

## Year 8- HT3 – Networking and the internet

Keywords:	
<b>Computer network</b>	Two or more computers are connected to allow them to communicate. <b>The internet is a worldwide network of computers all connected.</b>
<b>Switch</b>	Connects devices together on a network. Ports allow cables to be plugged in from each connected device.
<b>Packets</b>	Networks send and receive messages in small units of data
<b>Protocols</b>	<b>Sets of rules-</b> All methods of communication need rules in place in order to pass on the message successfully.
<b>IP address</b>	The address of a machine on the internet (can be public or private IP address). Example of IP address: 192.168.5.43. This also applies to web servers hosting websites.
<b>The domain name system (DNS)</b>	Internet maps/matches domain names to IP addresses.
<b>Email</b>	An <b>internet service</b> that allows people who have an email address to send and receive electronic messages.
<b>The Internet of Things (IoT)</b>	<b>IoT devices</b> collect and share information about you, with or without your knowledge. This includes microphones, cameras, and GPS location.
<b>Web browser</b>	Software (code) used to view information on the World Wide Web-retrieves the website's code from the <b>web server*</b> .
<b>Web page</b>	A document that is accessible through the internet on a web browser. It is usually written in a programming language called HTML.
<b>Server</b>	A powerful computer which provides services. <b>E.g.,</b> *located on the internet-holds website web pages.
<b>Router</b>	<b>Joins networks</b> together <b>across the internet</b> and forwards packets from <b>sender to receiver.</b>
<b>Search engine</b>	A website that allows you to look up information on the World Wide Web, E.g., Bing, Google, etc.
<b>Bandwidth</b>	The amount of data that can be moved from one point to another in a given time. <b>Measured in bits/second.</b>
<b>The internet</b>	A global network of computers (some are web servers).
<b>Hosting</b>	Holding a website.
<b>Uploading/Downloading</b>	Sending information to a web server/receiving information from a web server.
<b>Client</b>	Computer requesting the data from a server.
<b>Node</b>	A device connected to a network



NETWORK CABLE



HUB/SWITCH

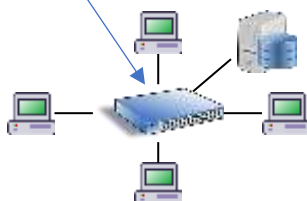


ROUTER

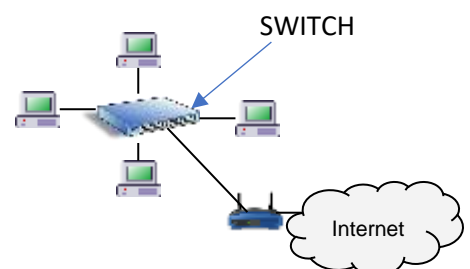


SERVER

SWITCH



**WWW::**The top-level **domain** in a **URL** is the part following the last '.' e.g., [www.amazon.com](http://www.amazon.com) has a top-level domain of ".com" ('commercial').



# Computing - Knowledge Organiser



A computer network can be either wired or wireless. **Wired** networks send data along cables. **Wireless** networks send data through the air using radio waves.



## IP Addressing

When **connected to a network** each device is given a unique **IP address** made up of four sets of up to three digits (**IPv4**), having a maximum value of 255, separated by dots. E.g.:

193.268.0.153

A new version has been introduced, IPv6, which has six sets of three digits, allowing an increase of the number of possible IP addresses.

When a node sends a message (as data packets), it uses the address of the node that will receive the message. A switch identifies the destination/receiving node and sends the message to it.

A node given a **static address** always keeps the same address making it easy for network managers to identify the device connected on a network. A node given a **dynamic** address has a different address assigned to it each time it connects to the network allowing more devices to connect. E.g., when a device disconnects from the network, its address is freed up for another device to use. When the first device reconnects, it is assigned any free address.

A **public IP** address identifies a network/ allows a device to access the internet directly whereas a **private IP** address identifies a device on a network/allows the device to connect to a network which and then connect to the internet.

## Packet switching

Messages are split up into data packets which are sent separately across the network and put back together to compile the message at the recipient node.

Each packet has two sections:

### **Header:**

**Has sender's and recipient's IP addresses,  
Packet number  
The total number of packets the message contains  
Details of any protocols used**

### **Payload - the actual message itself**

Packets are sent along the route that allows the quickest transmission of data. The recipient computer takes each packet, notes the number and puts them into the correct order.

Advantage: Packet switching helps to ensure messages arrive complete without slowing down a network. If packets are missing, recipient can request that just those packets are re-sent.

References:

[www.bbc.co.uk/bitesize/guides/zr3yb82/revision/7](http://www.bbc.co.uk/bitesize/guides/zr3yb82/revision/7)

Content extracted from the Teach Computing Curriculum by the National Centre for Computing Education:  
<https://teachcomputing.org/curriculum/key-stage-3/networks-from-semaphores-to-the-internet>