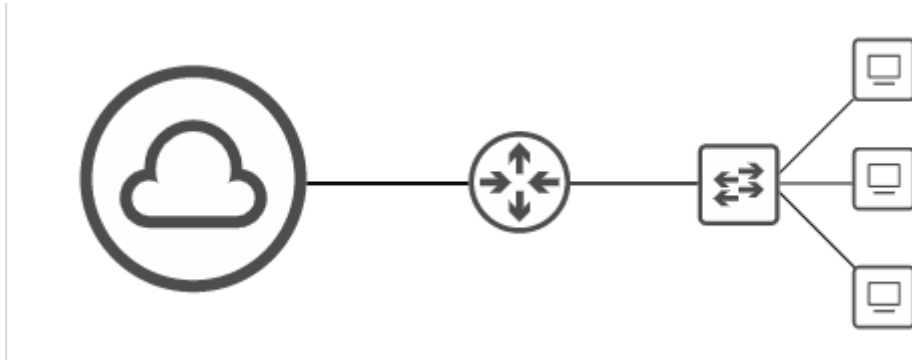


# Network Devices

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## Network Devices

In this section we will cover what a network is and the fundamentals.

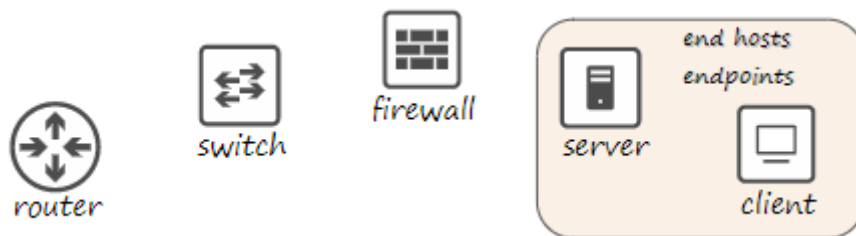


*Diagram of a network*

## What is a network?

- A digital telecommunications network that **allows nodes to share data/communicate**

Below are some of the different nodes that you will find in a network, we will explain what they all do later.

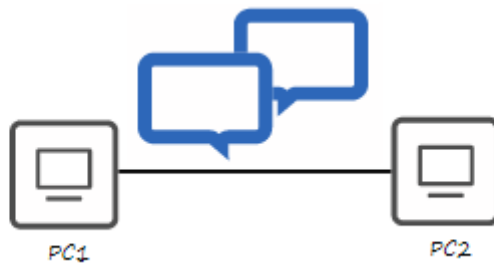


*Example of network nodes*

## Building a Network

We will gradually build our network from scratch, so we can understand the different network nodes and the role they play.

If we connect two computers together with a cable then have a (very basic) network! With the two computers connected, **this allows them to be able to communicate to each other.**



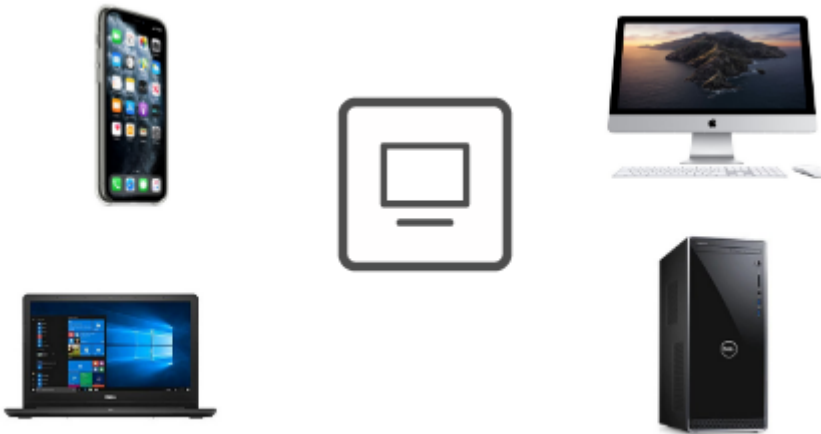
*Computers that are connected to each other creates a network*

## Clients & Servers

We will cover the definition of a client and a server, and also show some examples of what they look like.

### Client

Is a device that **access a service** made by a server



*Example of clients*

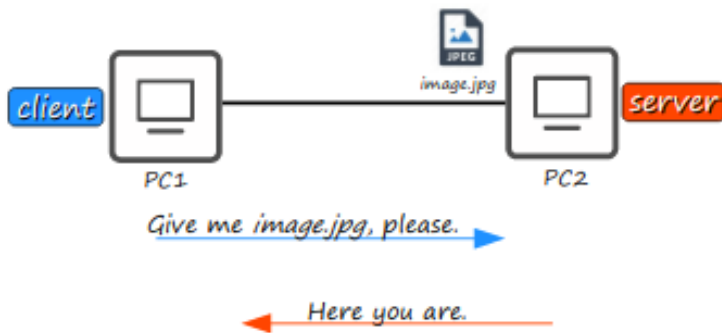
### Server

A device that **provides functions or services** for clients



*Example of servers*

**Your desktop can also be a server**; if we look at the building a network image we can say one PC is the server and the other is the client. For example, if a computer was sending a file to another, the computer **receiving** the file would be the **client**, and the computer **sending** the file would be the **server**.



