

Cisco DHCP部署

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Need for a DHCP Server

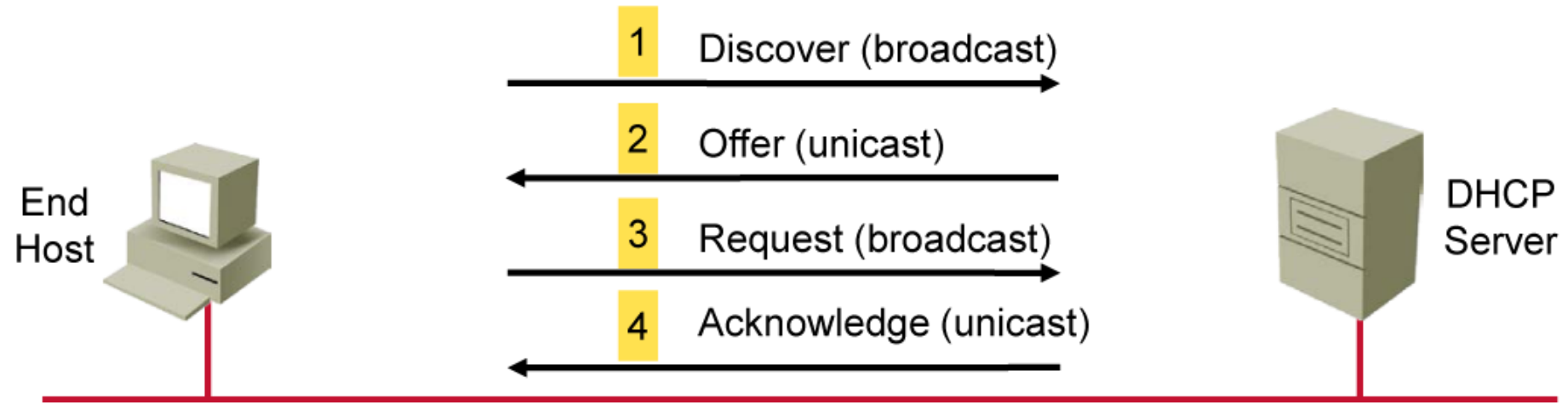
A manual IP address assignment in a medium-sized LAN is as follows:

- Time consuming-浪费时间
- Prone to errors-容易出错
- Unfavorable to employee mobility-毫无扩展性

A DHCP IP address assignment in a segmented LAN is as follows:

- An IP address that is automatically assigned in accordance with user VLAN settings根据用户VLAN属性，地址被自动的指定分配
- A centralized IP address allocation that enables consistency across the whole organization通过和中心地址的关联，使得整个组织有连续的和层次化的结构

