

ĐẠI HỌC KHOA HỌC TỰ NHIÊN, TP.HCM
KHOA ĐIỆN TỬ - VIỄN THÔNG
BỘ MÔN VIỄN THÔNG VÀ MẠNG

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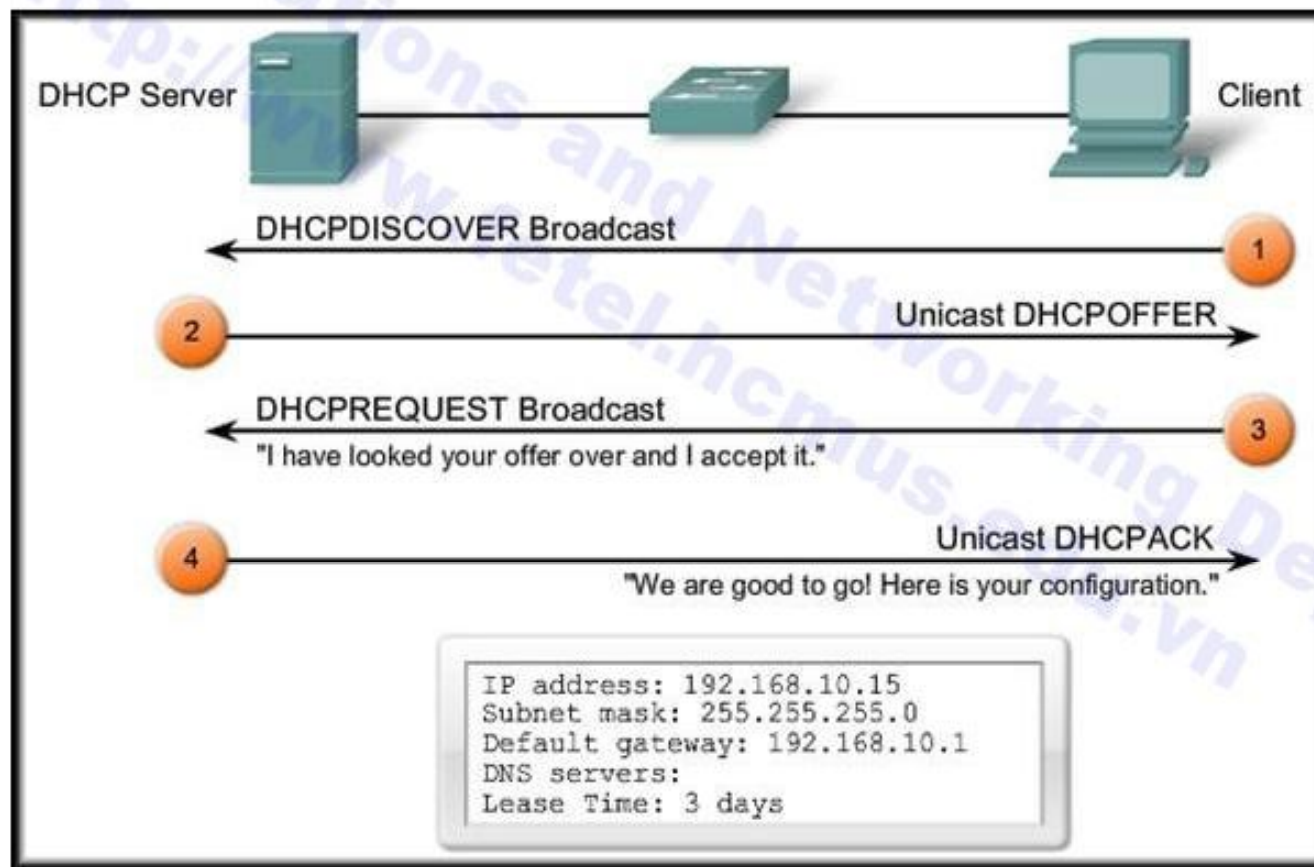
Môn học: Công Nghệ Mạng

Bài 05

DỊCH VỤ DHCP

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Dynamic Host Configuration Protocol (DHCP)



Dynamic Host Configuration Protocol (DHCP)

Every device that connects to a network needs an IP address.

- Network administrators assign **static IP addresses** to routers, servers, and other network devices whose **locations (physical and logical) are not likely to change.**
- User computers in an organization often change locations, physically and logically.
 - **Desktop clients** do not require a static address.
 - A workstation **can use any address** within a range of addresses.
 - This range is typically **within an IP subnet.**

Dynamic Host Configuration Protocol (DHCP)

- Administrators typically prefer a **network server** to offer DHCP services.

- Scalable.
- Relatively easy to manage.



