Task-1

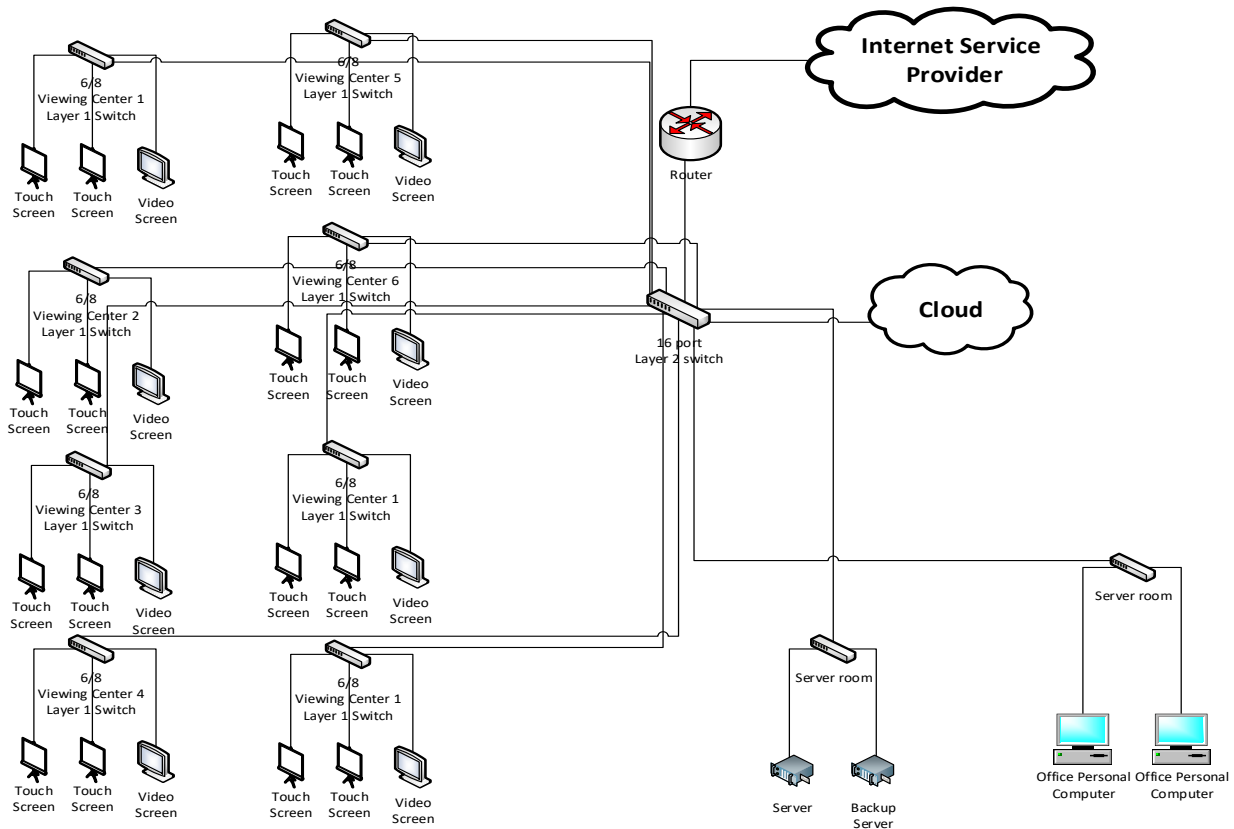**Introduction:** We are going to establish a network in the visitor center. For this purpose, we are visited some reputed organization to clear our concept how can we established an effective network. In this visit we also understand how we cabling our network can. Dependent with this we are going to make our own network.

Primarily there are 3 types of cables

1. Coaxial
2. Twisted pair
3. Optical fiber

Among them we use twisted pair cable.

Twisted pair cable: A type of cable that consists of two independently insulted wires twisted around one another. The use of two wires twisted together helps to reduce electromagnetic induction. Twisted pair cable is the most popular cabling LAN. Its maximum length is 100 meters. Twisted pair cable is rated according to number. Cat 1 to 6, we use cat-6 for our local cabling.(Cisco Systems, 14.03.2003)

Optical fiber: The core claddings are made of ultra-pure glass. Light is guided down the center of a fiber and reflects of the inner surface and protected by a plastic buffer coating. We use the cable for backbone connection.

a) **Connector:** For joining the devices, we need connectors. There are several types of connectors: Optical fiber, RJ-45, RJ-11, T-connector, etc.

