



The Ultimate Guide to Networking Devices





Contents

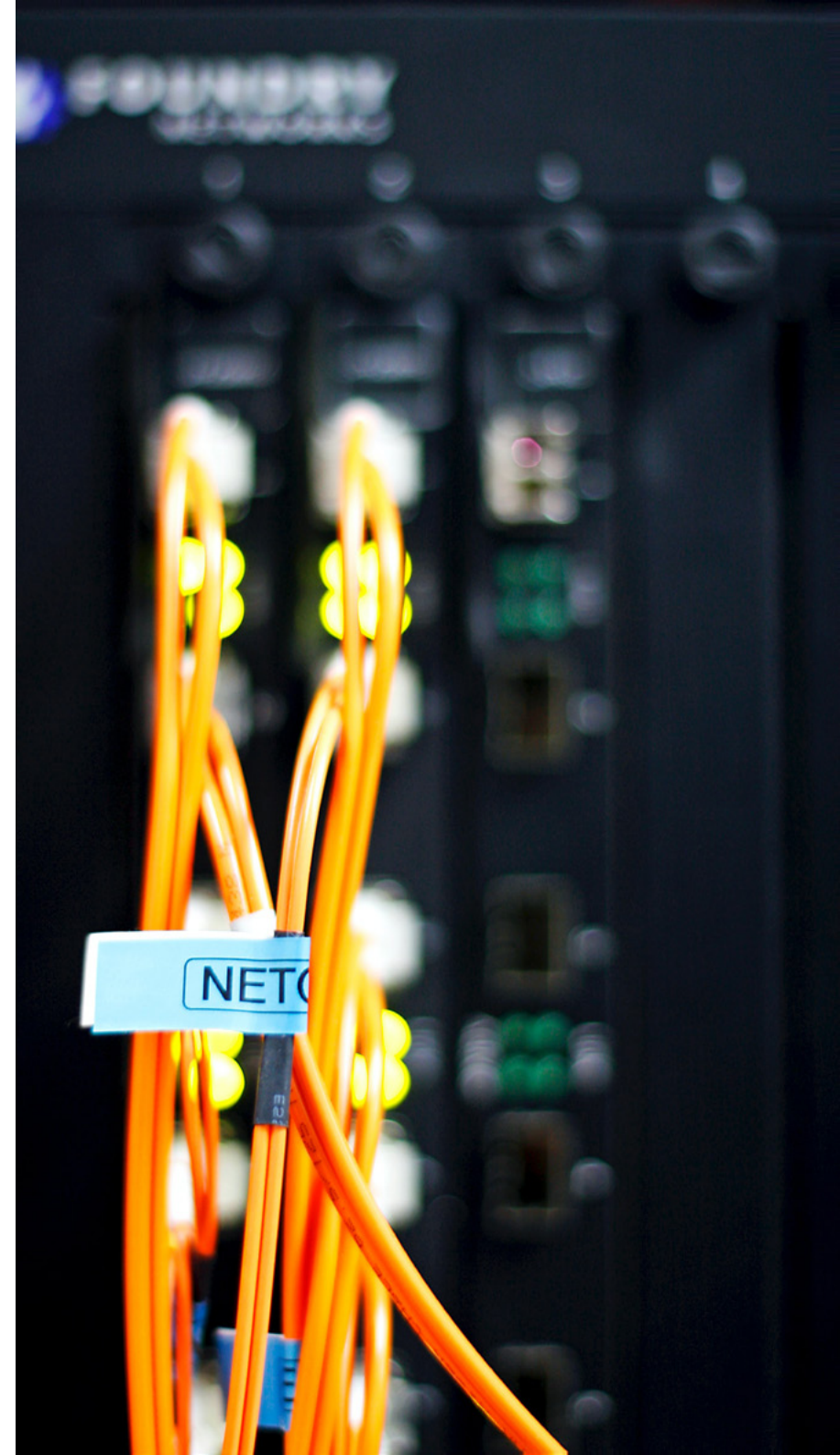
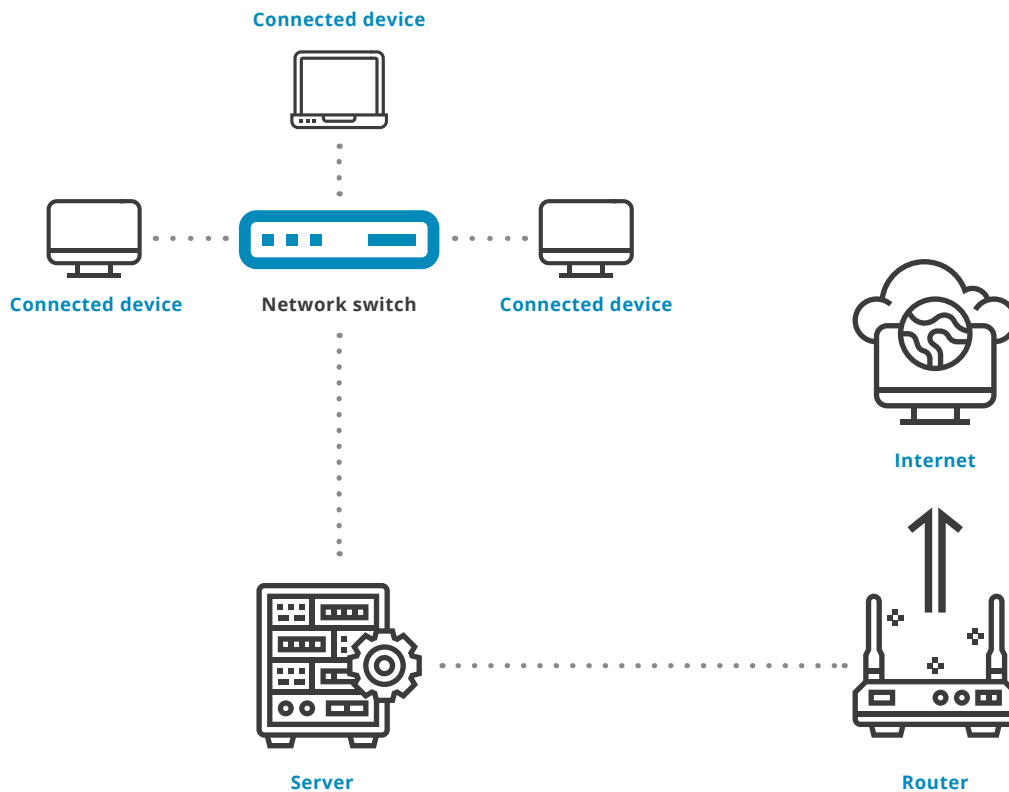
| | |
|--|----|
| What Makes up a Network | 3 |
| Components of a Network | 4 |
| Network Switch | 5 |
| Unmanaged Switch | |
| Managed Switch | |
| Smart Switch | |
| Router | 6 |
| Connected Devices | 7 |
| Cabling | 8 |
| Popular Ports | 9 |
| POE and POE+ | |
| RJ45 | |
| CX4 | |
| Transceivers | 10 |
| What is a Transceiver? | 11 |
| SFP | |
| What is SFP+? | |
| GBIC | |
| QSFP vs QSFP+ | 12 |
| The OSI and TCP/IP Referencing Models | 13 |
| What is the OSI Reference Model? | 14 |
| The 4 Layers of the TCP/IP Referencing Model | 15 |
| TCP/IP vs OSI Referencing Model | 16 |
| Networking Switch Selector | 17 |
| Choosing your Networking Device | 18 |
| How Does it Work? | 19 |