\*Interaction between client and server when sending a file\*



Interaction between client and server when watching a video



Interaction between client and server when making a call

## Switches

We will look at what switches are and how they are used within a network.

These are Cisco enterprise grade switches and are used by many enterprises



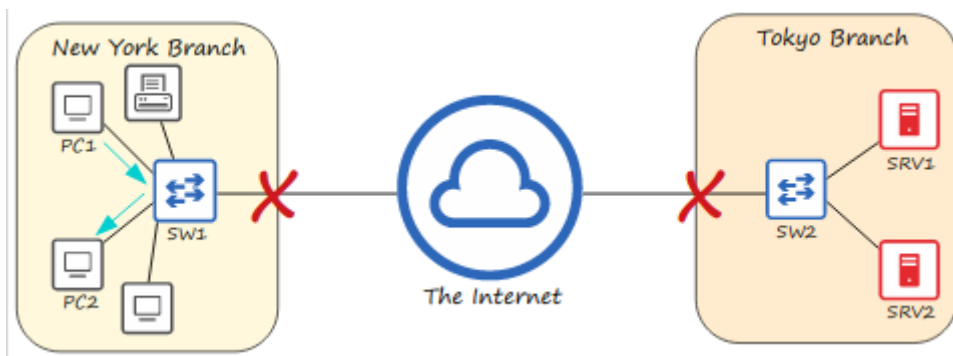
Because we **do not directly connect our clients and servers** to each other, we use **switches** to act as the *middleman* between the connections. They have the ability to host multiple connections because most switches usually have **over 24 ports** and they can accommodate both connectivity and hosting for the end host (clients & servers).



## LAN (Local Area Network)

*Switches can house multiple connections for clients and servers*

Switches forward the traffic of the end hosts within a **LAN (Local Area Network)**. This is basically a bunch of end hosts/devices that are on the same area - this could be the same office floor, the entire office (if it was small), or even your LAN at home. Devices that are connected to the switch will be able to communicate with each other; however **switches cannot communicate with other switches across the internet**.



*Switches can only communicate to devices in the same local network*

As you can see **switches only has access to devices in the same network**. In order to connect to other devices, like for the New York branch to connect to the Tokyo branch they would need a router to communicate over the internet.

**Catalyst switches are Cisco's enterprise grade switches which are used by many enterprises to connect their LAN's.**

## Routers



*Typical Cisco ISR enterprise routers*

Routers provide **connectivity between other LAN's over the internet**. They have **less ports** than switches and some can be found at the front of the device or at the back of the device. The routers in this image are *Cisco Enterprise* routers that provides connections between other LAN's. This allows data to be sent across the internet.



Routers allow LAN's/switches to communicate over the internet

## Firewalls

There are two types of firewalls: host-based firewalls and network firewalls.

### Host-Based Firewalls

Software applications that filter traffic entering and exiting the host machine (like a PC, laptop, etc). Most PCs have built in firewalls.

### Network Firewalls

Hardware devices that control network traffic entering & leaving the network.

In this course we will focus on **network firewalls**.



ASA5500-X



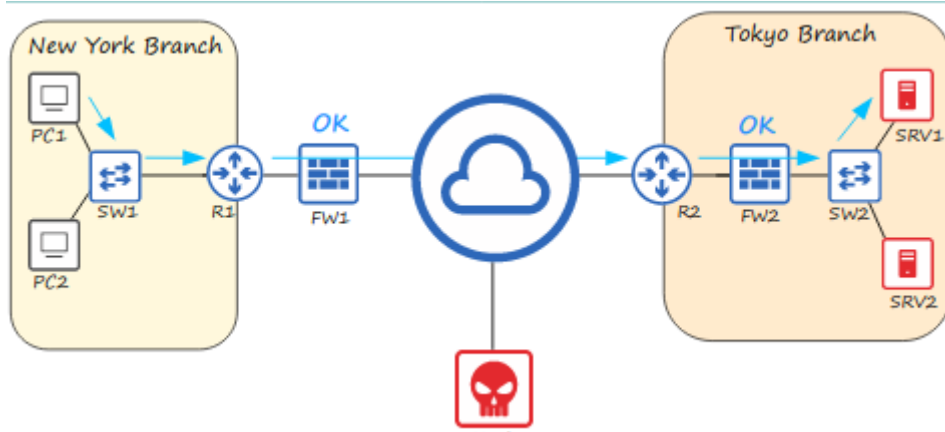
Firepower 2100

Cisco 'Next-Generation' network firewalls

The images above shows you what a typical '**Next-Generation**' Cisco firewall looks like. Older models like the **ASA (Adaptive Security Appliance)** is Cisco's classic model while the two in the image are Next-Gen because they come with extra security features like an **IPS (Intrusion Prevention System)**.

