
FORE
SYSTEMS

Building an ATM Network

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An ATM Network

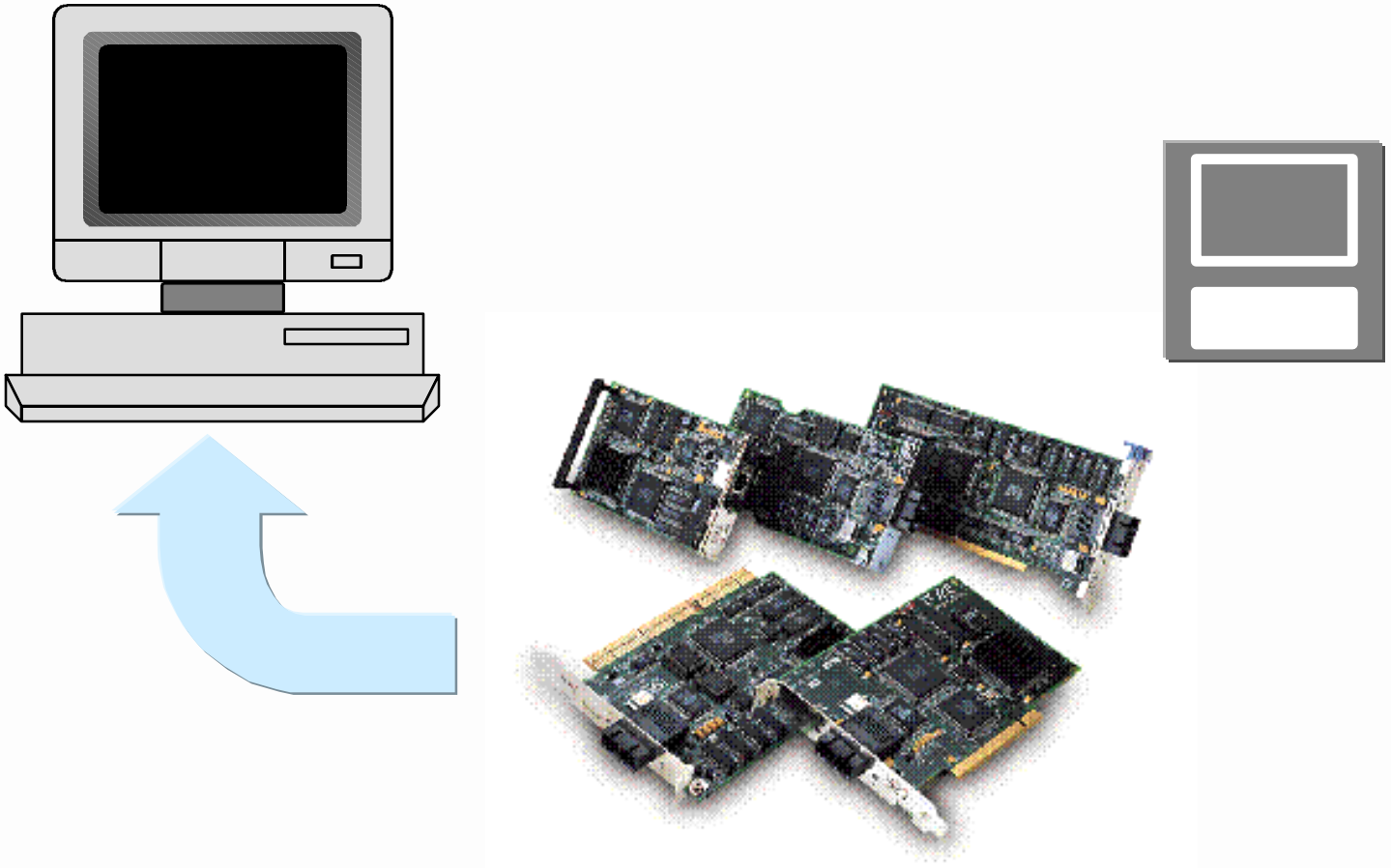
- **ATM Adapters**
- **LAN Edge Switches**
- **ATM-Capable Routers**
- **ATM Switches**

Like any other technology, ATM has its own specific jargon.

Even a simple ATM network might be made up of one or more of all of these devices.

While we may initially see this as a barrier to our understanding of the technology, ultimately jargon is a form of shorthand we simply can’t do without.