What Makes up a Network?

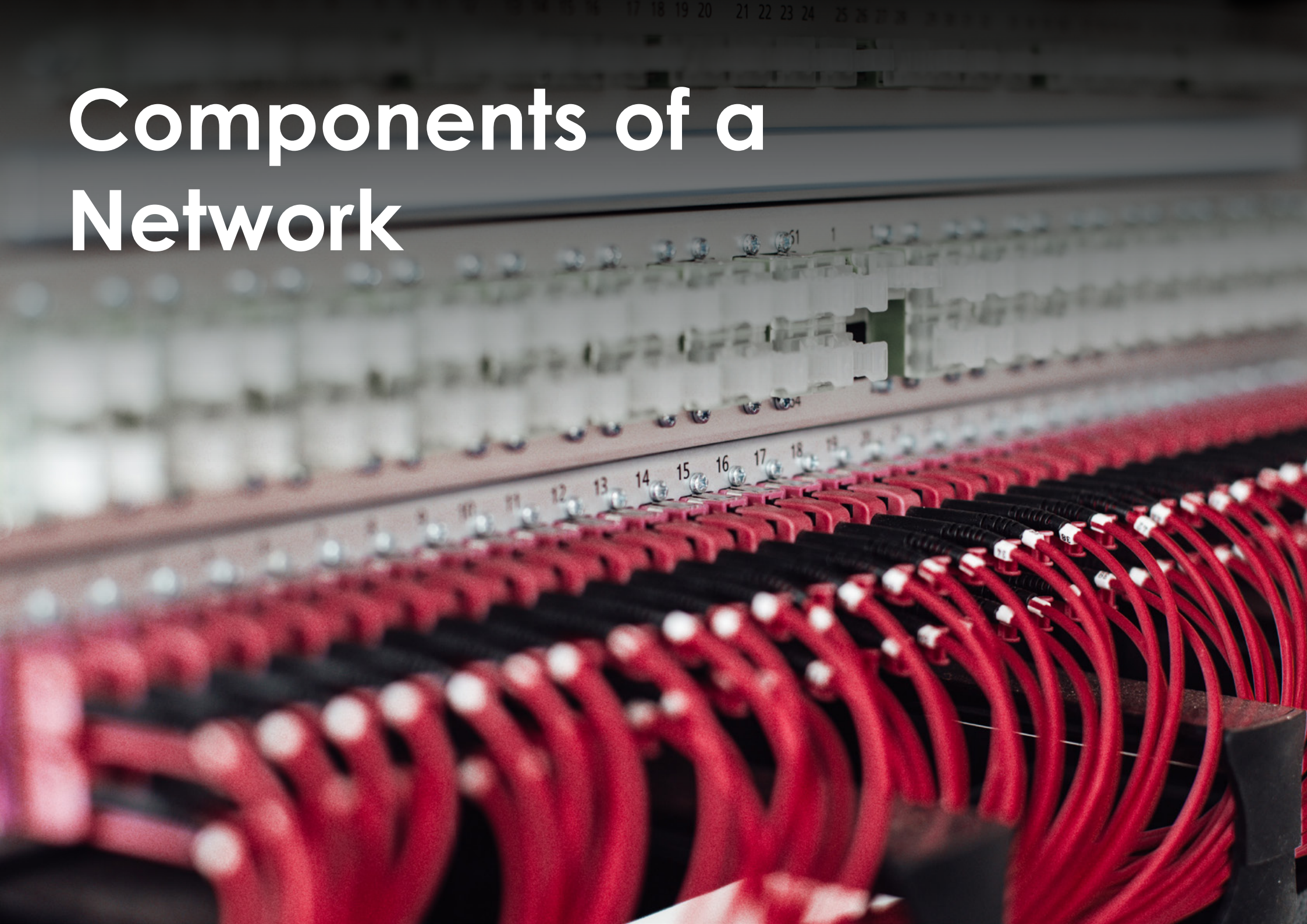
A network is a collection of IT hardware connected together to allow the devices to transfer data, share files and work as a team. These collected devices in your network are connected to a switch that allows data and files to be transferred between your technology.

When a server is connected via the switch, the computers in the network can save files and information that can be accessed by all devices within the network. This makes essential file sharing for home and business networks quick and easy.

