

# Introduction to IPv6 Lab

SUS09

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Note: The users root and geeko on the virtual machines have the password linux.

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Note: It is recommended that you try to solve the tasks on your own based on the description first, and only refer to the step-by-step description if you need hints how to proceed.

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## 1.1 Router Advertisement Daemon

In this exercise, you configure radvd on server1 and provide an IPv6 address to server2. The addresses used in this exercise are from the address range reserved for documentation

### Objectives:

Task I: Add an IPv6 Address to server1  
Task II: Edit /etc/radvd.conf

### Special Instructions and Notes:

If there is no eth1 interface on server1, use eth0 instead in the following instructions  
IPv6 address of server1: 2001:db8:::10  
IPv6 network prefix: 2001:db8::/64

### Task I: Add an IPv6 Address to server1

In this task, you add the 2001:db8:::10/64 IPv6 address to eth1 (or eth0 if there is no eth1). You can add the address temporarily using the **ip** command, or permanently with YaST, or by directly editing the `ifcfg-file` for the interface.

Do the following:

1. On server1, open a terminal window and **su -** to the root account.
2. To set the IP address temporarily (until the server is rebooted), enter  
**ip address add 2001:db8:::10/64 dev eth1**  
(If there is no eth1, use eth0 instead)
3. To view the address you just set, enter  
**ip address show**
4. To set the address permanently, open the  
`/etc/sysconfig/network/ifcfg-eth1` file and edit the IPADDR entry:  
**IPADDR='2001:db8:::10/64'**  
(If there is no eth1 interface, use the `ifcfg-eth0` file and add the following line at the end:  
**IPADDR\_6='2001:db8:::10/64' )**
5. You can also run **yast2 lan** and configure eth1 according to the above information (or add an address to eth0 if there is no eth1).

### Task II: Configure the Router Advertisement Daemon

In this task, you configure the Router Advertisement Daemon to distribute IPv6 addresses

in the network. Its configuration file is `/etc/radvd.conf`. It needs to be edited for `radvd` to be able to distribute IPv6 network prefixes in the local network.

Do the following:

1. As root user, on server1 open the `/etc/radvd.conf` file in an editor.
2. Scroll down to the line  
`prefix 2001:db8:1:0::/64`  
and change it to  
`prefix 2001:db8::/64`
3. Put comment characters (`#`) in front of all entries that are below the following lines:  
`prefix 2001:db8::/64`  
`AdvOnLink on;`  
`AdvAutonomous on;`  
`AdvRouterAddr off;`  
`};`  
except for the last line with  
`};`
4. Turn on IPv6 routing with  
`echo 1 > /proc/sys/net/ipv6/conf/all/forwarding`  
(You can make this persist over reboot by setting `IPV6_FORWARD="yes"` in `/etc/sysconfig/sysctl`.)
5. Start `radvd` with the command  
`rcradvd start`
6. If you want to start `radvd` automatically when the system boots, enter  
`chkconfig radvd on`
7. On server2, open a terminal window and enter  
`ip a s`  
You should see that one interface now has an additional IPv6 address with the `2001:db8:` prefix
8. From server2, try to ping server1 by entering  
`ping6 2001:db8::10`

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You have now set up `radvd` on server1.

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**(End of Exercise)**

## 1.2 DHCPv6

In this exercise, you configure dhcp6s on server1 and provide an IPv6 address and other information to server2.

The addresses used in this exercise are from the address range reserved for documentation

### Objectives:

Task I: Configure dhcp6s

Task II: Get an IPv6 Address from the Server

### Special Instructions and Notes:

If there is no eth1 interface, use eth0 instead in the following instructions

IPv6 address of server1: 2001:db8::10/64

- IPv6 address range: 2001:db8::1 to 2001:db8::100

### Task I: Configure dhcp6s

In this task, you configure the dhcp6s server to distribute IPv6 addresses from the pool given above as well as other information, such as the DNS server to use, in the network. The configuration of the dhcp6s server is contained in the `/etc/dhcp6s.conf` file.

Do the following:

1. On server1, open a terminal window and `su -` to the root account.
2. Open the `/etc/dhcp6s.conf` file in an editor and edit it so it looks like the following example (use eth0 if there is no eth1 in the virtual machine):

```
interface eth1 {
    server-preference 255;
    renew-time 60;
    rebind-time 90;
    prefer-life-time 130;
    valid-life-time 200;
    allow rapid-commit;
    option dns_servers 2001:db8::10;

    link AAA {
        pool{
            range 2001:db8::1 to 2001:db8::100/64;
```

```

        prefix 2001:db8::/64;
    };
};
};

```

3. In a terminal window as root, open the `/etc/sysconfig/network/dhcp6s` file in an editor and edit it so it looks like the following (use `eth0` if there is no `eth1`):
 

```

# specify the interface for dhcp6s
DHCP6SIF=eth1
# Command line options here
DHCP6SARGS=-v

```

 Save the file and close the editor.
4. Start the `dhcp6s` server:
 

```

rcdhcp6s start

```
5. In a terminal window, enter
 

```

tail -f /var/log/messages

```
6. Leave the terminal window open and the `tail` process running while you do Task II.

