Fast Ethernet Deployment

Workgroup Fast Ethernet Deployment

The evolutionary nature of 100BASE-T Fast Ethernet permits a phased approach to deploying 100BASE-T LANs. The performance advantages of 100BASE-T technology can be integrated into an existing 10BASE-T LAN on an "as needed" basis to alleviate bottlenecks on the way toward widespread deployment. The following overview provides one sample migration scenario for the workgroup LAN and clearly outlines three steps for moving an existing 10Mbps LAN to 100Mbps performance using 100BASE-T Fast Ethernet.

Step 1: Overnight Performance Increase with a Future

The first step is to install Intel's EtherExpress™ PRO/100 Adapters in the server, and deploy a 10/100 switching hub for dedicated, 100Mbps server connections. Existing 10BASE-T hubs and, if necessary, router ports, are linked to 10Mbps ports on the 10/100 switch (Figure 1).
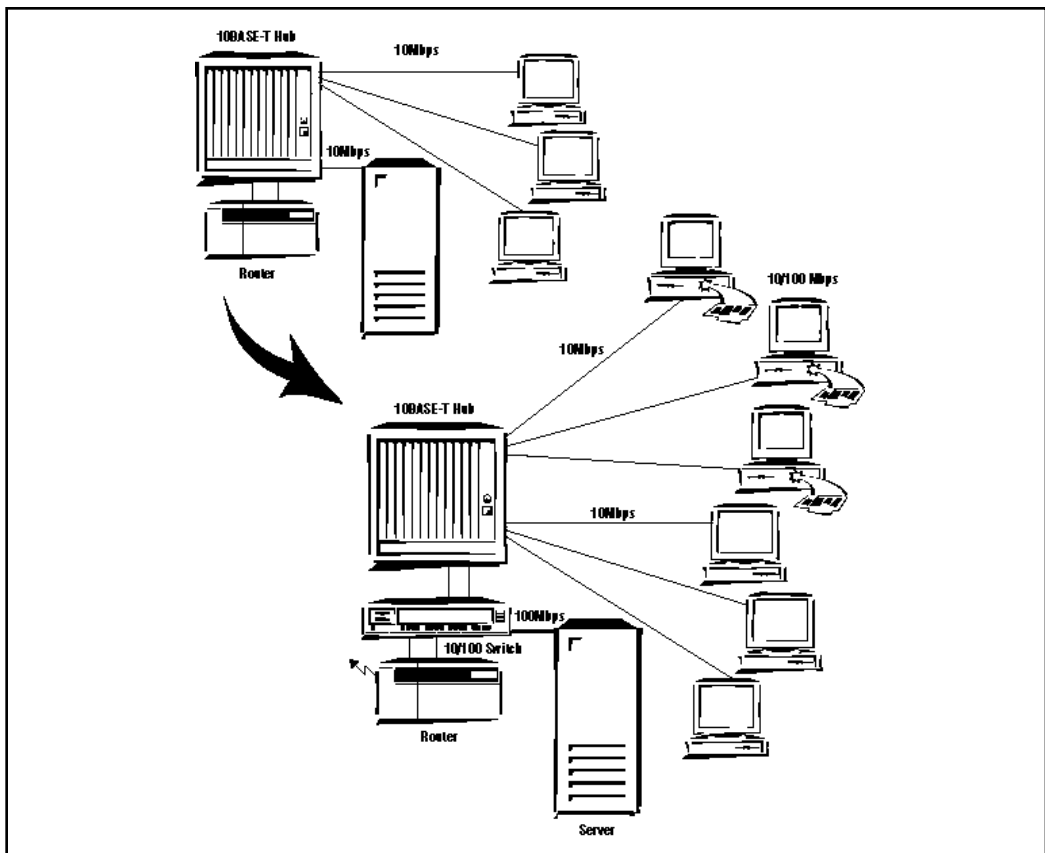

Figure 1: Overnight performance increase.

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Dedicating a switched 100Mbps link to the server is the most effective way to relieve server bottlenecks. Shared media connectivity solutions are limited in their ability to support the usually large amounts of server traffic. In addition, the switch can front-end an existing router for more efficient network microsegmentation. This also reduces the number of addresses required for network layer subnetting.