Below is an example of a network:



Components of a Network



Network Switch

The switch is an essential aspect of networking as this is the device that allows all others to connect together. Connected devices could be computers, printers, routers, servers, wireless access points and more. Allowing your devices to connect with one another lets computers work together (for example sending documents from your computer to your printer to be printed), and also means that devices can share files and other data easily from one to another.

There are 3 main types of switches: unmanaged, managed and smart.

Unmanaged Switch

The most basic type of switch; they can simply be plugged into devices and don't require configuration. However, this lack of configuration means that the network can't be personalised to suit a business or individual's needs.

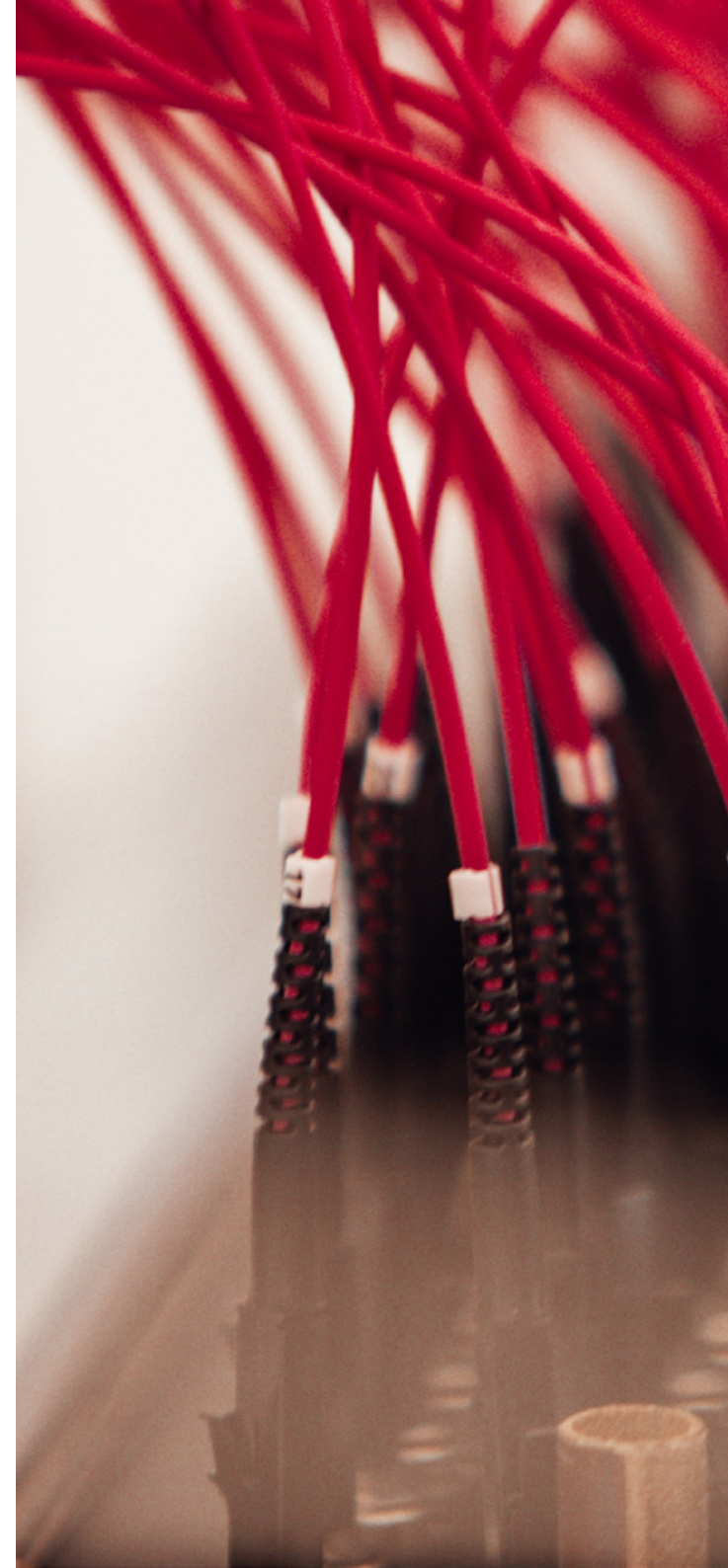
Managed Switch

Managed switches allow for customisation and configuration on many levels.

They are also generally more secure than unmanaged switches and so are required for the handling of sensitive information. Traffic can also be controlled with a managed switch allowing the administrator to give priority to one device over others etc.

Smart Switch

Smart, or intelligent, switches, are similar to managed switches in the security, control and features that they offer. However, a smart switch limits what can be configured by the administrator. They are a good middle point between unmanaged and managed switches whilst also being easy to use.