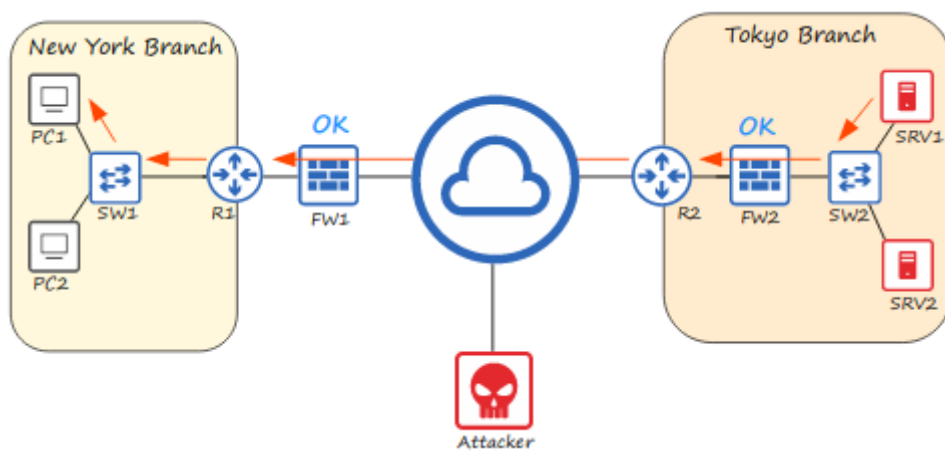
Firewalls monitor and control network traffic based on **configured security rules** that tells them which traffic to accept or deny. These firewalls can be placed inside or outside of the network, to protect the end hosts within (eg PCs & servers etc).

**This means firewalls are not directly connected to the end host.**



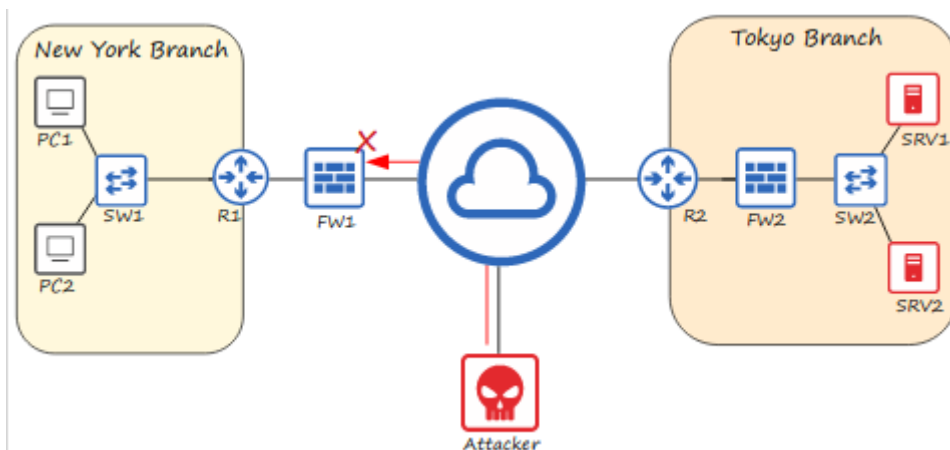
*The firewall protects end hosts in both New York & Tokyo*

If configured properly, the PCs from New York will be able to access the servers from Tokyo and vice versa.



*You configure which end hosts are allowed access to the network*

It will also block anyone **outside of the network** trying to access the PCs in New York or servers in Tokyo.



*Protects the network from outsiders*

## REMEMBER !!

- A host can refer to **any type of network node**.
- A client **access/receives a service**, while a server **provides the service**.

- The **same device** can be a server in some situations, and a client in other situations.
- Cisco's Enterprise grade **switches** which are used by many enterprises to **connect to their LAN's**.
- LAN's are **local area networks** that provide connectivity to **local devices**.
- Routers allow **communication between LAN's**. *They also allow data to be sent to other devices this way.*
- Routers have **less ports** than switches.
- There are two types of firewalls, **host-based** firewalls & **network** firewalls.
- Network firewalls **control traffic within the network**. *It stops outsiders from accessing the network.*
- Firewalls can also **connect to multiple networks**.
- There are more network devices which we will cover!

Download the flashcard for this session and leave a tick on the notes once completed twice.