



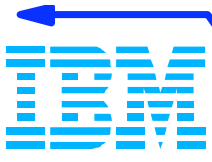
SVN SWITCHED(Transport)
VIRTUAL(Routing)
NETWORKING(for e-COMMERCE)

IBM's DIFFERENCE

**....just exactly how do I get QUALITY of Service
and LEGACY LAN access ?**

Graham Clarke
GGCLARKE@US.IBM.COM
Graham Clarke/Cary/IBM@IBMUS
(919) 486-2352

Scott Seal
SCOOTER@US.IBM.COM
Scott Seal/Cary/IBM@IBMUS
(919) 486-2349



NHD

Campus ATM Switching Solutions

TARGET AUDIENCE

Business Partners

IBM

2nd level Tech Support

Systems Engineers

NS IT Technical Spec'ts

Outside Mktg Reps
Inside Mktg Reps

NS IT Mktg Spec'ts (Acct/Geo)
NS IT Mktg Spec'ts (BP)
Client Reps

CONTENT

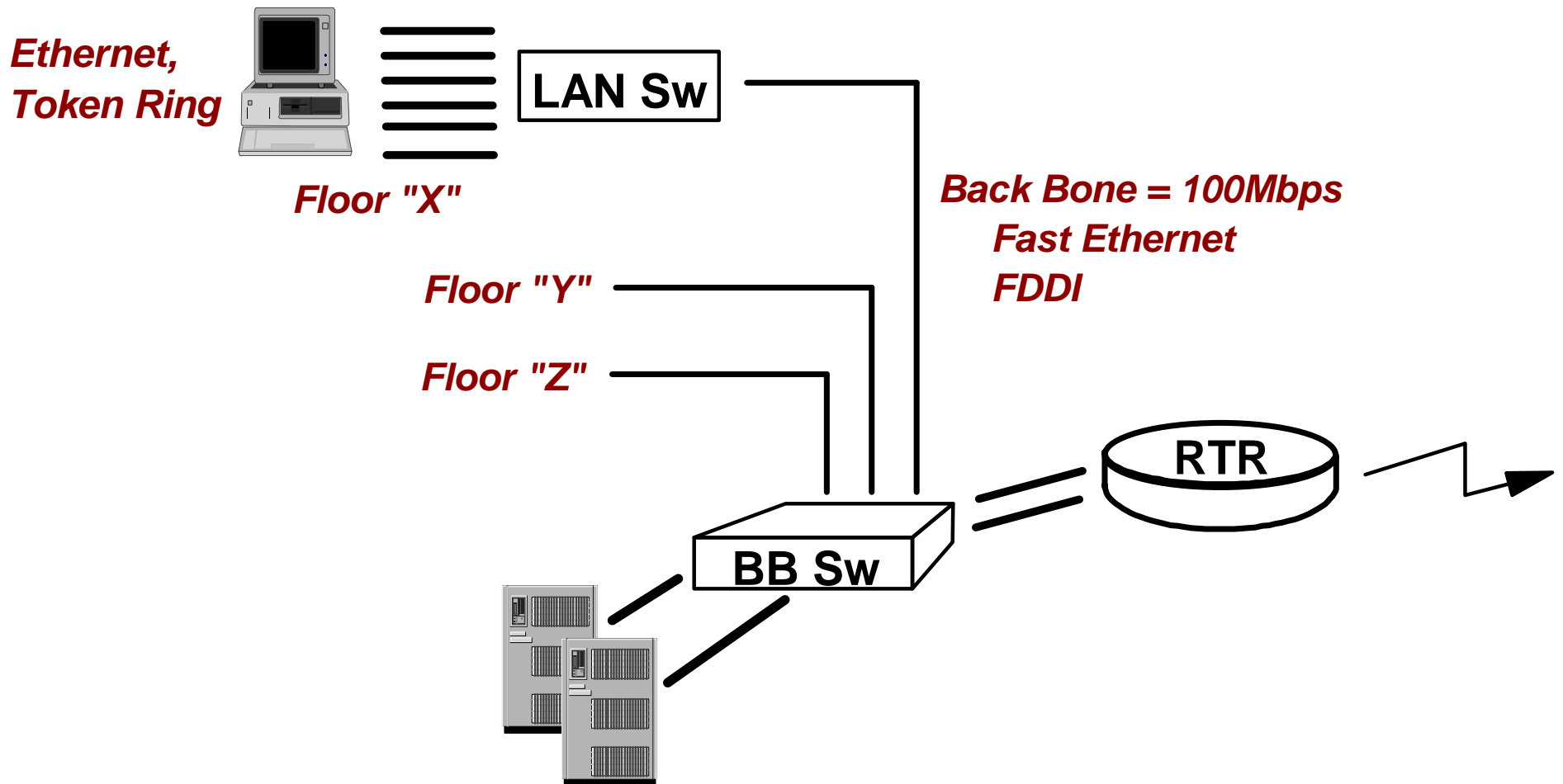
SVN

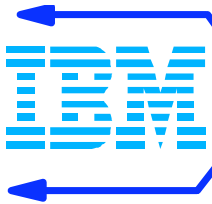
- ▶ identify CIO/CNO reasons that SVN is BEST STRATEGY to achieve NETWORK COMPUTING MODEL
- ▶ DIFFERENTIATE from "LAN Switch,Router" model

MSS

- ▶ SIMPLIFY it's STRENGTH
- ▶ Simplify LANE , Classic IP , SuperELAN , BCM , NHRP , MPOA
- ▶ MIGRATION PATH to MSS and ATM
- ▶ COMPETITIVE strengths in LAYER 3 Switching

