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TUTORIAL

# Remote Access and Network Management

Topics



## Accessing Linux System Remotely

Download and install Putty for remote accessing the Linux Server:

Putty is a free and open-source cross-platform **SSH** and **telnet** client that even after being around for over 20 years remains one of the most popular SSH clients being used especially on the Windows platform.Putty can be installed on Windows as well as Linux.For windows you can directly download it from the website *https://www.putty.org/*

### 1 Install Putty on Ubuntu:

**PuTTY** is available to install from the default official repositories in most Linux distributions. For instance, you can install **PuTTY** on **Ubuntu** and its derivative distros via the universe repository.

**Install PuTTy on Ubuntu**

First, you'll have to enable the universe repository so that you can access its packages, update your system to recognize its new access rights, and then run the install command.

```
$ sudo add-apt-repository universe
$ sudo apt update
$ sudo apt install putty
```

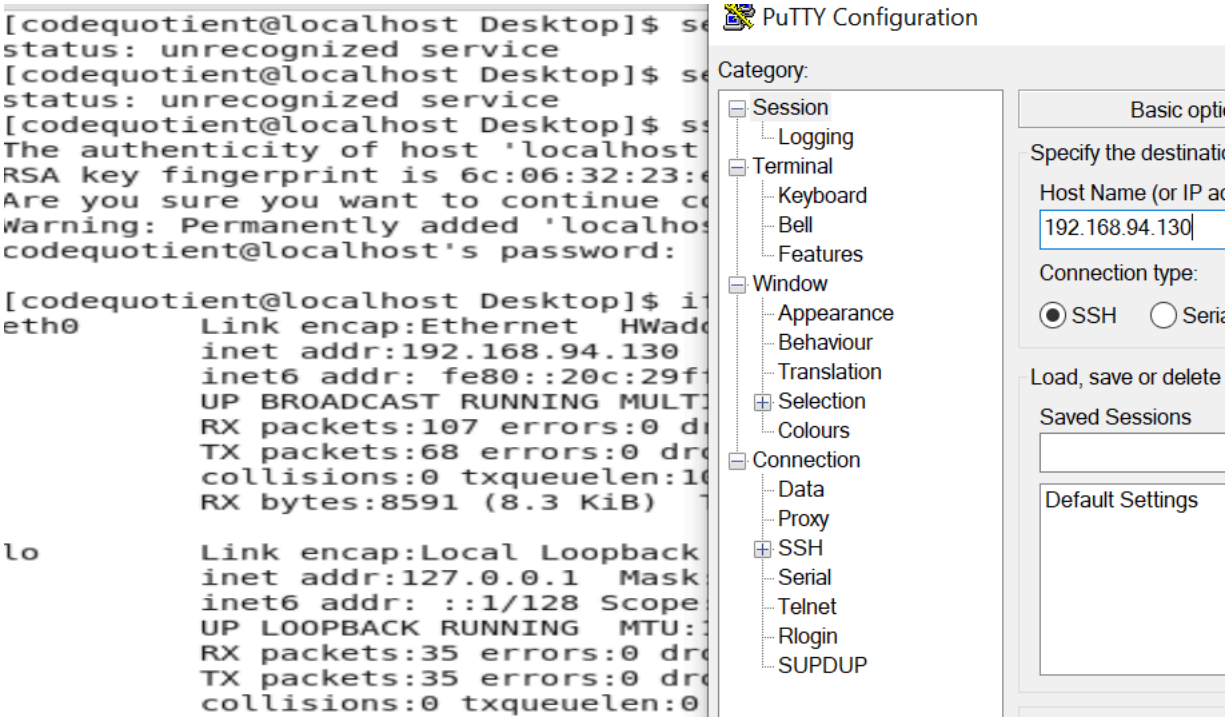
### 2. Install PuTTy on CentOS, Red Hat & Fedora

```
$ sudo yum install putty
```

### 3. install putty via its source code

```
$ tar -xvf putty-0.73.tar.gz
$ cd putty-0.73/
$ ./configure
$ sudo make && sudo make install
```

Now check the system IP Address with ifconfig command and use putty for accessing given ip with port 22 for ssh. After authentication you can access the linux server remotely.




## Connect Linux VM via Putty

· We can directly log in on a Linux machine through console i.e., with local access.