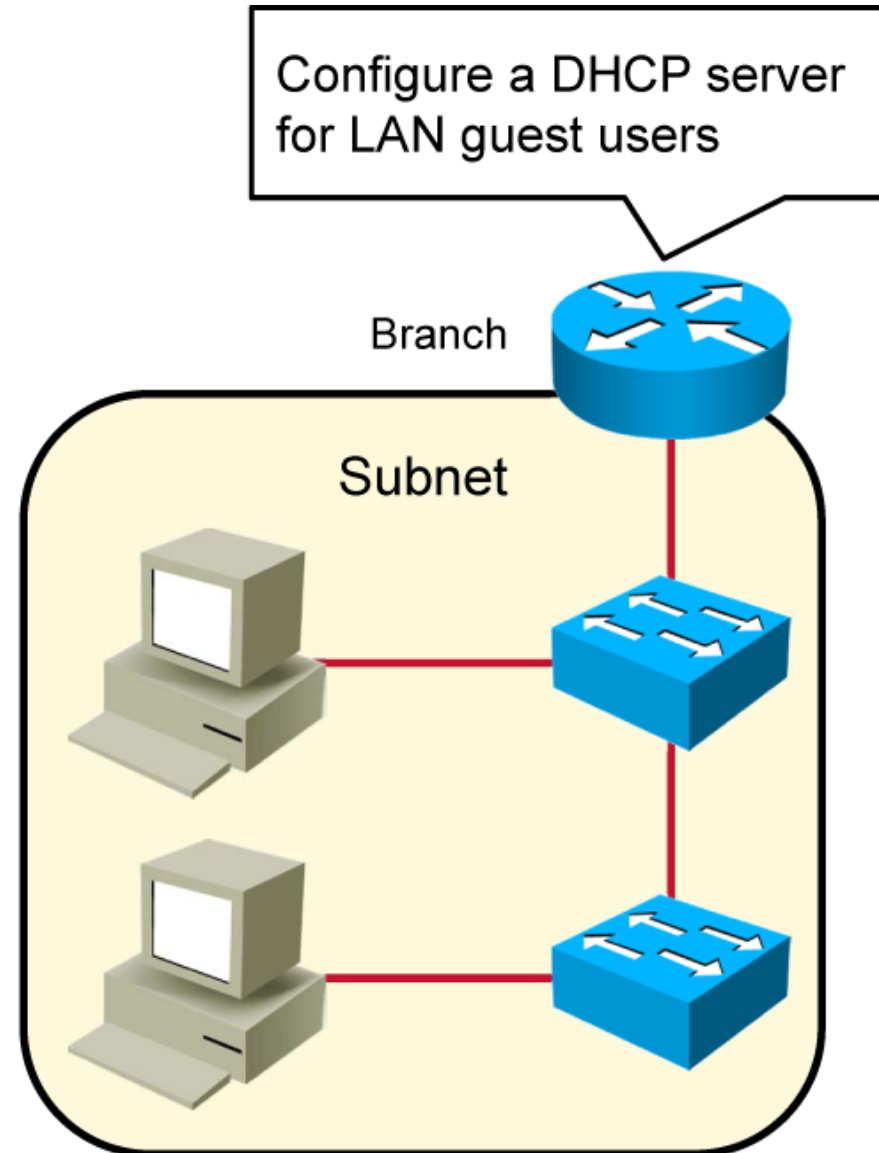
Understanding DHCP



Configuring a DHCP Server

Configuration scenario:

- Configure a DHCP server on a Cisco router
- Assign IP addresses from address pool 10.1.50.0/24 with a lease time of 12 hours
- Do not assign IP addresses from 10.1.50.1 to 10.1.50.50
- Additional parameters: default gateway, domain name, and DNS server



Configuring a DHCP Server (Cont.)

Cisco IOS DHCP server configuration:

- Enter the DHCP pool configuration mode
- Assign DHCP parameters to the DHCP pool
- Exclude IP addresses from the DHCP assignment

```
Branch(config)# ip dhcp pool Guests ====动态的分配地址
Branch(dhcp-config) #network 10.1.50.0 /24
Branch(dhcp-config)# default-router 10.1.50.1
Branch(dhcp-config)# dns-server 10.1.50.1
Branch(dhcp-config)# domain-name example.com
Branch(dhcp-config)# lease 0 12
Branch(dhcp-config)# exit
Branch(config)# ip dhcp excluded-address 10.1.50.1 10.1.50.50
```

Configuring a DHCP Server

```
Branch(config)# ip dhcp pool Yeslab 静态的分配地址
Branch(dhcp-config) #host 10.1.50.110 255.255.255.0
Branch(dhcp-config)# client-identifier XX
```

这个地方比较特殊；如果Client是window操作系统，这个Client-id 是在主机Mac的前面加上01；如01AB.CDAB.CDAB.CD；如果是一个IOS操作系统的设备那么这个Client-id 就是一个乱码，需要我们先在Show ip dhcp bing 中查看到这个Client-id 才能进行静态的绑定。

如果client端是一个linux操作系统的设备那么就不需要使用Client-identifier；而需要使能Hardware-addressABCD.ABCD.ABCD（client的MAC地址）

```
Branch(dhcp-config)# dns-server 10.1.50.1
Branch(dhcp-config)# domain-name example.com
Branch(dhcp-config)# lease 0 12
```

Configuring a DHCP Server

```
Branch(config)# ip dhcp pool Yeslab 静态的分配地址 方法二
Branch(dhcp-config) #origin file tftp://192.168.98.1/text.txt
Branch(dhcp-config) #network 192.168.98.0 255.255.255.0
```

例如要让MAC为abcd.abcd.abcd的客户端每次都分配到192.168.98.4的IP，

1、创建静态映射文本

```
*time* Oct 29 2013 20:52 PM
```

```
*version* 2
```

```
! IP address      Type Client-ID   Lease expiration
```

```
192.168.98.3/24 id  0100.104b.33da.73  Infinite
```

```
192.168.98.4/24 id  01abcd.abcd.abcd  Infinite
```

```
192.168.98.5/24 id  0100.104b.33da.75  Infinite
```

```
*end*
```

将以上蓝色文字另存为一个名为**test.txt**的文本文件，并上传到Router的flash中，注意在Client-ID局域的MAC前面多了一个**01**表示是介质类型是以太网，同时系统同的是**windows**。

Monitoring DHCP Server Functions

```
Branch# show ip dhcp pool

Pool Guests :
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)         : 0 / 0
Total addresses                   : 254
Leased addresses                  : 2
Pending event                    : none
1 subnet is currently in the pool :
Current index      IP address range      Leased addresses
10.1.50.55        10.1.50.1 - 10.1.50.254      2
```

- Verifies information about configured DHCP address pools

Monitoring DHCP Server Functions (Cont.)

```
Branch# show ip dhcp binding
Bindings from all pools not associated with VRF:
IP address      Client-ID/          Lease expiration    Type
                Hardware address/
                User name
10.1.50.54      0100.0c29.8807.34  Oct 18 2012 06:56 PM Automatic
10.1.50.56      0100.0c29.4532.be  Oct 18 2012 07:08 PM Automatic
```

- Displays address bindings information

```
Router1(config)#ip dhcp database flash:ABC.TXT

Router1(config)#end
```

Monitoring DHCP Server Functions (Cont.) 查看地址冲突

```
Branch# show ip dhcp conflict
IP address      Detection method  Detection time      VRF
10.1.50.52      Gratuitous ARP    Oct 18 2012 06:56 AM
10.1.50.53      Ping              Oct 18 2012 07:08 AM
```

