Manual Network Hardware Set up Guide

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# Abstract

This guide is aimed at non-technical users to assist with manual set up of network hardware. This guide will cover how to connect devices to a power supply, connect devices together using ethernet cables and setting up the devices so that they can communicate with each other and be Secure Shelled (SSH) into. This initial set up will allow for further configuration to be done by the automated network set up tool which will assist in planning the network. This guide also assists with interpreting the plan and correctly connecting devices in the way intended.

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# 1. Hardware

## 1.1 Appropriate Hardware

There are various considerations when picking the correct hardware for a network. The First consideration is expected size. This will determine how many devices are present on the network.

Next is cabling and the amount of data that will be the expected to be transferred across the connection there are three different types of relevant of ethernet cables. The first is a standard ethernet cable which is for regular connections transferring up to 10 megabits per second. The second is fast ethernet which is capable of up to 100 megabits per second and the third and final is gigabit ethernet which supports speeds up 1000 megabits per second. The downside of each is that the price increases with speed so forward planning is important to save money.

For example,

If you have a connection between the internet which supports up to 80 megabits per second then you would need a fast ethernet cable, but if the connection between that router with connection to the internet and a server is only expected to get 8 megabits per second at peak times then both can be regular ethernet cables as long as there is no other traffic coming through the router than that of the server

The third consideration is scalability this will determine how many additional cable slots any given router or switch will need above the currently used amount.

Routers are needed to connect multiple networks together. This means that depending on the number of networks present there may need to be multiple routers.

For example,

Two different servers with IP address 192.168.29.1/24 and 192.168.30/24 would need to be connected by a router whereas servers with 192.168.29.1/24 and 192.168.29.2/24 can be connected directly together. This is not required knowledge for the guide.

## 1.2 Cabling

### 1.2.1 Power Supply

There are two different types of cables that will need to be connected to all devices present on the network the first is the power cable. The majority of power cables use the cable shown below in figure 1. However, if your device comes with its power supply cable use the one that is included with it. There should be a symbol to denote where the power cable should be inserted.

A white and silver power cord

AI-generated content may be incorrect.

Figure 1 Most common cable

### 1.2.2 Ethernet Cables

Ethernet cables are an essential way of connecting devices together within a computer network. This is because they allow for data to travel in-between devices and depending on the ethernet cable the data transfer can be extremely fast. As mentioned earlier there are three main types of ethernet cable the normal (10 megabytes per second) the fast (100 megabytes per second) and the gigabit (1000 megabytes per second). However, all these cables look and act very similarly to each other. There is no real difference between them other than the speed and cost of them.

A close-up of a network port

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Figure 1 Ethernet cable Ports (p-themes, 2025)

Shown above is ethernet cable ports this is where you must plug in ethernet cables (shown below in figure 2). This is the first step to creating a functional connection between devices. When plugging in make sure to take care which port you are putting the cable into so that in the next step the device can be configured properly.



Figure 2 ethernet cable (Ellis, 2025)

### 1.2.3 Console Cable

There will be a console port on a device that does not come configured with the ability to accept Secure Shell (SSH) or Telnet connections. This port is used to do the software portion of the configuration and as such is required and must be done before proceeding to the next stage of configuration. The Console cable will be used to connect a PC or laptop directly to the router, switch or server. The types of cables are USB-serial or USB-C etc. Once connected use a terminal emulator such as PuTTy for windows or screen for Mac and Linux.

# 2. Software

### 2.1 Manual configuration

First you will need to be able to access the command line interface of the device you whish to configure. Next for devices that have an IOS operating system such as cisco routers and switches use the following commands replacing the <> with the appropriate information. The below commands will allow any automated script you have to connect to the device via telnet and do the remaining configuration

1. Conf t
2. User <username> privilege 15 secret <password>
3. Line vty 0 4
4. Transport input telnet
5. Login local
6. Exit
7. Enable secret <password>

The Second step for connecting devices is to set the IP address for the ethernet cable and then make sure that the connection is up and running. To input the IP address and subnet for the required connection use the below commands.

1. Int fa<fast ethernet number>
2. Ip add <Ip address> <subnet>
3. No shut

The final step is to enable and configure Open shortest Path First (OSPF) this will allow the devices to move the information sent to them to the correct place as efficiently as possible. The below commands should be done only be used once per device except command 3 that should be repeated for each interface as necessary.

1. router ospf 1
2. router-id <unique router ID ie 1.1.1.1>
3. network <interface network> <wildcard mask (opposite of netmask)> area 0
4. network 1.1.1.1 0.0.0.0 area 0
5. ip route 0.0.0.0 0.0.0.0 [next-hop-ip or interface]

# References

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