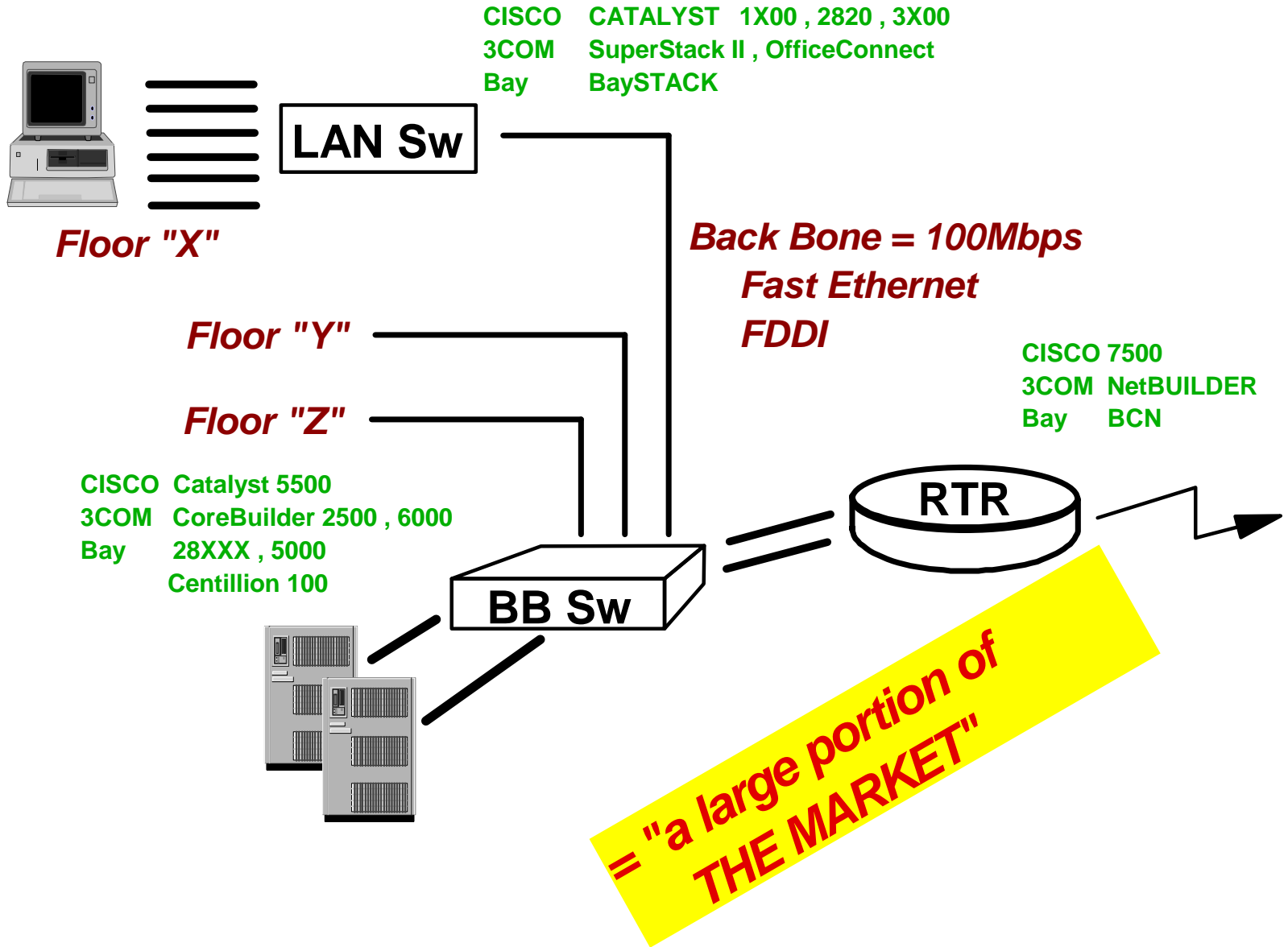
IBM **NHD** *the TYPICAL Collapsed BACKBONE
CAMPUS Scenario*





NHD

CAMPUS SWITCHING COMPETITION ..the FRAME technology CAMPUS

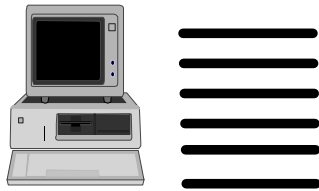




NHD

WHERE MSS / 826X / ATM FITS

CISCO CATALYST 5000 , 19XX , 2XXX , 3X00
 3COM CoreBuilder 5000
 SuperStack
 Centillion 100
 BaySTACK



Floor "X"

LAN Sw

Bay

Back Bone = **ATM 155**
 Fast Ethernet
 FDDI

Floor "Y"

Floor "Z"

ATM 155

CISCO 7500
 3COM NetBUILDER
 Bay BCN

CISCO Lightstream 1010
 3COM CoreBUILDER 7000
 Bay 5000 BH
 10625

BB Sw



RTR

LAN Emulation
 Classical IP
 NHRP , MPOA
Super ELANs
Broadcast MGT

?

VS.

