

Date: 19/04/2021

Lab Assignment No:10

Aim: A case study to design and configure any organization network.

Lab Outcome Attained: To design and configure a network for an organization

Theory:**Components -****Layer 2 Switching**

A layer 2 switch is a type of network switch or device that works on the data link layer (OSI Layer 2) and utilizes MAC Address to determine the path through where the frames are to be forwarded. It uses hardware based switching techniques to connect and transmit data in a local area network (LAN). They break up one large collision domain into multiple smaller ones.

It can also be referred to as a multiport bridge. Layer 2 switches are faster than routers because they don't take up time looking at the Network layer header information. Instead, they look at the frame's hardware addresses to decide what to do with the frame – to forward, flood, or drop it. Here are other major advantages of Layer 2 switching:

- Fast hardware-based bridging (using ASICs chips)
- Wire speed
- Low latency
- Low cost

Layer 3 Switching

A layer-3 switch can perform some or all of the functions normally performed by a router. Most network switches, however, are limited to supporting a single type of physical network, typically Ethernet, whereas a router may support different kinds of physical networks on different ports.

Wireless Access Point

In computer networking, a wireless access point (WAP), or more generally just access point (AP), is a networking hardware device that allows other Wi-Fi devices to connect to a wired network. As a standalone device, the AP may have a wired connection to a router, but, in a wireless router, it can also be an integral component of the router itself.

Wifi Router

A WiFi router is an electronic device that sends data received from an Internet cable to other devices. It also acts as a wireless access point from which it shares data through the use of radio signals. The router converts the data stream delivered by your Internet connection into radio signals.

ISP

An Internet service provider (ISP) is an organization that provides a myriad of services for accessing, using, or participating in the Internet. Internet service providers can be organized in various forms, such as commercial, community-owned, non-profit, or otherwise privately owned.

Internet services typically provided by ISPs can include Internet access, Internet transit, domain name registration, web hosting, Usenet service, and colocation.

Firewall

Firewall is a network security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules. A firewall typically establishes a barrier between a trusted network and an untrusted network, such as the Internet.

Networking Cable

Networking cables are networking hardware used to connect one network device to other network devices or to connect two or more computers to share printers, scanners etc. Different types of network cables, such as coaxial cable, optical fiber cable, and twisted pair cables, are used depending on the network's physical layer, topology, and size. The devices can be separated by a few meters (e.g. via Ethernet) or nearly unlimited distances (e.g. via the interconnections of the Internet).

4th Floor Networking Plan

Room 404 – (Lab)

40PC + 2 Teachers

- 2 L2 switches (24 ports)
- 1 wireless access point
- Total area = 120 sq m

Room 403 (Classroom)

- 1 wireless access point

Room 402 – (Lab)

14PC + 2 Teachers

- 1 L2 switches (24 ports)
- 1 wireless access point
- Total area = 70 sq m

Room 401 – (Lab)

100PC + 2 Teachers + 1 Podium

- 5 L2 switches (24 ports)
- 1 wireless access point
- Total area= 220 sq m

Components Used -

L2 Switch - 24 port - Cisco 24 Port Gigabit Switch (10/100/1000)

Computers & Accessories > Networking Devices > Network Hubs > Cisco 24 Port Gigabit Switch (10/100/1000)



Cisco 24 Port Gigabit Switch (10/100/1000)

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L3 Switch – 28 port - Cisco SG350-28P Managed Switch | 28 Gigabit Ethernet Ports | 24 Gigabit Ethernet RJ45 Ports | 2 SFP Slots | 2 Gigabit Ethernet Combo | 195W PoE | Limited Lifetime Protection (SG350-28P-K9-IN)

Computers & Accessories > Networking Devices > Network Hubs > Cisco SG350-28P Managed Switch | 28 Gigabit Ethernet Ports | 24 Gigabit Ethernet



Cisco SG350-28P Managed Switch | 28 Gigabit Ethernet Ports | 24 Gigabit Ethernet RJ45 Ports | 2 SFP Slots | 2 Gigabit Ethernet Combo | 195W PoE | Limited Lifetime Protection (SG350-28P-K9-IN)

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ISP - Hathway - Plan - Rs 8400 yearly (Speed = 50 mbps)

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Speed	50 Mbps
FUP (Monthly)	500 GB
Post FUP	2 Mbps
Subscription Charges (₹) 3 Months	2100
Subscription Charges (₹) 6 Months	4200
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Wire - Terabyte 30 METER Ethernet Cable CAT5/5E Network Cable Internet Cable RJ45 LAN Wire High Speed Patch Cable Computer Cord 30 m LAN Cable.