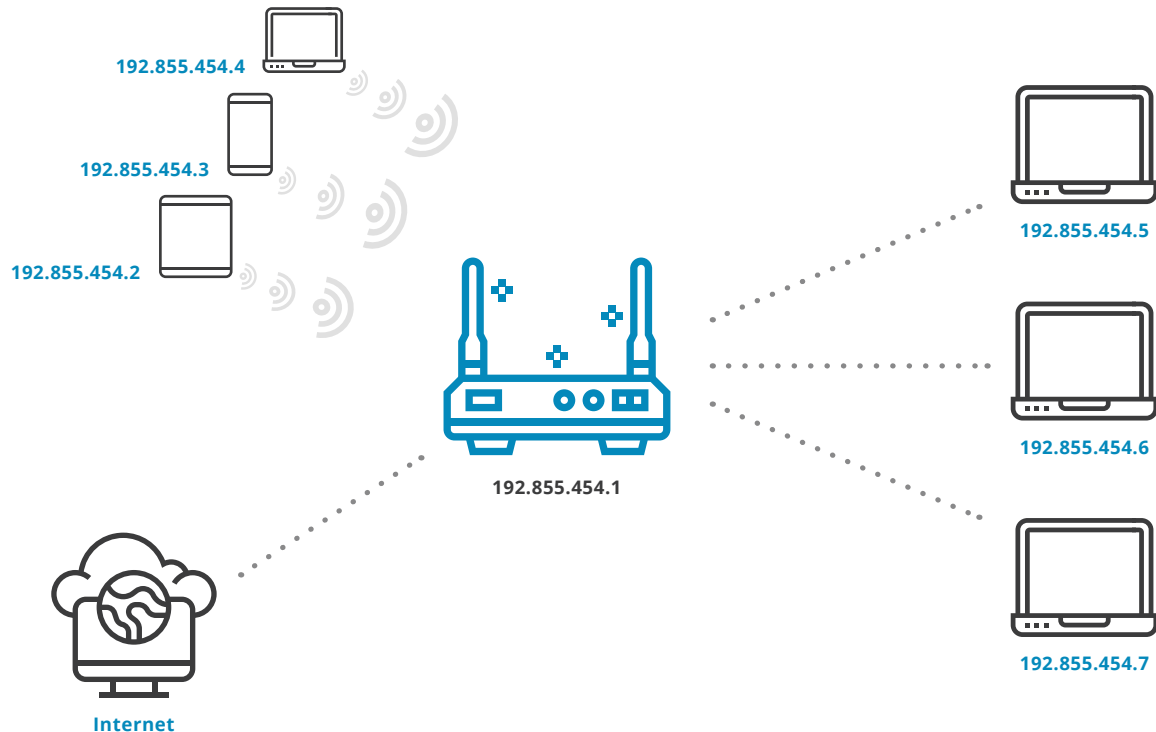


Routers

They help to connect your devices and networks to the internet, as well as protect your technology from security threats and create local networks.

Routing is the ability to select a path across one or more networks. Routers intelligently choose the best possible path for transferring data packets between devices and networks.

This can apply to any form of network however routing devices tend to handle the pathway for Internet Protocol or IP packets; in this form, the process is known as internet routing. Routers are the hardware behind the routing process. With the use of an IP address table routers are able to decide the best path to send packets between devices and networks. They connect two or more IP networks and transfer data between them as needed.



Connected Devices

All technological devices are given a MAC address when manufactured. The switch uses this MAC address to identify which port devices are connected to and find the best path to transfer data between them.





Cabling

Cabling is what connects all of the devices of a network together. Different types of cable are available, all offering different speeds, data transfer rates and distances. Attaching devices with fast data transfer capabilities requires cables that can match this performance, and vice versa, to make the most out of your network.

Copper and fibre optic are the two most common ways to transmit data through cables. Copper is more reliable over longer distances; however, fibre optic is incredibly fast!

The most common cabling for your networking switch is UTP, or Unshielded Twisted Pair. This cabling is basic in design and consists of two copper wires twisted together with no shielding. The twisted-pair affect performance characteristics such as crosstalk and attenuation.



Popular Ports

PoE and PoE+

Power over Ethernet (PoE) ports provide power to your connected devices. A PoE port is an open standard, also known as the 802.3af Standard. 802.3af is the old standard for PoE ports issued by IEEE (the Institute of Electrical and Electronics Engineers) and provides a power level of 15.4 watts to any connected device, such as an IP phone or security camera. PoE ports will always provide 15.4 watts, regardless of whether the connected device requires that level of power or less.

PoE+ ports are the updated standard, 802.3at. This new standard was released in 2009 and provides up to 30 Watts of power to up to 2 connected devices per port. This allows your switch to provide power to devices that require more energy, and power two devices simultaneously, allowing for greater customisation in your network. The PoE+ ports also allow devices to arrange the power wattage required, providing the level of power needed for a device to function without wasting unneeded energy. This feature makes PoE+ ports more efficient than the earlier model.

RJ45

RJ45 stands for registered jack 45 and is often mistakenly called Ethernet or CAT6. CAT6 cables have an RJ45 connector on each end and these two features, as well as RJ45 ports, make up an Ethernet connection.

RJ45 refers to both the male (connector) and the female (port) parts of an ethernet network. RJ45 is the most common method for data transfer between devices and so you will find multiple RJ45 ports on most switches on the market.

CX4

CX4 ports are capable of supporting a 10-Gigabit Ethernet connection, making this port a good choice when installing hardware for a 10GBE network system. By combining low-latency, low cost and reduced power consumption, CX4 ports offer a great choice for demanding applications and networks with heavy levels of traffic whilst ensuring high levels of efficiency and productivity for your network.

CX4 ports provide a reliable and exceptionally fast networking option to support a 10GbE IT system. Find out more about 10GbE networking solutions in our [blog on switch speeds](#).

Transceivers



What is a Transceiver?

A transceiver is a module that is a combination of transmitter and receiver in one device. Most transceivers are wireless, but in the case of networking switch ports, they deal with cable and fibre optic solutions.

SFP

SFP stands for small form-factor pluggable and refers to a port or transceiver module found in some networking switches. SFP ports provide a high-speed and reliable connection option between devices through copper or fibre optic cables. They are a great option for many large networking solutions due to the secure and exceptionally fast connections they provide.