As the network grows, all new desktop workstations and servers should be equipped with Intel's EtherExpress PRO/100 adapters. Using the flexibility of this multi-speed card, these stations can operate at 10Mbps initially and have the ability to move to 100Mbps at any time by auto-sensing the hub speed. The workstation doesn't have to be touched again. Plus, to meet the additional demands placed on high-performance network servers, the PRO/100 Smart Adapter comes with an on-board Intel i960® processor that offloads the host CPU and delivers even lower CPU utilization and faster throughput.
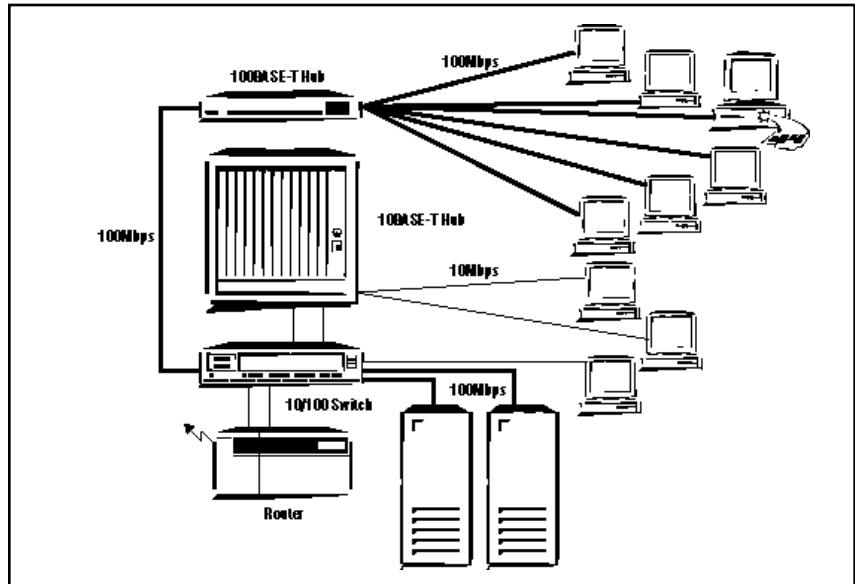

Figure 2: Empowering the desktop.

Step 2: Empowering the Desktop, Enabling More Demanding Network Applications

Empowering desktops with 100Mbps performance is accomplished by connecting an Intel Express Stackable Hub to the switching hub. Then, the 100Mbps-capable desktops can be moved from 10 to 100Mbps ports (Figure 2). The Intel PRO/100 adapters in the workstations automatically detect and operate at the new higher speed, so no desktop reconfiguration is required. The transition is simple and seamless. The combination of Intel's EtherExpress PRO/100 adapters and Intel's Express Stackable Hubs provides a total Fast Ethernet workgroup solution. Client/server applications reach their peak performance in high-bandwidth workgroups such as this.

Step 3: A Scalable Switched Internetwork

As more workstations transition to 100BASE-T operation, the need to internetwork at 100Mbps becomes critical. Step 3 provides for that high speed connectivity while offering a simple migration to faster, more scalable switched networks in the future.