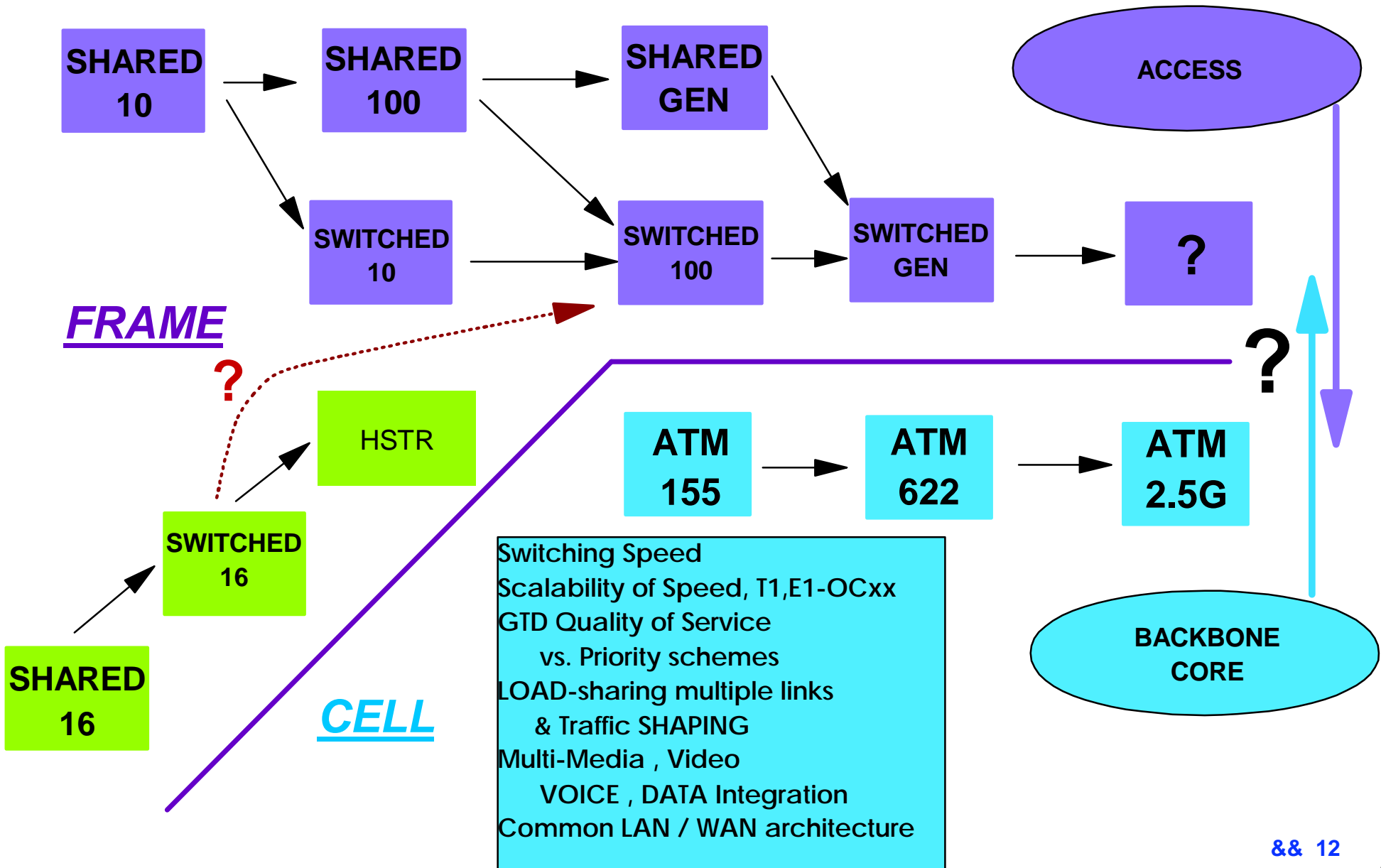
MSS

8210

or

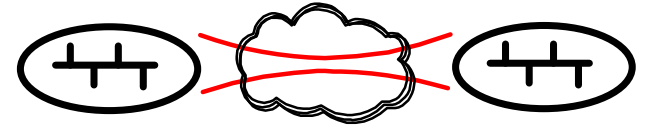
8260,
8265

IBM **NHD** 1998....It's NOT... FRAME or CELL
It's.....FRAME and CELL



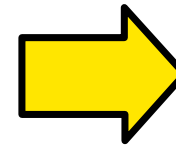
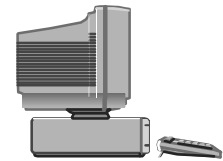
IBM **NHD** **REASONS for NETWORK CHANGE**

1. the LAN has "left the BUILDING !!!"
- it's NOT really LOCAL anymore



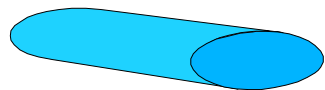
2. the N/W end-point is NOT a CHUNK of H/W
- it's a PERSON !

MOBILITY !

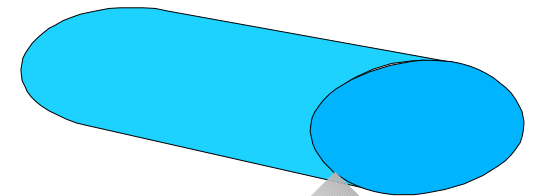


3. that VIDEO stuff is right around the corner !
- FOOTBALLS through GARDEN HOSES !

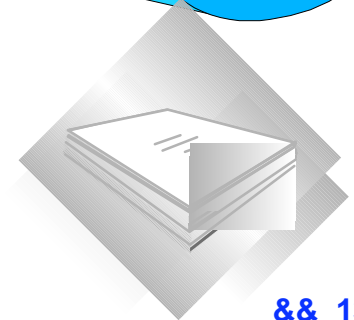
BANDWIDTH !

