

Ipsilon Networks

~~IP + ε = Ipsilon~~

IP plus a little bit more...

Mission

Be the premier provider of solutions for high performance IP networks.

IP

- **Phenomenal growth of IP Internetworking**
- **IP is the only choice for large networks**
- **No single vendor dominance; strong vendor support**
- **Users & vendors heavily invested in IP**

Why is the IP user frustrated?

- **Router price/performance falling behind switches**
- **ATM's complexity far exceeds Ethernet's**
- **Switches don't scale - no attention to routing**
- **Networks not open for research innovation, end user customization, 3rd party enhancements**

The Innovation Gap

- **More innovative ideas & skills for network evolution than ever**
- **Researchers can't afford to build their own large networks**
- **Vendors, not owners or researchers, control the evolution of networks**
- **Large networks evolve slowly anyway**
- **Evolution ceases; revolution starts to look good**

The Opportunity

- **Focus on IP to simplify network architecture**
- **Use switch hardware for revolutionary price/performance**
- **Let users avoid complex, proprietary & immature ATM protocols & products**
- **Leverage innovation in the broad research community**

What does the IP user need?

- **Routing**
- **Price/Performance**
- **Simplicity**
- **Openness**

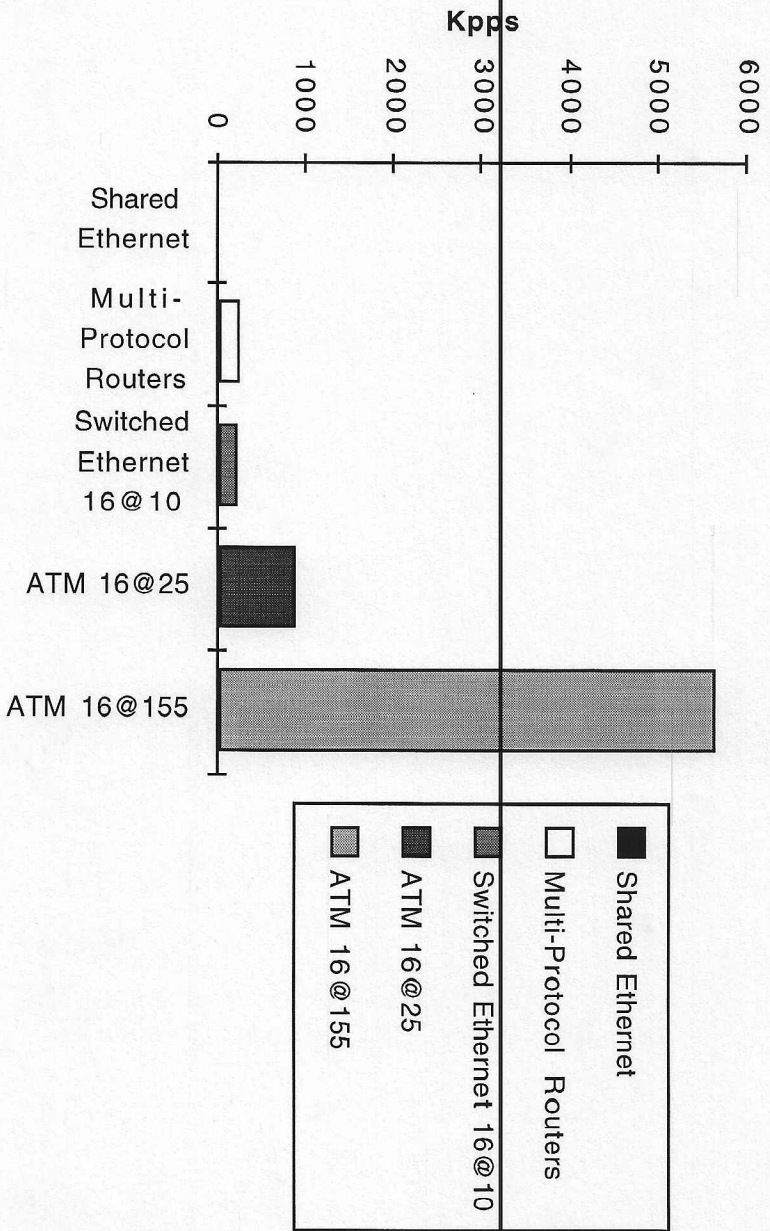
IP is Routing

- **Routing is not just for traversing LAN media types**
- **Routers allow scaling:**
 - » **Address & topology management**
 - » **Administrative boundaries**
 - » **Security management**
 - » **etc.**
- **Lower layers can aggravate, but not alleviate, routing problems**

Price/Performance