- In a small branch or SOHO location, a **Cisco router** can be configured to provide DHCP services without the need for an expensive dedicated server. 📄



DHCP Operation

- **Address Allocation Methods:**

- **Manual:**

- The IP address for the client is pre-allocated by the administrator and DHCP conveys the address to the client.

- **Automatic:**

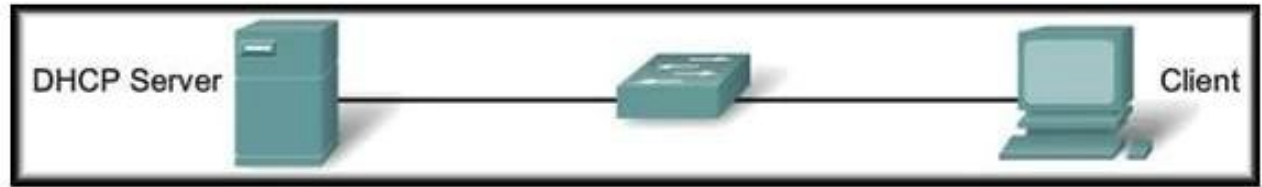
- DHCP automatically assigns a permanent IP address to a client with no lease period.

- **Dynamic:**

- DHCP assigns, or leases, an IP address to the client for a limited period of time.

DHCP Operation

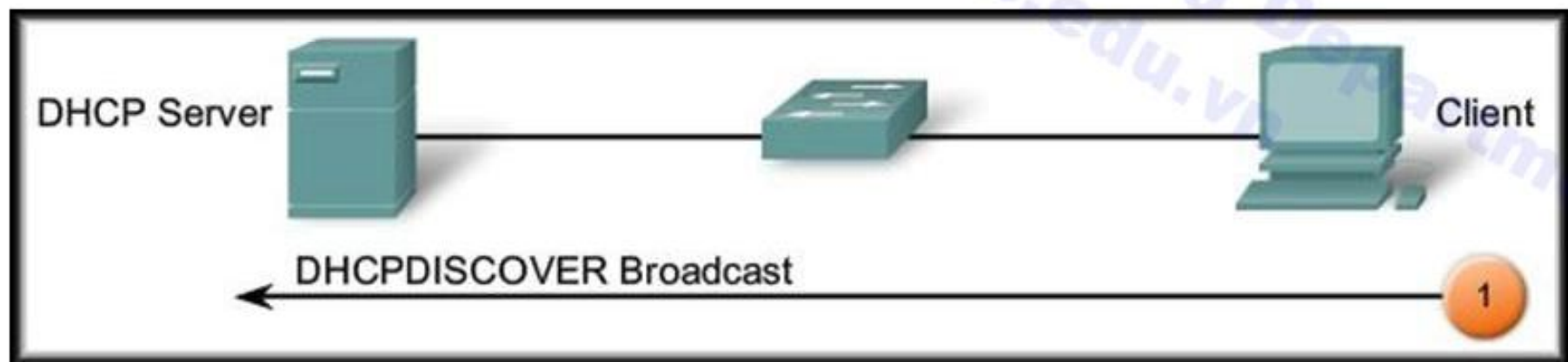
- **Dynamic Allocation:**



- DHCP works in a **client/server** mode.
 - When the client connects, the server **assigns or leases** an IP address to the device.
 - The device connects to the network with that leased IP address until the **lease period expires**.
 - The host must contact the DHCP server periodically to **extend the lease**. cho thuê
 - The leasing of addresses assures that addresses that are no longer used are **returned to the address pool** for use by other devices.