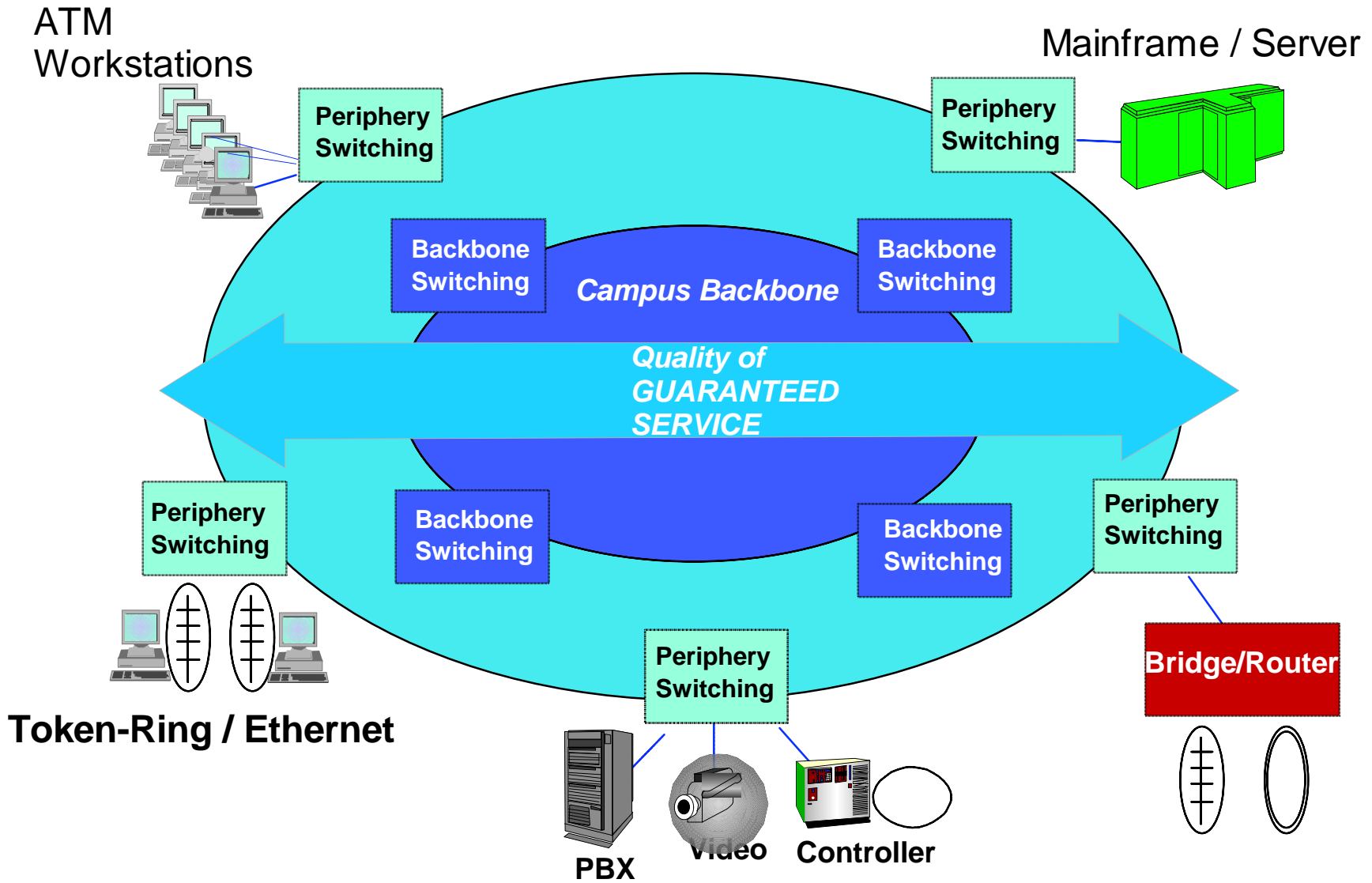


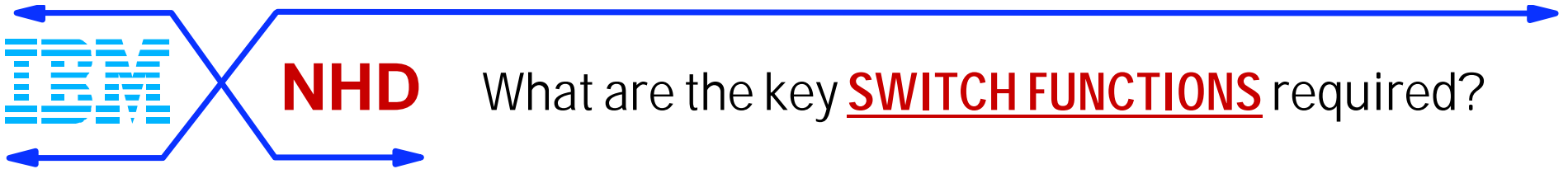
8 =====} 8,000,000



4. NO !...I don't want to be put on HOLD !!!
...would you like the
EXTENDED WARRANTY on that PACKET ?

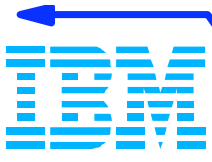






What are the key SWITCH FUNCTIONS required?

- Dynamics: Must keep work groups together even when mobile or distributed.
 - Requires LOGICAL grouping , not PHYSICAL..... ie. ELANs , VLANs
- Scaleability: Must be able to span across the campus or the enterprise.
 - Requires ROUTING broadcast reduction
 - Requires scaleable address resolution capability
- Switch Routing: Must move traditional routing out of the core of the network.
 - Requires scaleable switch routing
 - Must work with ATM switch and shared LEGACY LAN media
- Comprehensive: Must be able to support all media types.
 - Requires a single architecture between media.
 - Must use standards based approach for interoperability
- Security , Redundancy: Use MSS's Forum Compliant LAN EMULATION
 - utilize Redundant components for HIGH AVAILABILITY



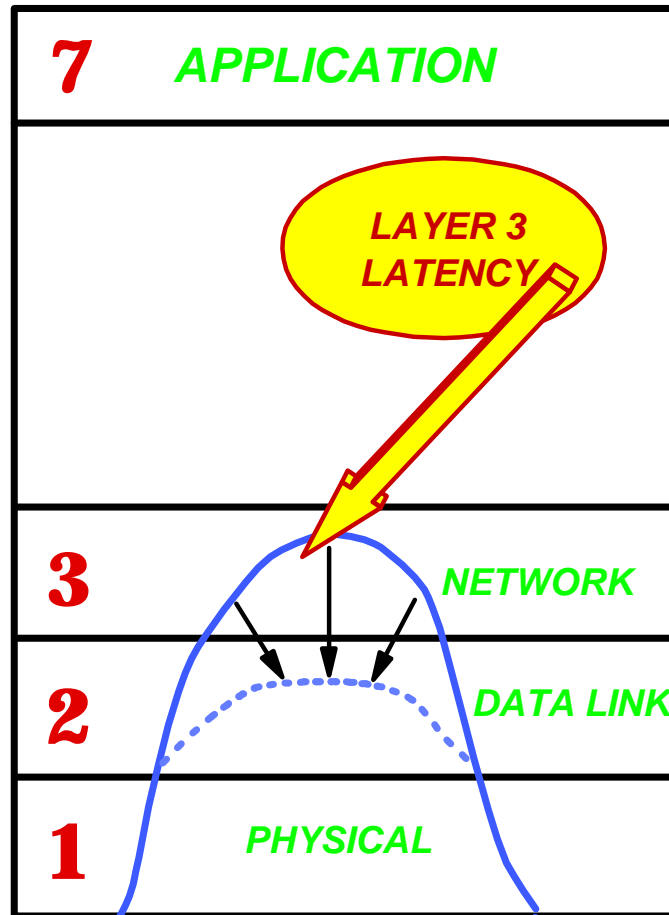
NHD

TODAY'S CHALLENGE

The SOLUTIONS ?

- I. keep doing it at LYR 3,
just do it FASTER, and try doing some in MicroCode
- II. Don't do it ALL,..minimize job to be done (ie. IP , Enet)
- III. allow Routed LYR 3 flow to happen for a while,
see if Pattern Recognized, then SWITCH flow to LYR 2
- IV. Use your NEIGHBOUR's effort, but if you're the 1st, GO FIND IT ONCE, and send a MAP home! then SWITCH at LYR 2

7 LAYER OSI Model



ROUTE SWITCHING
LAYER 3 SWITCHING
CUT THRU SWITCHING
IP Switching

CISCO's Netflow,
 BAY's Switchnode , Accelar
 3COM's FastIP
 IPSILON's IP Switching

IBM's MSS

(LANE , CIP , NHRP ,MPOA

IP , IPX
 APPLETALK,
 XNS

E/Net , TR , FDDI
 ATM , FR , X.25
 ISDN

PROTOCOLS

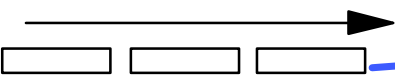
MAC , LLC
 SDLC , BSC

"the wire"
 signalling

SOFTWARE
 (ie. routing)

HARDWARE
 (ie. switching)

PKTS / FRAMES



"give me directions..."

next node "z"
 next node "y"
 next node "x" ?

