

## **ACN University existing network**

Its a flat map network with a centralized network having 4 main modules. Namely,

the first module consisting of a staff room:

with 3 depts. , each having 1 desktop for HOD, 20 other for anchor teachers and rest 30 available RJ45 ports for other staffs to access the network.

A second module consisting of the classrooms and labs:

with 3 depts. , CSE having 5 sections, which accounts for 20 classrooms for 4 years, has 4 labs each with 40 computers

## **Network Design**

### **Business goals**

Working with the client:

its an education network

to provide basic networking capabilities across the university

if it fails, restoration of the failed network would be taken care of

Changes in enterprise networks:

resiliency is not the prime concern here up to some extent

security is the main concern when it comes to admin and finance dept.

### **The scope of network design:**

We aren't implementing security surveillance

We aren't implementing intrusion detection systems or other complex security protocols

But have firewalls and other basic security measures

We aren't ensuring 5 nines of availability, but have double redundancy and backup for important services

DO's:-

- Minimizing the cost while keeping customer needs
- Scrapping the previous topology
- Creating new topology to meet customer specifications
- Implement access control to take care of who can access which data
- Will provide the list of the necessary hardware
- Access control should also take care of the hierarchy of users i.e privilege based on the group they fit in.
- For in prem – different kind of security measures security
- ISP will take care of bandwidth that is necessary
- Central management control

## **Business Constraint:**

low-cost setup

to finish the work within the given time frame

Having strong relationships with college increasing chances of requesting for our service in the future too. (would also help in the recommendation)

## **Technical goals**

### **Scalability:**

is not a main factor of concern but also accounting for minor changes/increase of systems or availability

### **Availability:**

The learning management system which will be used for course submissions, for hosting video lectures/resources and conducting online examinations requires high available access

to the network, so need to focus on 4 9's availability.

Back up servers for admin. and finance dept are installed to act in case of failure.

### **Manageability:**

SNMP will be implemented on all the routers from every building.

To manage and provide security to the systems used by hod and other anchor teachers.

### **Usability:**

to make sure students can access the network with ease.

Also to implement DHCP for faster access to the network.

Claynet users and other staffs are able to access the network not being present in the university by implementing a VPN.

**Adaptability:**

Implementing efficient routing protocols.

Modularise the network such that any new additions can easily be accommodated.

**Network Design trade-off chart**

- Scalability 10
- Availability 20
- Security 10
- Manageability 15
- Usability 15
- Adaptability 10
- Affordability 10
- Network Performance 10

**Logical Design**

**Proposal:**

- Overview

Implemented a hierarchical architecture

The core layer, distribution layer, and access layer are included

- DMZ

The area between two firewalls

The centralized management server is located here

- Centralized Management Server
- Distribution Layer

Directs the access between the 2 different access layer groups

- Access Layer

Finance

Admin

CSE Dept

EEE and ECE depts

Learning management system

Claynet

#### QoS Parameters

- Throughput
- Transit Delay
- Minimum bandwidth
- Drop Rate
- Successful data transfer upload and download

#### Costs

#### Core Layer

The core layer is responsible for fast and reliable transportation of data across a network. The core layer is often known as the backbone or foundation network because all other layers rely upon it. Its purpose is to reduce the latency time in the delivery of packets. The factors to be considered while designing devices to be used in the core layer are:

At the core layer, efficiency is the key term. Fewer and faster systems create a more efficient backbone. There are various equipments available for the core layer. Examples of core layer Cisco equipment include:

- Cisco switches such as 7000, 7200, 7500, and 12000 (for WAN use)
- Catalyst switches such as 6000, 5000, and 4000 (for LAN use)
- T-1 and E-1 lines, Frame relay connections, ATM networks, Switched Multimegabit Data Service (SMDS)

DEVICE	COST
Cisco switch 7000 series (for WAN)	Rs. 9,47,000/-
Catalyst 6000 series (for LAN)	Rs. 2,80,000/-
T1 lines	Rs. 14,000/- per month
This item Cisco CVPN3005-E/FE-BUN VPN Concentrator	Rs. 7,600 /-
Cisco 24 port Gigabyte Switch	Rs. 6,955 /-
Cisco ASA5505-BUN-K9 ASA 5505 Firewall	Rs. 28,612 /-