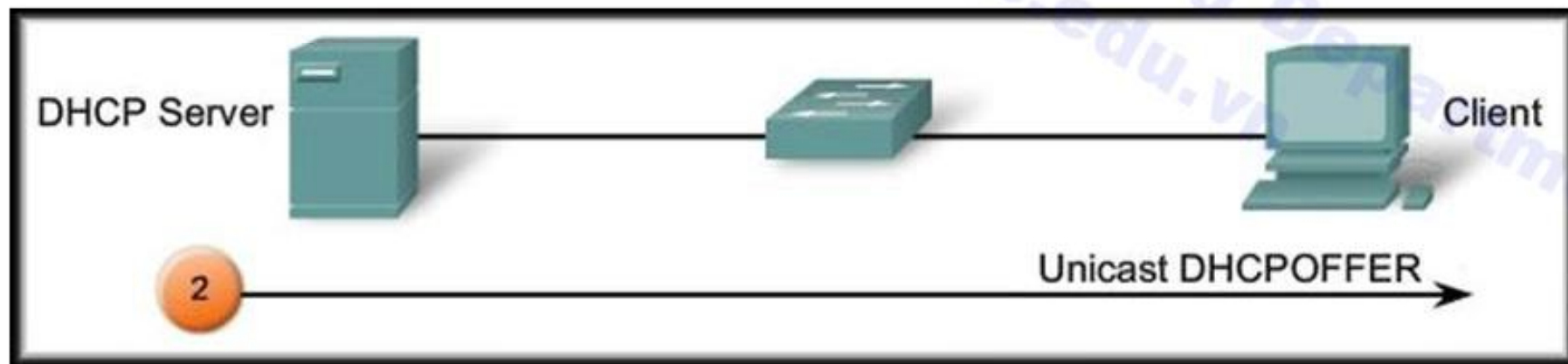
DHCP Operation

- **Dynamic Allocation:** 4 Step Process.
 - **DHCPDISCOVER:**
 - The client **broadcasts** a **DHCPDISCOVER** message.
 - The **DHCPDISCOVER** message finds the DHCP server(s) on the network.



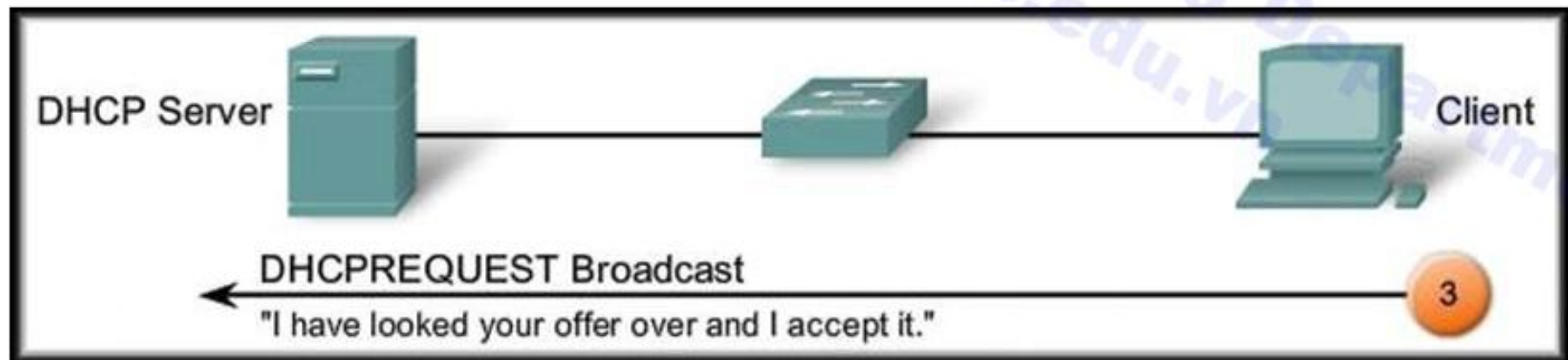
DHCP Operation

- **Dynamic Allocation:** 4 Step Process.
 - **DHCPOFFER:**
 - The server responds with a **DHCPOFFER**.
 - The **DHCPOFFER** message is sent as a **unicast** and contains an available IP address to lease.



