

# King Fahd University of Petroleum & Minerals

Electrical Engineering Department

## EE 400, Experiment # 9

### **KFUPM Data Network: Study of Real-World Networking Equipment and Servers**

#### **Objectives:**

The objective of this demonstration is to familiarize students with the real-world network example in order to show them the network components working in place and to give an idea of how the actual networks are designed and maintained.

#### **Present KFUPM Enterprise Gigabit Network (Figure 1a and 1b)**

It comprises of

- Cisco 7206 router for WAN connectivity.
- PIX firewall for enhancing security.
- Two core switches at the backbone for redundancy and load balancing.
- Layer3 switch/router at the distribution.
- Layer2 switches at the access layer.
- 20 Academic Buildings are connected using Single Mode Fiber
- 15 Remote Locations are connected using HDSL links
- More than 3000 network points

#### **Core Layer**

- Cisco 6509 switch
- Modular switch with 256 Gbps switching fabric
- Two GBIC based GE modules each with 16 ports
- One GE module with 16 UTP based giga speed ports
- One module with 48 FE ports
- Two power Supplies for redundancy
- Two supervisor engines
- Non blocking architecture

#### **Distribution Layer**

- Cisco 3550-12T
- 24 Gbps switching fabric
- non blocking architecture
- 10 UTP based giga speed ports
- 2 GBIC based ports

### **Access Layer**

- HP procurve 2524
- 9.6 Gbps switching fabric
- Non blocking architecture
- 24 Fast Ethernet ports
- 2 open transceiver slots for Gigabit or 100BASE-FX

### **KFUPM Internet Connectivity (Figure 2)**

- Directly connected to KACST Riyadh using STC ATM backbone
- 8Mbps of bandwidth is available
- PIX firewall is being used to ensure high level of security
- ATM (Asynchronous Transfer Mode) is being used for internet connectivity
- Directly connected to KACST Riyadh using STC ATM backbone over fiber
- 8 Mbps of bandwidth (being fully utilized)
- Technically can go up to 155Mbps
- PIX firewall is being used to ensure high level of security

### **Internet Bandwidth usage statistics (Figure 3)**

Last updated at Tue Oct 7 16:15:28 2003

- Bandwidth (for the day):  
**Cur:** 8.19 Mbits/sec  
**Avg:** 8.19 Mbits/sec  
**Max:** 8.19 Mbits/sec
- Average in (for the day):  
**Cur:** 736.99 kbits/sec  
**Avg:** 823.78 kbits/sec  
**Max:** 1.59 Mbits/sec
- Average out (for the day):  
**Cur:** 7.46 Mbits/sec  
**Avg:** 6.57 Mbits/sec  
**Max:** 7.76 Mbits/sec

### **Project of providing network connectivity to student dorms (Figure 4)**

#### **Scope of Work**

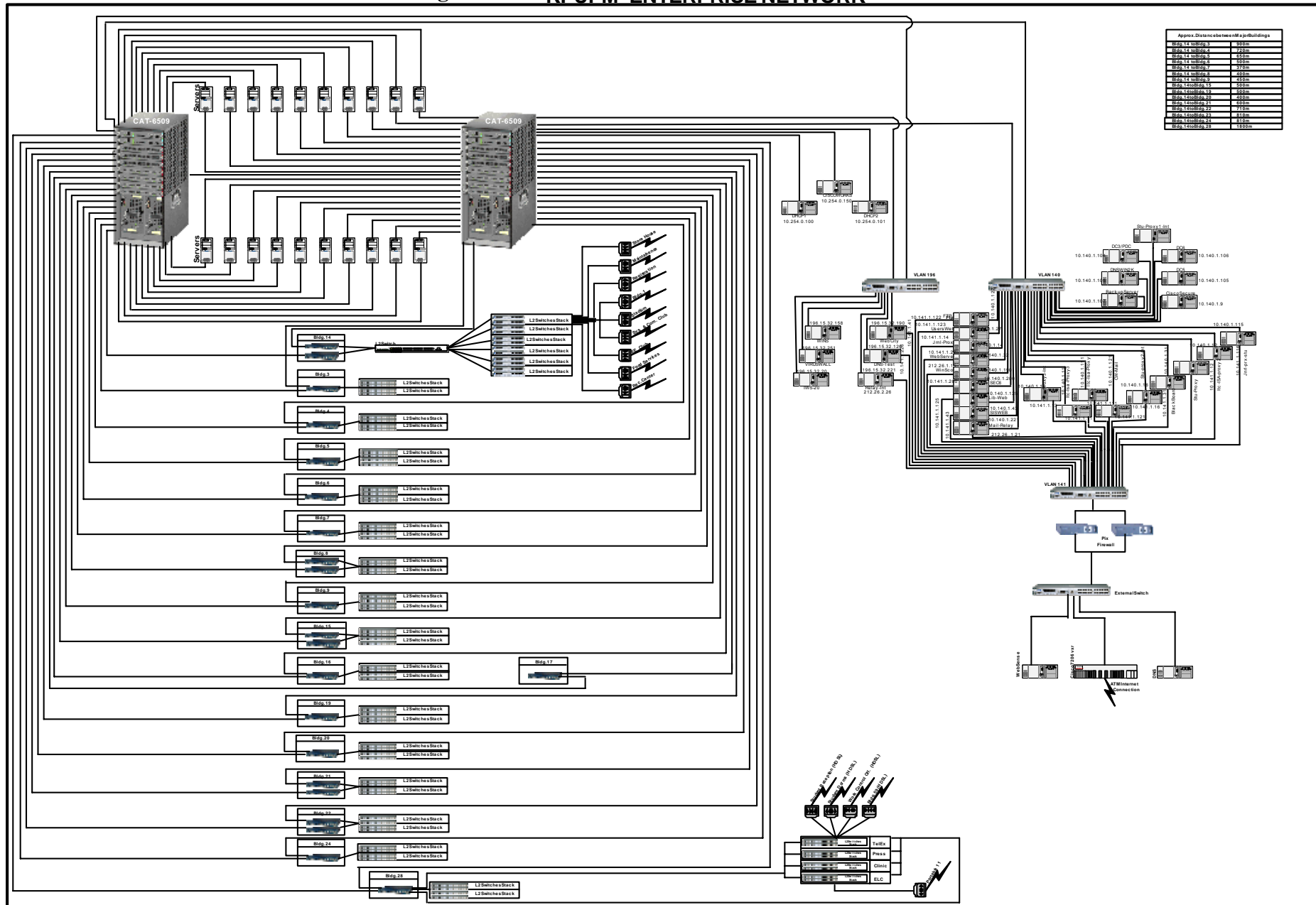
- Four groups of buildings based on similarity
- Group A Twelve Buildings ( 801-812 )
  - 32 rooms -> 64 network nodes
- Group B Three Buildings ( 813-815 )
  - 76 rooms -> 154 network nodes
- Group C One Building ( 816 )
  - 88 rooms ->176 network nodes