## Task II: Get an IPv6 Address from the Server

You can simply start YaST and edit the `eth1` (or `eth0`) configuration to use DHCPv6, it will create the `/var/lib/dhcpv6/dhcp6c.eth1.conf` file and start `dhcp6c`. However, the steps below will give you some idea what happens “under the hood”.

Do the following:

9. On server2, as root open a terminal window and, using an editor, create a `/var/lib/dhcpv6/dhcp6c.eth1.conf` file with the following content (if there is no `eth1`, use `eth0` instead):
 

```

interface eth1 {
    request domain-name-servers;
    request domain-search-list;
};

```
10. In a terminal window, as root, enter
 

```

dhcp6c -v --netconfig -c
/var/lib/dhcpv6/dhcp6c.eth1.conf -f eth1

```
11. Open a second terminal window, and enter
 

```

ip a s

```

 You should see an additional IPv6 address with the `2001:db8:` prefix from the

range defined in Task I.

12. In the second terminal window, enter

```
cat /etc/resolv.conf
```

You should see a `nameserver 2001:db8::10` entry

13. Stop the `dhcp6c` process in the first terminal window by pressing `Ctrl+c`.

Enter `ip a s` again and, using `cat`, have a look at `/etc/resolv.conf`. You should see that the IP address is removed again, as is the nameserver entry.

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You have set up DHCPv6 on server1 and received the network information on server2.

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**(End of Exercise)**

## 1.3 DHCPv6 - Fixed Address

In this exercise, you configure dhcp6s on server1 and provide a fixed IPv6 address and other information to server2.

The addresses used in this exercise are from the address range reserved for documentation

### Objectives:

Task I: Configure dhcp6s

Task II: Get an IPv6 Address from the Server

### Special Instructions and Notes:

If there is no eth1 interface, use eth0 instead in the following instructions

IPv6 address of server1: 2001:db8::10/64

IPv6 address of server2: 2001:db8::20/64

### Task I: Configure dhcp6s

The configuration of the dhcp6s server is contained in the `/etc/dhcp6s.conf` file. In this task you configure dhcp6s to hand out addresses from a pool to clients

1. On server1, open a terminal window and `su -` to the root account.
2. Check the `/var/lib/dhcpv6/server6.leases` file and note the DUID (DHCP UID) and the IAID (Identity Association Identifier) for the lease from the last lab:

DUID: \_\_\_\_\_

IAID: \_\_\_\_\_

3. Open the `/etc/dhcp6s.conf` file in an editor and add the following after the `link` entry from the last lab, using the DUID and IAID values from Step 2:

```
link AAA {
    pool{
        range 2001:db8::1 to 2001:db8::100/64;
        prefix 2001:db8::/64;
    };
};
host BBB {
    duid 00:01:00:01:...;

    iaidinfo {
        iaid 144...;
```

```
        renew-time 30;
        rebind-time 40;
};

address {
    2001:db8::20/64;
    prefer-life-time 60;
    valid-life-time 90;
};
};
```

Save the file and leave the editor.

- Restart the dhcp6s server.

```
rcdhcp6s restart
```

- In a terminal window, enter

```
tail -f /var/log/messages
```

- Leave the tail process running while you do Task II of this exercise.

## Task II: Get a Fixed IPv6 Address from the dhcp6s Server

You can simply start YaST and edit the eth1 (or eth0) configuration to use DHCPv6, it will create the `/var/lib/dhcpv6/dhcp6c.eth1.conf` file and start dhcp6c. However, the steps below will give you some idea what happens “under the hood”.

Do the following:

- Unless already done in the previous lab, on server2, as root open a terminal window and, using an editor, create a

`/var/lib/dhcpv6/dhcp6c.eth1.conf` file with the following content:

```
interface eth1 {
    request domain-name-servers;
    request domain-search-list;
};
```

- In a terminal window, as root, enter

```
dhcp6c -v --netconfig -c  
/var/lib/dhcpv6/dhcp6c.eth1.conf -f eth1
```

- Open a second terminal window, and enter

```
ip a s
```

You should see the 2001:db8::20 IPv6 address.

If not, the dhcp6s server might still be using the old lease information, as it may

still be valid. In this case open the `/var/lib/dhcpv6/server6.leases` file, restart the `dhcp6s` server on `server1` and on `server2` stop and start the `dhcp6c` process.

17. In the second terminal window, enter

```
cat /etc/resolv.conf
```

You should see a `nameserver 2001:db8::10` entry

18. On `server2`, stop the `dhcp6c` process in the first terminal window by pressing `Ctrl+c`.

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You have set up DHCPv6 on `server1` and received the specific IPv6 address on `server2`.

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**(End of Exercise)**

