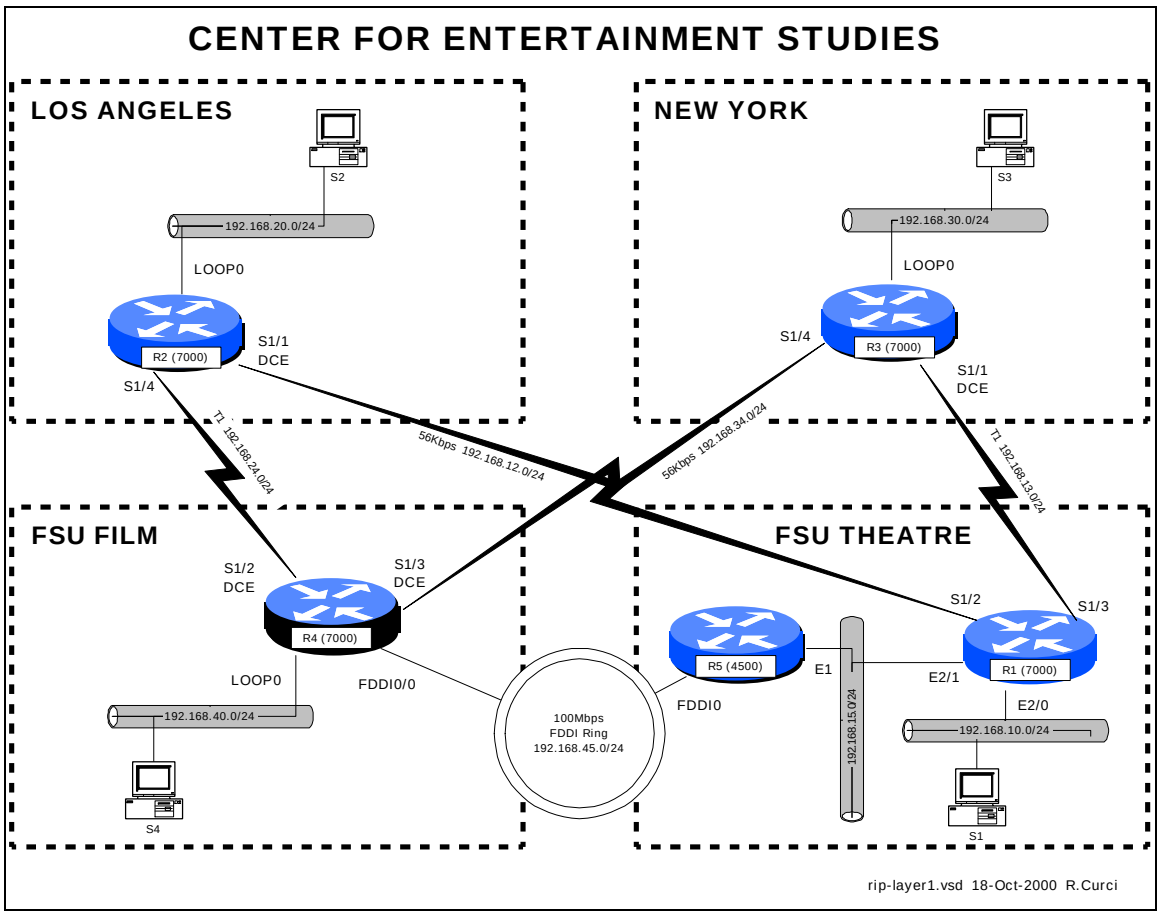

Overview

Governor Bush has just been reelected thanks to an effective TV campaign with the help of FSU faculty from the School of Theatre and Film School. In return he has obtained funding for the new FSU Center for Entertainment Studies which will oversee the Film School and School of Theatre. These two schools will retain their existing office space at separate locations tied together with a 100Mbps FSU FDDI backbone. Theatre is located on the FSU Campus while Film is located at the FSU University Center. In this document, these locations will be referenced as “FILM” and “THEATRE”. Funding has been obtained to expand the program and open branch campuses in Los Angles and New York City.

You have just been hired as the Network Manager for the Center and your first task is to network your ethernet-based computers at all four geographical locations using the TCP/IP protocol. Your highest bandwidth needs are between “THEATRE” and “FILM”. “NEW YORK” mostly needs to communicate with “THEATRE” while “LOS ANGELES” mostly needs to communicate with “FILM”. All locations must be able to talk with all others, but the major needs are outline above. You have two routers at “THEATRE” and one at each of the other locations. Each site has one router with

available serial ports for connecting WAN circuits. You have a budget of $7,000 per month for WAN circuit monthly recurring costs and determine the following prices:

MONTHLY RECURRING COSTS			
CITY1	**CITY2**	**56K bps**	**T1 1.44Mbps**
TALLAHASSEE	LOS ANGELES	$500	$3,000
TALLAHASSEE	NEW YORK	$500	$3,000
LOS ANGELES	NEW YORK	$500	$3,000

You decide to buy a T1 from "NEW YORK" to "THEATRE" and a second T1 from "LOS ANGELES" to "FILM", each terminating on different routers. Since you have $1000/month left in your budget you decide to spend it on two slower speed 56K circuits: "NEW YORK" to "FILM" and "LOS ANGELES" to "THEATRE". For extra redundancy, you decide to terminate these backup circuits on different routers on the Tallahassee end as depicted in the wiring diagram. You decide to use the RIP routing protocol and get everything up and running.