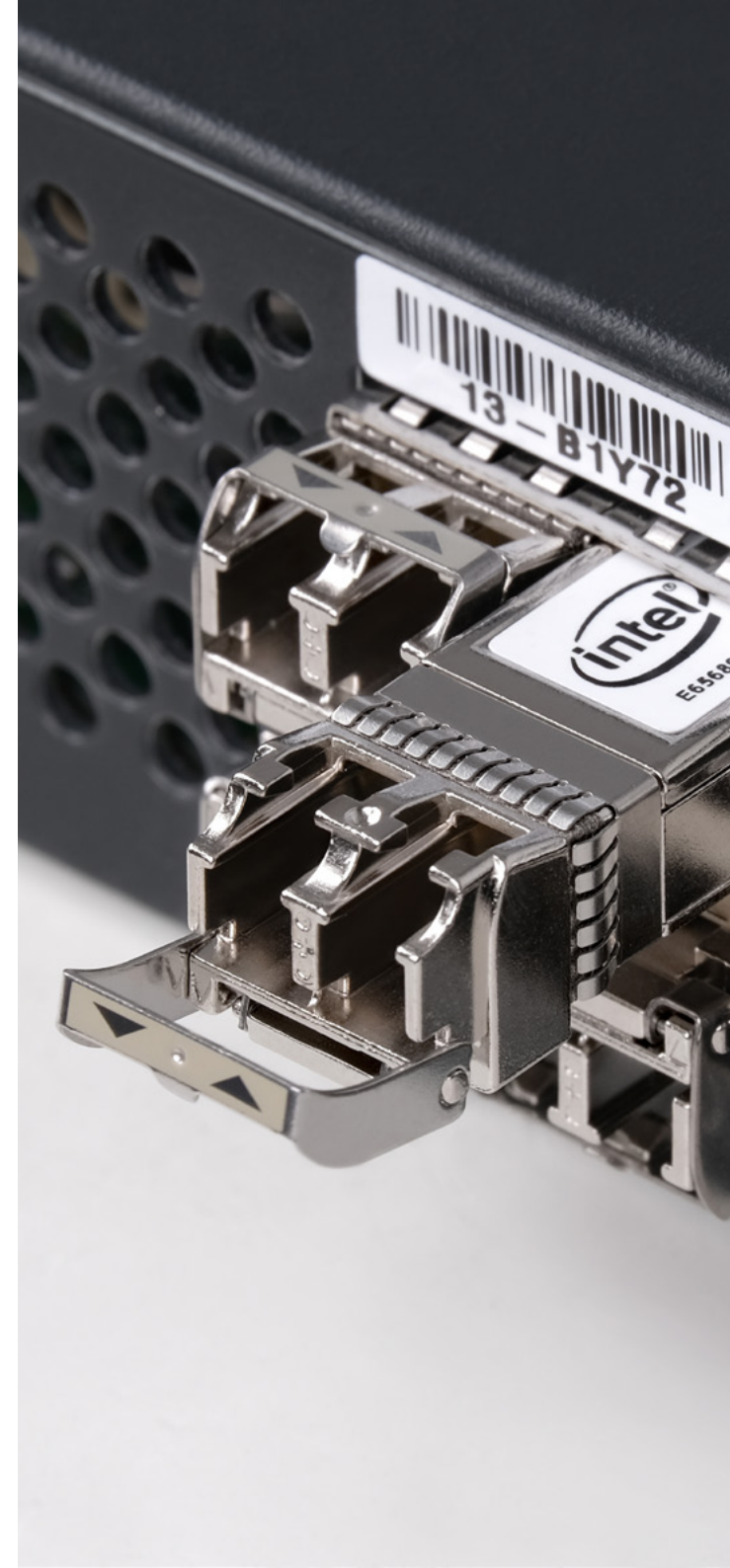
What is SFP+?

SFP+ looks and acts identically to an SFP module, however, it is capable of supporting up to 10Gbps. SFP+ is recommended for larger networks with many connected devices to avoid bottlenecks and keep information moving between devices efficiently. SFP+ allows your network to make use of faster cabling and device options, such as single or multi-mode fibre.

Choosing between SFP and SFP+ is a case of assessing how much demand will be on your network system and deciding on the best port option to support your business's needs. For small to medium networks, SFP is a good choice and provides high-speed, reliable connections. For larger networks, higher speeds and transfer rates will prevent bottlenecks and ensure network efficiency.

GBIC

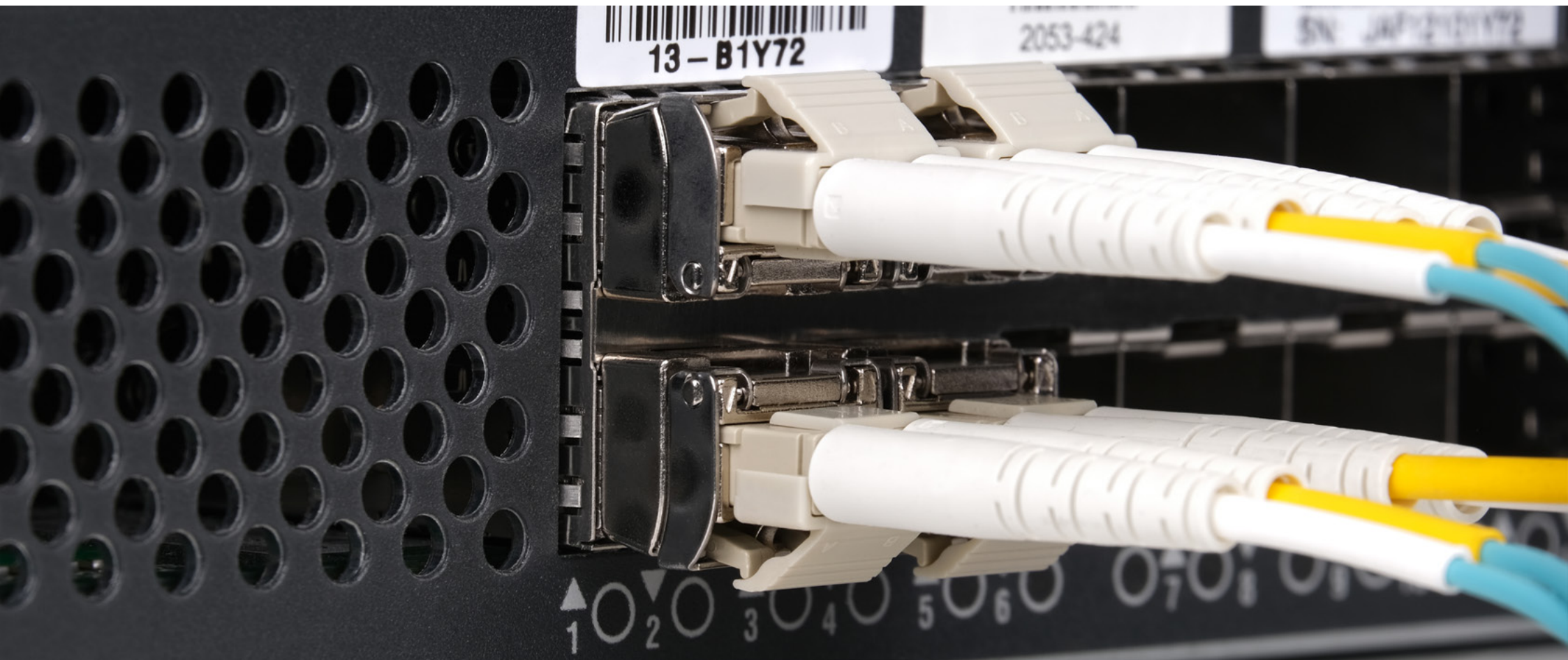
GBIC is a hot-swappable transceiver. It stands for Gigabit Interface Converter and it is generally used to convert between the optical and electrical signal. SFP is seen as an upgraded GBIC module and the only real difference between the two is size, with SFP being a much smaller choice.