- **Ethernet is cheap(!), but not fast enough**
- **Workstations can use > 100Mbps; PCs are catching up**
- **Connectionless multi-protocol routers are difficult and expensive**
- **Switches are cheap and easy**
- **ATM hardware leads in price/performance**
 - » 25Mbps switched ATM cost == 1x switched Ethernet
 - » 155Mbps switched ATM cost == 2x switched Ethernet

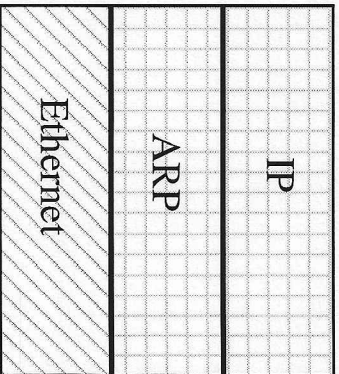
Performance



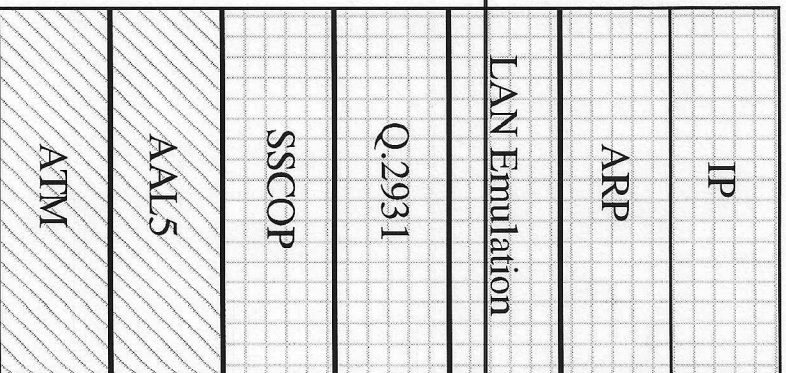
Where'd the simplicity go?

- **Layering for maximum compatibility leads to complexity**
- **Virtual LANs, LAN Emulation mean more work for routers**
- **ATM defines new, complex, address space - needs lots of administration**
- **ATM defines heavyweight connection protocols**

Ethernet vs. ATM Forum



Ethernet Stack



ATM Forum Stack

Open Networks: The Promise

- **Open platforms allow innovation by customers, 3rd parties, researchers**
- **Open interfaces allow customers choice of implementation**
- **Open competition leads to continual price/performance improvement**
- **Reference implementations greatly improve interoperability**

Open Networks: The Reality

- **Desktops & servers have become open platforms**
- **Hubs, bridges, routers, switches have become complex, closed, proprietary systems**
- **Network vendors seek lock-in through proprietary interfaces, esp. management**
- **Standards usually behind market need; typically no reference implementation**
- **The Mega-Hub is the new mainframe**

The Solution

- **Marry router s/w with switch h/w**
- **Not just a *layering* of routing above switching; route management *replaces* switch management**
- **Open protocols, open platform for router h/w & s/w to enable innovation**

