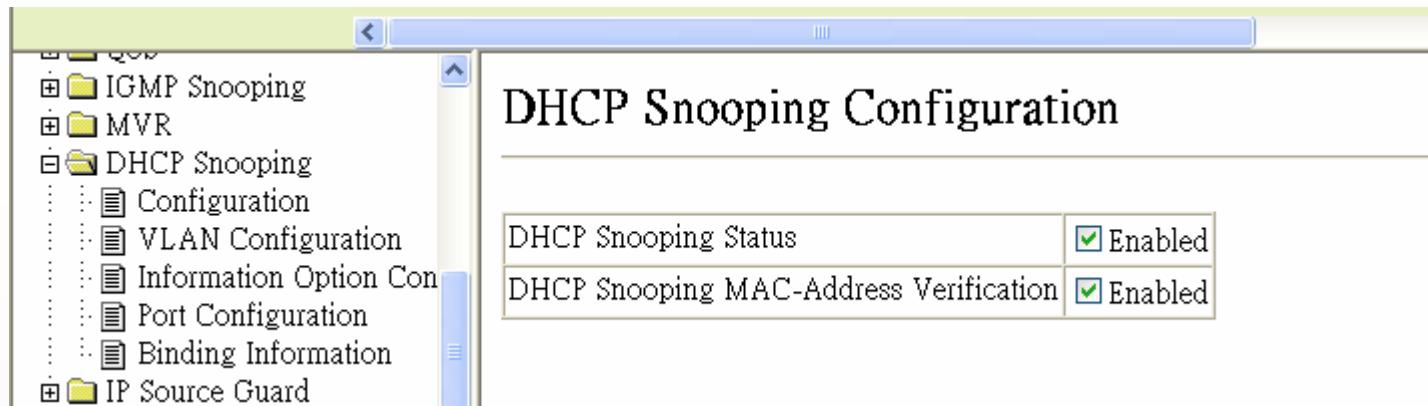
```
Console(config)#ip dhcp snooping information policy ?
  drop    drop
  keep    keep
  replace replace
```

- ***ip dhcp snooping information policy {drop/keep/replace}*** – configure the reforwarding policy, default is: replace existing option82 information of DHCP Request packets.
- Note: If the DHCP Snooping is enabled and the option82 feature is enabled, then the option82 function works.