· For remote login first of all we have to assign ip address to our Linux Machine.

· After this, Check your ip address through "**ipconfig"** command.

· If "**ifconfig"** command is not working you can use "**ip a"** command because ifconfig is being replaced by ip command in newer versions of Linux.

· If network ip is not assigned then change network settings from virtual box settings to Virtual Box Host only.

· **Host only adapter** : Allows communication between your PC and Virtual Machine

· **Bridged Adapter**: Allows communication between your PC and VM plus allows communication to Internet also. You can pick any one of these network settings.

· Check for IP Address, if not showing enable your NIC by "**ifup eth0"** command, where eth0 is NIC card in my PC.

· For MAC users don't download Putty,just open the terminal and run following command:

```
ssh -l username IP Address of Linux Machine
```

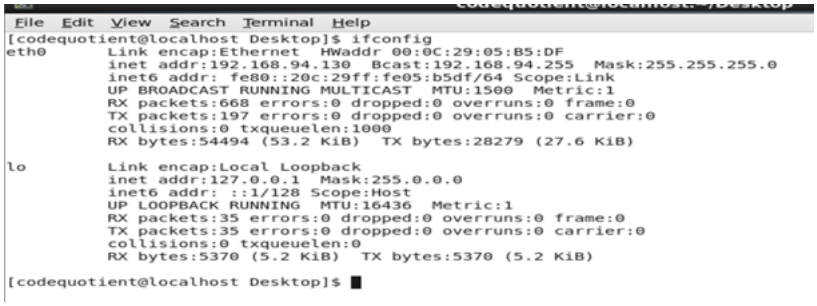
· If you want to access Linux machine from a windows machine, install putty and enter IP of Linux Machine at port 22

· Enter the credentials and enjoy the access.

## ifconfig command

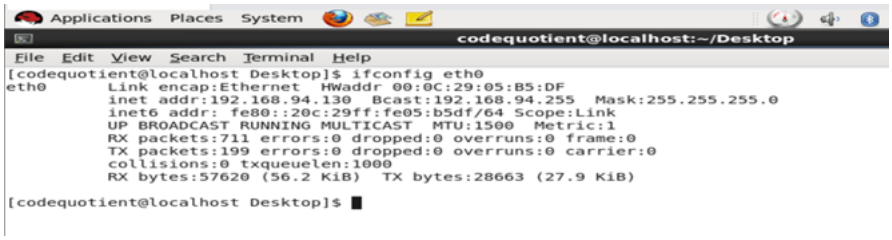
**ifconfig** in short "**interface configuration**" utility for system/network administration in **Unix/Linux** operating systems to configure, manage and query network interface parameters via command-line interface or in a system configuration scripts. The "**ifconfig**" command is used for displaying current network configuration information, setting up an ip address, netmask, or broadcast address to a network interface, creating an alias for the network interface, setting up hardware address, and enable or disable network interfaces.

1. View All Network Interface Settings




2. Display Information of All Network Interfaces

### 3. View Network Settings of Specific Interface




### 4. How to Enable a Network Interface

```
[root@codequotient ~]# ifconfig eth0 up
OR
[root@codequotient ~]# ifup eth0
```

### 5. How to Disable a Network Interface

```
[root@cq ~]# ifconfig eth0 down
OR
[root@cq ~]# ifdown eth0
```

### 6. How to Assign an IP Address to Network Interface

To assign an IP address to a specific interface, use the following command with an interface name (**eth0**) and ip address that you want to set. For example, "**ifconfig eth0 172.16.25.125**" will set the IP address to interface **eth0**.

```
[root@cq ~]# ifconfig eth0 172.16.25.125
```

### 7. How to Assign a Netmask to Network Interface

Using the "**ifconfig**" command with the "**netmask**" argument and interface name as (**eth0**) allows you to define a netmask to a given interface. For example, "**ifconfig eth0 netmask 255.255.255.224**" will set the network mask to a given interface **eth0**.

```
[root@cq ~]# ifconfig eth0 netmask 255.255.255.224
```

### 8. How to Assign an IP, Netmask, and Broadcast to Network Interface

```
[root@cq ~]# ifconfig eth0 172.16.25.125 netmask 255.255.255.224 broadcast 172.16.25.63
```

### 9. How to Change MTU for a Network Interface

The "**mtu**" argument sets the maximum transmission unit to an interface. The **MTU** allows you to set the limit size of packets that are transmitted on an interface. The **MTU is** able to handle a maximum number of octets to an interface in one single transaction.