Strategy

- **Use public domain routing software; leverage oversupply of ATM hardware**
- **Publish protocol specifications, management interfaces & reference implementations for all components**
- **Deploy on commodity, open systems**
- **Encourage commoditization of industry; foster competition to grow market**
- **Create interoperability products for ATM Forum standards, Ethernet, etc.**

Benefits to end user

- **Scaleable networks through routing**
- **Leading edge price/performance - ATM h/w**
- **Lower cost of ownership - simple, familiar administrative model**
- **Choice of vendors, easier customization - open routing platform**

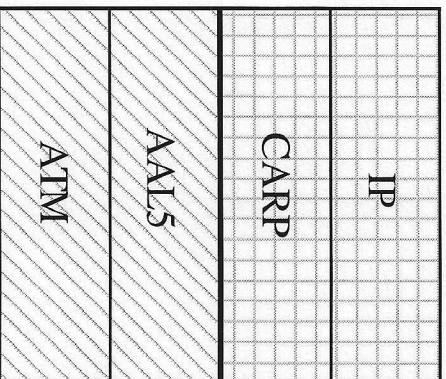
Alternatives

	Fast	Cheap	Simple	Routeable	Open
Ipsilon	+	+	+	++	++
Ethernet Switches	-	++	++	-	--
Newbridge	+	?	-	+	-
VIVID					
Fore	+	?	?	?	-
Cisco Fusion	+	--	--	++	-
Synoptics Lattis	+	?	-	-	-
ATM Forum Standard	+	-	-	-	-

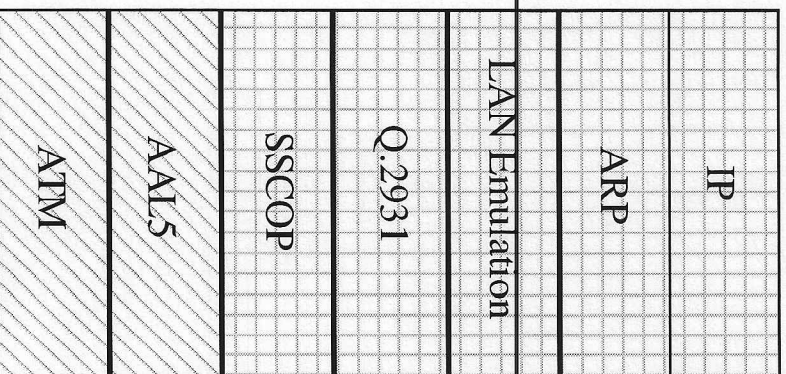
ITM vs. ATM

- **ITM uses ATM hardware**
- **ITM uses IP focused software protocols**
- **Both ends must be ITM, e.g., switch & hub or switch & NIC**
- **ITM uses router software instead of ATM's connection management software**
- **ITM has PVCs just like ATM**