By linking 100BASE-T ports directly to the router, users can then route between network segments at 100Mbps, maintaining the high performance established at the desktop (Figure 3). The 100Mbps router interfaces also provide a direct path to highly scalable switched networks such as ATM.
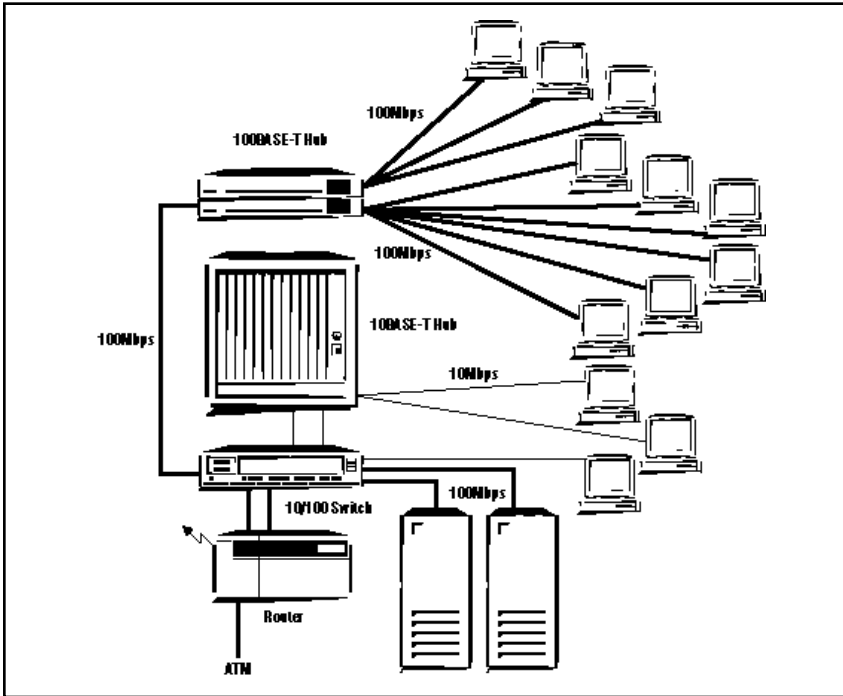
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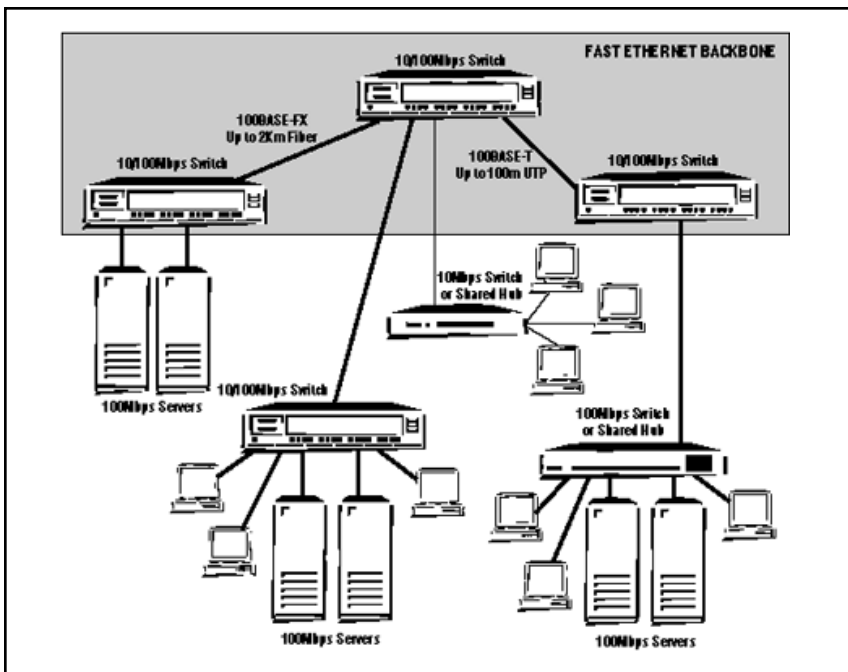

Figure 3: Scalable switched internetwork

Figure 4: Deploying Fast Ethernet in the backbone

Enterprise Fast Ethernet Deployment Deploying 100BASE-T as a Backbone

Fast Ethernet is also easy to install as a new backbone, with a seamless connection to existing 10BASE-T workgroups. Figure 4 shows a new network installed with a 100Mbps Fast Ethernet backbone and both 100Mbps and 10Mbps clients and servers. 100Base-FX, the standard for Fast Ethernet over fiber, allows for 100Mbps backbone connections over standard multi-mode fiber connections of extended lengths up to 2 km. This provides a backbone with very few distance restrictions. In this example, the backbone is made up of 10/100Mbps switching hubs which provide connection and bridging services over 100BASE-T and 100Base-FX.

Deploying 100BASE-T with FDDI
The major differences between FDDI and 100Base-FX are that FDDI supports a transmission scheme and ring topology similar to Token Ring, while 100Base-FX relies on Ethernet format packets and the star topology.