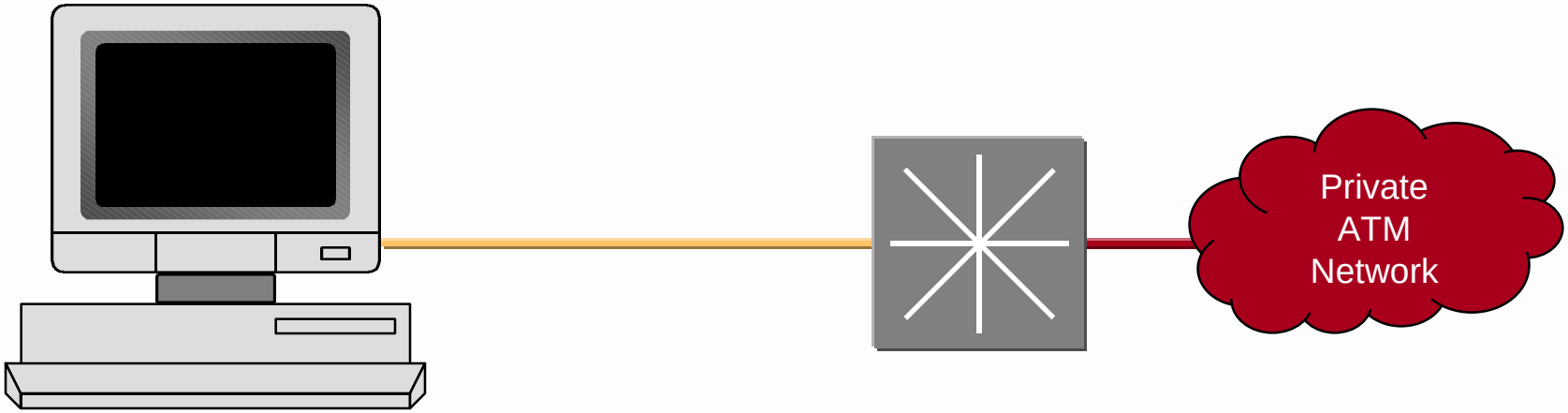
ATM Adapters



To connect computers into an ATM switch, we need to provide the computer with an ATM interface (just like we do when we connect computers into Ethernet or Token Ring LANs).

A range of ATM adapters is available to suit the bus that your computer is using. In addition, device drivers allow the adapter to appear as a normal LAN adapter to the computer's operating system.

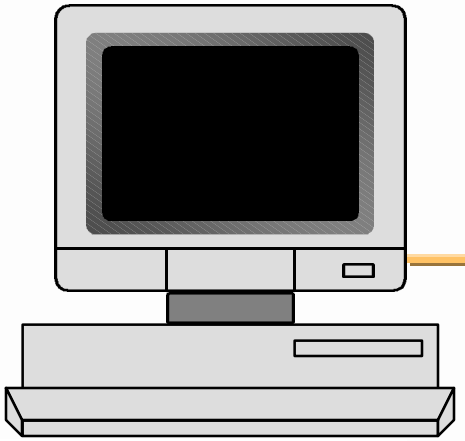
Ethernet Edge Switches

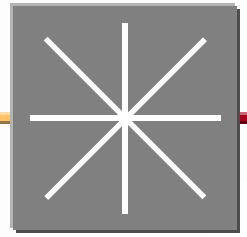


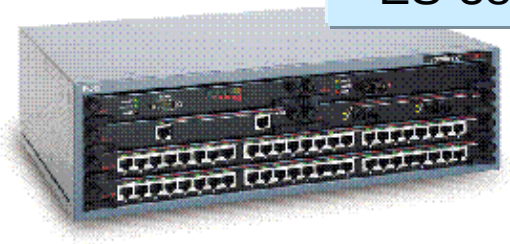
Sometimes we need to protect our investment in existing Ethernet LAN adapters in our PCs.

To connect Ethernet workgroups onto an ATM backbone, we use an Ethernet Edge Switch. This device allows various kinds of LAN interface on the left hand side, and offers an ATM uplink connection to the backbone on the right hand side.