ITM vs. ATM

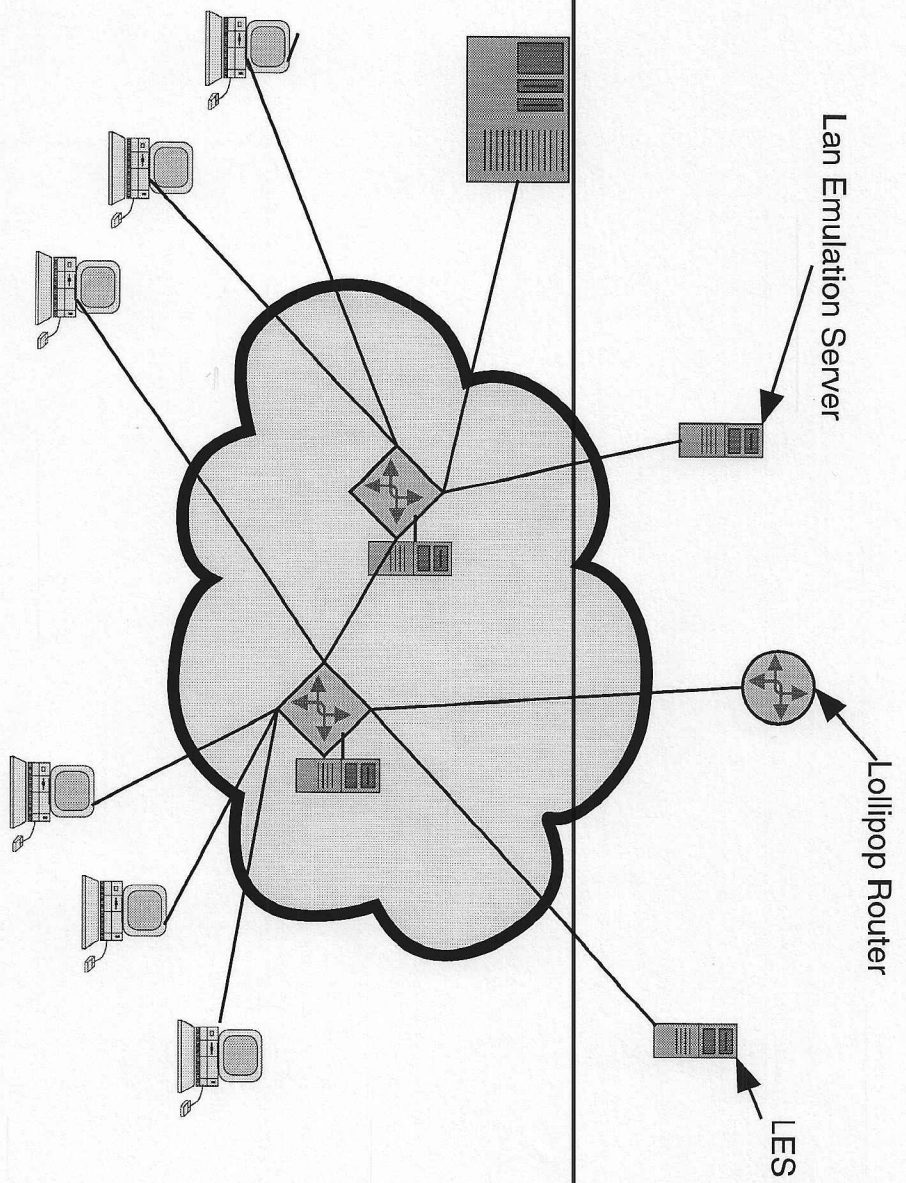


ITM Stack



ATM Forum Stack