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Warranty NA

Firewall - Cisco ASA 5506-X

Computers & Accessories › Networking Devices › Routers › ASA 5506-X with FirePOWER services



ASA 5506-X with FirePOWER services

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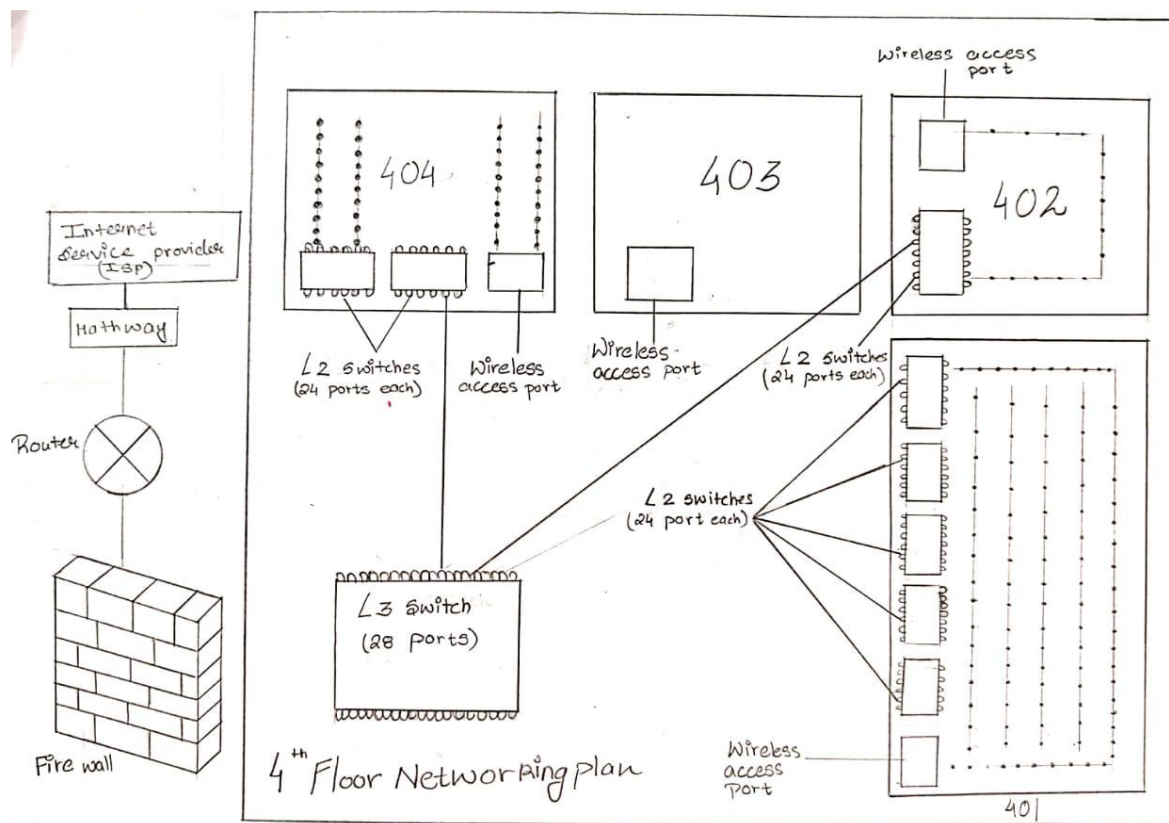


No-Contact
Delivery

Costing -

<u>Component</u>	<u>Requirements</u>	<u>Price (In Rs)</u>	<u>Total</u>
L2 Switch	8	10450	83600
L3 Switch	1	34000	34000
Wifi Router	4	1600	6400
Wire	6 (30 m each)	549	3294
Firewall	1	45000	45000
Total Budget			172294

Design -



Conclusion -

We have successfully designed and configured an organization's network.