Ethernet Edge Switches







ES-3810

PowerHub
6000

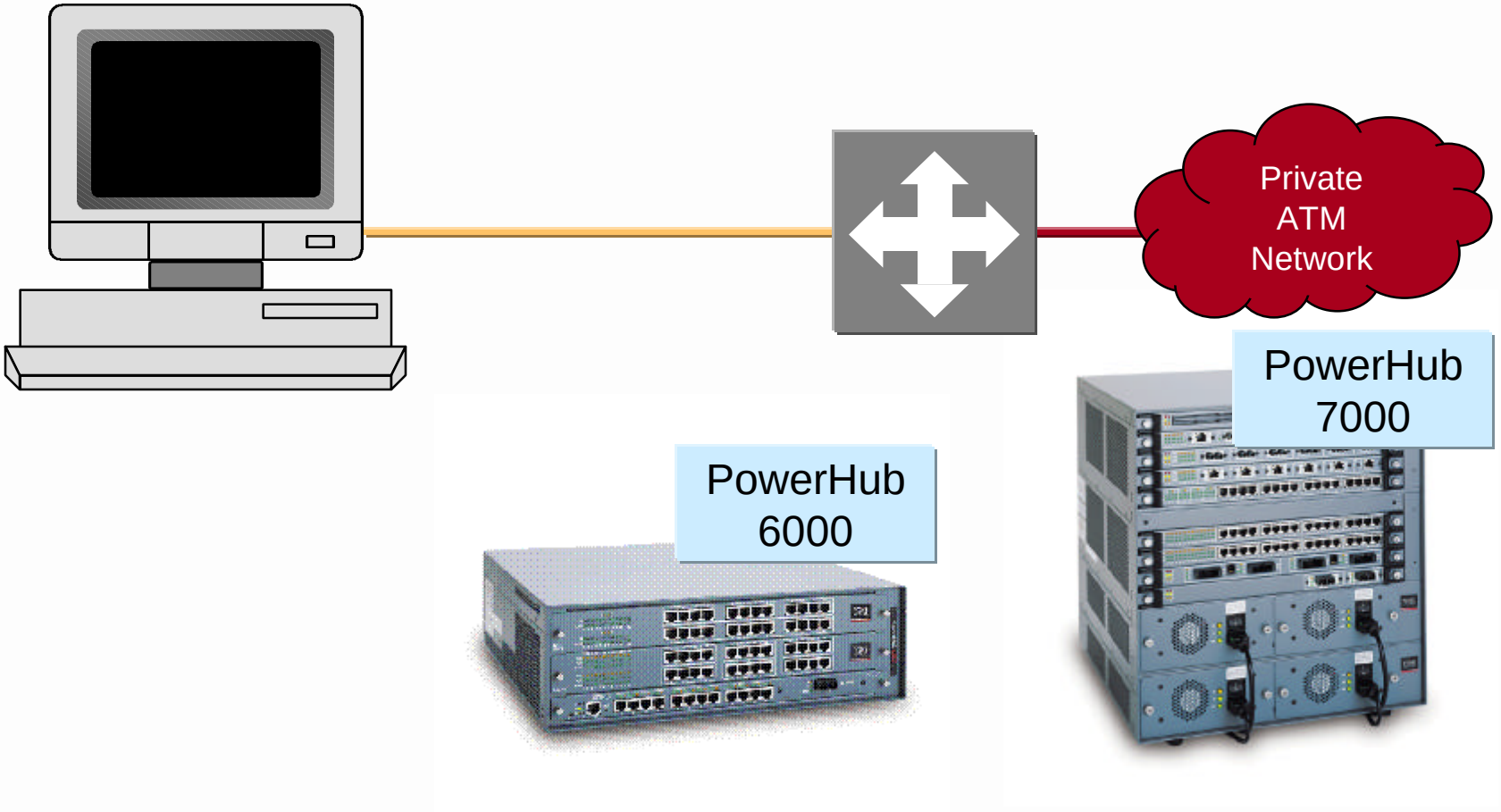
PowerHub
7000

This is the generic symbol for an Ethernet Edge Switch, and here are the products within FORE's inventory that act as Edge Switches.

The ES-3810 is a high-performance Ethernet desktop switch, allowing dedicated 10 or 100 Mbps connections from PCs or servers into the ATM cloud.

The PowerHub 6000 and 7000 are multilayer Edge switches. This means they can act as Layer 2 bridges into the ATM cloud, and can also route at Layer 3 between network segments.

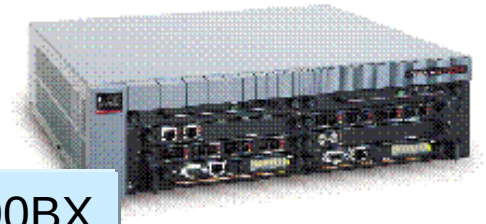
ATM-Attached Routers



Where devices are acting as Layer 3 routers, this is the symbol that I'll use.

