

## How to Use IP Command in Linux with Examples

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#### Introduction

The **ip command** is a Linux networking tool for system and network administrators. IP stands for Internet Protocol and as the name suggests, the tool is used for configuring network interfaces.

Older Linux distributions used the ifconfig command, which operates similarly. However, ifconfig has a limited range of capabilities compared to the ip command.

In this tutorial, we go through all of the important operations the ip command can perform in Linux.



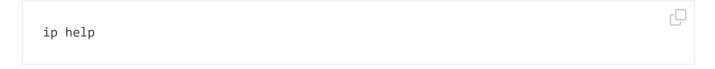
## How to Use the ip Command

ip [OPTION] OBJECT {COMMAND | help}

OBJECTS (or subcommands) that you will use most often include:

- 1. link (I) used to display and modify network interfaces.
- 2. address (addr/a) used to display and modify protocol addresses (IP, IPv6).
- 3. **route** (**r**) used to display and alter the routing table.
- 4. **neigh** (**n**) used to display and manipulate neighbor objects (ARP table).

There are many other objects and commands available. To see a full list type in the following command:



To execute commands, you can use either full or abbreviated forms. For example, **ip link** and **ip l** will give the same results.

When configuring network interfaces, you must run the commands as root or a user with sudo privileges.



**Warning:** By default, the system does not retain the changes permanently. Once you restart a Linux Server, the newly modified state will be lost.

There are two ways to make your adjustments permanent: **1.** add the commands to a startup script or **2.** edit the distro-specific configuration files.

# **Manage and Display Network Interfaces**

You can get a list of all below-mentioned link command options and more by typing:

ip link help

#### **Get Network Interface Information**

To see link-layer information of all available devices (which have a driver loaded) use the command:

ip link show

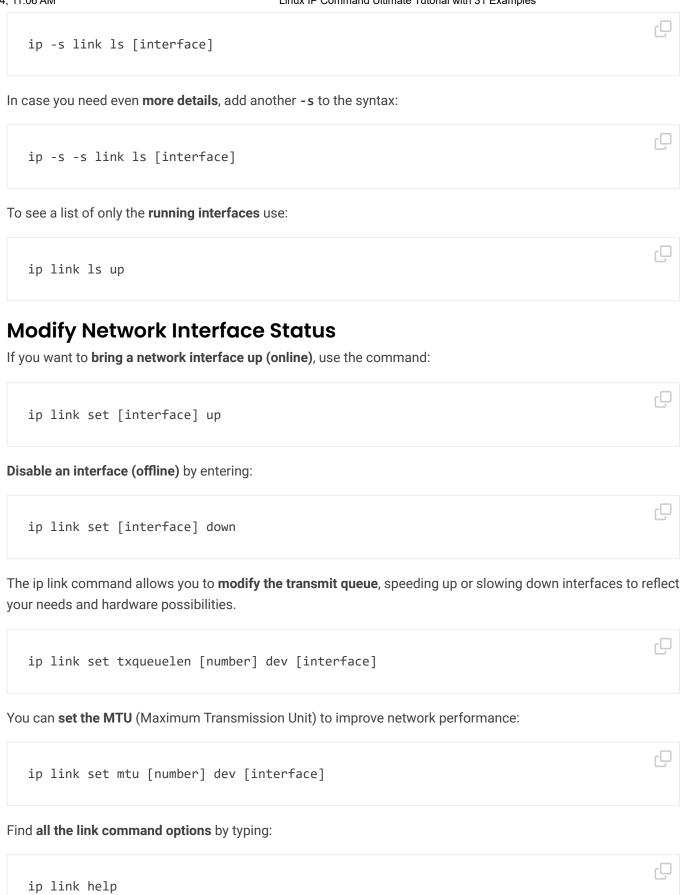
If you want it to display the information for one specific device, type in the following:

ip link show dev [device]

To see statistics for all network interfaces (details such as transferred or dropped packets, or even errors) use:

ip -s link

You can also see similar information for an individual network interface with:





Note: Check out our comprehensive Linux network commands list with a downloadable PDF.