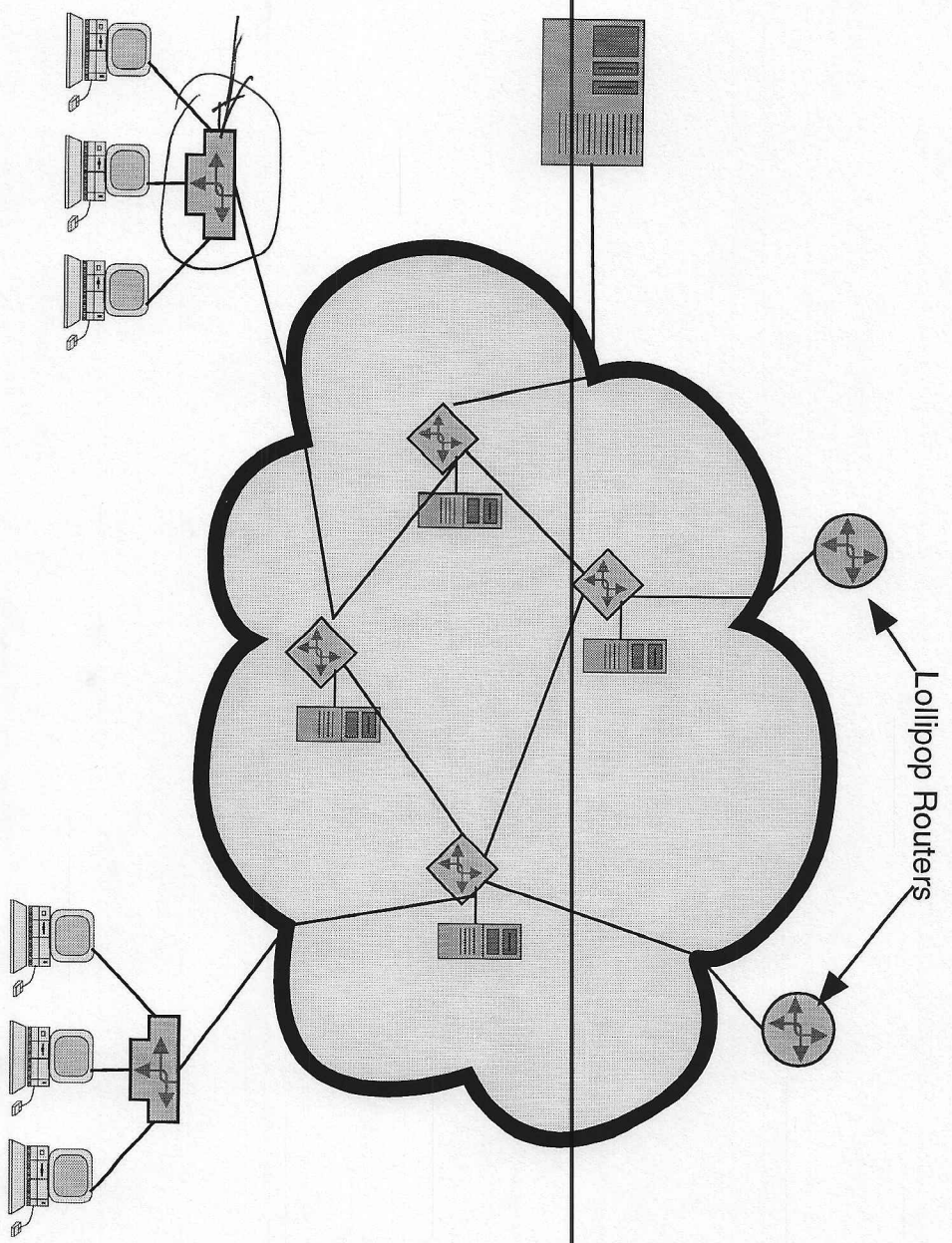
ATM Workgroup



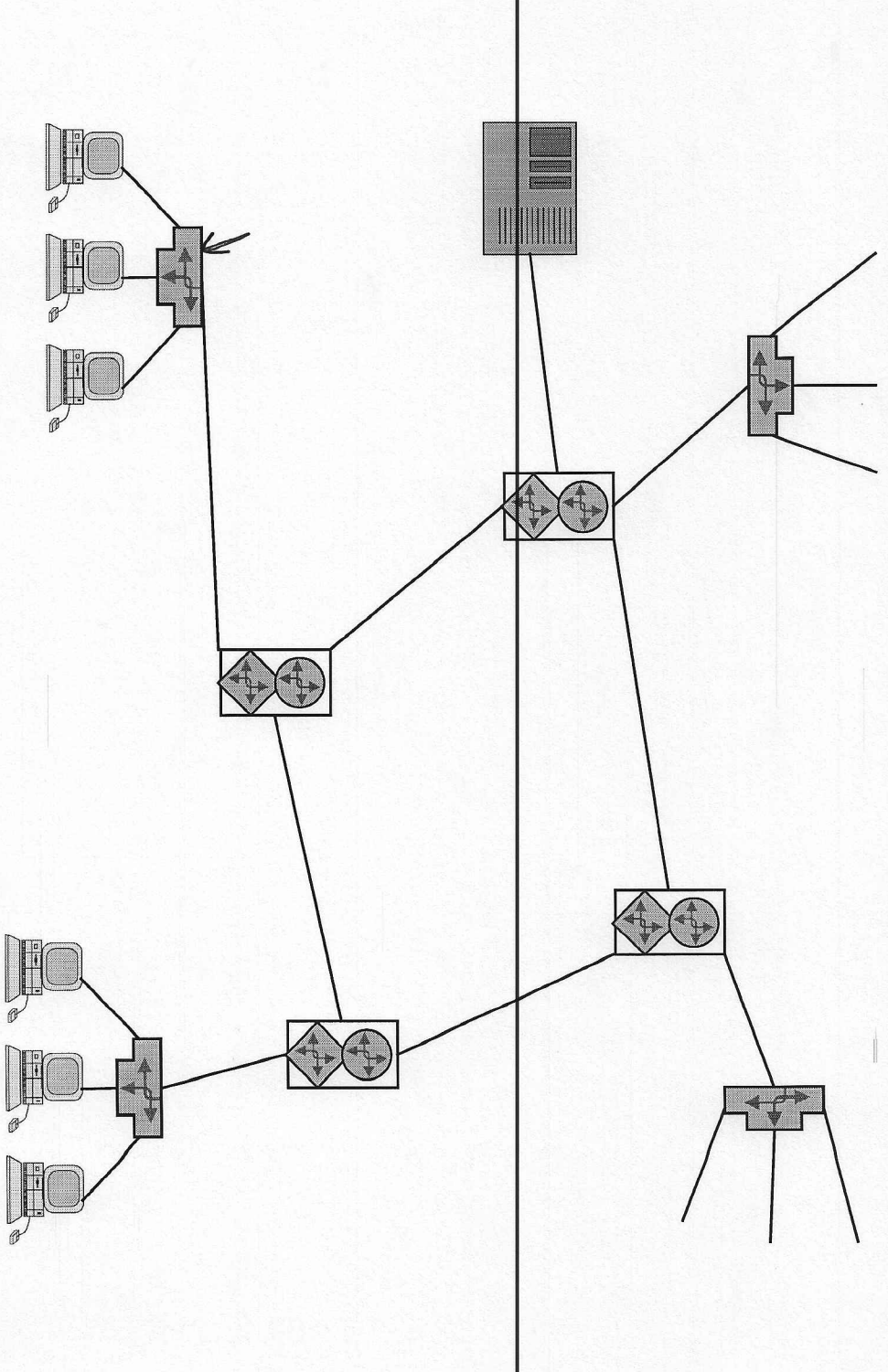
Summary

- **IP world is frustrated**
- **IP can join forces with switching**
- **Networks should be open**