There is also another type of connector. Among them we use RJ-45

RJ-45: RJ-45 is eight wire connectors used commonly to connect computers on to a local area network. It is the standard connector for UTP cabling data network which is made by plastic. It can only insert in one way and wire goes each pin in the connector. Now a days it is the most popular connector.(Mitchell, n.d.)

c) The cost of cabling and installation:

Serial	Product name	Amount	Price
1.	UTP category 6 Cable	200 Meters	$150
2.	Monomode Optical Fiber Cable	100 meters	$320
3.	RJ-45 Connectors	60 pieces	$280
4.	Straight Tip (ST) connector	1 piece	$50
5.	Installation cost		$1250
	Total		$2050

d) The data transfer rates that will be required

Viewing platform:

User	Data rate
Web came	5 Mbps
Touch screen	20 Mbps

Visitors center

User	Data Rate
16 touch screens	160 Mbps
8 Video screen	100 Mbps

Server room

User	Data Rate
1 server computer	250 Mbps
1 backup server computer	250 Mbps

Office room

User	Data Rate
2 office computers	20 Mbps
Total	**805mbps**

Task2

I have used the following Protocols to work differently on the different platform in this network architecture:
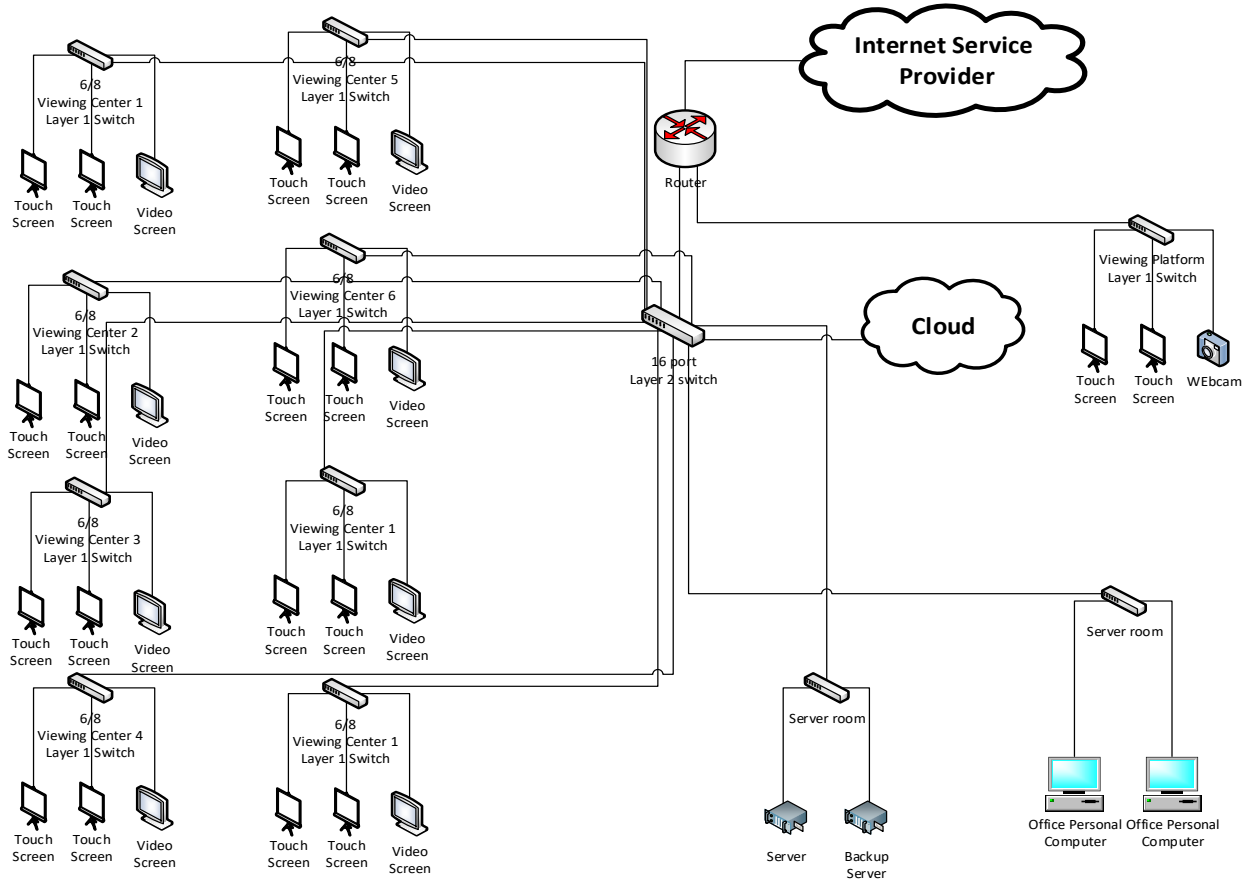
Protocols used for office purpose:

POP3 and SMTP–In office purpose these protocols are used commonly specially for email transaction

Protocols for multimedia purpose:

TCP/IP protocol: These protocols are set up as the base means of communications. For connect the internet hosts use these protocols.

RTSP - The **Real-time Streaming Protocol** should be used for delivering streaming audio and video over the Internet.