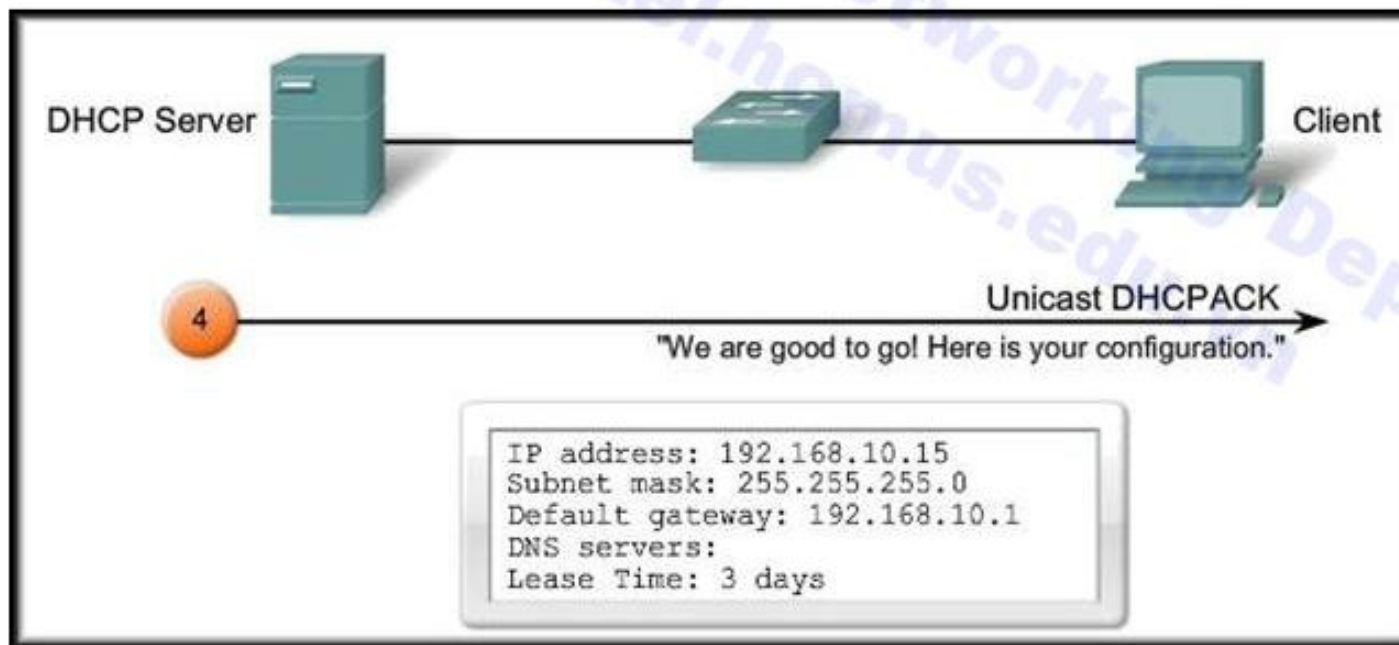
DHCP Operation

- **Dynamic Allocation:** 4 Step Process.
 - DHCPREQUEST:
 - The client responds with a **broadcast** of a **DHCPREQUEST** message.
 - When used for obtaining a lease, it serves as an *acceptance notice to the selected server* and an *implicit decline to any other servers*.
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 - Also used for **lease renewal** and **verification**.



