Mobile IP Network Layer

Lesson 09

Dynamic Host Configuration Protocol

Mobile node (or laptop) visiting another network

- Needs identity on the network— a separate domain name server
- Requires to function on subnet on the Internet
- Needs a new IP address

Mobile node visiting a foreign network

- DHCP enables that node a new IP address
- Gets a Care-of address (COA) by agent discovery process and advertisement of the COAs by the foreign agent
- Co-located COA obtained by the dynamic host configuration protocol (DHCP)

Server for the Mobile node visiting another network

- Provides a dynamic IP address, subnet mask, and ARP and RARP caches
- Enables the node to transmit and receive the IP packets using the new IP address for accessing Internet
- Server (and thus subnet) has its own IP address to provide connectivity to the Internet

Dynamic host configuration protocol (DHCP)

- A protocol to dynamically provide new IP address to visiting node
- Set subnet masks for the node
- Enables use of the server and subnet router at the place being visited
- Guarantees that any assigned network address is in use by only one DHCP client or none at a given instant

DHCP client

- Software in an agent (for example, foreign agent for visiting mobile node)
- Device software for connecting to the network using a software component
- Protocol communicates with a server
- Number of steps in the DHCP protocol for dynamically configuring the client IP address and other networks

DHCP server

- The server— software for allocation of network addresses to the computer
- A number of DHCP servers at a subnet, a request is broadcasted to several servers
- Server may be part of the operating system of the computer seeking connection to the network

Step 1

- The DHCP client in an agent, device or node broadcasts DHCPDISCOVER— *a discover* request
- Directly or through a DHCP relay-agent to the servers

Step 2

- Each server listening to the *discover*-request DHCPDISCOVER finds the configuration, which can be offered to the client
- Server(s) send(s) the configuration parameters including an IP address not presently in use at the subnet
- The configuration parameters are in the DHCPOFFER for the offered configuration

Step 3

- Client can reject the DHCPOFFER from a server or servers
- When DHCP offers from all the servers are rejected, the client repeats the steps from step 1
- Else step 4

Step 4

- The client replies to the servers, through a DHCPREQUEST to each server
- The option ‘reject’ is set in each reply to those DHCP servers to which the client reply is ‘reject’
- The option ‘select’ is set for those servers to which the client reply ‘select’

Step 5

- The selected DHCP server creates and manages bindings
- Sets a time interval during which the offered IP address will be valid for the DHCP client
- The required interval can vary
- Depends on the likely Internet connection interval at a particular Internet serving network

Binding

- A collection of configuration parameters, including at least one IP address, which is associated with and binds to the DHCP client
- Periodically provide new IP addresses

Step 6

- The DHCP server confirms the binding through a message
- It sends DHCPACK after creating the binding

Step 7

- When the DHCP client computer leaves the subnet, it sends DHCPRELEASE message
- In case the client does not send DHCPRELEASE within a specified time interval, the server frees the created binding

Step 8

- The server and client also use the authentication protocols before considering the DHCPDISCOVER from a client and before accepting a DHCPOFFER, respectively

Summary

- DHCP Client at visiting mobile node requests the servers
- DHCP server assigns dynamically the client IP address and other network configuring parameters to a DHCP client
- Gets COA by agent discovery process
- Co-located COA obtained by DHCP

End of Lesson 09

Dynamic Host Configuration Protocol