PPPoE- Point to Point Protocol over Ethernet used while transmitting data between webcam and visitor center office devices.

HTTP: Used for the browser to communicate with the web server.

Protocols for security and network purpose:

IPSec - **IP Security protocol** used for secure communications between systems.(Anon., 28.06.2014)

 For layer 2 we used STP and OSPF used for Router usage.

CAT-6 cables used for connecting the viewing platform devices with the visitor center. Provide high speed internet service for managing real time data transmission from peripherals such as webcam and touch screens which are located at the viewing platform. For linking up network router and ISP I used single mod fiber optic cable. This will give frequently data flow at the time of feeding live streaming. It also helps to manage interactive issues that often cause good amount of data traffic.

The visitor center connected with the viewing platform by CAT-6 cable. It must be concealed carefully with insulated and weather proof layer. A backup cable must be standby alongside so that, if the main link somehow cuts of, the backup cable come to online almost immediately and never disconnect the connection for a single moment.

I have already provided the visitor center is connected with the viewing platform as well as the webcam, minimum a single 16 port switch, 8 port switches, a webcam device and LED touch screen monitors are required. Here I have connected all hardware devices of viewing platform with a router, which will transfer the data via switches and establish a connection with the single piece of hardwires.

The router will connect with the ISP in this network architecture, the visitor center and the viewing platform are also connected with the router. The router will connected with server and internet to the stuffs in the visitor center. The workers will also get access to the Internet for basic official and maintenance purpose but it is limited.

Task-3

Robustness has always an important role in any network. Robustness means the ability of a structure to withstand events like fire, explosions, impact or the consequences of human error, without being damaged to an extent disproportionate to the original cause. In this network design most of the hardware will work without any break in the year, minute fault tolerance. So these devices which we used must be very high quality as the devices can passes data frequently and keeping continuous usage. 'Available' software is used foresting peripheral qualities. Thorough market comparison for device's quality and durability as well as current user's opinion on hardware will also be kept in account.

 I tried my best to keep the quality and performance aspects in mind and do my best to collect materials which is the best in market. But these are nothing but mechanical devices, so there remains a chance for disputes in their performance, a backup for the hardware devices will be always ready in case of hardware lacking.

As the webcam streaming 24 hours a day, there should be occur a problem any time. For this case a secondary backup webcam can be installed in case the main device somehow goes offline it should be in online.

Task: 4

We have to test all our devices; are they work properly or not. We have to test our network step by step.

Cabling and installation: During the installation process cables can become damaged or kink, insulation can be broken, some connection may be poorly crimped and so on. We must be test the software which we installed in our system, if they work correctly or not. If find any problem we must solve it.(Anon., n.d.)

Hardware test: Physical connection and its function need to test properly. It is an important part because if any damage occurs the whole system goes down. We have to cheek all the networking devices such as server working station that they are working perfectly.

Testing network traffic systems: We must be test whether the allocated data can be transferred properly or not and it is one of the most important tasks for better network.

Testing Data Transfer Rate overall for being a time: The bandwidth must be cheeked that the data transfer rate same as it is given in the PC.

Power option: We need to test whether the power connection works or not.

Security system test: Network security testing is conducted after the system has been developed, installed, and integrated during its Implementation and Operational stages. The result of the testing can help to detect the problem and prevent the attacks and vulnerability.(Radack, n.d.)

Performance test: To ensure the availability and performance of the network a periodic network performance test is indispensable. PRTG Network Monitor is a comprehensive monitoring solution that covers the entire range of bandwidths, usage and availability. Monitoring. It comes with all features and functionalities needed for a professional network performance test.(Anon., n.d.)

Recommendation: We are creating a LAN network which is connected with the internet connection, we have to cheek all the devices whether working properly or not. We have to cheek first switch and PC, ISP and switch by a cable tester that their color codes are matched if not we have to re-construct them. At last, we must cheek the bandwidth rate is it perfect or not? If everything is okay, we can go for operation by handing it up to the authority of the tourist center.

Conclusion: For this network we used the best element to make ours network more reliable. But very few decisions have made with imagination as there is no tourist center like this in our country. We used backup for each element and file server which makes the network very strong. The most important thing is that the authority can change or increase overall network and facilities.

Task 5:

Review of Task1 to Task4:

To design this network, we have completed primary introducing resource and media, connectors and all of our cabling and installation issues

After completing the first step, we have selected and bought individually all of our required hardware and devices according to our service demand.

We needed to make sure the best safety and security for our network to ensure the zero downtime and strength protective measurement all kinds attack in this step of our network designing.

After ensuring the proper safety and security we have to test our whole network top to bottom with our entire network testifying devices

We are lucky for getting the offer to design this network and we are hoping with relax if we get the chance in future for design these types of networks   we will do better result.

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