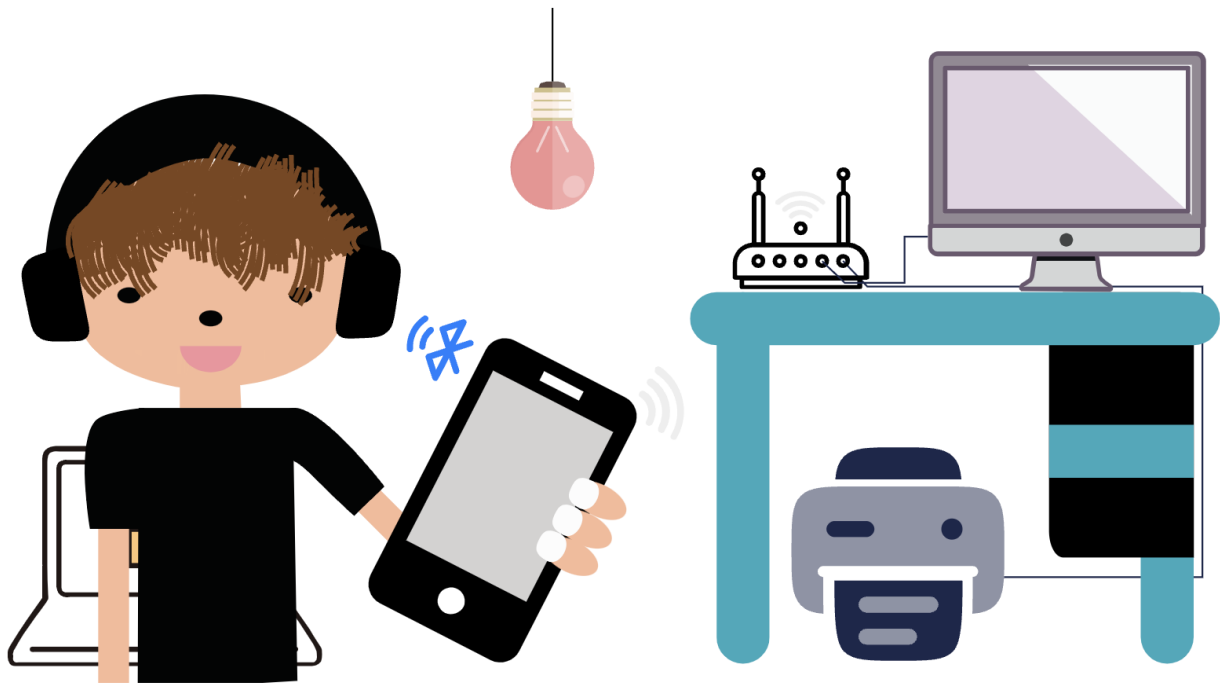


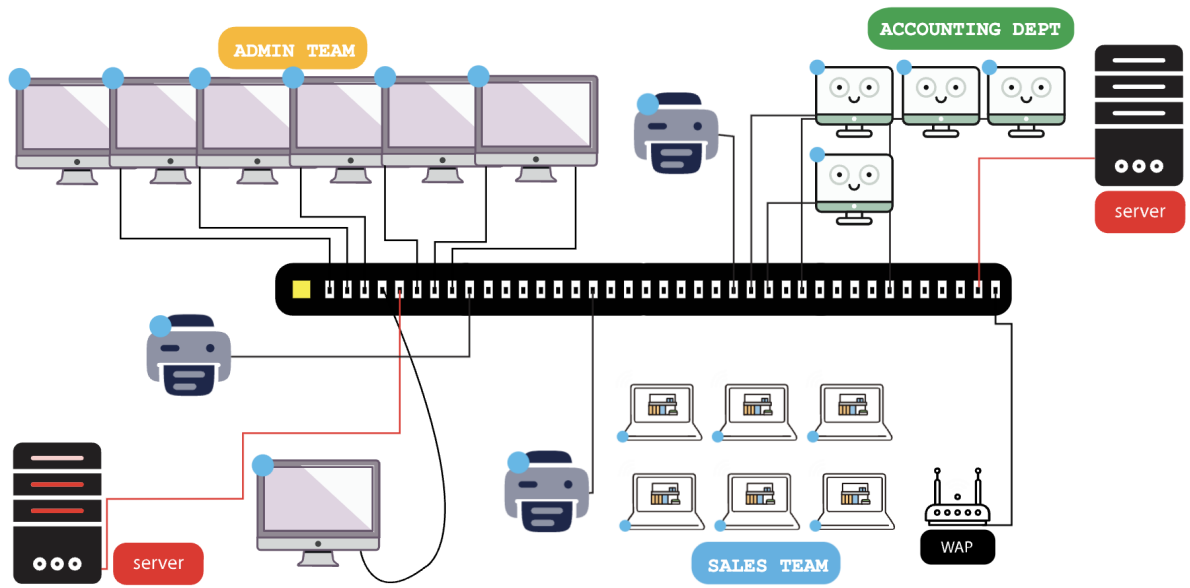
Personal Area Network (PAN)