6
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NHD

SVN vs. ROUTERS

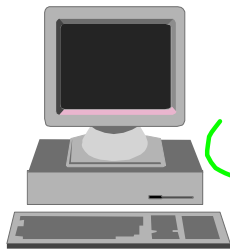
EVERY PACKET of EVERY FLOW processed at L3 SOFTWARE LAYER at EVERY ROUTER node

move intelligence of ROUTE SERVING out to EDGE of N/W all the way to WKSTN

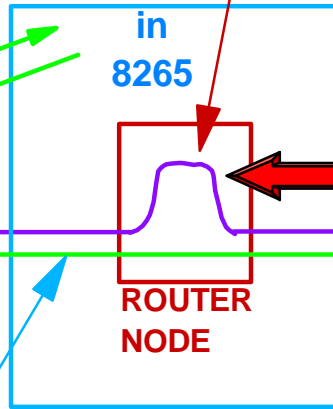


ROUTE SERVER ie. MSS in 8265

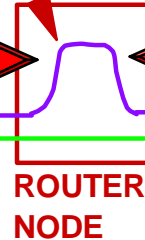
BROADCASTING between RTRs
N/W Topology updates
Search Requests
Protocol Services



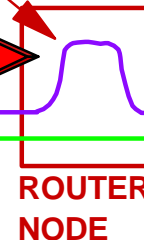
SOURCE



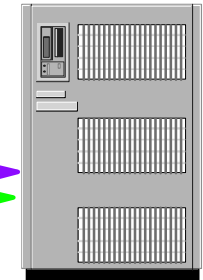
ROUTER NODE



ROUTER NODE



ROUTER NODE



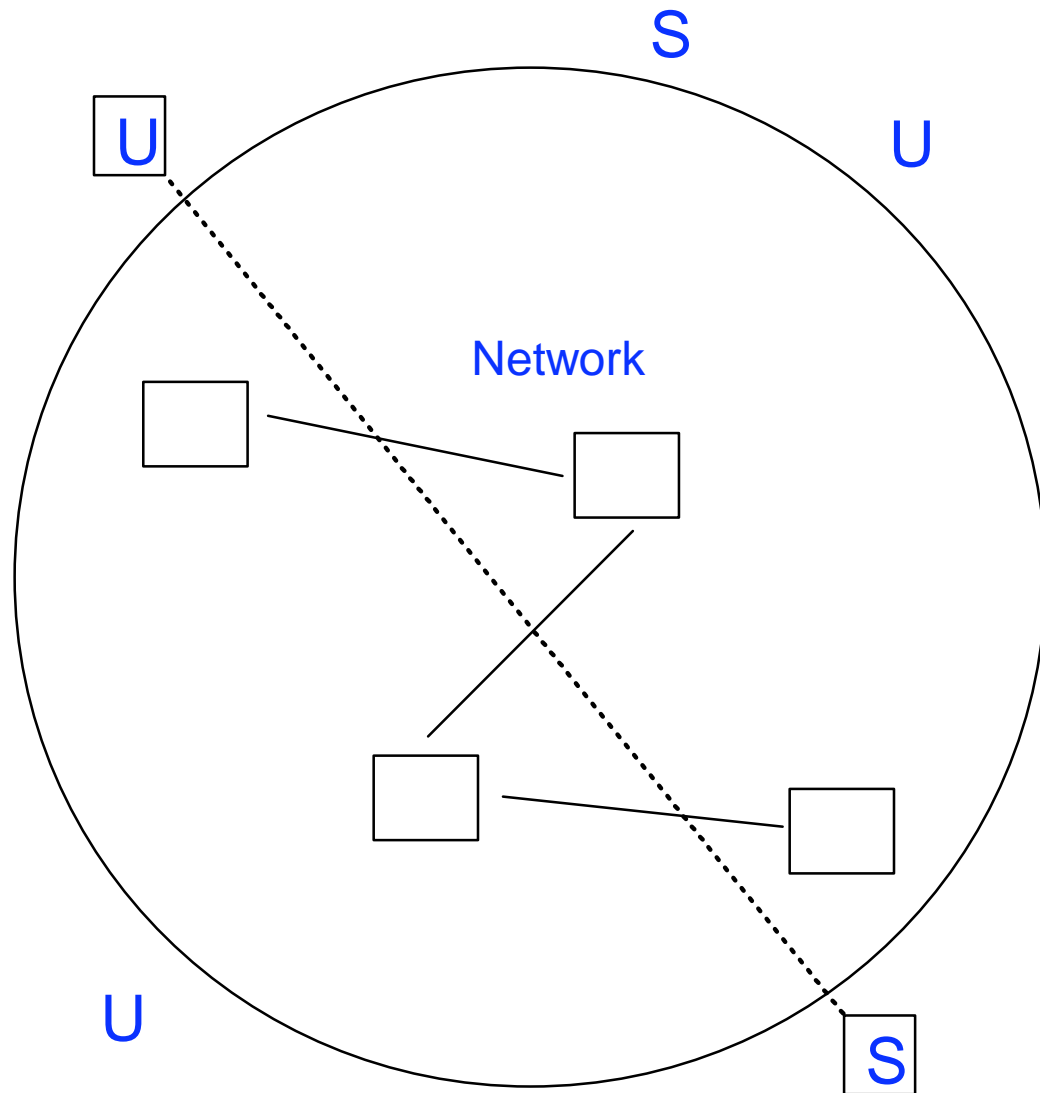
DESTINATION

Switched Virtual Networking

CALL SETUP done ONCE

CONNECTION oriented session for duration (at LAYER 2)

7
&& 16



Remember, networks exist because people (users of the network) want access to information (source of data)