# **Monitor and Manage IP Addresses**

Check out all below-mentioned address commands and more by typing the following:

ip addr help

### **Monitor IP Addresses**

**Display all devices** by using the following command:

ip addr	
To list all network interfaces and the associated IP address, use the command:	
ip addr show	
You can also see information about an individual network:	
ip addr show dev [interface]	
To <b>list the IPv4 addresses</b> , use:	
ip -4 addr	

To list IPv6 addresses type:

ip -6 addr

#### **How to Add IP Address in Linux**

Add an IP address to an interface using the command:

ip addr add [ip\_address] dev [interface]



**Note:** If the interface specified does not exist, the output will display the *Cannot find device [interface]* message.

If you need to add a broadcast address to an interface use the command:

ip addr add brd [ip\_address] dev [interface]

To remove an IP address from an interface type:

ip addr del [ip\_address] dev [interface]

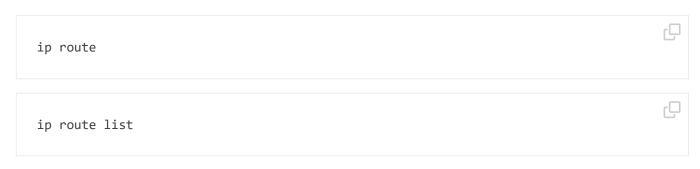
# **Manage and Display IP Routing Table**

See a full list of ip route commands with the following command:

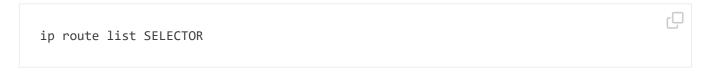
ip route help

### **Display IP Routing Table**

List all the route entries use either of the following commands:



With the commands above, the output displays all of the route entries in the kernel. If you need to narrow down the search, add the **SELECTOR** object:





**Note:** SELECTOR := [root PREFIX][match PREFIX][exact PREFIX][table TABLE\_ID][proto RTPROTO][type TYPE][scope SCOPE]

To view routing for a distinct network, use the following syntax:

ip route list [ip\_address]

### **Modify IP Routing Table**

To add a new entry in the routing table that can be reached on a specific device, type in the command:

ip route add [ip\_address] dev [interface]

Or you can add a new route via gateway by typing:

ip route add [ip\_address] via [gatewayIP]

Also, the command allows you to add a route for all addresses via the local gateway by adding the **default** option:

ip route add default [ip\_address] dev [device]

ip route add default [network/mask] via [gatewayIP]

To delete an existing entry in the routing table, use the commands:

ip route del [ip\_address]

ip route del default

ip route del [ip\_address] dev [interface]

# **Display and Modify IP Neighbor Entries**

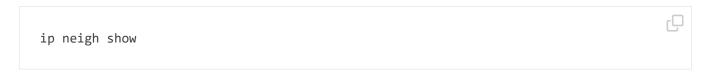
Neighbor entries tie the protocol address and the link-layer addresses under the same link. Organized into IPv4 tables, they are also called ARP (Address Resolution Protocol) tables.

For a full list of all neigh command options use:

ip neigh help

### **Display IP Neighbor Entries**

To display neighbor tables, use the following command:



The output shows the MAC addresses of devices which are part of the system and their state. The state of a device can be:

- 1. REACHABLE signifies a valid, reachable entry until the timeout expires
- 2. **PERMANENT** signifies an everlasting entry that only an administrator can remove
- 3. **STALE** signifies a valid, yet unreachable entry; to check its state, the kernel checks it at the first transmission
- 4. **DELAY** signifies that the kernel is still waiting for validation from the stale entry

### **Modify IP Neighbor Entries**

Add a new table entry with the command:

```
ip neigh add [ip_address] dev [interface]

Or, remove an existing ARP entry:

ip neigh del [ip_address] dev [interface]
```

#### **Conclusion**

You now know what the IP command in Linux is and how to use the command to assist in network/system administration.

Next, discover more Linux Commands in our Cheat Sheet and Tutorial With Examples.