

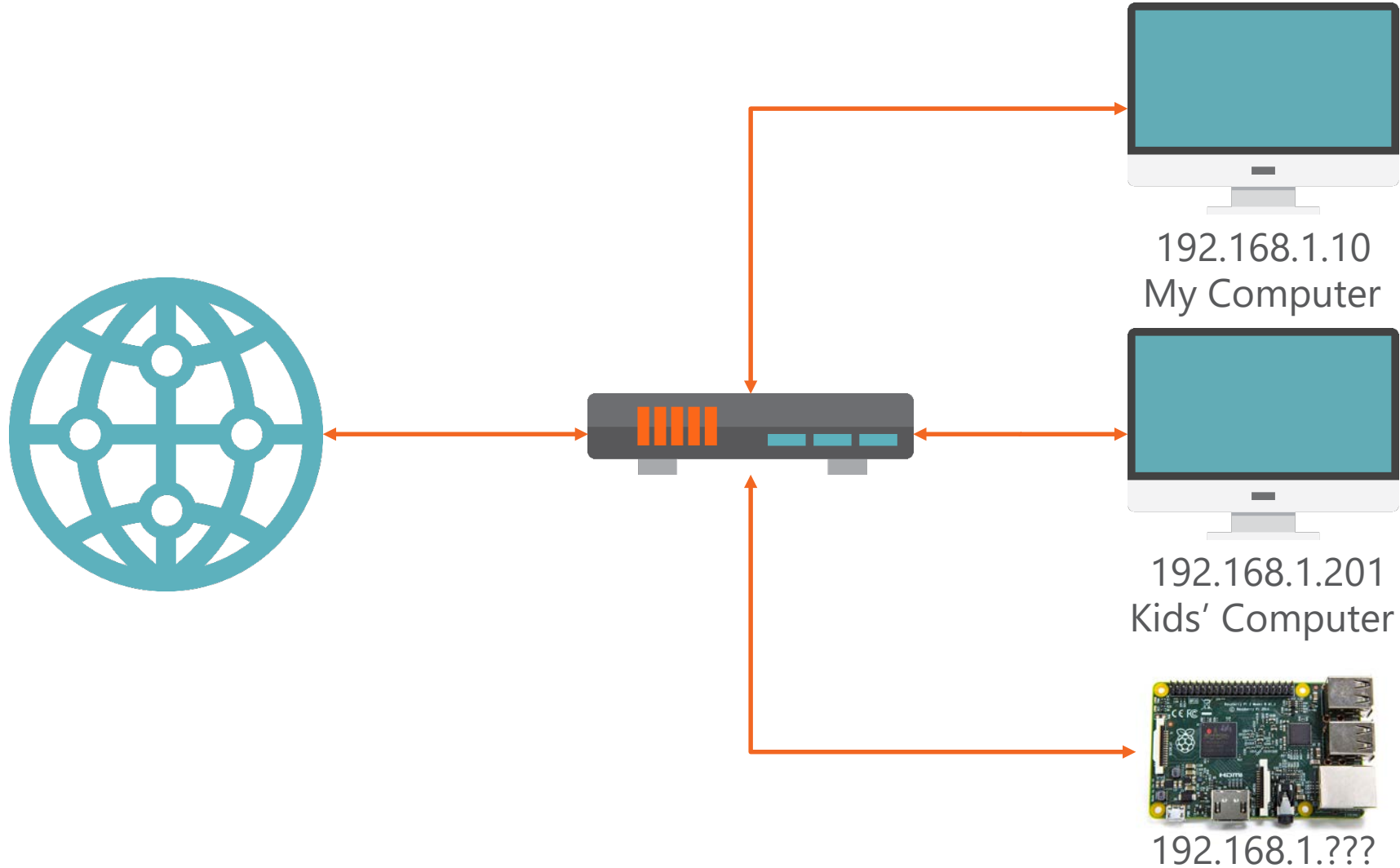
# Going Headless



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# Network Addresses



# Static IP Address

The screenshot shows the web interface of a TP-Link N750 Wireless Dual Band Gigabit Router (Model No. TL-WDR4300). The browser address bar shows the URL `192.168.1.1/XVQWFTBBWJXMWOIB/userRpm/Index.htm`. The left sidebar contains a navigation menu with the following items: Status, Quick Setup, Network, Dual Band Selection, Wireless 2.4GHz, Wireless 5GHz, Guest Network, DHCP (highlighted), - DHCP Settings (sub-item), - DHCP Clients List, - Address Reservation, USB Settings, NAT, Forwarding, Security, Parental Control, Access Control, Advanced Routing, Bandwidth Control, IP & MAC Binding, Dynamic DNS, and IPv6 Support. The main content area is titled "DHCP Settings" and contains the following configuration options:

DHCP Settings	
DHCP Server:	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Start IP Address:	<input type="text" value="192.168.1.100"/>
End IP Address:	<input type="text" value="192.168.1.199"/>
Address Lease Time:	<input type="text" value="120"/> minutes (1~2880 minutes, the default value is 120)
Default Gateway:	<input type="text" value="192.168.1.1"/> (optional)
Default Domain:	<input type="text"/> (optional)
Primary DNS:	<input type="text" value="0.0.0.0"/> (optional)
Secondary DNS:	<input type="text" value="0.0.0.0"/> (optional)

Below the settings is a "Save" button.

**DHCP Settings Help**

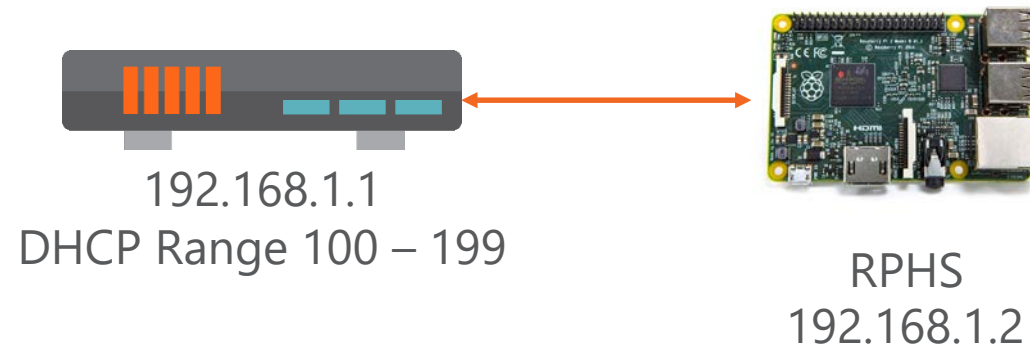
The Router is set up by default as a DHCP (Dynamic Host Configuration Protocol) server, which provides the TCP/IP configuration for all the PCs that are connected to the Router in the LAN.

- DHCP Server** - Enable or Disable the server. If you disable the Server, you must have another DHCP server within your network or else you must configure the IP address of the computer manually.
- Start IP Address** - This field specifies the first address in the IP Address pool. 192.168.0.100 is the default start IP address.
- End IP Address** - This field specifies the last address in the IP Address pool. 192.168.0.199 is the default end IP address.
- Address Lease Time** - The Address Lease Time is the length of time a network user will be allowed to keep connecting to the Router with the current DHCP Address. Enter the amount of time, in minutes, that the DHCP address will be "leased". The time range is 1~2880 minutes. The default value is 120 minutes.
- Default Gateway** - (Optional) Suggest to input the IP Address of the LAN port of the Router, default value is 192.168.0.1.
- Default Domain** - (Optional) Input the domain name of your network.
- Primary DNS** - (Optional) Input the DNS IP address provided by your ISP. Or consult your ISP.
- Secondary DNS** - (Optional) You can input the IP Address of another DNS server if your ISP provides two DNS servers.

**Note:** To use the DHCP server function of the Router, you should configure all computers in the LAN as "Obtain an IP Address automatically" mode. This function will take effect until the Router reboots.