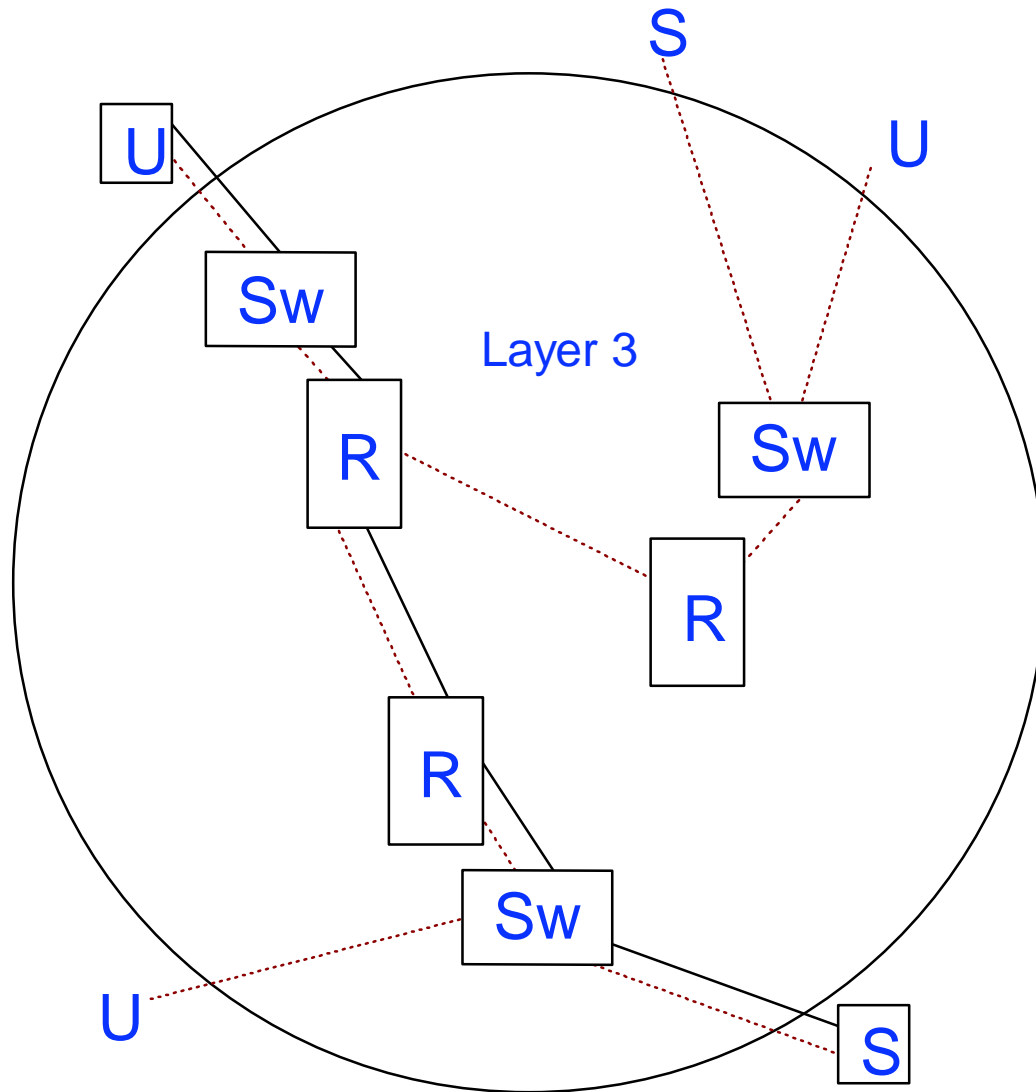
1. Find "S", the destination
2. Determine the path to follow
3. Send the information to user

U - User
S - Source
---- Information flow



NHD

The Routed Network

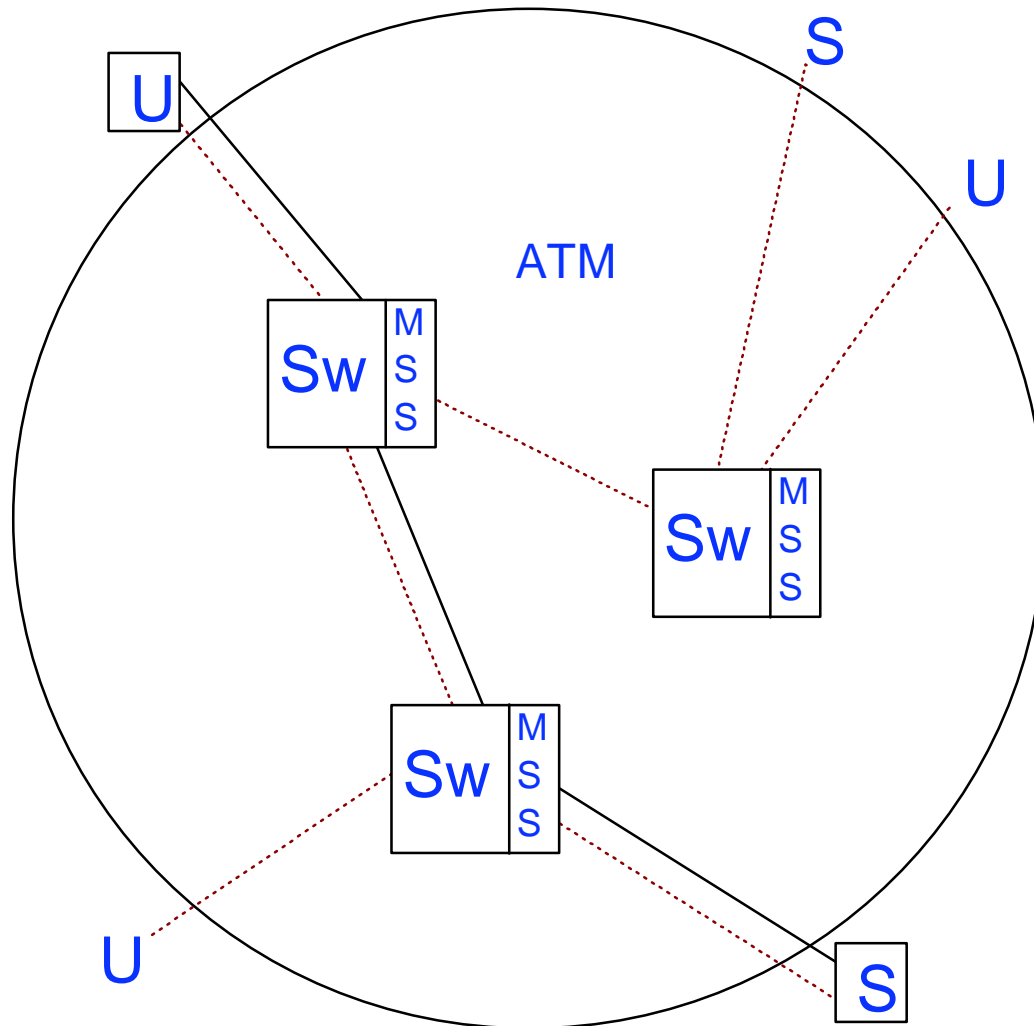


- Multiple platforms
- Continuing broadcast traffic to find server
 - managed by layer 3 subnets
- Each frame checked by every router in path
 - determines route for duration of flow
- Software based
- Can have single point of failure
- May be proprietary