ATM Switches

ASX-1000

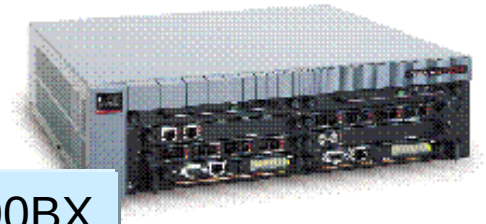


ASX-200BX

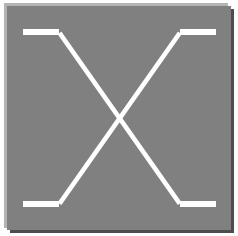
These are ATM Switches. They happen to be ASX-200BX and ASX-1000 backbone switches from FORE's product portfolio, but these devices share many characteristics with other ATM switch products.

ATM Switches

ASX-1000



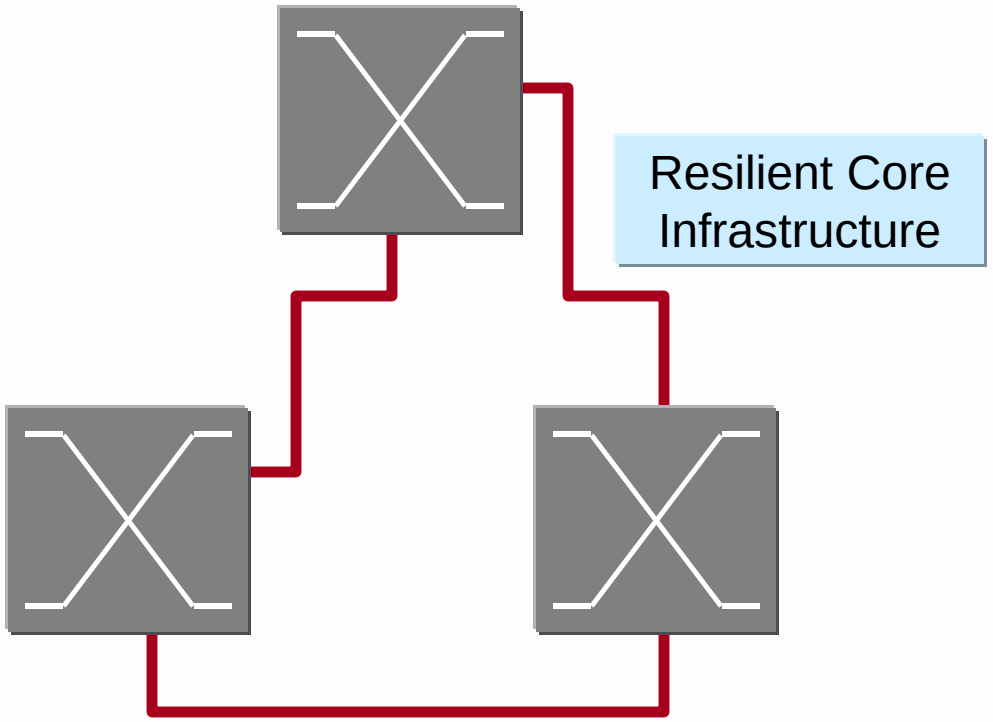
ASX-200BX



So that you'll recognize the objects in these diagrams by their *function*, and not their appearance, I'll be using a generic industry symbol for an ATM switch, as shown above.

Whenever you see this symbol, you know that device is acting as an ATM switch, regardless of its capacity, or its manufacturer.

Building an ATM Network (Human View)



Let's build a simple ATM network from these components.

In the center of the network are the ATM switches. Typically we create resilient backbones by interconnecting several switches with redundant paths. Routing software (ie., PNNI) inside the switches will allow connections to find their way even if individual links or switches fail.

