Practical No. 12

Aim: Installing and configure DHCP server and write a
program (C++ or Python or Java) to install the software on remote machine.

Objectives
- Understand what is DHCP and where it is used.
- Understanding the installation and configuration procedure of DHCP server.
- Understand remote installation of software.

Theory:

Dynamic Host Configuration Protocol (DHCP)

      The DHCP is nothing but the work provided by network which allows the host computer for getting the automatic assign setting from the server as that oppose to the manual configuration of each and every network host. Computers that are configure to the DHCP clients doesn't have any power across a setting that are receiving from DHCP server, and architecture made is being lucent to the user of computers.

      Standard setting that is given by the Dynamic Host Configuration Protocol server to the Dynamic Host Configuration Protocol clients includes:

1. IP address of the default gateway to use
2. IP address and the net mask
3. IP address of the DNS servers to utilise

Nevertheless, configuration properties could also be supplied by a DHCP server such as:
1. Time Server
2. Host Name
3. Print Server
4. Domain Name

The configuration settings provided a DHCP server could make use of the coming methods:

Manual allocation(MAC address)

Manual allocation method needs the use of Dynamic Host Configuration Protocol so that it identifies the distinctive address of hardware on every network card that connects to network and after that it continues its supply with the regular configuring at every instance when the Dynamic Host

Configuration Protocol clients make request to the Dynamic Host Configuration Protocol server by making use of that network device. These makes sure that the specific address is being assign in automatic manner to that network card, build on its Manual allocation address.

Dynamic allocation (address pool)

Here, the DHCP server would be assigning an IP address from the group of address (which is also called as scope or its range) for the particular phase of lease or time, which has been configure on server or till a client inform the server that it does not needs addresses henceforth. In such regards, clients would have received their dynamic configurable properties and on the basis of a "first come, first served". When a Dynamic Host Configuration Protocol client isn't available on network for a particular phase of time, the configuration is deceased and then release back to the address group so to get its utilisation by the other Dynamic Host Configuration Protocol Clients. In such regards, address could be on lease or use for the specific range of time. After this phase, the client had to rearrange sublet with a server so as to preserve the utilisation of address.

Automatic allocation

By making use of such method, Dynamic Host Configuration Protocol server assigns the IP address automatically to a device permanently, by making the selection   from   a group of addresses available.   Generally   Dynamic Host Configuration Protocol is been utilised in order to assign the temporal address to client, but a Dynamic Host Configuration Protocol server could allow a timeless lease time. The above two methods could be consider as "automatic" as in every condition the Dynamic Host Configuration Protocol server assign the address with no additional involvement required. There is one difference among them is for how long an IP address is being lease, also it can be said as whether the address of clients changes over time. Ubuntu is carried with the both Dynamic Host Configuration Protocol client and server. The server is dhcpd also known as dynamic host configuration protocol daemon. The client provided with Ubuntu is dhclient and it needs to get install on each and every computer that requires the automatic configuration. These two programs are simple to configure and install and it would be started automatically at the time of booting of system.

DHCP Installation and Configuration Steps(Tested on Ubuntu 14.04 OS)

1. At the terminal, command for installing dhcpd:
$ sudo apt-get install isc-dhcp-server
2. Edit the /etc/dhcp/dhcpd.conf file and then add the configuration as needed. Usually, here we need to allocate an IP address in random

manner. This could be done with the setting as:
minimal sample
/etc/dhcp/dhcpd.conf
default-lease-time 600;
max-lease-time 7200;
subnet 192.168.1.0 netmask 255.255.255.0 f
range 192.168.1.150 192.168.1.200;
option routers 192.168.1.254;
option domain-name-servers 192.168.1.1,
192.168.1.2; option domain-name
"mydomain.example";
}

This would outcome in the DHCP server getting clients an IP address from the range of 192.168.1.150-192.168.1.200. It would lease the IP address for about 10 minutes if a client does not ask for a particular frame of time. Nevertheless the maximum

(allowed) lease would be of 7200 seconds. Server would advise the client to utilise 192.168.1.254 as the default gateway and 192.168.1.1 and 192.168.1.2 as its DNS servers.

3. Also edit /etc/default/isc-dhcp-server to notify the interface dhcpd that needs to listen to i.e. eth0 for the wired interface and wlan0 for the wireless interface.
4. After making change in the config file you had to restart the dhcpd:
$sudo service isc-dhcp-server restart

Remote software installation
Write a simple socket program to establish the connection with the server and send configuration steps via. the socket.

Python APIs

For connecting to remote machine and executing commands on remote machine pxssh API is require.
import pxssh
To enter password in asteric format instead of visible plain text. import getpass

Algorithm: Remote

DHCPonfiguration 1: Establish

remote connection using pxssh.
2: Provide username and password to connect/authenticate to

remote machine. 3: Use sendline API to send and execute
commands on remote machine.
4: Use prompt and before API to display the output of commands
　 executed on remote machine.
5: Perform DNS configuration on remote machine using Step3 and Step4.

Conclusion: We are studied Installing and configure DHCP server and write a program
to install the software on remote machine

Signature with date