If FDDI is already installed as the backbone, then Fast Ethernet can easily be deployed to the desktop in an inexpensive and non-
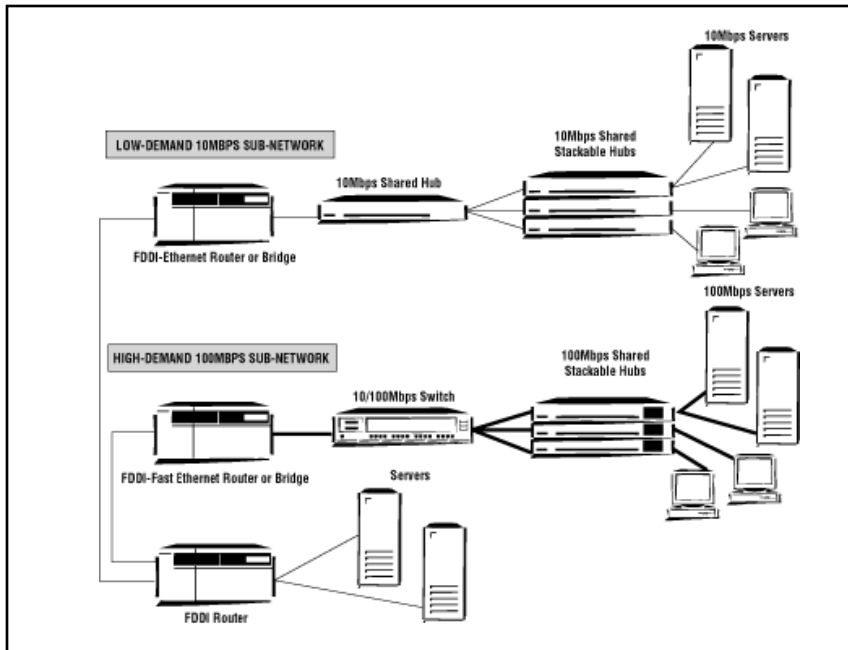
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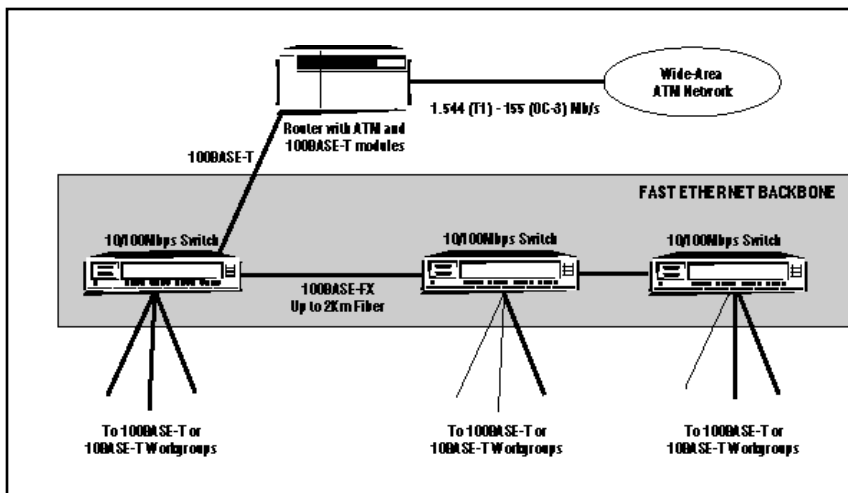Figure 5: Deploying 100Base-T with an FDDI backbone in place

Figure 6: Deploying 100Base-T with ATM

Deploying 100BASE-T with Asynchronous Transfer Mode (ATM)

Fast Ethernet and ATM approach the network bandwidth bottleneck from two different levels. ATM is thought of as a "tops-down" technology, penetrating the WAN connection and eventually, the enterprise and backbone. ATM offers cell-based switching of fixed length packets, generally implemented as a high-speed WAN connection over SONET* based fiber. Standards for ATM over fiber have been finalized and several vendors have developed interoperable products.

In contrast, Fast Ethernet has developed as a "bottoms-up" high bandwidth solution for the desktop, including servers, clients, and workgroups. This is due mainly to its cost effectiveness today and easy integration into existing Ethernet environments. Fast Ethernet's dominance will be at the desktop, while ATM will become prominent on the WAN and backbone.

With ATM in the WAN, 100Mbps Fast Ethernet switches are the logical choice to increase the bandwidth to your servers, workgroups, and clients. Figure 6 shows how 100Mbps Fast Ethernet can be integrated into a typical 10BASE-T and ATM network scenario. Many clients are still

disruptive way. As shown in Figure 5, FDDI bridges to Fast Ethernet in the same way it bridges to 10Mbps Ethernet. For instance, an FDDI ring is down-linked to a 10Mbps workgroup through an FDDI-Ethernet router. Similarly, a simple FDDI-Fast Ethernet router will enable high-speed, down-link

connections to servers, workgroup shared hubs, or workgroup switches. This can be a hardware based router with FDDI and Fast Ethernet modules, or a software based router which leverages FDDI and Fast Ethernet NICs.

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connected with 10Mbps connections, while the high-bandwidth servers and clients have dedicated or shared 100Mbps connections. WAN connectivity is provided by an ATM-to-10/100Mbps switch.

Fast Ethernet: 100Mbps Bandwidth, When and Where It's Needed

Fast Ethernet brings real benefits to both client and server performance, and can be deployed in a flexible, cost-effective way. And because Fast Ethernet is an evolutionary extension of the popular and proven 10BASE-T Ethernet technology, it can be integrated into an existing Ethernet environment one step at a time, when and where it's needed. Moreover,100BASE-T architecture is easily extendible. It can be connected to an existing FDDI campus backbone, and it allows the network infrastructure to accommodate ATM at any time.

Enabling a LAN for high speed networking doesn't have to be an overhaul of mammoth proportions. Fast Ethernet is technology and products for today, giving you performance for today's and tomorrow's demanding network. Call Intel for detailed information about Fast Ethernet products, or for the name of a qualified reseller near you.

Product support numbers

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Product Information	800-538-3373 or 503-264-7354	+44-1793-431155	Singapore +65-735-3811
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