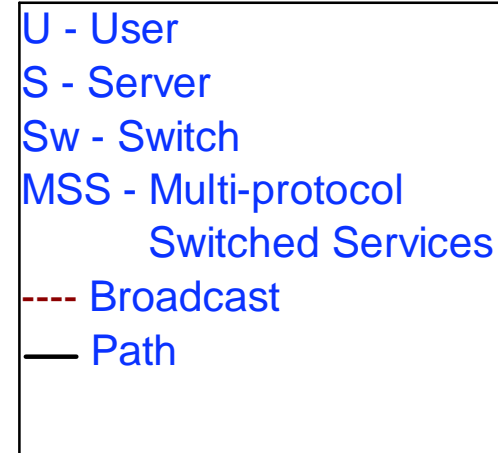
U	- User
S	- Server
R	- Router
Sw	- Switch
- - -	Broadcast
—	Path

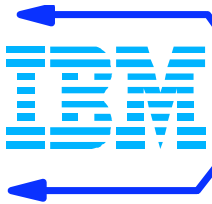


NHD The ATM/MSS Network: Resolution



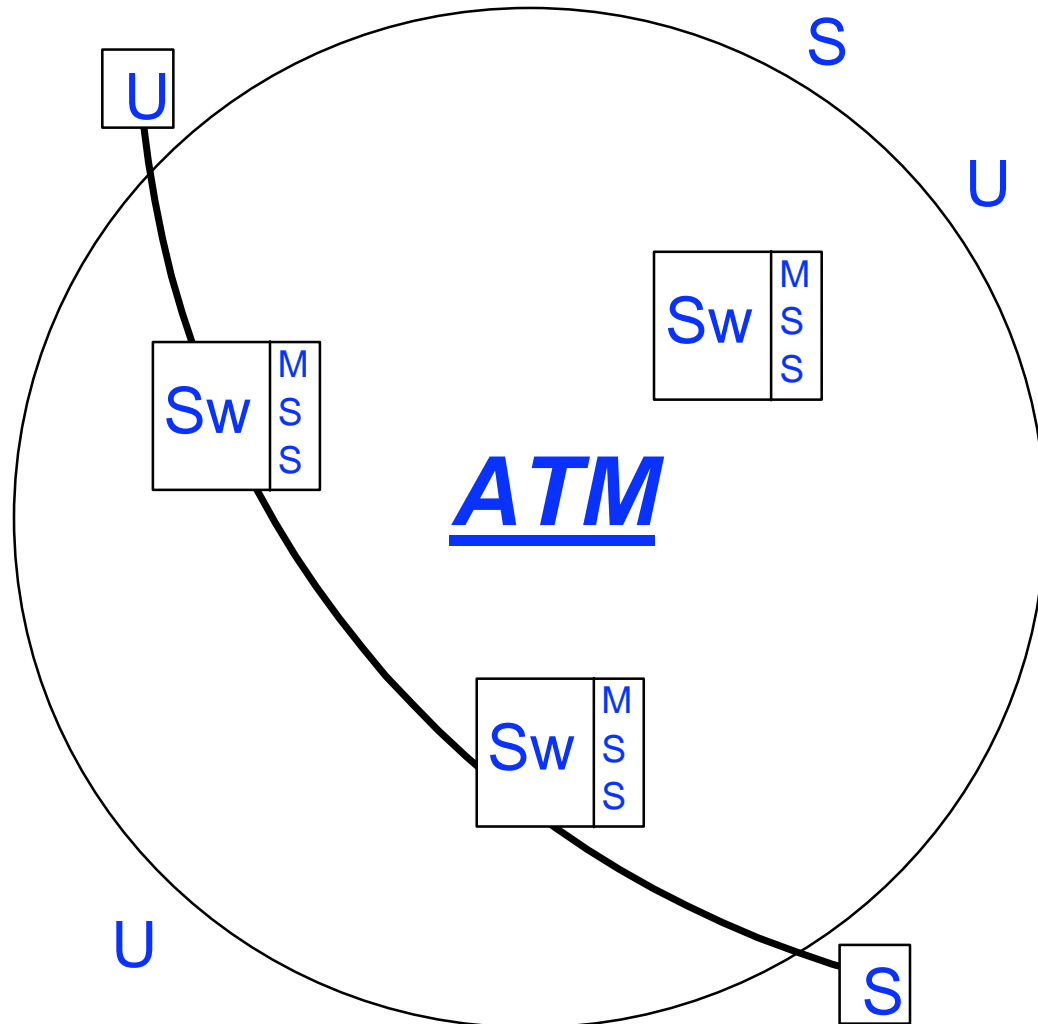
- One platform
- MSS determines path to server
 - this resolves ATM address, then 'Virtual Circuit' established between user & server
- Broadcast manager (BCM)
 - once server is found, ATM address 'stored' by MSS
 - future broadcasts converted to 'unicasts' based on knowledge of this address
- Hardware based
- Redundancy of all critical MSS components
- Entirely based on open standards
 - LANE, NHRP, MPOA





