

### B.2.1.2 Bridges, routers

Bridges and routers are used to connect multiple LANs over local or long distances. While performing similar basic functions, bridges operate at a lower network layer of the OSI model and perform a simple point-to-point (or point-to-multi-point), protocol transparent, transmission service; routers operate at the Network Layer of the OSI model and provide more sophisticated, multi-path routing. For wide area bridging or routing, all of these devices require either dedicated telecommunication lines between them, or connections to X.25 packet networks.<sup>10 11</sup>

Simple bridges can be purchased for \$5,000.00 to \$10,000.00 each; more sophisticated routers will cost \$15,000.00 to \$30,000.00 depending on configuration and capability. Suppliers include: Cisco Systems Inc, Wellfleet Communications Inc, Network Systems Corp , Timeplex Inc. (\$8,000.00(Ethernet only) - \$29,800(4 Ethernet & 2 FDDI)).

### B.2.1.3 Cabling systems

To connect the workstations and servers of any single LAN, it is necessary to have a cabling system in place. Cabling systems are available based on a variety of media: COAX cable (2 types), twisted pair copper wire (shielded and unshielded), fibre-optic cable, and even wireless systems based on various broadcast technologies (spread spectrum, narrow band and infra-red)

In order to optimize and manage cabling systems, a variety of concentrator, hub and distribution systems are available from suppliers such as Cabletron and Synoptics.

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<sup>10</sup> "LAN Interconnect Using X.25 Network Services", John Barrett, Eberhard Wunderlich, *IEEE Networking*, Vol 5, No 5, September 1991

<sup>11</sup> "LAN Interconnection Across SMDS", George Clapp, *IEEE Networking*, Vol 5, No 5, September 1991