Networking Basics

Contents

Overview

A network is *a group of two or more devices which are able to communicate* with each other.
This module introduces some of of the concepts and components of **networking**.

Why we have networks

Networks are used for the transfer of information, this can be between members of the same organisation, or between organisations.
There are a few properties of networks which are advantageous, compared to not using networks:

- High capacity - networks can transfer large amounts of data.
- Fast speeds - sending data over a network is usually very fast.
- Low latency - the time taken for one packet of data to be transferred between nodes is short.
- High availability - networks tend to be reliable, meaning you can send data whenever you want.

Connecting to the Internet

How is it that your computer is able to connect to other computers which may be hundreds of miles away, allowing you to view this content?
The answer to that is the **Internet**.

The Internet is a global network of nodes, which is mainly used to access information from the web, any two nodes connected to the Internet can communicate as long as they know the **address** of the other node.

Before your device can connect to the Internet, it must first connect to a router which has a connection to the Internet.
When a router receives a packet it forwards it on to the device for which it was intended.

Connecting to a network

Two nodes do not have to be connected to the Internet to communicate, but they still have to be in a network.

A company may have an internal network of computers, printers, servers and other devices, these can still be connected and communicate with each other, but not use the internet.

Before a device can be connected to an internal network, it must connect to a router, switch or hub. These all do a very similar job, redirecting data packets, but with varying levels of intelligence.

- Hub - low intelligence - any packet received on one connection is redistributed to all other connections, the ensures the packet reaches the node it's targeting, but also every other connected node.
- Switch - medium intelligence - a switch can learn which node is on which connection, and only redistribute the packet to the correct node.
- Router - high intelligence - a router can operate as a switch, learning which node is on which connection, but it can do other jobs too.
  It is the only one of the three devices which is able to connect a node to the Internet.

Glossary

Nodes

A **node** is any device which can communicate on a given network.
Examples of nodes are:

- computers
- smartphones
- printers
- routers

Web

The **World Wide Web**, or web for short, is a collection of information which can be accessed via the internet.

Packet

A **packet** is a small chunk of data sent along a given network pathway.

Tutorial

There is no tutorial for this module.

Exercises

If you are on a Windows machine, open up the file explorer and on the left hand side click on the `Network` option to see what nodes are connected to your current network.