- Displays the address conflicts that are found by a DHCP server
 - **IP Address:** The IP address of the host as recorded on the DHCP server
 - **Detection Method:** The manner in which the IP address of the hosts were found on the DHCP server; can be a ping or a gratuitous ARP
 - **Detection time:** The time when the conflict was found

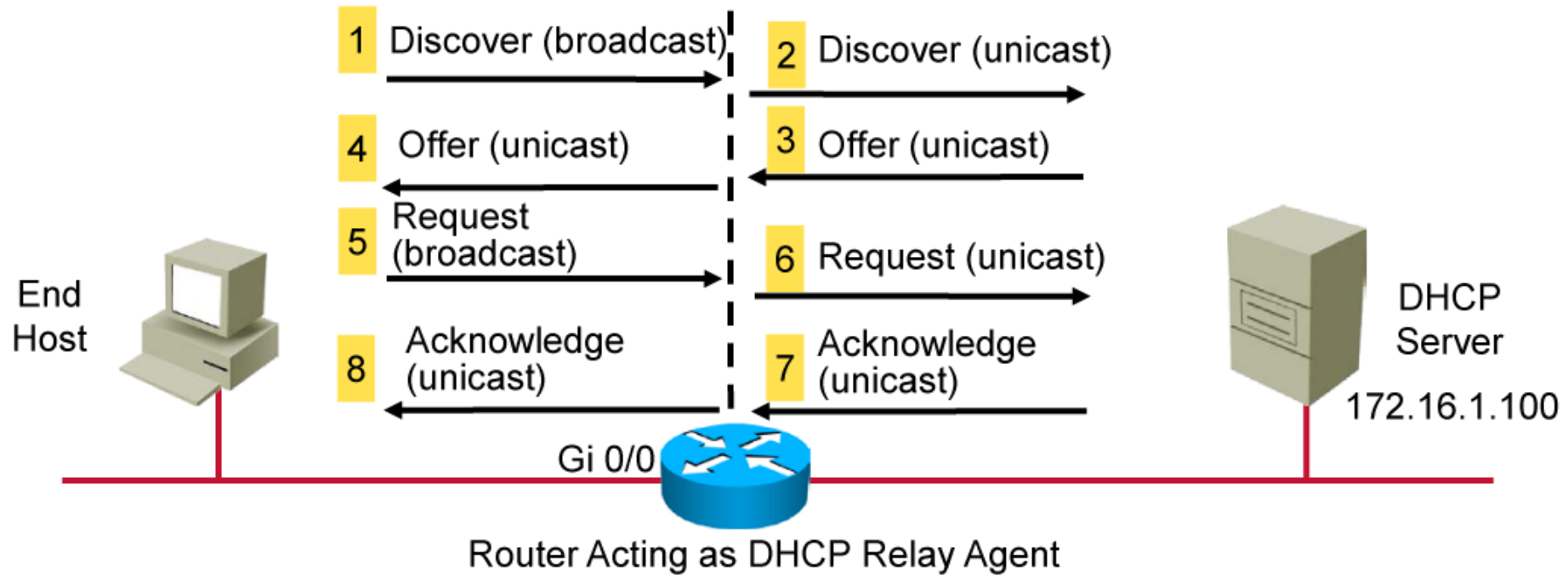
DHCP Relay Agent

The need for a centralized DHCP solution:

- Managing individual DHCP servers across many locations is time-consuming. 管理处于不同VLAN或者地点的DHCP服务器耗费时间
- Ensuring consistency in several different places can easily lead to errors. 管理不同位置的服务器容易导致错误

To support a centralized DHCP solution in branch offices, only the **DHCP relay agent** needs to be configured.

DHCP Relay Agent (Cont.)



```
Branch(config-if) # ip helper-address 172.16.1.100
```

- Enables DHCP relay agent on a local interface
- DHCP中继代理的前提是路由相互可达，把不能通过跨越网段的广播封装到单播中实现

DHCP Relay Agent (Cont.)

```
Branch(config-if)# ip helper-address 172.16.1.100
```

配置了Ip helper-address 会把UDP的报文都发给Server
全局下: ip forward-protocol {UDP [PORT]} 默认是转发所有的
UDP 数据

如果是只想转发dhcp的报文, 那么需要

```
no ip forward-protocol
```

```
ip forward-protocol udp 67
```

```
ip forward-protocol udp 68
```

Summary

- A DHCP server provides dynamic IP address assignment to end hosts, reducing errors and the time that is needed to administer address assignment.
- Before a client obtains an IP address from a DHCP server, it exchanges DHCP discover, offer, request, and acknowledge messages with the DHCP server.
- Both Cisco routers and Cisco Catalyst switches can be configured as DHCP servers.
- Use the verification commands **show ip dhcp pool**, **show ip dhcp binding**, and **show ip dhcp conflict** to monitor a DHCP server.
- When a centralized DHCP server is in use, configure DHCP relay agent functionally using the **ip helper-address** interface configuration command.

Thank you.