QSFP vs QSFP+

QSFP stands for Quad Small Form-factor Pluggable and works in the same way as an SFP or SFP+ transceiver. This transceiver provides 4 transmit and 4 receiver channels to support higher data transfer rates for your network. QSFP supports a 4x1Gbps or 40Gbps, transfer rate making it a faster option than SFP or SFP+ modules.

QSFP+ is an even faster option, offering 4x10Gbps, or 40Gbps, data transfer rate. When deciding on the transceiver for your network it is worth considering the applications of your business and the number of connected devices to assess the speed and transfer rate that your network will need.



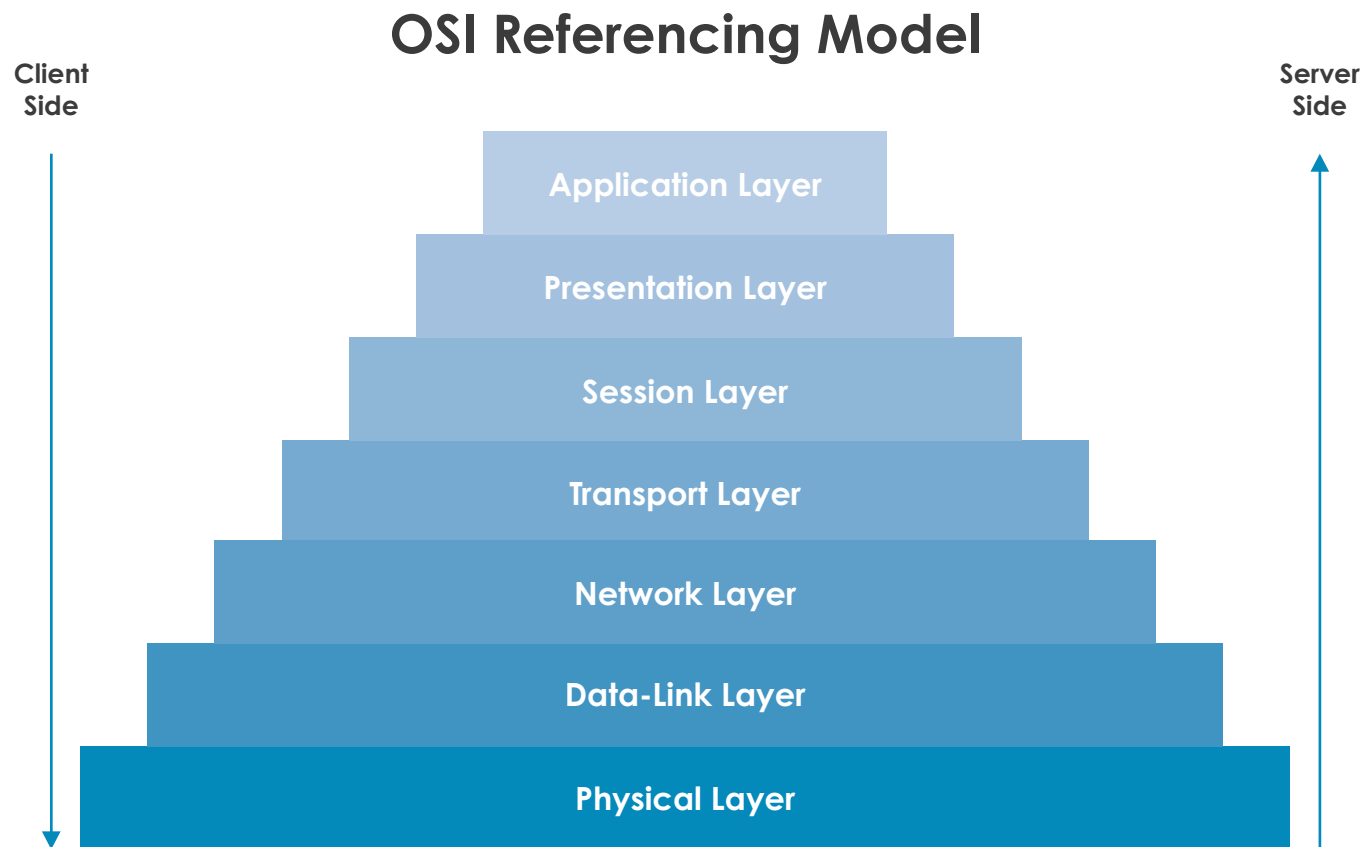
The OSI and TCP/IP Referencing Models



Both the OSI and the TCP/IP models are the standard references for the communication that occurs between devices or networks when data is transferred. Different protocols are used to break down the data being transferred from the sender's device, as well as to reassemble the data for the user on the receiving end; these two models offer a reference for this process.

What is the OSI Reference Model?

The OSI reference model is a 7 layer vertical standard for transferring data between devices or networks. Data travels down the layers of the model when sent and rises back up the layers on the receiving device's end to ensure.