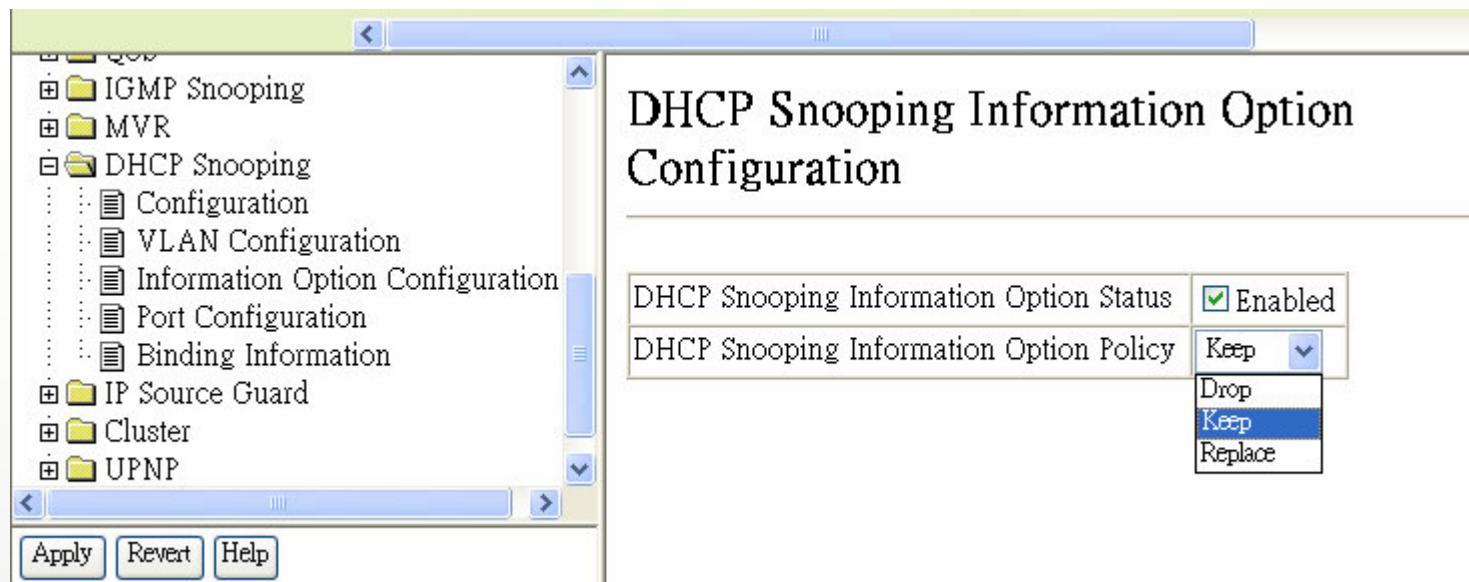
DHCP Option 82 Commands

- **Console(config)# IP dhcp relay information option**
Global configuration command to enable DHCP Relay Option 82. Use the **no** form to disable.
- **Console(config)# IP dhcp relay server A.B.C.D**
To specify server IP address

Configure Option 82 In DHCP Snooping by Web I.



Configure Option 82 In DHCP Snooping by Web II.