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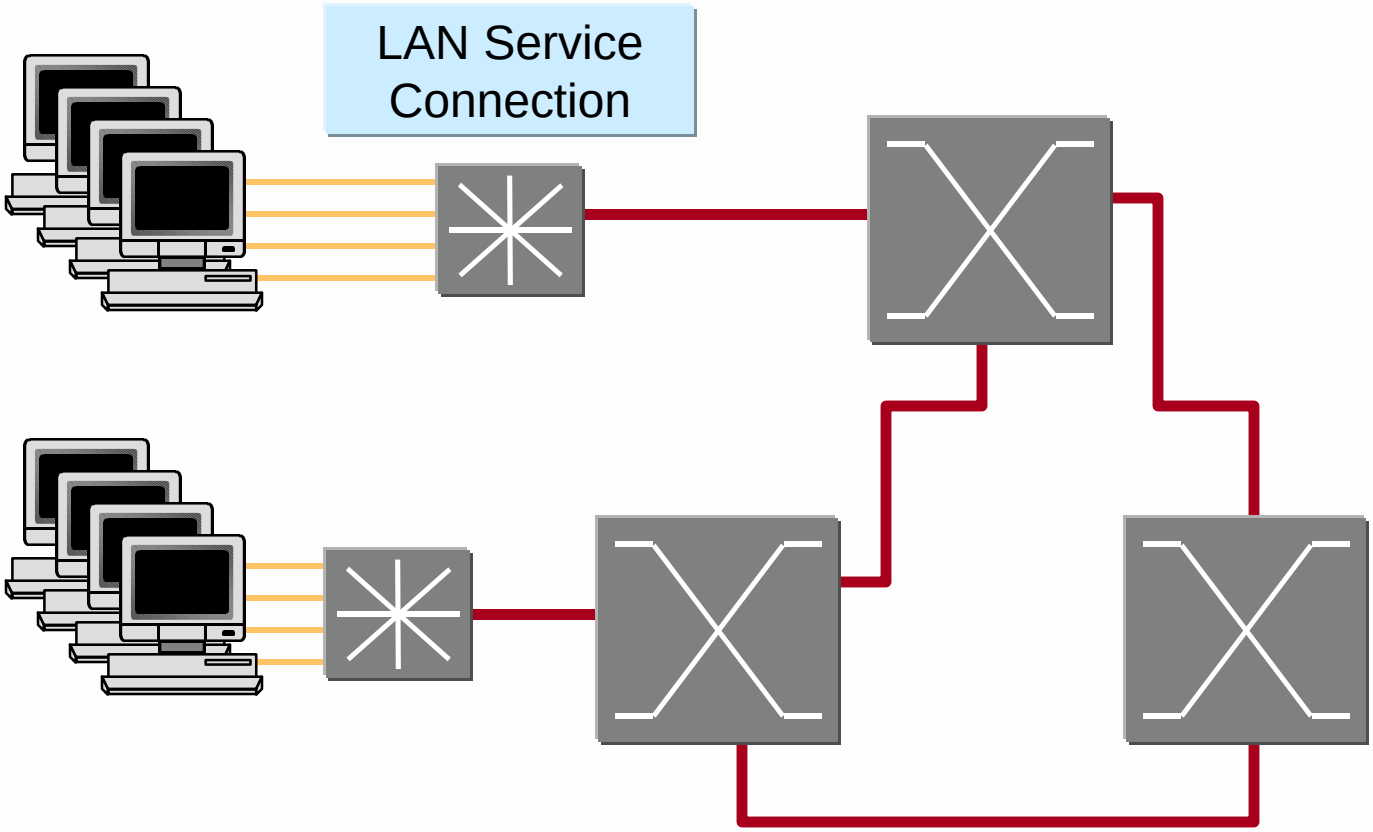

To this core, we add LAN service access by using LAN edge switches.

These devices allow, for example, conventional or switched Ethernet workgroups access to the resilient ATM backbone.