For example, "**ifconfig eth0 mtu 1000**" will set the maximum transmission unit to a given set (i.e. **1000**). Not all network interfaces support **MTU** settings.

```
[root@cq ~]# ifconfig eth0 mtu 1000
```

### 10. How to Enable Promiscuous Mode

What happens in normal mode, when a packet is received by a network card, it verifies that it belongs to itself. If not, it drops the packet normally, but in the promiscuous mode is used to accept all the packets that flow through the network card.

Today's network tools use the promiscuous mode to capture and analyze the packets that flow through the network interface. To set the promiscuous mode, use the following command.

```
[root@cq ~]# ifconfig eth0 promisc
```

### 11.How to Disable Promiscuous Mode

To disable promiscuous mode, use the "**-promisc**" switch that drops back the network interface in normal mode.

```
[root@cq ~]# ifconfig eth0 -promisc
```

### 12. How to Add New Alias to Network Interface

The **ifconfig** utility allows you to configure additional network interfaces using the **alias** feature. To add the alias network interface of **eth0**, use the following command. Please note that the alias network address is in the same subnet mask. For example, if your **eth0** network ip address is **172.16.25.125**, then the alias ip address must be **172.16.25.127**.

```
[root@cq ~]# ifconfig eth0:0 172.16.25.127
```

Next, verify the newly created alias network interface address, by using the "**ifconfig eth0:0**" command.

```
[root@cq ~]# ifconfig eth0:0

eth0:0    Link encap:Ethernet  HWaddr 00:01:6C:99:14:68
          inet addr:172.16.25.123  Bcast:172.16.25.63  Mask:255.255.255.240
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          Interrupt:17
```

#### 13. How to Remove Alias to Network Interface

If you no longer required an alias network interface or you incorrectly configured it, you can remove it by using the following command.

```
[root@cq ~]# ifconfig eth0:0 down
```

#### 14. How to Change the MAC address of Network Interface

To change the **MAC** (**Media Access Control**) address of an **eth0** network interface, use the following command with the argument "**hw ether**". For example, see below.

```
[root@cq ~]# ifconfig eth0 hw ether AA:BB:CC:DD:EE:FF
```

## ip command

The ip command is a networking command-line utility that is used to assign an IP address to a network interface or configure/update useful network variables on a Linux system.

It is a part of the iproute2 package and offers several network administration tasks such as bringing up or down network interfaces, assign and remove IP addresses and routes, manage ARP cache, and much more.

The ip command is much similar to ifconfig, but it is greatly more powerful with more functions and capabilities added to it.

## Configure Static IP Address Internet Protocol (IPv4)

To configure static IP Addresses in Linux, you need to update or edit the network configuration file to assign a Static IP Address to a system. You must be a superuser with a **su (switch user)** command from the terminal or command prompt.

## For RHEL/CentOS/Fedora

Open and edit the network configuration files for (**eth0** or **eth1**) using vi editor. For example, assigning IP Address to **eth0** interface as follows.

```
[root@tecmint ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth0
```

**Simple output:**

```
DEVICE="eth0"
BOOTPROTO=static
ONBOOT=yes
TYPE="Ethernet"
IPADDR=192.168.50.2
NAME="System eth0"
HWADDR=00:0C:29:28:FD:4C
GATEWAY=192.168.50.1
```

Use below command to just restart the networking service, no need to restart the Linux Server as we generally do in case of Windows.

```
# service network restart
```

## For Ubuntu/Debian/Linux Mint

Assign Static IP Address to **eth0** interface editing configuration file **/etc/network/interfaces** to make permanent changes as shown below.

```
auto eth0
iface eth0 inet static
address 192.168.50.2
netmask 255.255.255.0
gateway 192.168.50.1
```

Next, restart network services after entering all the details using the following command.

```
# systemctl restart NetworkManager.service
Or
# /etc/init.d/networking restart
```