# Static IP Address

## Assigning Directly on the Device



# Static IP Address

## Prerequisites

- A working network connection
- Methods have changed more than once
- Can be set up through raspi-config, or from the desktop
- Used to require hand-editing of config files

# DHCP

## Dynamic Host Configuration Protocol

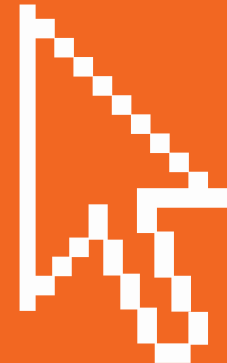
- IP address and netmask
- Router's IP address
- DNS server addresses

# Netmask vs CIDR Prefix Length

- Two ways of conveying the same information
- "CIDR Conversion Table"
- 24 = 255.255.255.0
- 12 = 255.255.0.0
- 08 = 255.0.0.0

# Static IP Demo

Assigning an IP address directly





# Static IP Address

## Assigning via DHCP Lease



192.168.1.1

### DHCP Table

RPHS:192.169.1.2

XBOX:192.168.1.3

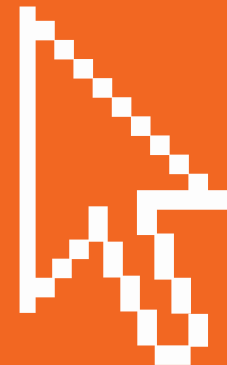


RPHS

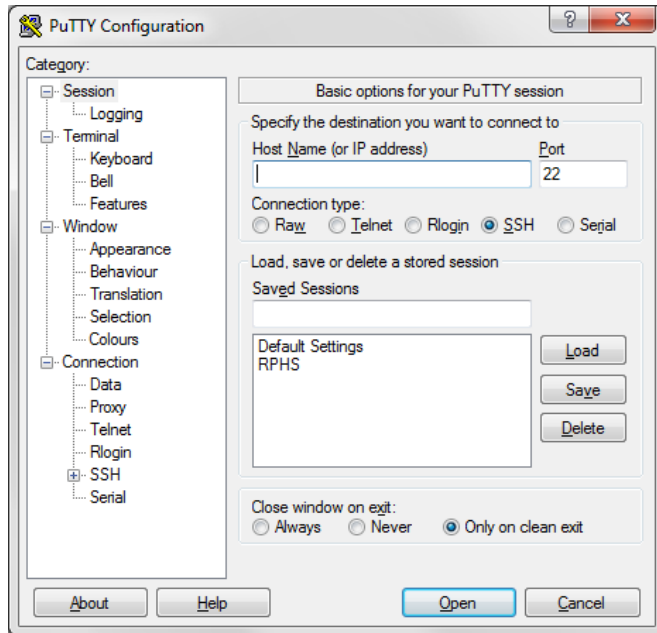
192.168.1.2

# Static IP Demo

Assigning an IP address via DHCP  
lease



# Static IP Demo



Download PuTTY from [www.putty.org](http://www.putty.org)  
Free and Open-Source

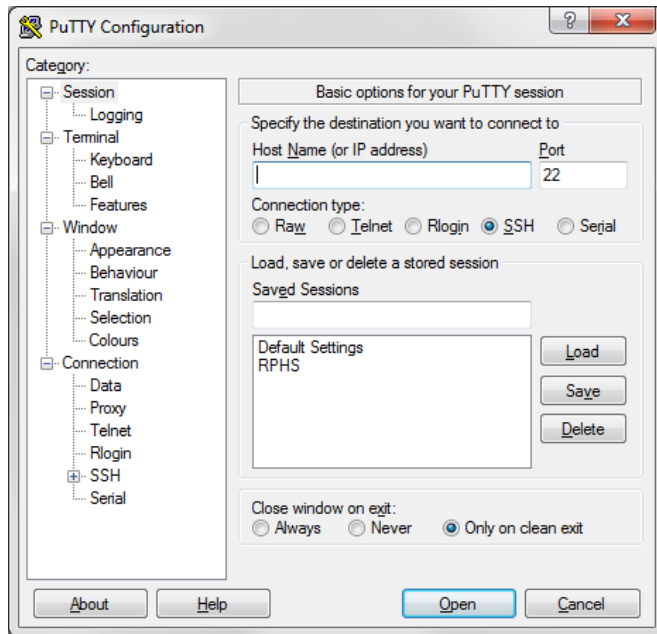
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# Connecting Remotely

## Secure Shell (SSH)

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# For Windows Users



Download PuTTY from [www.putty.org](http://www.putty.org)  
Free and Open-Source

# For Mac/Linux Users

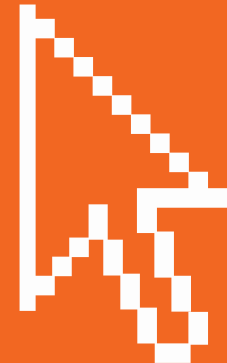


Just use "ssh -l <username>  
<address>"