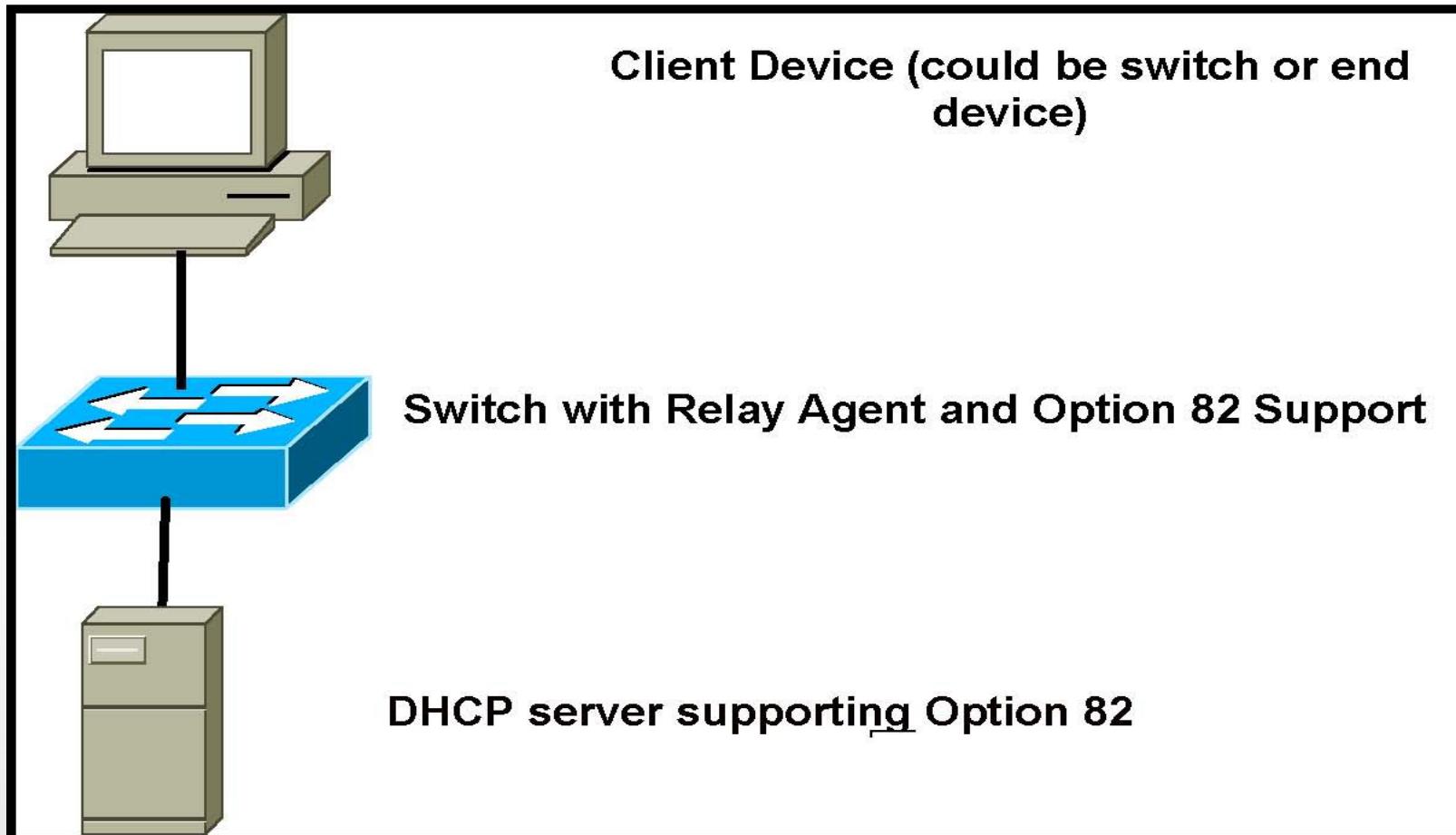
Hands On



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Scenario



Create VLAN

- Console#config
- Console(config)#**vlan database**
- Console(config-vlan)#**vlan 2 media ethernet state active**
- Console(config-vlan)#**vlan 3 media ethernet state active**
- Console(config-vlan)#**exit**

Assign ports to VLAN

- Console(config)#**interface eth 1/7-12**
 - Console(config-if)#**switchport allowed vlan add 2**
 - Console(config-if)#**switchport native vlan 2**
 - Console(config-if)#**switchport allowed vlan remove 1**
 - Console(config-if)#**exit**
-
- Console(config)#**interface eth 1/13-24**
 - Console(config-if)#**switchport allowed vlan add 3**
 - Console(config-if)#**switchport native vlan 3**
 - Console(config-if)#**switchport allowed vlan remove 1**
 - Console(config-if)#**exit**

Switch Configuration for Option 82

- Console(config)#**ip dhcp relay information option**
- Console(config)#**ip dh re information policy drop**
- Console(config)#**ip dhcp relay server 192.168.255.1**
- Console(config)#**exit**

Show Option 82 status

- Console#**sh ip dhcp-relay**

Status of DHCP relay option82:

Insertion of option82 is Enabled.

DHCP option policy :drop.

DHCP relay-server address 192.168.255.1 0.0.0.0
0.0.0.0 0.0.0.0 0.0.0.0

Web configuration

Layer2+ Fast Ethernet Standalone Switch ES3526XA - Microsoft Internet Explorer

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(I) 說明(H)

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網址(D) http://192.168.255.92/ 移至 連結 >

Unit: 1 Mode: Active

Link Up Link Down

IP Configuration

Management VLAN: 1

IP Address Mode: Static

IP Address: 192.168.255.92

Subnet Mask: 255.255.255.0

Gateway IP Address: 192.168.255.254

MAC Address: 00-12-CF-1E-3B-A0

DHCP Relay Option 82: Enabled

DHCP Relay Option 82 Policy: Replace

DHCP Relay Server: 192.168.255.1 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0

Restart DHCP

Apply Revert Help

完成 信任的網站

開始 服務 命令提示... Layer2+ F... Cisco TFT... 文件1 - M... 下午 08:48

Management VLAN:	1
IP Address Mode:	Static
IP Address:	192.168.255.92
Subnet Mask:	255.255.255.0
Gateway IP Address:	192.168.255.254
MAC Address:	00-12-CF-1E-3B-A0
DHCP Relay Option 82:	<input checked="" type="checkbox"/> Enabled
DHCP Relay Option 82 Policy:	Replace
DHCP Relay Server:	192.168.255.1 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0

DHCP server configuration

- shared-network Test {
 subnet 192.168.255.0 netmask 255.255.255.0 {
 option routers 192.168.255.254;
 }
 pool { allow members of "NoCircuitID";
 range 192.168.255.50 192.168.255.75; }

 pool { allow members of "Port4";
 range 192.168.255.96 192.168.255.105; }

 pool { allow members of "Port5";
 range 192.168.255.106 192.168.255.115; }

 pool { allow members of "VLAN2";
 range 192.168.255.126 192.168.255.140; }

 pool { allow members of "VLAN3";
 range 192.168.255.141 192.168.255.190; }

 pool { allow members of "WithCircuitID";
 range 192.168.255.191 192.168.255.200; }
}

Verify IP address assigned

- Connect to the different ports to check if IP address assigned correctly
 - Port 4 range 192.168.255.96 192.168.255.105
 - Port 5 range 192.168.255.106 192.168.255.115
- Connect to the different VLANs to check if IP address assigned correctly
 - VLAN 2 range 192.168.255.126 192.168.255.140
 - VLAN 3 range 192.168.255.141 192.168.255.190



Q&A