Before we take a look at Virtual LANs, let's take a moment to consider that a tool to connect devices together doesn't have to be complicated - **a network switch**. You may even have some kind of switch at home, possibly integrated into a wifi router.

Circle the switch in the above image. This kind of network is called a **Personal Area Network** (PAN) and is probably the smallest network. Even having a bluetooth connection between your smartphone and ear buds can be considered a PAN.

Take a look at the following scenario involving a LAN in a company office. Check out the network switch!! It has many ports and allows many devices to connect, creating a network. A strategy for ensuring the security of the network is to use a **list of trusted MAC addresses**. Any device not on the list cannot join!



How many **clients** can you count on this network?

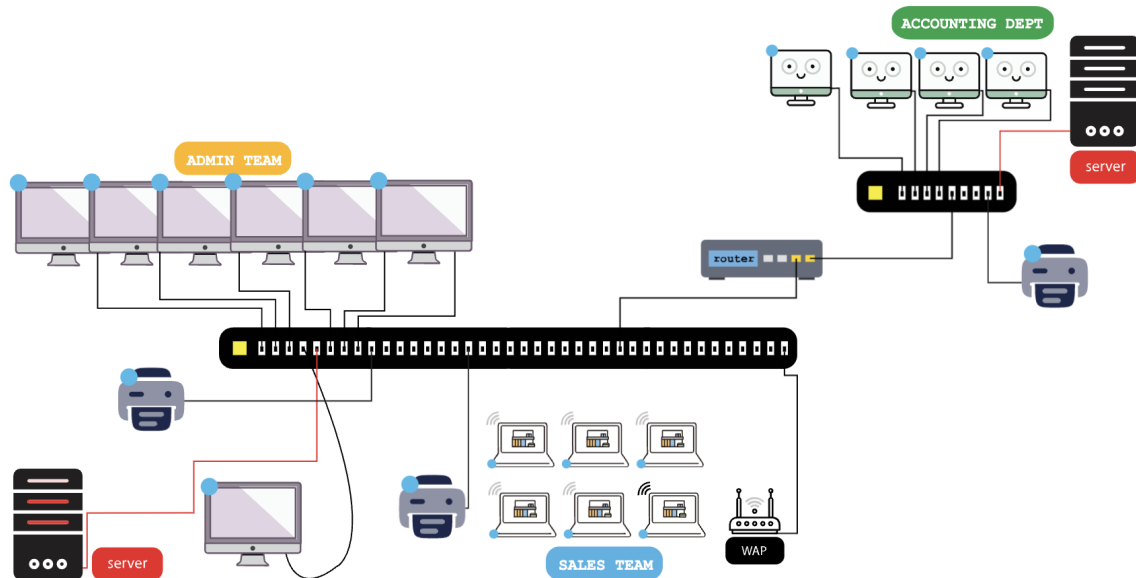
How many **servers** can you count on this network?

The performance of the network varies during the day. Sometimes it is quite slow and at other times it is very fast. Explain why this might be so:

A Security Issue

The accounting team has its own server. Can you find it in the above diagram? **Circle it.** It is full of sensitive employee information. At the moment, anyone connected to the network could attempt to access this server.

The network manager has decided to separate the accounting team onto a **subnetwork**. In effect, the company's LAN is now 2 subnetworks connected by a **router**¹. Find and circle the router in the diagram below:



The router can divert network traffic from one sub network to another as necessary. One benefit of breaking a network into subnetworks is that it reduces the amount of traffic on the sub networks, meaning that performance can remain high. Generally devices need to be in the **same physical location** in order to join a sub network eg in the same room or floor in an office building. *One reason for this is that a cable needs to connect any new devices to the correct switch, so the new device needs to be near the correct switch.*

¹ routers can be used to connect networks together and switches are used to connect devices to a network

To improve security and efficiency, the network manager is now considering creating 2 more subnetworks, one for ADMIN and another for SALES.

