

**A Branch's
Ethernet LAN**

In each branch office, a Cisco 2620 router is used. This router has different interfaces on board:

- Serial 0 and Serial 1: to connect the router to either T1 dedicated leased line using PPP (Point-to-Point Protocol) or the Frame Relay. Usually, a Cisco 2620 router has an internal CSU/DSU (1 or 2) but if not, an external CSU/DSU is connected to one of the serial ports.
- T1 CSU/DSU interface, which pretty much does what the serial ports.
- Fast Ethernet interface: to connect the router the Ethernet LAN.

Since each router has only 1 or 2 internal CSU/DSU, we will need external ones to connect the router to either other router using T1 lines.



Figure 2: Cisco 2620 Router

For the LAN in each branch, a Cisco Catalyst Switch with 10/100 Ethernet ports to connect all the workstations together. Sometime, we might need Fast Ethernet hubs if the 24-port switch is not enough for the workstations exist in each branch.

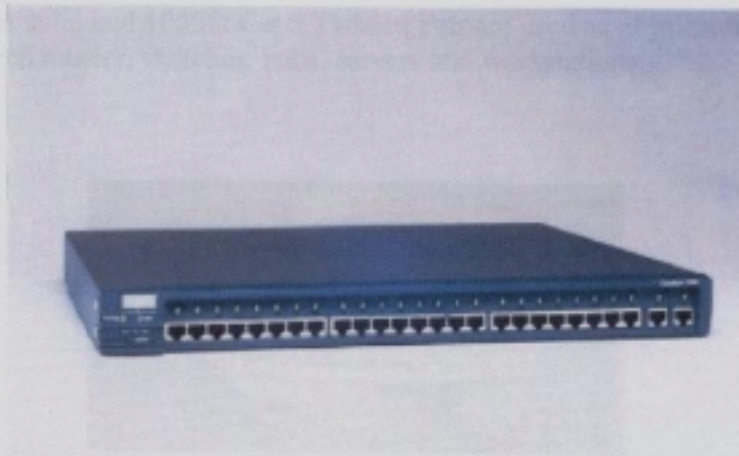


Figure 3: Cisco Catalyst 2942 Switch

Also, we need 10/100 Fast Ethernet NIC (Network Adapters) in order to connect each workstation and servers to the Ethernet network.



Figure 4: PCI 10/100 Ethernet Network Adapter

Cables unlimited 1000Ft Cat 5 Twisted Pair are used as physical links between routers, switches, hubs, servers and workstations



Figure 5: Cat 5 Twisted Pair Cables

Finally, since Cisco Ethernet switch has only 24 ports used to connect devices to the Fast Ethernet network, we may use Fast Ethernet Hubs later on.

Financial Statement

HARDWARE

Device	Individual Price	Quantity	Total
Cisco 2620 Router (1 T1 CSU/DSU & E0)	6331.875	10	63318.75
Cisco 2620 Router (2 T1 CSU/DSU, 4 S, 1 E0)	6483.75	3	19451.25
Cisco Catalyst 2924 Switch	5621.25	13	73076.25
T1 CSU/DSU Channel	2275.275	8	18202.2
1000Ft Cat 5 Cables	1012.47	13	13162.0125
10/100 Ethernet Adapter	108.75	213	23163.75
			197,212.3125

LOCAL LOOP PHONE COMPANY SERVICES

Service	Throughput	Setup Fee	Quantity	Monthly Fee
Frame Relay	1.538K	7875	3	2062.50
Dedicated T1 Leased Line	1.544Mgbps	4500	10	*

* The monthly fees depend on the distances between branches:

From Khobar to Riyadh = 1874.9625

From Riyadh to Jeddah = 2532.1875

From Khobar to Jeddah = 2812.50

Total Cost (Setup Fees + Charges per year) = **1,032,858 S.R.**

INSTALLATION CHARGES

In addition to all previous calculations, we added too the installation fees by our technicians and engineers who will travel to the corporate branches to finish the job.

We will send 18 people for this project. All of them will need 200 per day as hand cash including lodging and food for 5 days. Also, they will need 1500 S.R. as a budget for them to rent a car for 5 days in each location. Finally, in order for them to go to the different cites, we need to get them flight tickets from Madinah to the different locations:

From Madinah to Riyadh = 1960 S.R. for 7 people
From Madinah to Jeddah = 1540 S.R. for 7 people
From Madinah to Khobar = 2100 S.R. for 4 people

We will pay each guy 60 S.R. per hour for his work. For 18 people for working 12 hours a day for 5 day it will be 64,800 S.R.

The Total Installation costs = **89,100 S.R.**

TOTAL =
1,333,132.53 S.R.

According to the initial budget set by the corporate, we will provide them with quality products and efficient service that will meet their needs. The budget is 1,500,000 S.R. so that our profit is 100,100 S.R., since we will tell the customer that the total cost is 1,433,132.53 S.R. Moreover, we still that can charge the customer after introducing our services to them.

The customer has to pay the monthly T1 fees after one year from the installation, since the installation costs include one year charges for the both Frame Relay services and the dedicated T1 lines. Also, they have to pay if they want to have Internet connectivity at their sites. The Internet will cost about 937.50 S.R. per month for each branch. The usage level determines the monthly charges.

Offers

Our company will provide the customer with the following services:

- Free Internet connectivity for 1 year
- 6 months free connection links, pre-paid fees to the local loop phone company
- 6 months free helpdesk and maintenance

After these free services, the customer has to pay in order to have them again. We will charge the customer for the helpdesk and maintenance. Whenever the customer calls after the free time for both helpdesk and maintenance, we will charge them 3.00 S.R. a minute for assisting. Also, every time a technician needs to go to the client sites, we will charge them 100 S.R. an hour in order to troubleshoot problems.

Proposed Ideas

- We can provide you all the links needed to connect your branches together through us.
- We also provide Back-up service to store your data at our side. This will guarantee that the data will be saved and totally secured.
- Powerful IBM Servers. These IBM Netfinity servers are integrated with all networks.
- We provide a service called Dial Backup. By this service, a branch always able to talk to other branches even if the link goes down for some time.
- The customer can be connected to our mainframe, so all data and video processes will be through us since it is much cheaper than building a complete mainframe system at the client sites.

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Limitations

Video or any other real time applications can run on Frame Relay Network

which is cheaper solution but not in all locations affective and good quality Frame Relay services are available. In terms of quality, the dedicated Leased Line connectivity is recommended as you have pre-determined and fixed Latency that is must for any real time traffic.

In this project, we are using both Frame Relay services and dedicated T1 to show you that we understand about them, and know how to deal with each one's configuration.

Finally, we could use any higher speed links such as T3 instead of T1 lines for better performance. DIGEX, the local loop provider we are dealing with, has both T1 and T3 lines. A T3 line is a super high-speed connection capable of transmitting data at a rate of 45 million bps (bits per second). It represents a bandwidth equal to about 672 regular voice-grade telephone lines, which is wide enough to transmit full-motion, real-time video, and very large databases over a busy network. But, since the initial budget set by the customer was 1,500,000 S.R., using T3 lines as backbone links between branches will exceed the budget because it is more expensive than T1 lines.