# SSH Demo

Connecting via PuTTY

Connecting via "ssh"



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# Connecting Remotely

Webmin



# Installing Software With APT

apt

APT updates installed packages

APT installs new packages

APT takes care of dependencies

# Installing Webmin



Update APT's list of sources

Update APT's list of packages

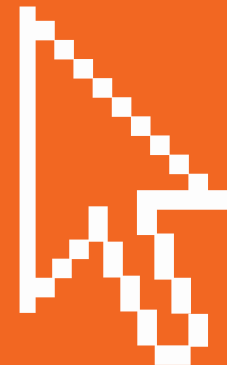
Install Webmin

# Demo: Installing Webmin

Updating apt sources

Updating apt packages

Installing Webmin



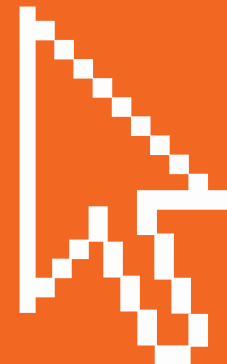
# A Quick Tour of Webmin

Update software packages

Check server statistics

Perform administrative tasks

Issue commands



# Updates

## Remote Desktop

- Originally used x11vnc
- Tricky to set up and run
- Pixel desktop includes RealVNC Connect
- Simplifies connecting, even outside the house
- Can't live without it

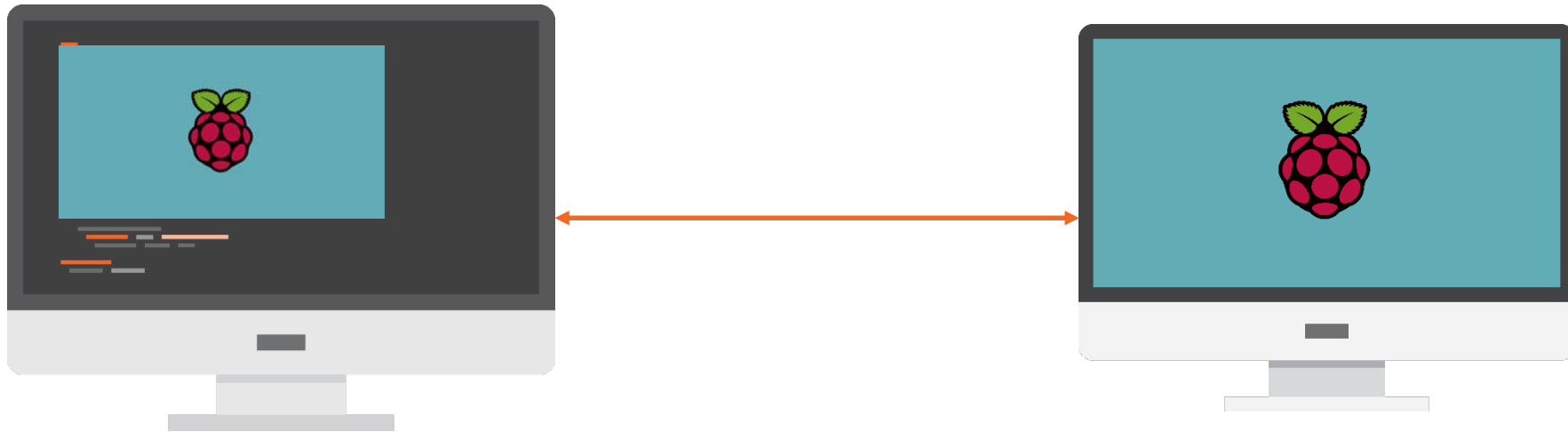
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# Connecting Remotely

Remote Desktop (VNC)

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# Virtual Network Computing (VNC)

