Computer Networks Project

Design A Pre-Sales Proposal For Network Setup In A University

Team 2 -

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1) Introduction:

The given university has an ADSL(Asymmetric digital subscriber line) internet connection which would be used by the departments except for the R&D department which should not have access to the same. All the departments(7 departments) should be able to communicate with each other. Each department contains 25-50 users.

2) Project Scope:

This proposal is for a data communication network to SRM University. The University recently approved funding sufficient to pay for the development of this proposal.
The network is designed to serve SRM University. The University has 7 departments, as follows:

1. IT
2. Finance
3. HR
4. Management
5. Faculty
6. Students
7. R&D

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except for the R&D department which will not have access to the same. All the departments will be able to communicate with each other. Each department contains 25-50 users.

3) Objectives of the Network

The network is designed to achieve several objectives:

1. ***Secure Service :*** The main objective of this network is to provide secure administrative computing service among the different departments. It is designed to be functionally and physically isolated from access by people not employed by the University education system so as to minimize the risk of unauthorized use.
2. ***Integration and Update :*** Presently there are many LANs within our SRM University, but much of the equipment is out of date, many of the LANs are incompatible with each other, and not connected in a system-wide network. This proposal describes a WAN that integrates and updates these LANs to support productive collaboration across the system.
3. ***Versatile Information Processing :*** The network will enable users to retrieve, process, and store ASCII and non-ASCII text, still graphics, audio, and video from any connected computer.
4. ***Collaboration :*** The network will combine the power and capabilities of diverse equipment across the state to provide a collaborative medium that helps students combine their

skills regardless of their physical location. A network for this university will enable these students to share information and ideas easily so they can work more efficiently and productively.

5. ***Scalability :*** The design is scalable so that more university buildings as well as other campuses of SRM can be added as funding becomes available without having to redo the installed network.

4) Networking Requirement

1. The active network components which are required (Routers , Switches).
2. The number of switches , routers which are required for the design.
3. The IP Design schema for the department.
4. Explanation of the details required to be configured on the Switch and how to create different departments with VLAN.
5. Explanation of how to restrict internet connection for R&D Department and allow access for the other departments with Access control lists on the Router.
6. Identify the feature on the router which is required for sharing the Internet for the users.
7. Identify the TCP/IP adapter parameters (IP address, Subnet mask, Default Gateway, DNS Server IP address) for the users.
8. Network Design Diagram.

5) Network Design Strategy

As our university has an ADSL connection, here is the brief about it-
ADSL stands for Asymmetric Digital Subscriber Line and is a common type of DSL communication technology designed to offer faster speeds and greater bandwidth over traditional dial-up connections. ADSL allows faster transmission and more data to be sent over existing copper telephone lines that are used for landlines when compared to traditional modem lines. The word Asymmetric in ADSL refers to the fact that it uses most of its capacity to transmit signals downstream towards the customer in order to provide faster download speed.

Design Assumptions -
This design assumes the following:

- The SRM University Network has a firewall that protects all information coming and going from the network.
- Internet service is provided by the SRM University Network, which is subsidized by the state government.

6) Software Requirements

For this particular project , Design A Pre-Sales Proposal For Network Setup In A University, we require a good bandwidth with internet connection along with that we require a software - Cisco Packet Tracer.

For implementation, it is advised that the end - user has a Cisco account so as to save the file when editing & reading.

To successfully install and run Packet Tracer 7.0, the following minimum prerequisites must be met:
● CPU: Intel Pentium 4, 2.53 GHz or equivalent
● OS: Microsoft Windows 7, 8.1, 10, Ubuntu Linux 12.04 LTS or 14.04 LTS
● RAM: 512 MB Free ● Storage: 400 MB of free disk space (No tutorials)
● Display resolution: 800 x 600
● Adobe Flash Player
● Language fonts supporting Unicode encoding (if viewing in languages other than English)
● Latest video card drivers and operating system updates For optimal performance when running PT 7.0, the following capabilities are recommended:
● CPU: Intel Pentium 4, 3.0 GHz or better
● RAM: 1 GB or more
● Storage: 500 MB of free disk space
● Display resolution: 1024 x 768
● Sound card and speakers
● Internet connectivity (if using the Multi User feature)

7) VLAN & IP Network Configuration

1. IT

PC 7 -
IP Address - 40.10.10.4
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

PC 6 -
IP Address - 40.10.10.5
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