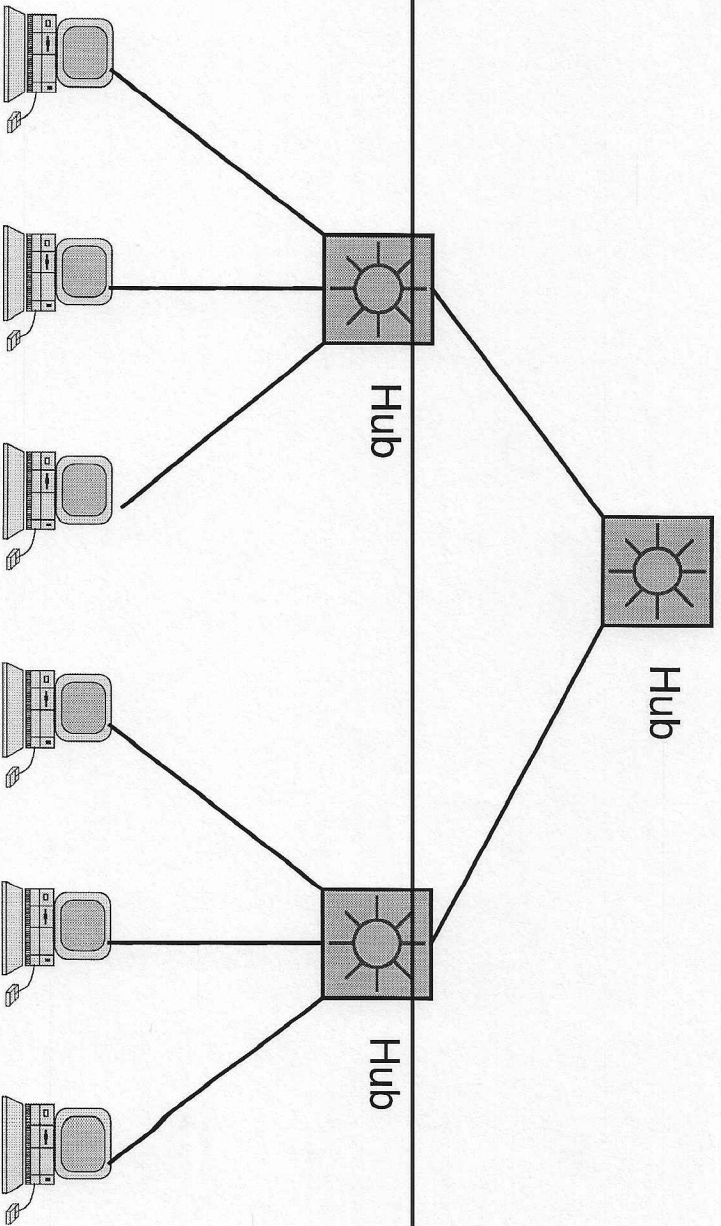
Big ATM Backbone



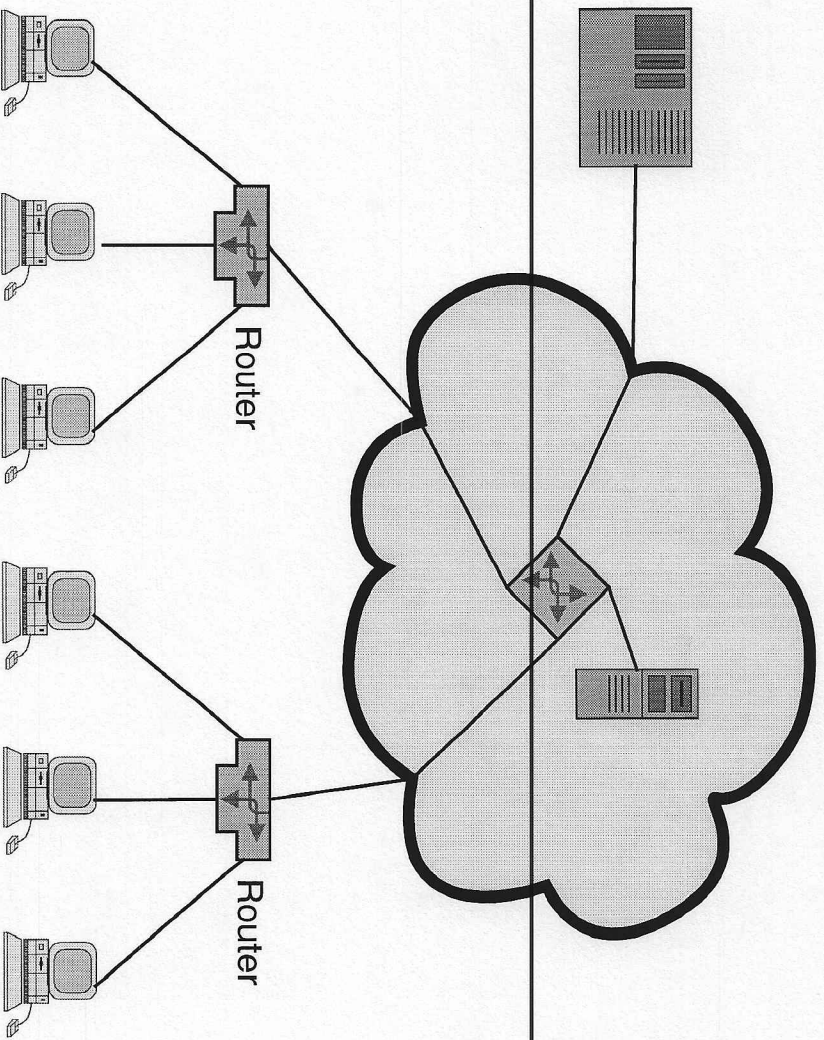
Big ITM Backbone