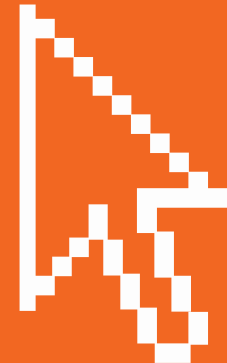


# Demo: Installing x11vnc

Install x11vnc through apt-get

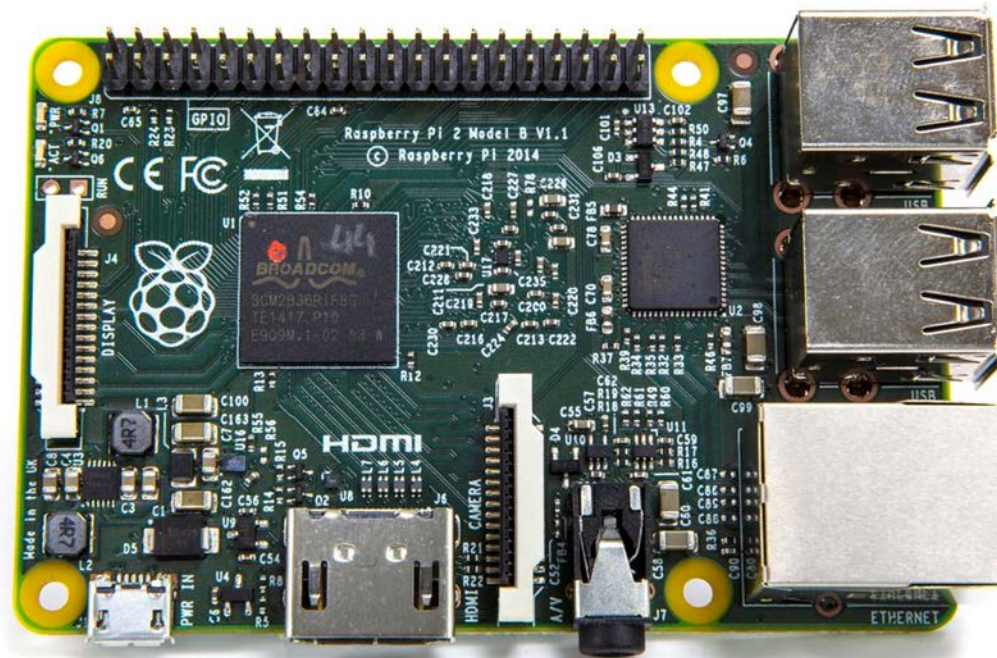
Configure x11vnc

Connect via VNC client



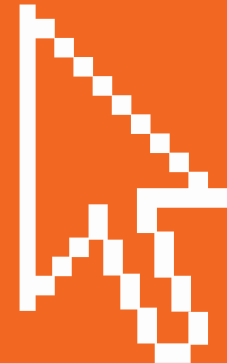


# The Headless Raspberry Pi



# Demo: Remote Desktop

Connecting



# Make A Backup

Windows

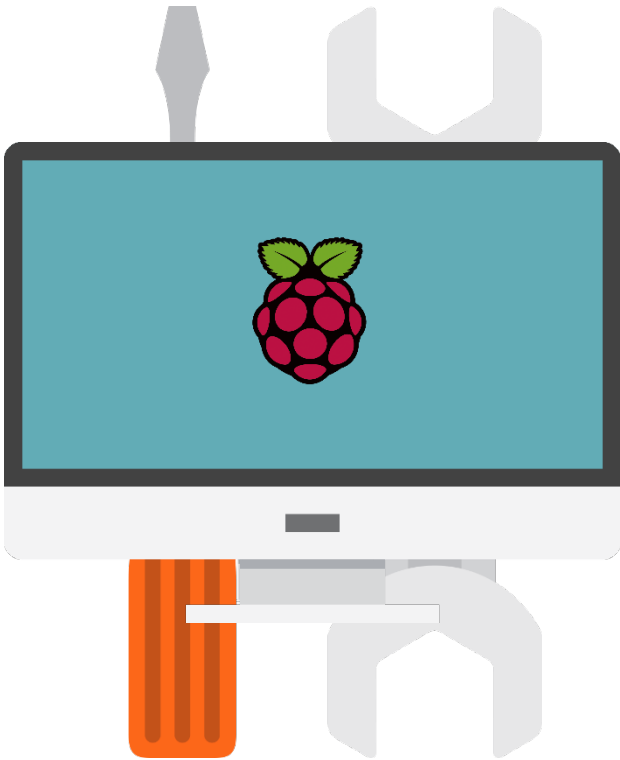
Win32DiskImager

Mac / Linux

```
sudo dd if=/dev/diskn of=~/.pi.img bs=1m
```



# Summary



- Assigned a static IP address
- Connected via SSH
- Connected via Webmin
- Connected via VNC