2. Finance

PC0 -

IP Address - 10.10.10.2
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

PC1 -

IP Address - 10.10.10.3
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

3. HR

PC 10
IP Address - 30.30.30.5
Subnet Mask -255.0.0.0
Default Gateway -0.0.0.0

PC 11
IP Address - 30.30.30.4
Subnet Mask -255.0.0.0
Default Gateway -0.0.0.0

4. Management

PC 2
IP Address - 20.20.20.2
Subnet Mask -255.0.0.0
Default Gateway -0.0.0.0

PC 3
IP Address - 20.20.20.3
Subnet Mask -255.0.0.0
Default Gateway -0.0.0.0

5. Faculty

PC8 -

IP Address - 50.20.20.4
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

PC9 -

IP Address - 50.20.20.5
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

6. Students

PC4 -

IP Address -30.30.30.2
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

PC5 -

IP Address - 30.30.30.3
Subnet Mask - 255.0.0.0
Default Gateway - 0.0.0.0

7. R&D

It comprises Access point named as Access Point 0, which has two port 1, port 2, with SSID as free wifi, and coverage range as 140 metres.

8) Server Configuration

Server Type - Server PT

DHCP Server
IP Address - 40.40.40.1
Subnet Mask - 255.0.0.0
DNS Server - 40.40.40.2

DNS Server
Default Gateway -10.10.10.1
DNS Server - 40.40.40.2

9) Requirement analysis of routers and switches

Switch 0 -

VLAN Config - 10 - Finance (Interface FA0/6 & FA0/7)
20 - Management (Interface FA0/11 & FA0/12)

30 - Students (Interface FA0/16 & FA0/17)

Switch 1 -

VLAN Config -

40 - IT (Interface FA0/6 & FA 0/7)
50 - Faculty (Interface FA0/11 & FA 0/12)
60 - HR (Interface FA0/16 & FA 0/17)

10) Proposed Routers and Switches

Switch

Type used - 2960- 24

Router

Type Used - Router - PT

11) University Network Layout

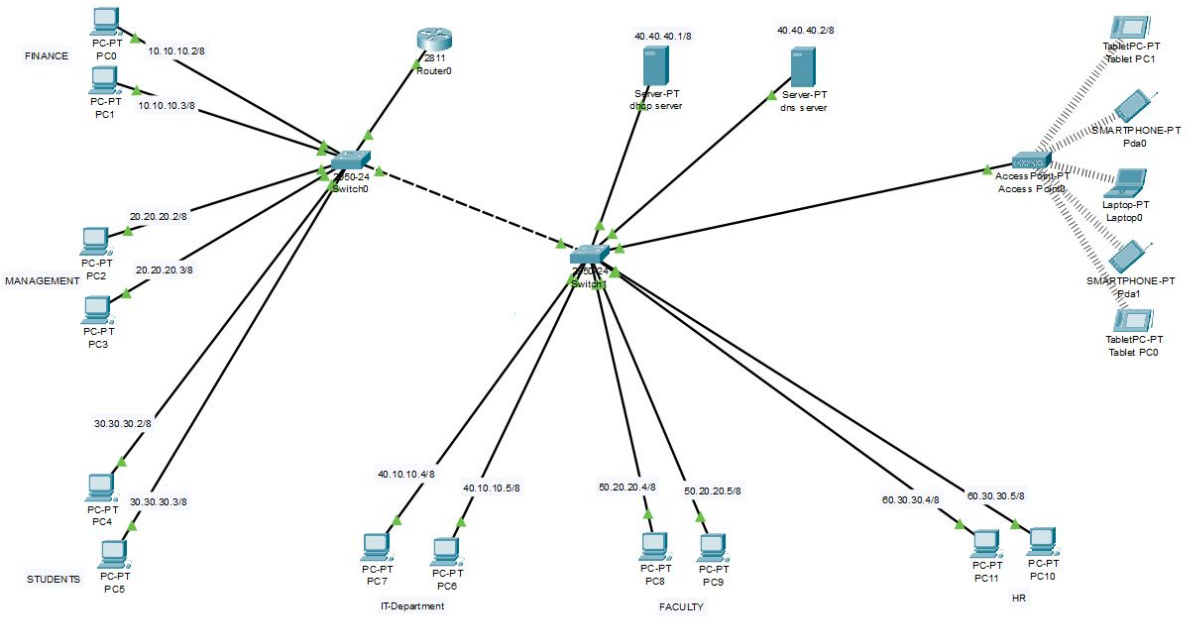

Fig. Network Proposal For University Layout

Conclusion

The Network proposal for a University for 7 departments has been implemented using Cisco packet Tracer.
The project successfully provides a secure service that gives a safe administrative computing service.
It also has integrated LANs within the computer network for ease of access.
The network layout has been implemented as a successful collaboration between the diverse departments of the university.
The project has created a platform for sharing information and ideas within students & teachers that results in increased productivity & communication.