## Examples of ip commands:

### 1. Assign an IP Address to a Specific Interface

The following command is used to assign an IP Addresses to a specific interface (**eth1**) on the fly.

```
# ip addr add 192.168.50.5 dev eth1
$ sudo ip addr add 192.168.50.5 dev eth1
```

**Note:** Unfortunately all these settings will be lost after a system restart.

### 2. How to Check an IP Address

To get the depth information of your network interfaces like IP Address, MAC Address information, use the following command as shown below.

```
# ip addr show
$ sudo ip addr show
```

**Sample Output**

```
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN qlen 1000
    link/ether 00:0c:29:28:fd:4c brd ff:ff:ff:ff:ff:ff
    inet 192.168.50.2/24 brd 192.168.50.255 scope global eth0
    inet6 fe80::20c:29ff:fe28:fd4c/64 scope link
       valid_lft forever preferred_lft forever
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN qlen 1000
    link/ether 00:0c:29:28:fd:56 brd ff:ff:ff:ff:ff:ff
    inet 192.168.50.5/24 scope global eth1
    inet6 fe80::20c:29ff:fe28:fd56/64 scope link
       valid_lft forever preferred_lft forever
```

### 3. How to Remove an IP Address

The following command will remove an assigned IP address from the given interface (**eth1**).

```
# ip addr del 192.168.50.5/24 dev eth1
$ sudo ip addr del 192.168.50.5/24 dev eth1
```

### 4. How to Enable Network Interface

The "**up**" flag with interface name (**eth1**) enables a network interface. For example, the following command will activate the **eth1** network interface.

```
# ip link set eth1 up
$ sudo ip link set eth1 up
```

### 5. How to Disable Network Interface

The "**down**" flag with interface name (**eth1**) disables a network interface. For example, the following command will De-activates the **eth1** network interface.

```
# ip link set eth1 down
$ sudo ip link set eth1 down
```

### 6. Check Route Table

Type the following command to check the routing table information of the system.

```
# ip route show
$ sudo ip route show
```

**Sample Output**

```
10.10.20.0/24 via 192.168.50.100 dev eth0
192.168.160.0/24 dev eth1  proto kernel  scope link  src 192.168.160.130  metric 1
192.168.50.0/24 dev eth0  proto kernel  scope link  src 192.168.50.2
169.254.0.0/16 dev eth0  scope link  metric 1002
default via 192.168.50.1 dev eth0  proto static
```

### 7. Add Static Route

Why do you need to add Static routes or Manual routes, because that the traffic must not pass through the default gateway. We need to add Static routes to pass traffic from the best way to reach the destination.

```
# ip route add 10.10.20.0/24 via 192.168.50.100 dev eth0
$ sudo ip route add 10.10.20.0/24 via 192.168.50.100 dev eth0
```

### 8. Remove Static Route

To remove the assigned static route, simply type the following command.

```
# ip route del 10.10.20.0/24
$ sudo ip route del 10.10.20.0/24
```

### 9. Add Persistence Static Routes

All the above routes will be lost after a system restart. To add permanent Static route, edit file **/etc/sysconfig/network-scripts/route-eth0** (We are storing static route for (**eth0**).

**For RHEL/CentOS/Fedora and Rocky Linux/AlmaLinux**

```
# vi /etc/sysconfig/network-scripts/route-eth0
```

and add the following lines and save and exit. By default **route-eth0** file will not be there, need to be created.

```
10.10.20.0/24 via 192.168.50.100 dev eth0
```

**For Ubuntu/Debian/Linux Mint**

Open the file **/etc/network/interfaces** and at the end add the persistence Static routes. IP Addresses may differ in your environment.

```
$ sudo vi /etc/network/interfaces
auto eth0
iface eth0 inet static
address 192.168.50.2
netmask 255.255.255.0
gateway 192.168.50.100
##########{Static Route}############
up ip route add 10.10.20.0/24 via 192.168.50.100 dev eth0
```

Next, restart network services after entering all the details using the following command.

```
# systemctl restart NetworkManager.service
Or
# /etc/init.d/networking restart
```

### 10. Add Default Gateway

The default gateway can be specified globally or for interface-specific config files. The advantage of the default gateway is If we have more than one NIC is present in the system. You can add the default gateway on the fly as shown below the command.

```
# ip route add default via 192.168.50.100
$ sudo ip route add default via 192.168.50.100
```