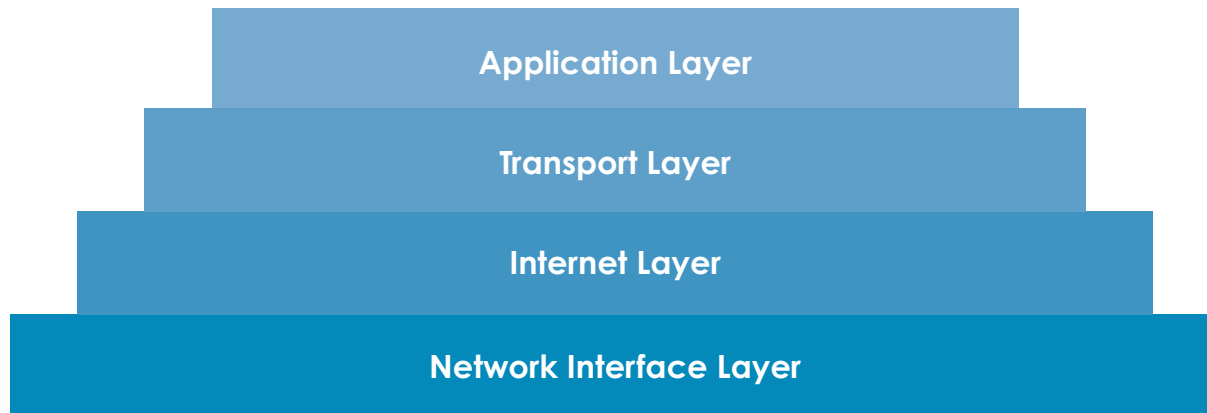


The 4 Layers of the TCP/IP Referencing Model

The TCP/IP model only consists of 4 layers and can be mapped onto the OSI model to form a more condensed reference. Just as with the OSI model, the TCP/IP is a standard reference for networking, demonstrating how data is transferred between devices. However, unlike OSI, TCP/IP functions horizontally rather than vertically.

The name TCP/IP came from the most commonly used protocols used in this model, TCP (Transmission Control Protocol) from the transport layer, and IP (Internet Protocol) from the network layer.

TCP/IP Referencing Model

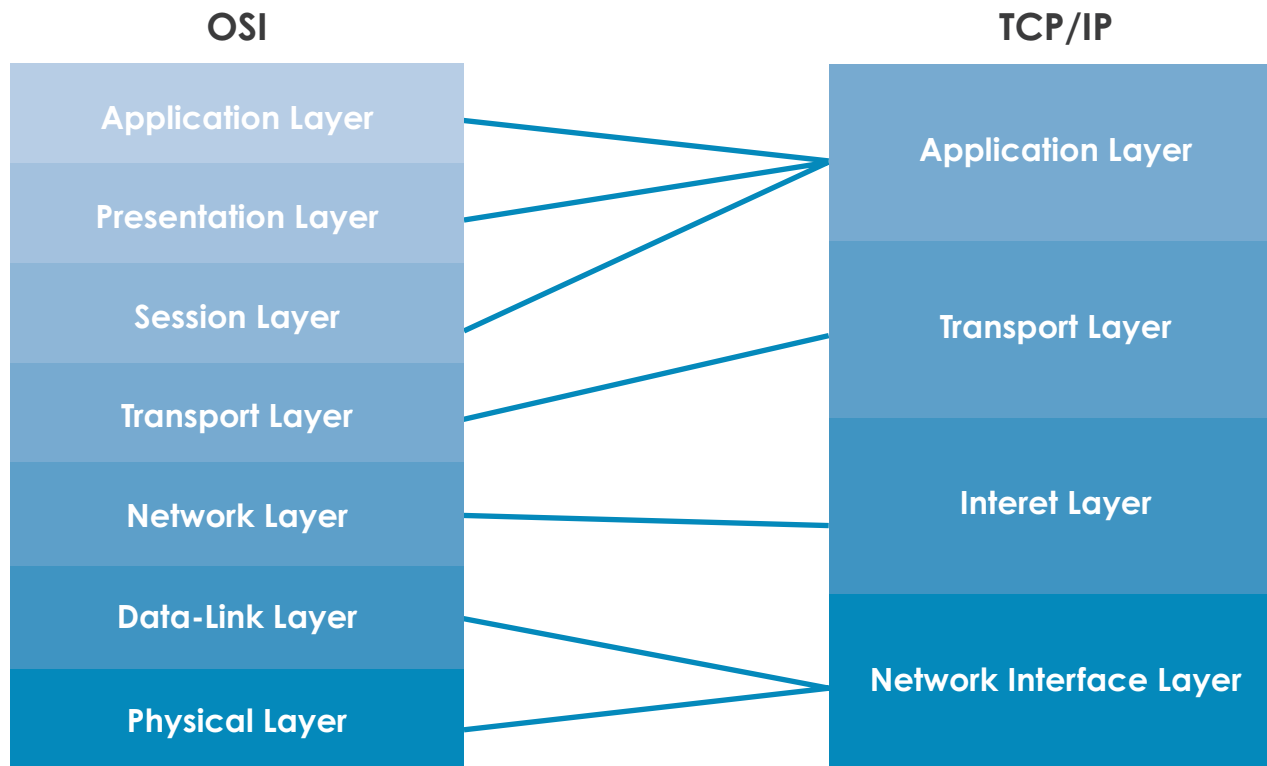


TCP/IP vs OSI Referencing Model

The TCP/IP model is a much newer and more reliable referencing standard than OSI. Developed in the 1970s, OSI can often be viewed as outdated in the networking industry and many have adopted the TCP/IP model in its place. The TCP/IP model is more flexible in what you can accomplish and does not feature the strict boundaries of the older OSI reference.

