Birla Institute of Technology & Science, Pilani
Computer Networks (CS F303 / IS F303)
Second Semester 2015-2016

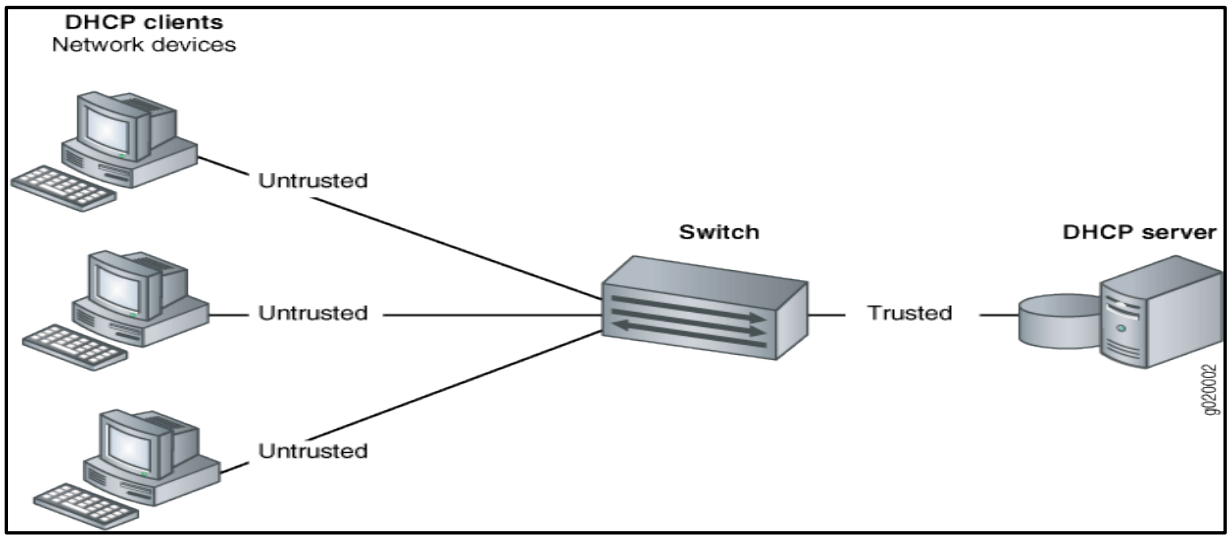
Configuring a DHCP Server

Aim: Installation and configuration of a DHCP server.

Objective: To understand the functionality of a DHCP server.

Requirements: Ubuntu (v11.10 has been used. The commands may require minor modification for older versions. See http://is.gd/EGdeix for changes required.)
Two or more machines interconnected directly, or through a network interconnection device like a switch (without a preconfigured DHCP server).

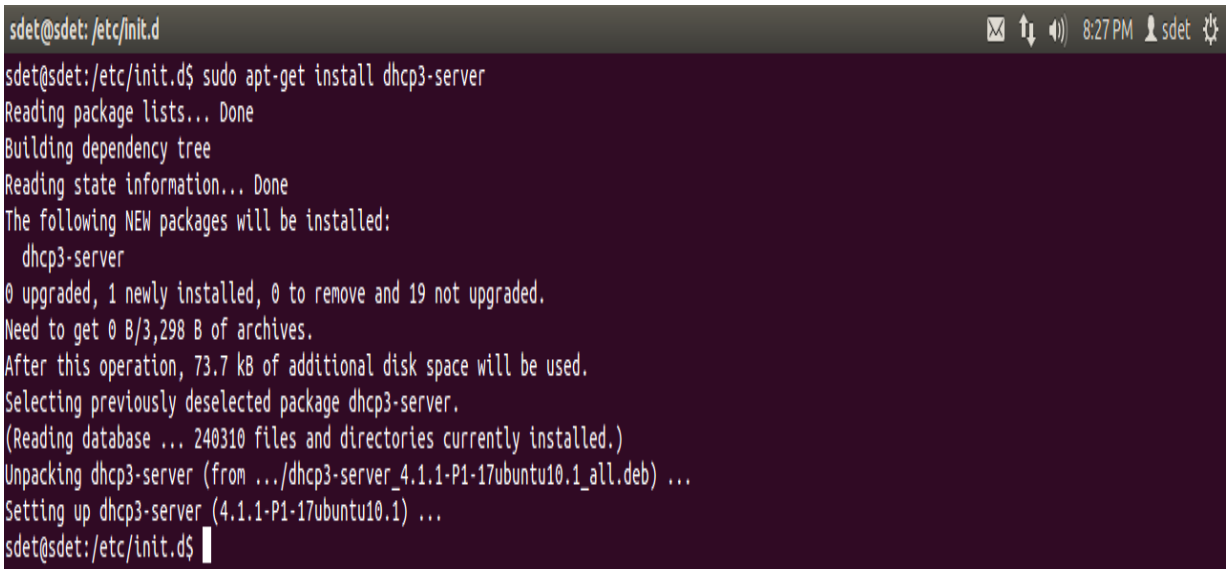
Description: Dynamic Host Configuration Protocol (DHCP) allows for manual and automatic assignment of IP addresses. DHCP is enacted when a new machine joins a network or an existing machine attempts to renew its IP address. DHCP is an extension of an older protocol known as the "bootstrap protocol" (BOOTP) and is backwards compatible with BOOTP.
(Further reading: http://is.gd/JbJhBs)



