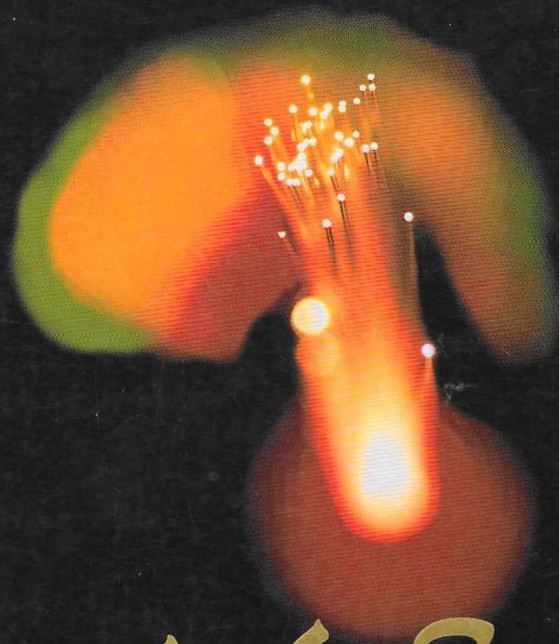




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International Standard Book Number: 0-7897-2574-6

Library of Congress Catalog Card Number: 20-01096112

Printed in the United States of America

First Printing: November 2001

04 03 02 01 4 3 2 1

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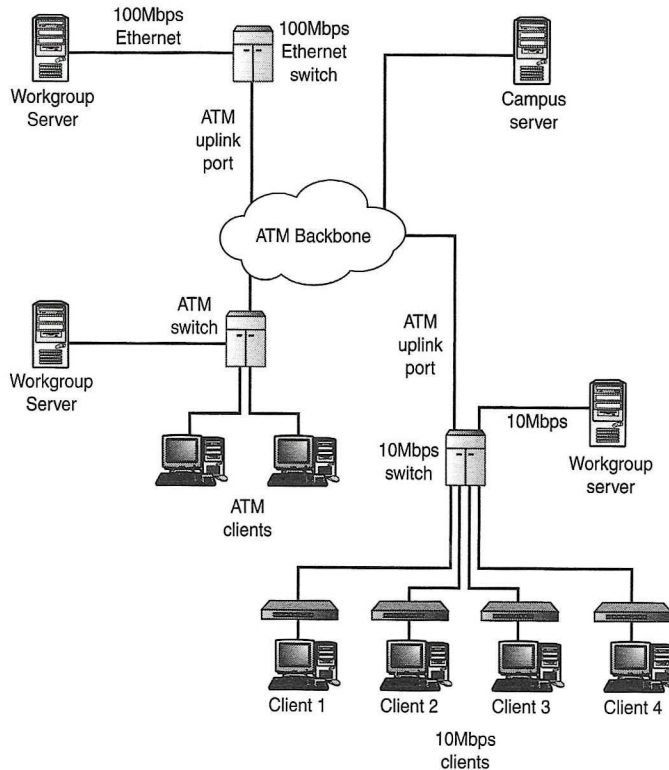
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Figure 6.10
Switched Ethernet is
connected through an
ATM uplink port to
ATM LANs.



SAN TOPOLOGIES

SAN makes use of three kinds of topologies in its configuration: point-to-point, arbitrated loop, and switched. When these three topologies are interconnected, a fabric is created.

Point-to-point is a simple and easily applied topology for connecting two nodes, and the bandwidth is dedicated to these two nodes. A connection between a storage device and a server uses point-to-point topology. The point-to-point connectivity is also applicable between two CPUs. This type of topology is best used on a small scale.

The *loop* (arbitrated) topology ensures that the bandwidth is shared between all the nodes that are connected to the loop, unlike point-to-point topology. The loop can also be connected node-to-node, but this might cause the loop to stop functioning if even one node malfunctions. The arbitrated loop is cost-effective in terms of the high bandwidth and connectivity it offers. The arbitrated-loop technology can support up to 126 nodes. It is possible to connect a loop to a Fibre Channel switch to further increase a fabric's size.

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The *switched fabric* topology is appropriate for large-scale or enterprise networks in which a number of users are interconnected and need to access or share a common data storage array. A *fabric* is used to connect networks across large distances. The fabric can connect a maximum of 16 million nodes. It offers a maximum bandwidth of 200MBps times the number of nodes. The fabric can comprise one or more electronic switching devices to enable a point-to-point connection between the pairs of nodes.

The fabric is not limited in terms of the number of loops it can connect. To make a comparison, a switched fabric works in a similar fashion to a switched telephone network in that it can provide a dedicated connection between multiple pairs of nodes. In a switched fabric network, the data throughput value is greater than that of point-to-point and loop configurations. The higher data throughput is due to the chances of a number of dedicated paths through the fabric.

➔ To learn more about point-to-point and arbitrated loop topologies, see "Arbitrated Loop Topology," p. 126

FIBRE CHANNEL SWITCHES

Fibre Channel switches work in a style similar to conventional switches and offer increased bandwidth and performance. Fibre Channel switches differ in terms of the number of ports they can support. It is possible to connect a number of switches to form a switch fabric. If multiple switches are connected, it is important to copy (cascade) each switch's configuration into the remaining switches that are connected.

NON-CASCADED SWITCHED FABRIC

A non-cascaded switched fabric can support configurations that are required by large enterprises. This type of configuration can be set up in such a way that it allows every system to have the required access to each switch. In this manner, if a switch fails, it is possible for the system to use any controller and ensure continuous operation. The Fibre Channel switched topology for non-cascading switches is shown in Figure 6.11.

CASCADED SWITCHED FABRIC

A cascaded switched fabric offers interconnections between switches. The main benefit of a switched fabric is that it serves as a logical switch with a single connection working to provide access to all the other ports that are present on the set of switches. The Fibre Channel switched topology for switches with cascading is shown in Figure 6.12.

Fibre Channel protocols allow dynamic as well as permanent data paths between the nodes that are on the switched fabric. A permanent data path ensures a guaranteed bandwidth between two nodes. A dynamic path provides the freedom for any node that is connected to the fabric to communicate with another node as long as a third node is also not trying to communicate with the target simultaneously.

In the current market, where data storage is a necessity, storage area network products are in great demand. These products need to offer high bandwidth, resource sharing, and flexible

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