- Group D Three Buildings ( 901-903 )
  - 102 rooms -> 204 network nodes

**Features**

- Gigabit IP technology is being used
- 21 new buildings will be connected
- Each room equipped with 2 network pts
- More than 2000 network pts
- Has doubled the network size

**Figure 1: KFUPM ENTERPRISE NETWORK**



**Figure 2**

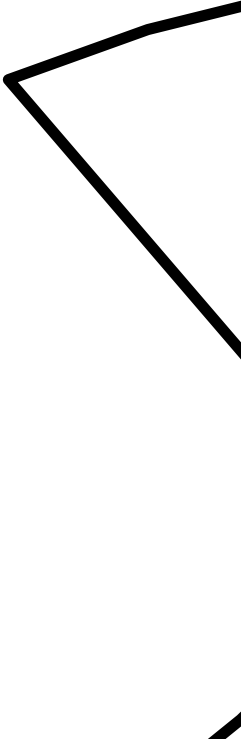
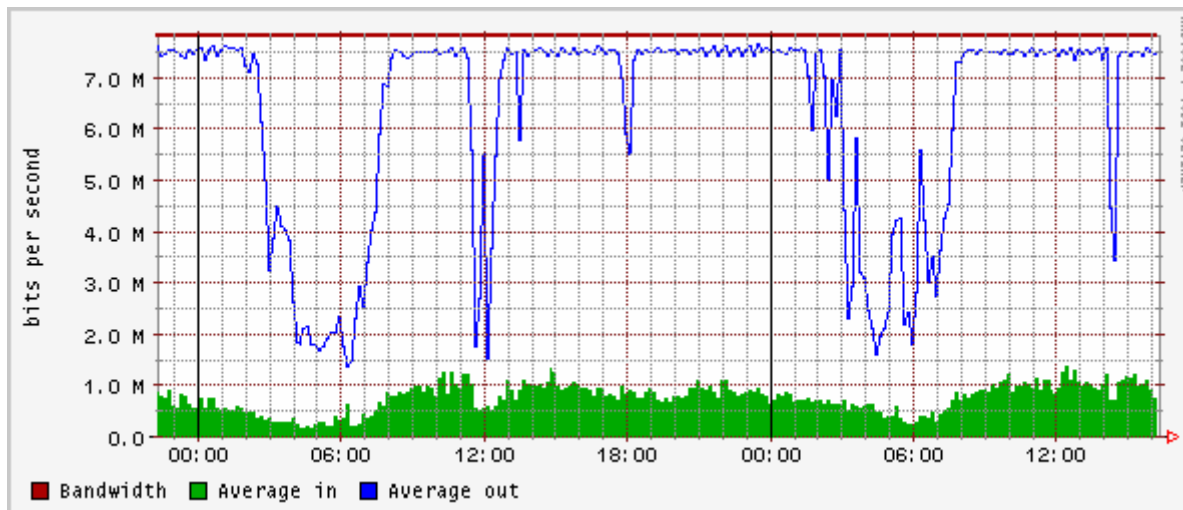


Figure 3



**Figure 4**

**KFUPM**

**Bldg 815**

**Cat 2950G-48**