Installing the DHCP Server:

- Open the terminal.
- Use either of the commands “sudo apt-get install isc-dhcp-server” or “sudo apt-get install dhcp3-server” to install the latest version, if not already done.

Note: The start-up may show up as “failed”. This however is only because the server has not been configured as of yet.



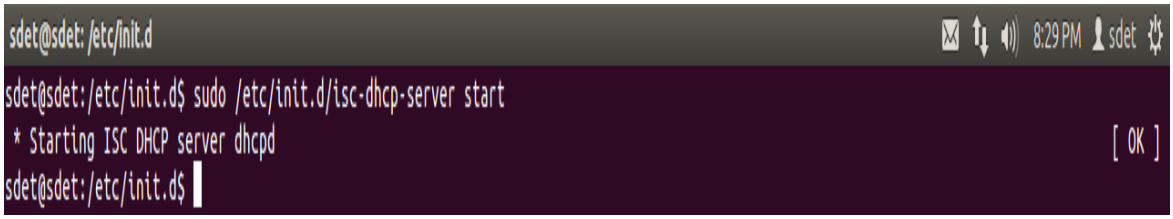
Procedure:

1. Edit the DHCP server configuration. This may be done by using the command: *"sudo gedit /etc/dhcp/dhcpd.conf"*

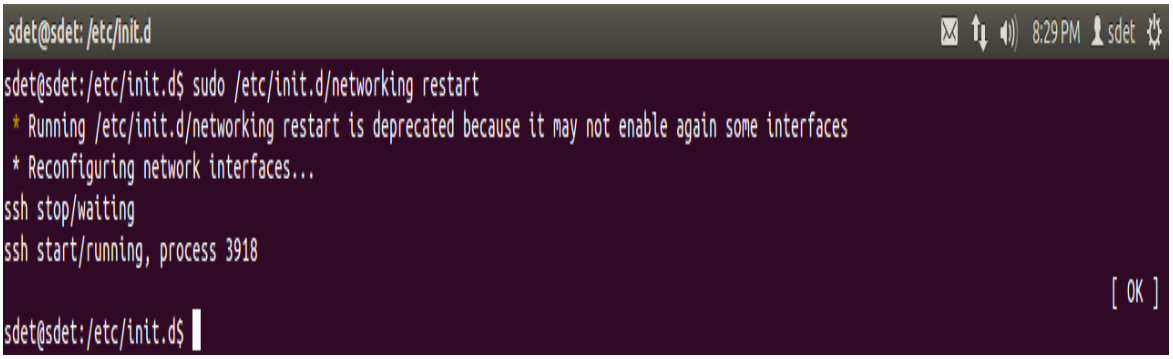
2. Edit the contents of the configuration file, making the necessary changes. The lines shown may be added/edited as required. 'domain-name' and 'domain-name-servers' may be uncommented and edited, if required. Here, we have set the range of IP addresses assigned by our DHCP server to be between 10.0.0.100 and 10.0.0.200. Other ranges may also be specified. Be careful however, that the addresses entered are valid IPv4 addresses.

```
# option definitions common to all supported networks...
#option domain-name "example.org";
#option domain-name-servers ns1.example.org, ns2.example.org;

#default-lease-time 600;
#max-lease-time 7200;

    default-lease-time 600;
    max-lease-time 7200;

    option subnet-mask 255.255.255.0;
    option broadcast-address 192.168.1.255;
    option routers 192.168.1.254;
    option domain-name-servers 192.168.1.1, 192.168.1.2;
    option domain-name "yourdomainname.com";

    subnet 10.0.0.0 netmask 255.255.255.0 {
    range 10.0.0.100 10.0.0.200;
    }

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
authoritative;
```