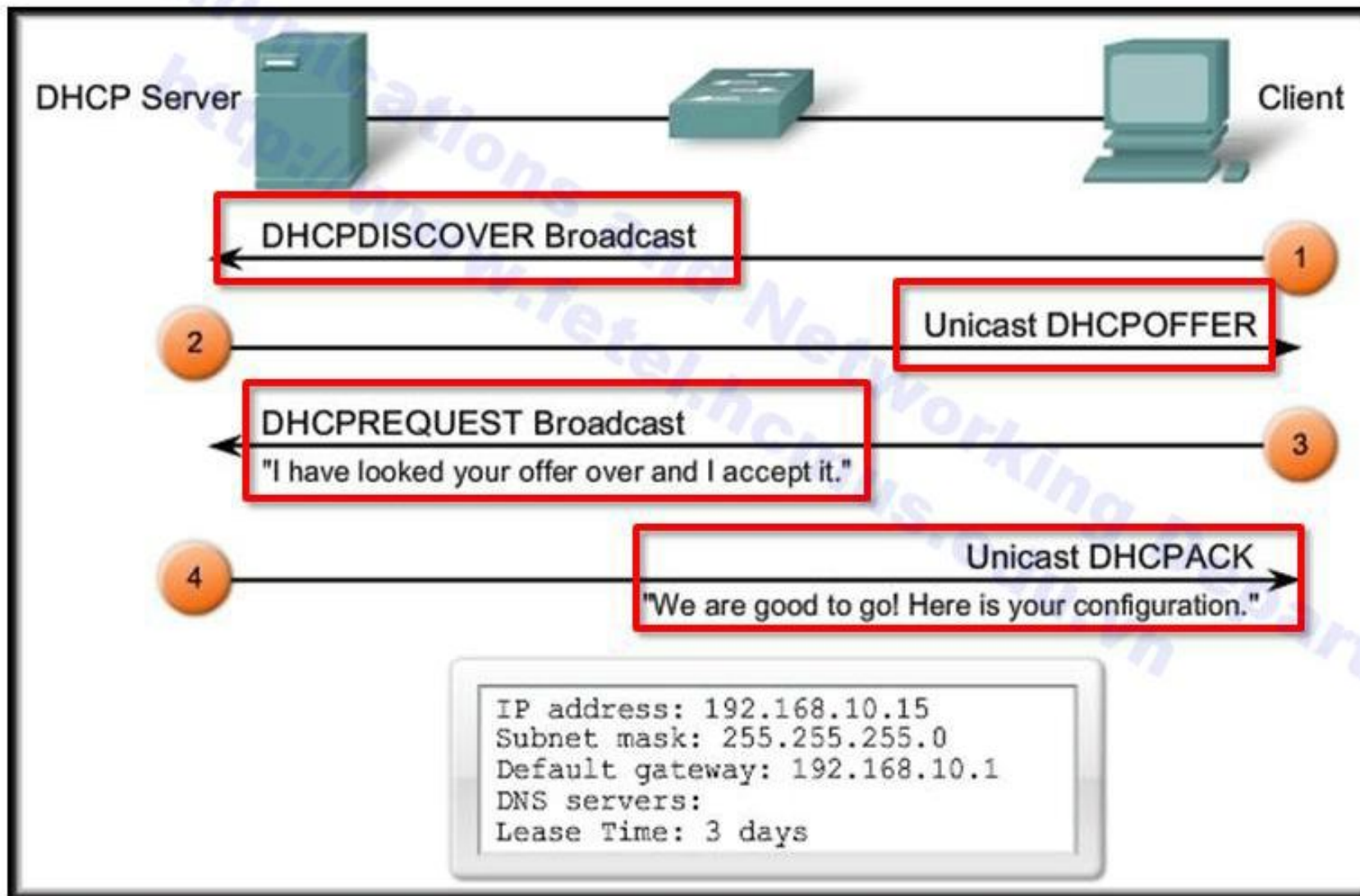
DHCP Operation

- **Dynamic Allocation:** 4 Step Process.
 - **DHCPACK:**
 - The server verifies the lease information and responds with a **DHCPACK** message.
 - The client logs the information and **sends an ARP** request to verify that the address is unique.



DHCP Operation

- **Dynamic Allocation:** 4 Step Process.



BOOTP and DHCP

- **Bootstrap Protocol (BOOTP):**

tiên nhiệm

- Predecessor of DHCP.
- A method to download address and boot configurations for **diskless workstations**.
- Both DHCP and BOOTP are client/server based and use **UDP ports 67 and 68**.
- The **main difference** is that BOOTP was **designed for manual pre-configuration** of the host information in a server database.

BOOTP	DHCP
Static mappings	Dynamic mappings
Permanent assignment	Lease
Only supports four configuration parameters	Supports over 20 configuration parameters

DHCP Message Format

- The developers of DHCP needed to maintain compatibility with BOOTP.

Same as BOOTP

8	16	24	32
OP Code (1)	Hardware type (1)	Hardware address length (1)	Hops (1)
Transaction Identifier			
Seconds – 2 bytes		Flags – 2 bytes	
Client IP Address (CIADDR) – 4 bytes			
Your IP Address (YIADDR) – 4 bytes			
Server IP Address (SIADDR) – 4 bytes			
Gateway IP Address (GIADDR) – 4 bytes			
Client Hardware Address (CHADDR) – 16 bytes			
Server name (SNAME) – 64 bytes			
Filename – 128 bytes			
DHCP Options – variable			

Added to support functions of DHCP.

DHCP Server

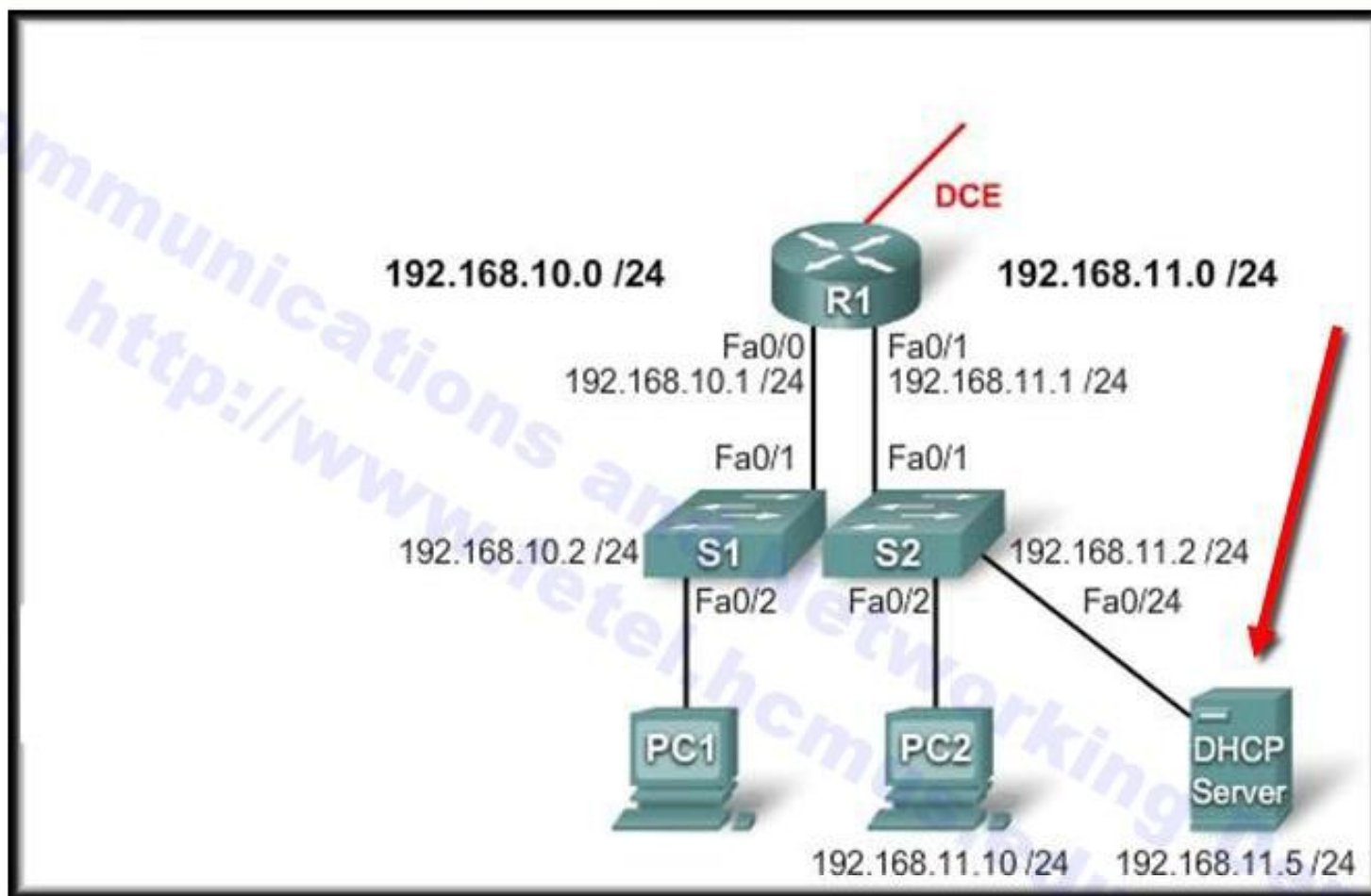
DHCP server ping 1 IP nao do mac dinh 2 lan truoac khi chi dinh IP do cho 1 client