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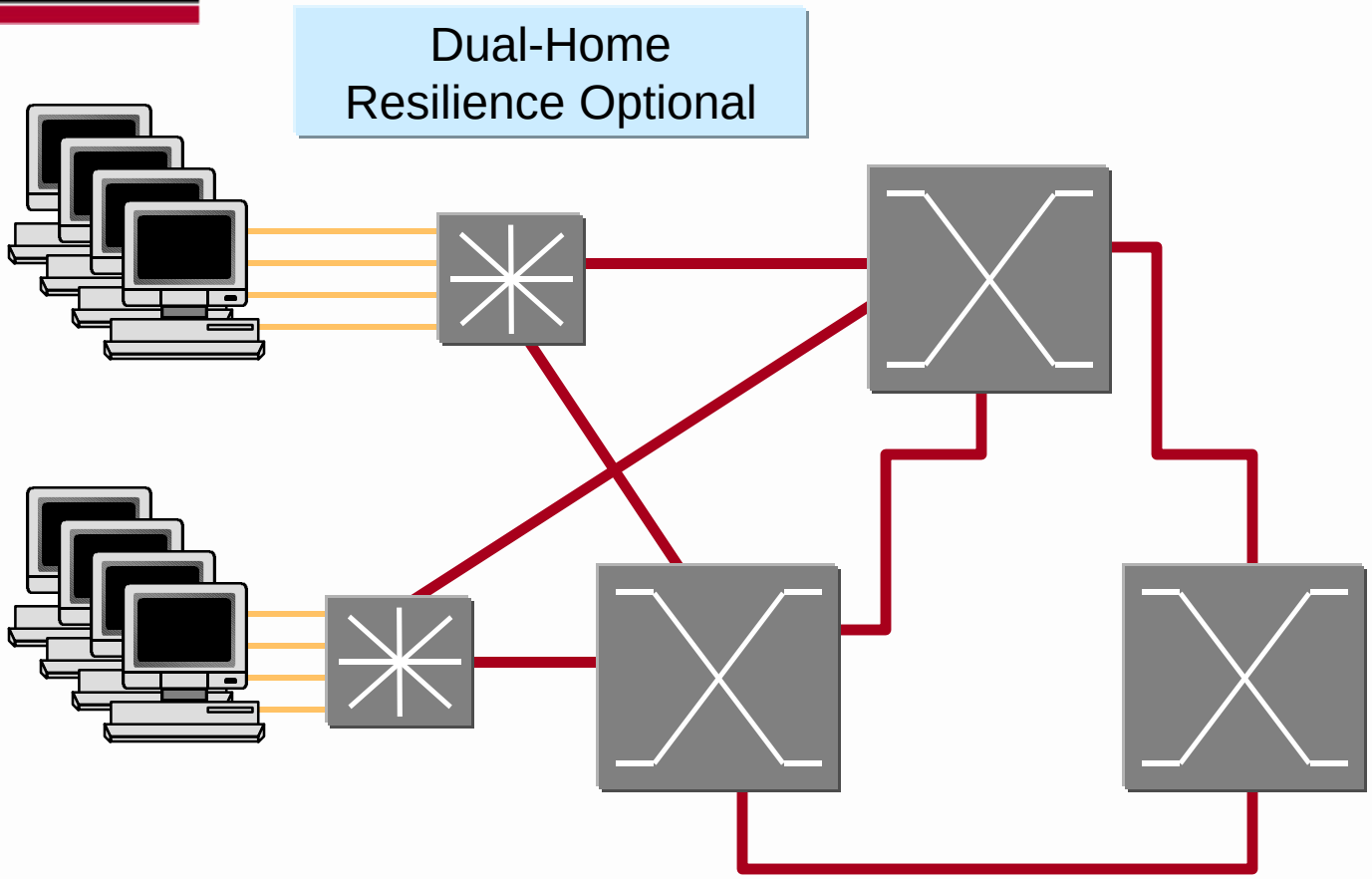
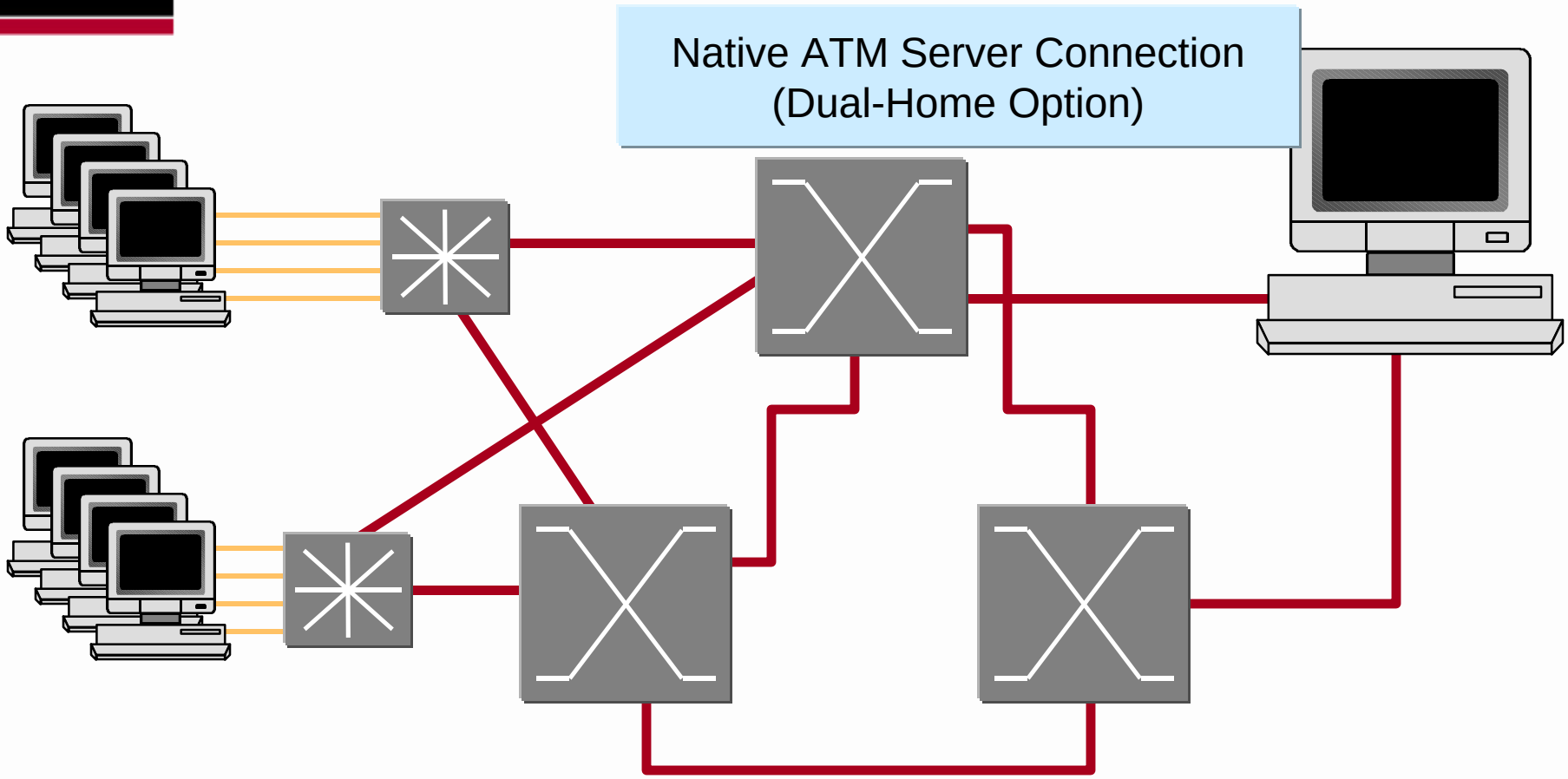