Draw this new network **topology**:

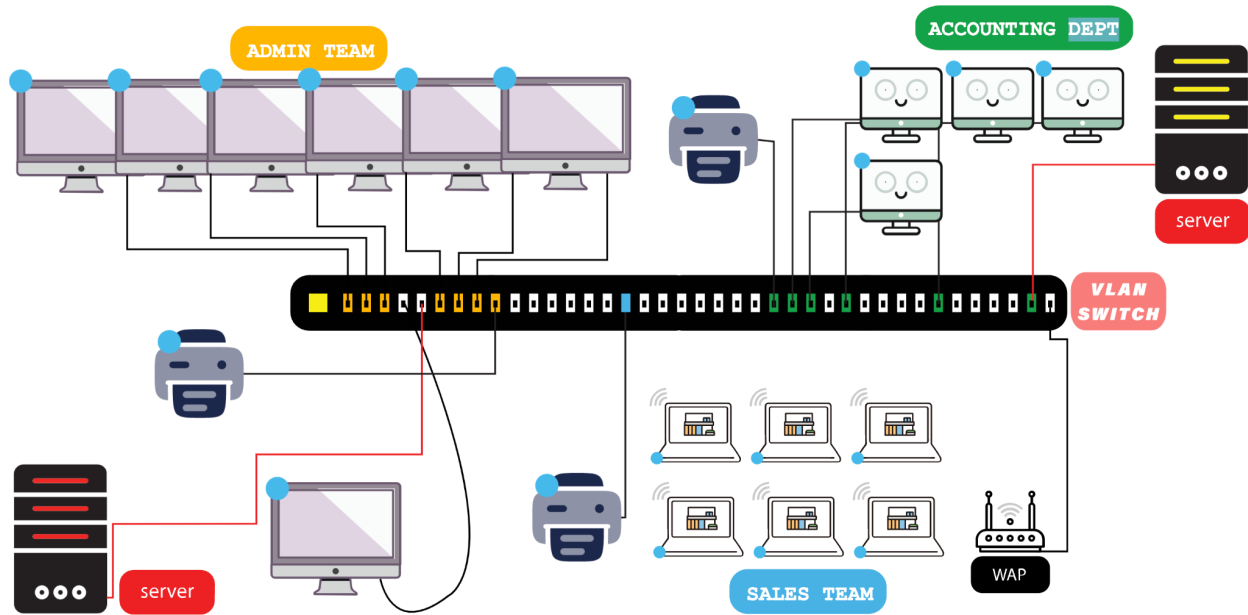


Outline a drawback of this approach to managing devices on a network:



A Smart Switch

The smart people who design networks and network equipment (eg switches and routers) came up with a very smart way of managing devices on a network. They designed a switch which is programmable. Each port can be programmed as part of a sub network. Here is an example to help illustrate the concept:



Color codes have been used on the ports to highlight the concept. Some of the ports have been programmed as part of the Admin Team's sub network. Others have been programmed for other sub networks. If a new staff member joins the Accounting Team, just **program an available port** to join the accounting team's sub network. The staff don't even have to be in the same room or floor in order to join the sub network! They just need to connect to the switch and this is possible with wall sockets and patch panels etc.

Take another look at the network. A new staff member needs to connect her desktop computer to the admin team's sub network. Draw the device and use the color codes to connect the desktop to the network.

A Virtual LAN uses a programmable switch to create sub networks. It does not need to rely on the physical location of the network devices, like a normal LAN does.

A LAN is considered to be a **physical** network.

A V-LAN is considered to be a **logical** network.

Generative AI

What response does your favourite Generative AI tool eg ChatGPT give for the following prompt:

In less than 50 words, outline the difference between LAN and VLAN

Unit Page Vocabulary

Return to the unit page. Find the following terms and ensure you are familiar with their meaning/purpose. Make revision notes if necessary.

Protocol

Traffic

PAN

Data Packet

Router

Exam Questions

Return to the unit page and attempt the exam questions.