Experiment # 9
Point-to-point LAN extension by bridges and LAN connectivity over a WAN by routers using DSL link

Objective:

In this experiment students will learn the connectivity and configuration issues for a Point-to-point LAN extension by bridges and LAN connectivity over a WAN by routers using DSL link. Students will have hands-on practice for the configuration of the involved network components i.e. DSL equipment, bridges and routers.

Introduction:

The campus HDSL system provides connection between geographically distributed Ethernet Local Area Networks (LANs) in a campus environment. To provide the connection, the campus-REX performs MAC bridging or static IP routing over a HDSL line. Telephone-grade copper wiring can be used as the HDSL transmission medium.

When LANs are distributed over a large physical area (such as within a metropolitan area) or cabling is not available between sites, unloaded pair of coppers may be leased from a local carrier for LAN connectivity.

Digital Subscriber Line (DSL) technology is a modem technology that uses existing twisted-pair telephone lines to transport high-bandwidth data, such as multimedia and video, to service subscribers. The term *xDSL* covers a number of similar yet competing forms of DSL technologies, including ADSL, SDSL, HDSL, HDSL-2, G.SHDL, IDSL, and VDSL. xDSL is drawing significant attention from implementers and service providers because it promises to deliver high-bandwidth data rates to dispersed locations with relatively small changes to the existing telco infrastructure.

xDSL services are dedicated, point-to-point, public network access over twisted-pair copper wire on the local loop (last mile) between a network service provider's (NSP) central office and the customer site, or on local loops created either intrabuilding or intracampus

Routing is the act of moving information across an internetwork from a source to a destination. Along the way, at least one intermediate node typically is encountered. Routing is often contrasted with bridging, which might seem to accomplish precisely the same thing

to the casual observer. The primary difference between the two is that bridging occurs at Layer 2 (the link layer) of the OSI reference model, whereas routing occurs at Layer 3 (the network layer). This distinction provides routing and bridging with different information to use in the process of moving information from source to destination, so the two functions accomplish their tasks in different ways.

Exercise:

A. Point-to-point LAN extension by bridges using HDSL link

1. Connect the campus-REX unit1 to the console using COM1.
2. Log on the HyperTerminal utility. Press Spacebar and you will be asked to enter password. Hit Enter to skip the password.
3. You are now in the Main Menu. Go to System Settings Menu.
4. Go to System Parameters.
5. Set the System Date and Time. Assign the unit some ID. Don't change the password.
6. Return to System Settings Menu.
7. Go to HDSL Parameters Menu. Set the HDSL operating mode to be Standard. Set transceiver mode to Auto and HDSL Rate to E1.
8. Return to main menu.
9. Go to Data Port Settings Menu.
10. Go to Bridge/Router configuration.
11. Set Bridge/Router mode to Bridge, Encapsulation to HDLC, and Timing source to Internal.
12. Return to Data Port Settings Menu. Perform Write NVRAM operation and Reset the interface.
13. Configure the other unit also with the same settings.
14. Connect the units to each other on Line Port. Connect unit1 to the Hub1 and unit2 to the Hub2 on 10BaseT ports.

15. Connect the two terminals 1 and 2 on hubs 1 and 2, respectively.

16. Check the connectivity of the two terminals by Pinging each other.

B. LAN connectivity over a WAN by routers using HDSL link

1. Repeat steps 1 to 10 from part A.
2. Set Bridge/Router mode to Router and Encapsulation to HDLC.
3. Assign LAN and Line IP addresses and subnet masks. Enter the default gateway address. (Note: All IP addresses will be specified by the instructors in the lab).
4. Return to Data Port Settings Menu. Perform Write NVRAM operation and Reset the interface.
5. Configure the other unit also with the same settings except the IP addresses for this unit that will be specified by the instructors in the lab.
6. Repeat steps 14 to 16 from part A.