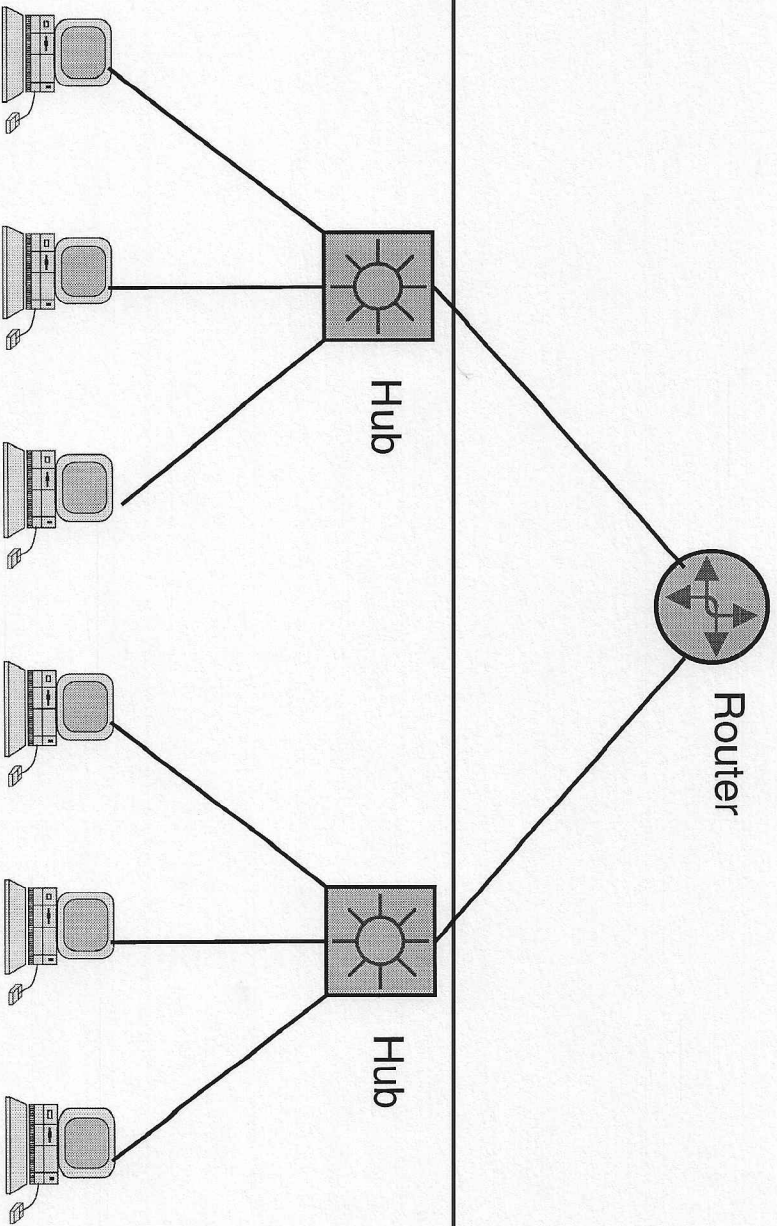
Basic Backbone



Small ATM Backbone



Segmented Backbone



ITM Workgroup