Here are your IP address assignments. Note some of the conventions to make addressing a little bit easier. Generally speaking, network masks are /24 unless otherwise specified. Interfaces between routers use the two router numbers in the third octet, i.e. a links from router X to router Y is network 192.168.XY.0 where X is the lower numbered router. Also, on interfaces between routers, the last octet of the address corresponds to the router. For example, note that all interfaces on r4 that go to other router have "4" as the last octet.

IP ADDRESS ASSIGNMENTS		
ROUTER	**PORT**	**IP ADDRESS**
R1	E2/0	192.168.10.1/24
R1	E2/1	192.168.15.1/24
R1	S1/2	192.168.12.1/24
R1	S1/3	192.168.13.1/24
R2	LOOP0	192.168.20.1/24
R2	S1/1	192.168.12.2/24
R2	S1/4	192.168.14.2/24
R3	LOOP0	192.168.30.1/24
R3	S1/1	192.168.13.3/24
R3	S1/2	192.168.34.3/24
R4	LOOP0	192.168.40.1/24
R4	S1/2	192.168.24.4/24
R4	S1/3	192.468.34.4/24
R4	FDDI0/0	192.168.45.4/24
R5	E1	192.168.15.5/24
R5	FDDI0	192.168.45.5/24

Your users are complaining that sometimes the network is slow. Investigate using the built-in router tools "ping", "traceroute", "ttcp", "show ip route", "show cdp neighbor", and "show ip protocol". Measure the throughput between the different routers to quantify

what is “slow.” Why are some things “slow”? What can be gone to correct these problems? What are some of the tradeoffs you have encountered between throughput and fault tolerance.

The initial router configurations for all five routers are in file *rip-config.txt*. You should be able to cut and paste the configurations into the routers. Output from “show ip route” and “show ip protocol” are on file *sh-ip-route.txt*. Output from “show cdp neighbor” are on file *sh-cdp-nei.txt*. By just looking at the diagram and routing tables, you should be able to manually determine the route IP packets will take one hop at a time through the network.

INITIAL ROUTER CONFIGURATIONS:

COMMON:

```
service udp-small-servers
service tcp-small-servers
enable password cisco
no ip domain-lookup
no ip classless
logging buffered
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 password cisco
 login
```

R1:

```
hostname r2
interface Loopback0
 description S3 LAN
 ip address 192.168.20.1 255.255.255.0
 no shutdown
interface Fddi0/0
 no ip address
 no shutdown
interface Serial1/1
 description Link to R1 S1/2
 ip address 192.168.12.2 255.255.255.0
 bandwidth 56
 clockrate 56000
 no shutdown
interface Serial1/4
 description Link to R4 S1/2
 ip address 192.168.24.2 255.255.255.0
 bandwidth 1544
 no shutdown
router rip
 network 192.168.20.0
 network 192.168.24.0
 network 192.168.12.0
```

R2:

```
hostname r2
interface Loopback0
 description S3 LAN
 ip address 192.168.20.1 255.255.255.0
 no shutdown
interface Fddi0/0
 no ip address
 no shutdown
interface Serial1/1
 description Link to R1 S1/2
 ip address 192.168.12.2 255.255.255.0
 bandwidth 56
 clockrate 56000
 no shutdown
interface Serial1/4
 description Link to R4 S1/2
 ip address 192.168.24.2 255.255.255.0
 bandwidth 1544
 no shutdown
router rip
 network 192.168.20.0
 network 192.168.24.0
 network 192.168.12.0
```

R3:

```
hostname r3
interface Loopback0
 description S4 LAN
 ip address 192.168.30.1 255.255.255.0
 no shutdown
interface Fddi0/0
 no ip address
 no shutdown
interface Serial1/1
 description Link to R1 S1/3
 ip address 192.168.13.3 255.255.255.0
 bandwidth 1544
 clockrate 2000000
 no shutdown
interface Serial1/4
 description Link to R4 S1/3
 ip address 192.168.34.3 255.255.255.0
 bandwidth 56
 no shutdown
router rip
 network 192.168.30.0
 network 192.168.34.0
 network 192.168.13.0
```

R4:

```
hostname r4
interface Loopback0
 description S2 LAN
 ip address 192.168.40.1 255.255.255.0
 no shutdown
interface Fddi0/0
 description Link to R5 FDDI0
 ip address 192.168.45.4 255.255.255.0
 no shutdown
interface Serial1/2
 description Link to R2 S1/4
 ip address 192.168.24.4 255.255.255.0
 bandwidth 1544
 clockrate 2000000
 no shutdown
interface Serial1/3
 description Link to R3 S1/4
 ip address 192.168.34.4 255.255.255.0
 bandwidth 56
 clockrate 56000
 no shutdown
router rip
 network 192.168.24.0
 network 192.168.34.0
 network 192.168.40.0
 network 192.168.45.0
```

R5:

```
hostname r5
interface Ethernet1
 description Link to R1 E2/1
 ip address 192.168.15.5 255.255.255.0
 media-type 10BaseT
 no shutdown
interface Fddi0
 description Link to R4 FDDI0/0
 ip address 192.168.45.5 255.255.255.0
 no keepalive
 no shutdown
router rip
 network 192.168.45.0
 network 192.168.15.0
```