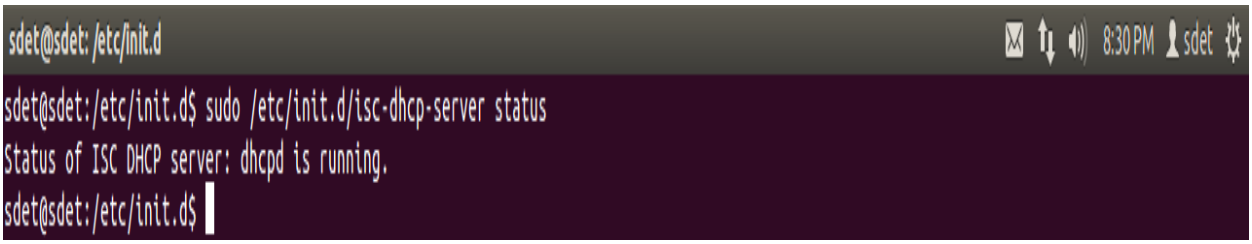
3. Start the DHCP server. This is done by running the command:
   sudo /etc/init.d/isc-dhcp-server start



4. Restart networking services using the command: *sudo /etc/init.d/networking restart*



5. The DHCP server should now be up and running. Its status may be checked by using the command: *sudo /etc/init.d/isc-dhcp-server status*



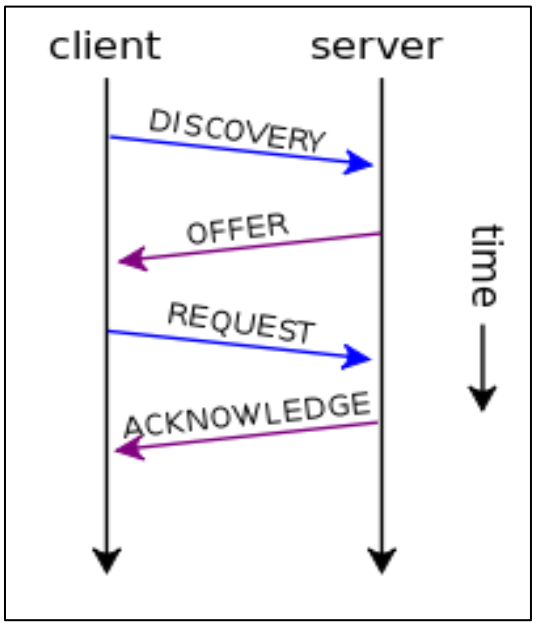
6. The DHCP server's IP address may be found by using the command: *ifconfig*

7. You may now try connecting another machine to your server directly, or through a network interconnection device like a switch. Try the previous command on that machine. Note that the IP address assigned to it is in the range specified in dhcpd.conf

```
tanay@tanay-M17xR3:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 5c:26:0a:71:ed:92
          inet addr:10.0.0.103  Bcast:10.0.0.255  Mask:255.255.255.0
          inet6 addr: fe80::5e26:aff:fe71:ed92/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:98117 errors:0 dropped:0 overruns:0 frame:0
          TX packets:30006 errors:0 dropped:0 overruns:0 carrier:6
          collisions:0 txqueuelen:1000
          RX bytes:34192022 (34.1 MB)  TX bytes:4157050 (4.1 MB)
          Interrupt:53

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:5909 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5909 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:720999 (720.9 KB)  TX bytes:720999 (720.9 KB)

wlan0     Link encap:Ethernet  HWaddr 38:59:f9:81:3b:e3
          inet addr:10.0.0.101  Bcast:10.0.0.255  Mask:255.255.255.0
          inet6 addr: fe80::3a59:f9ff:fe81:3be3/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:447 errors:0 dropped:0 overruns:0 frame:0
          TX packets:679 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:63505 (63.5 KB)  TX bytes:47452 (47.4 KB)

tanay@tanay-M17xR3:~$
```

Observations:

- The newly connected nodes will be assigned an IP addresses from the pool of legal values specified in dhcpd.conf.
- The IP address assigned to the newly connected nodes follow the sequence below



Lab Observation Sheet

Configuring a DHCP Server

Name: **ID No.:** **Date:**

Procedure:

Observations Table:

S. No.	Questions	Answers
1	What is the subnet used?	
2	In the sample text for dhcpd.conf given, which lines may be left out?	
3	What is the IP address of the configured DHCP server?	
4	What happens if multiple subnets are defined in dhcpd.conf?	
5	Can we use the newly added nodes as DHCP servers themselves? Justify.	