- By default, the DHCP server **pings a pool address twice** before assigning the address to a requesting client.

Neu DHCP ma ping khong thay IP hoi dap trong 500ms thi DHCP server gia su rang IP do ko ton tai vaf su dungj IP khac de cap cho client

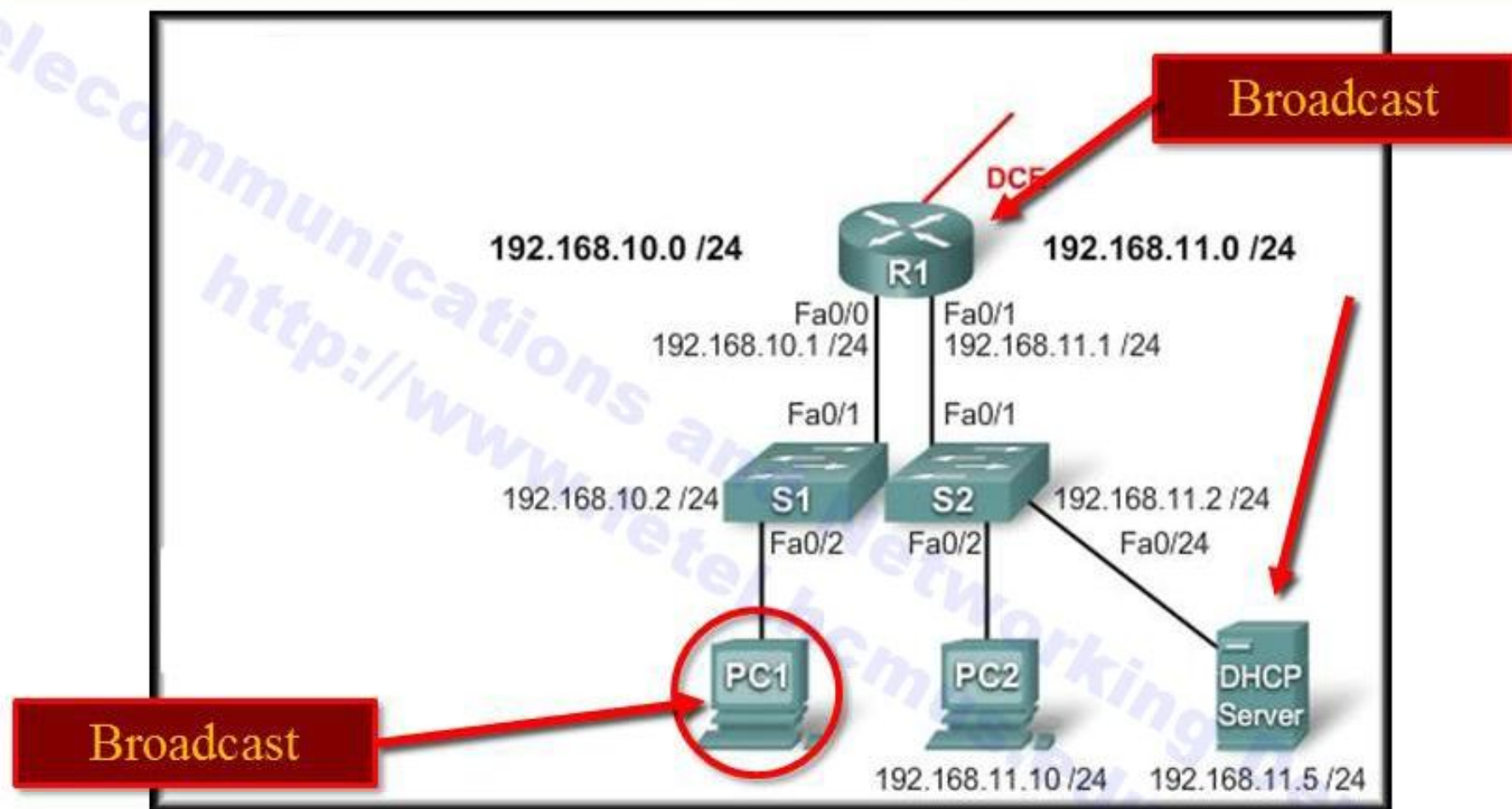
- If the ping is **unanswered within 500 ms (i.e. times out)**, the DHCP server *assumes that the address is not in use and assigns the address to the requesting client.*
- To change the number of ping packets sent and/or the timeout wait value:

DHCP Relay Agent



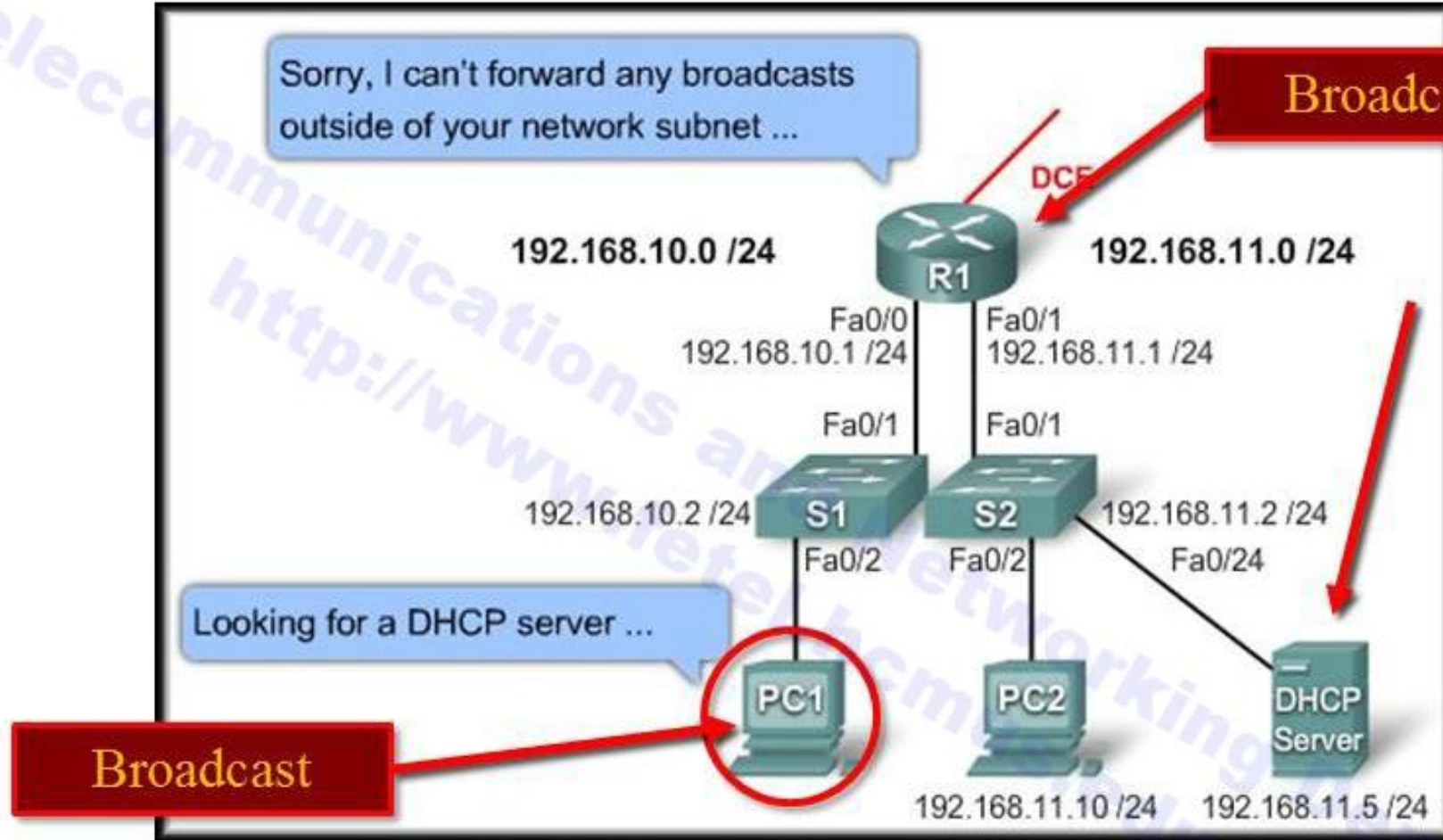
- In a complex hierarchical network, enterprise servers are usually contained in a server farm.
- These servers may provide DHCP, DNS, TFTP, and FTP services for the clients.