This having been said, it is a lot more difficult to introduce new protocols into the TCP/IP model and so the protocols of the OSI reference are easier to replace and develop upon as and when new technology is introduced. This means that, despite its age, the TCP/IP standard has the potential to become an outdated reference as new technologies are developed.

TCI/IP Referencing Model



Networking Switch Selector



System



Reset

SF200E-24P

24-Port 10/100 PoE Smart Swi

Choosing your Networking Device

Choosing the device that best serves your IT needs can be complicated due to the sheer volume of hardware on the market and the varying configurations available. Techbuyer has developed a tool to help you narrow down your choice to technology that fits your selected requirements!

By selecting features that you require on your networking device, our networking switch selector displays devices that comply with your choices to help you identify a range of products that will work best for you and your company.

Refine your search [Clear Filters](#)

MANAGEMENT

☐ Smart managed [?](#)

☐ Unmanaged [?](#)

☐ Managed [?](#)

PORT TYPE

☐ QSFP [?](#)

☐ QSFP+ [?](#)

☐ RJ-45 [?](#)

☐ SFP [?](#)

☐ SFP+ [?](#)

NUMBER OF PORTS

☐ 1-16

☐ 17-32

☐ 33-48

☐ 49+

FEATURES

☐ Fanless [?](#)

☐ IPv6 [?](#)

☐ PoE [?](#)

☐ PoE+ [?](#)

☐ Redundant Power [?](#)

UPLINK SPEED

☐ 100Mb [?](#)

☐ 1Gb [?](#)

☐ 6Gb [?](#)

☐ 8Gb [?](#)

☐ 10Gb [?](#)

☐ 16Gb [?](#)

☐ 40Gb [?](#)

☐ 100Gb [?](#)

ROUTING/SWITCHING

☐ Layer 2 [?](#)

☐ Layer 3 [?](#)

☐ Layer 4 [?](#)

BRAND

☐ ARISTA

☐ Cisco


☐ IBM

☐ JUNIPER

☐ IIP

☐ Dell


Items 1-32 of 236



HP A3600-48-POE SI 48 PORT ETHERNET SWITCH

Product Code: JD327A


View



HPE SN6000B 16GB 48/36 ACTIVE PORT ACTIVE FC SWITCH

Product Code: QK753B-36AP


View



CISCO 3850 CATALYST 48 PORT LAYER 3 STACKABLE GIGABIT POE+ SWITCH

Product Code: WS-C3850-48P-S

View



HP SN6000 STACKABLE SINGLE POWER FIBRE CHANNEL SWITCH

Product Code: AW575BR

View

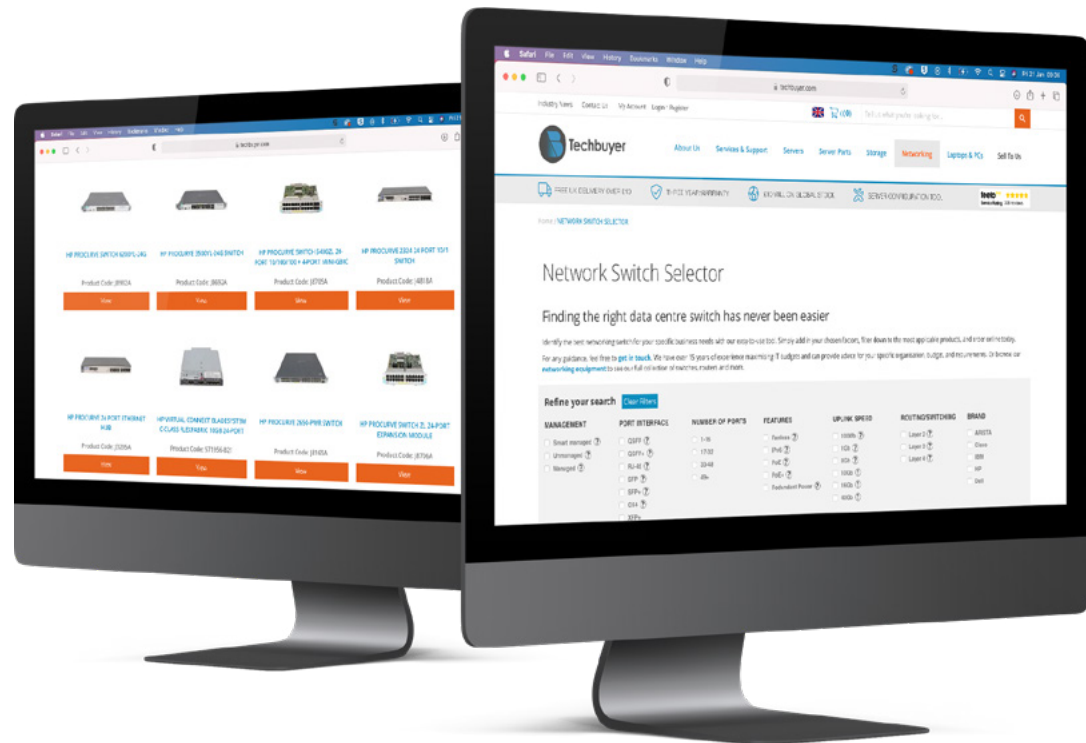


How Does it Work?

Our switch selector allows you to select which layer you would like your switch to fit into, as well as any ports that you require, the management method, the number of ports available, any advanced features you may require, the uplink speed, as well as the brand! You can select as many or as few options across the tool as you please and not every section needs a selected option to bring devices that match your search.

As you select your options, the choice of networking devices displayed will decrease until you are left with a single, or a handful of switches that meet your requirements. The more options you include the fewer devices will be displayed as you narrow down on the best solution for you.

Try our Switch Selector!



Why use Techbuyer

Techbuyer is a global supplier of sustainable IT solutions for the purchasing, maintenance and disposal of technology. With over a decade of experience providing high-quality and personalised IT systems, Techbuyer offers expert advice and recommendations to help you make any IT decision with confidence. Get in touch with our team to find out exactly what we can do for you and your IT system.

Get in Touch