As an additional safety feature, we can attach the edge devices to two ATM backbone switches. This feature is known as “dual-homing.”

Software in the edge switch allows the connections to be load-balanced if they are both up, or to fail over to the still-functioning connection if there’s a link failure (eg., caused by a broken cable).

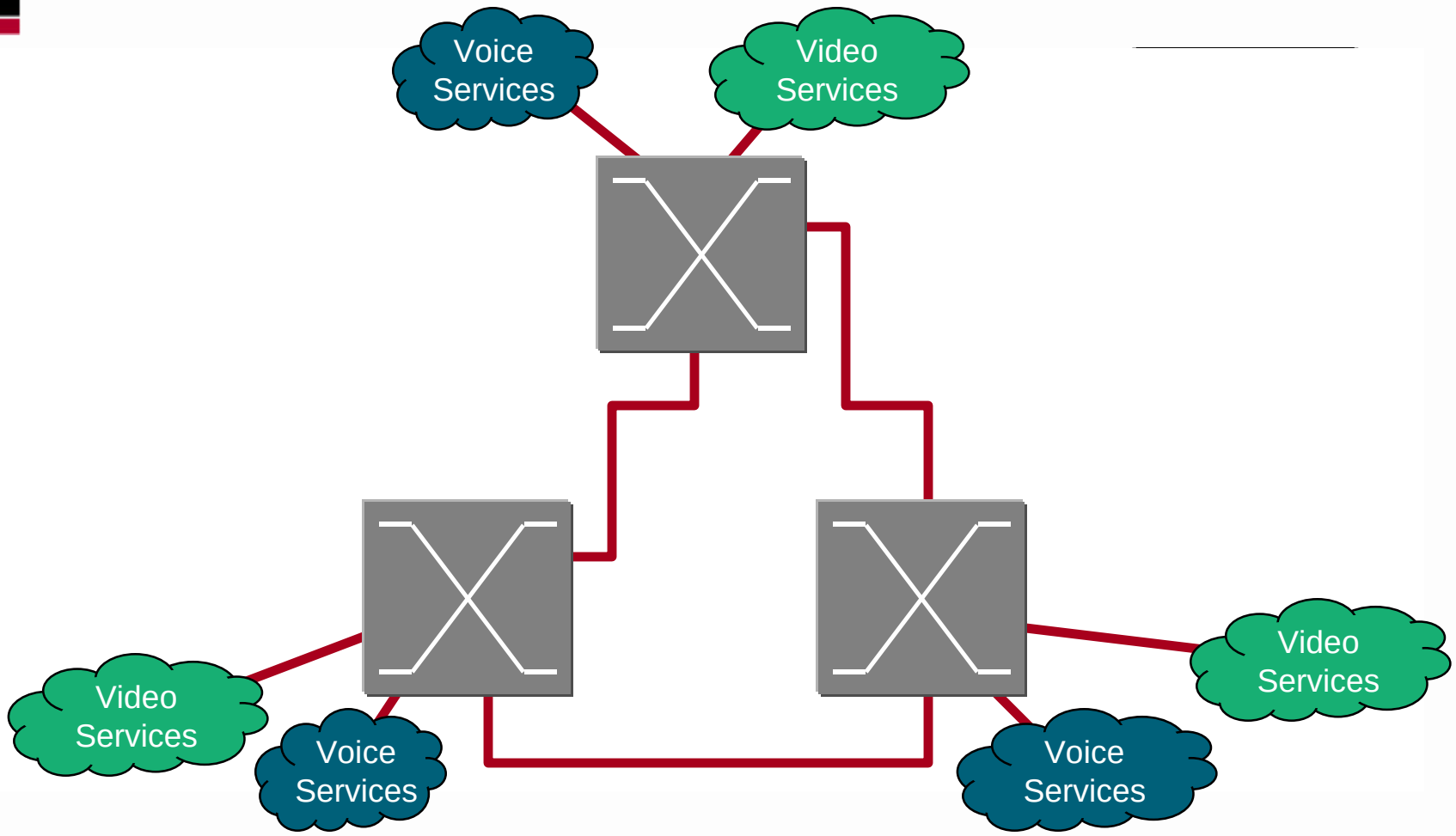
Building an ATM Network (Human View)



Ideally we also attach servers directly to the ATM backbone to allow the server to make use of ATM's native VLAN capabilities, or in an MPOA environment, to allow short-cuts to terminate directly in the server.

Since servers are mission-critical resources, we would also expect a dual-homing capability. While ATM allows this to happen at the physical layer, the appearance of the redundant connection to the operating system depends on the specific server implementation.

Building an ATM Network (Human View)



Since ATM is a multi-service infrastructure, we can also overlay voice and video services onto the backbone. These services retain their required Quality of Service connections even if the data services are throwing bursts of information into the backbone.

Summary

- **ATM is just another network technology**
  - **It's Own Special H/W and S/W**
  - **It's Own set of Jargon**
- **Can Use ATM to Create Resilient, Intelligent Infrastructure**
- **Services Operate Over the Infrastructure**
  - **LAN Services**
  - **Voice/Video Services**

In summary, we can see that ATM is essentially just another networking technology.
Of course it has its own specific hardware and software, and its own set of jargon.

Summary

- ATM is just another network technology
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- Services Operate Over the Infrastructure
  - LAN Services
  - Voice/Video Services

We can use ATM to create truly resilient networks. The resilience is possible within the backbone, and in the service links into the backbone, too.

In general, the failover times for an ATM backbone are much shorter than for a conventional network. For a FORE Systems' network, these times are normally less than 5 seconds, which means that most data applications will barely notice that a link failure has taken place.

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- Can Use ATM to Create Resilient, Intelligent Infrastructure
- **Services Operate Over the Infrastructure**
  - **LAN Services**
  - **Voice/Video Services**

ATM acts as the underlying infrastructure, with a variety of services operating over it.

An ATM network is a true Virtual Network because it is able to mimic LAN segments, or point-to-point connections in any combination.

LAN services are able to share the backbone efficiently with delay-sensitive voice and video. This is not possible with any alternative technology.