DHCP Relay Agent



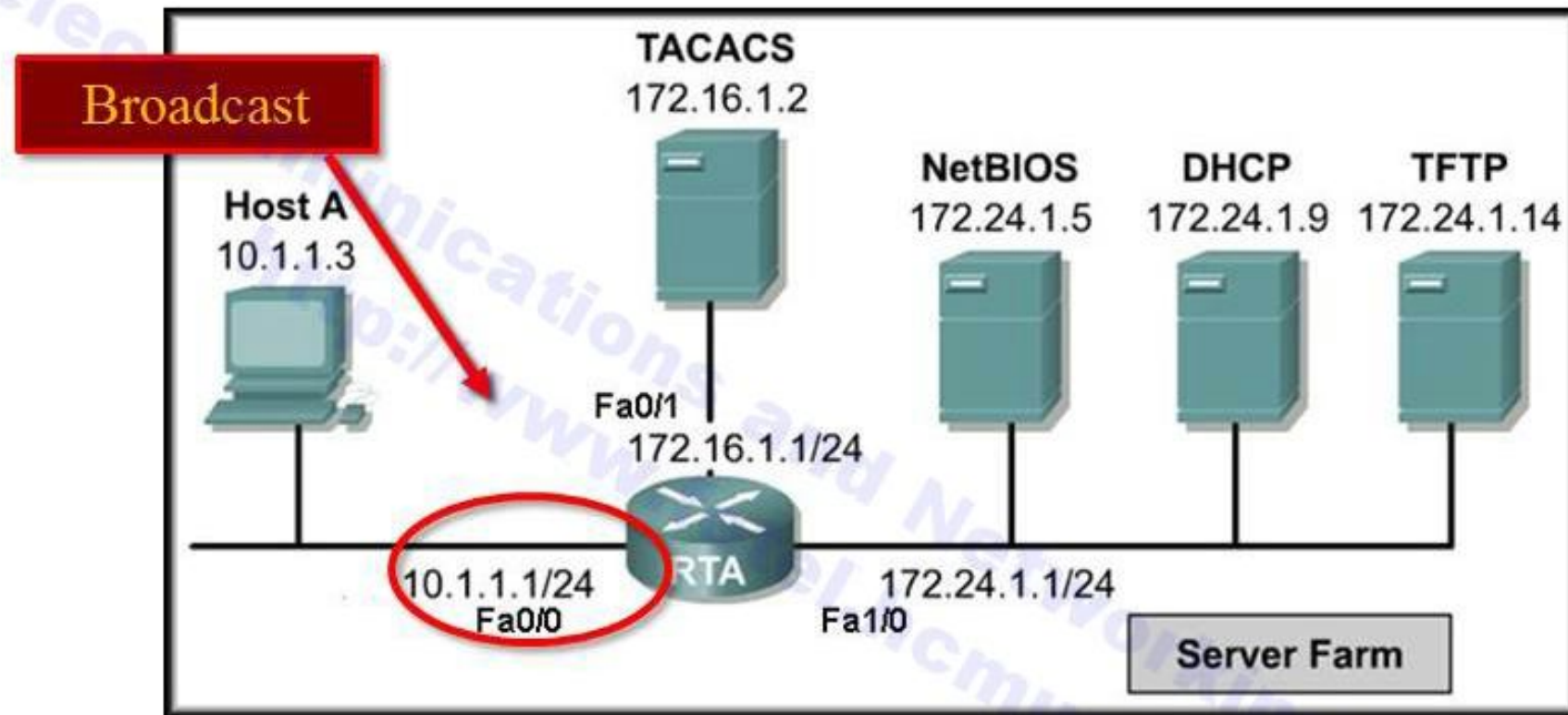
- PC1 either tries to obtain an IP configuration or attempts to renew its address.
- In addition, other network services use broadcasts to find a TFTP server or an authentication server.

DHCP Relay Agent



- The solution is **DHCP Relay Agent**.
- Routers will forward DHCP broadcasts, and others, to the appropriate server.

DHCP Relay Agent



- To configure **RTA Fa0/0** (the interface that *receives* the Host A broadcasts) to **relay DHCP** broadcasts to the DHCP server.

Câu hỏi và giải đáp



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