NHD

The ATM/MSS Network: Send Information



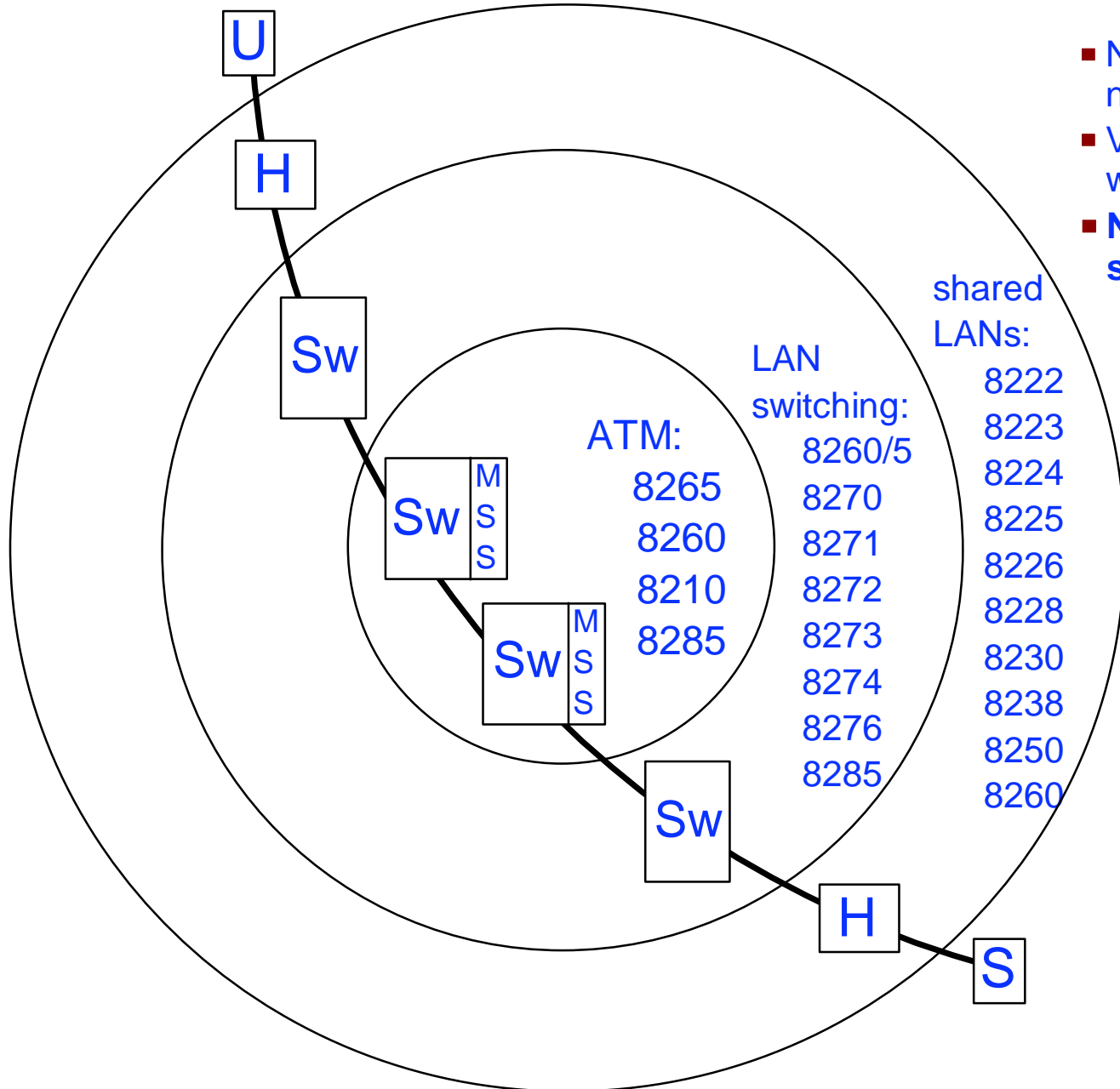
- The 'flat' network!
 - leverages switched infrastructure
 - connection oriented
 - broadcast traffic virtually eliminated
- ATM Quality of Service (QoS)
- **MSS solution available since 1996!**
 - **Standards based!**

U - User
 S - Server
 Sw - Switch
 MSS - Multi-protocol
 Switched Services
 — Path



NHD

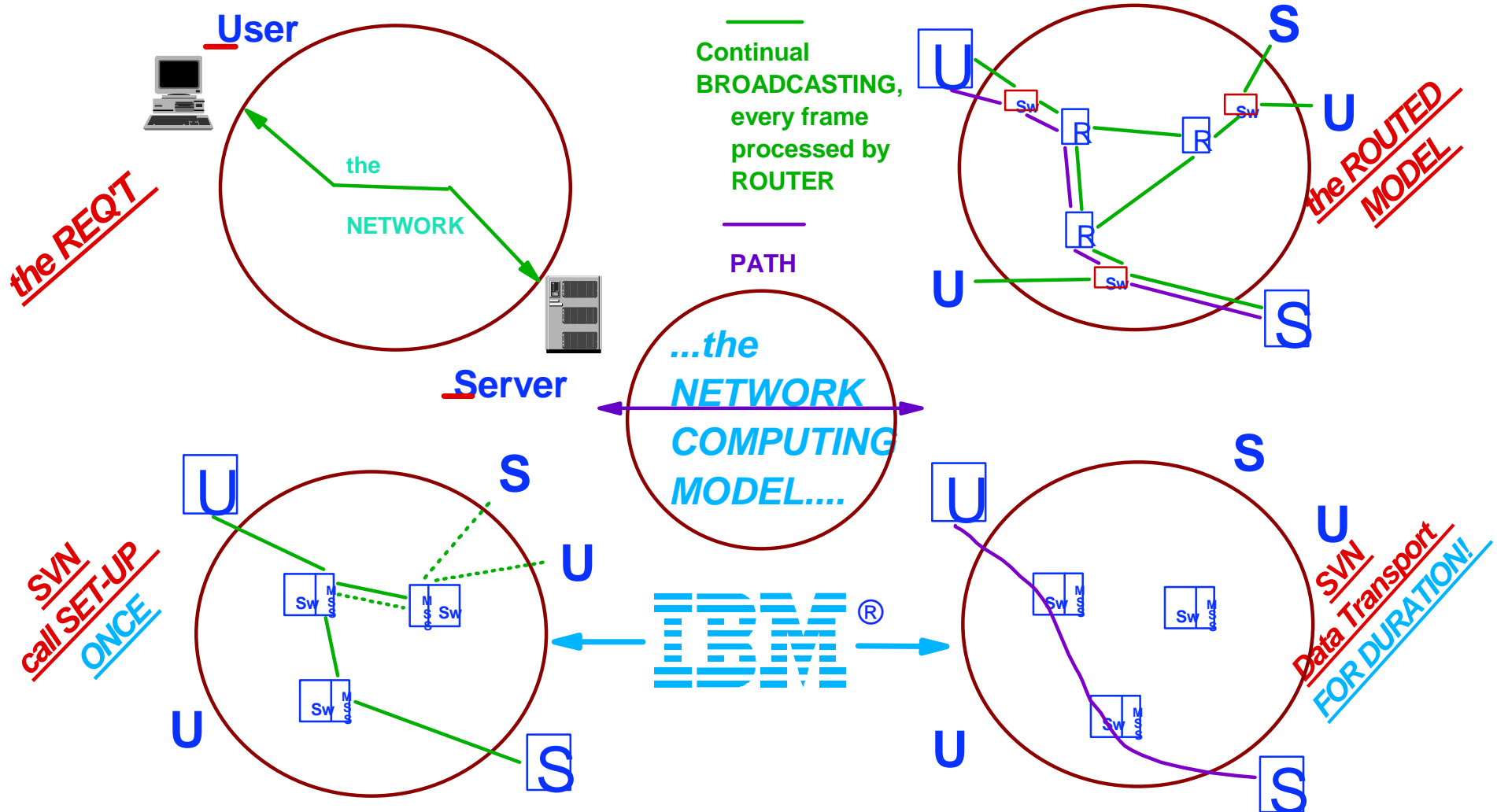
The MSS Campus Network: IBM Products



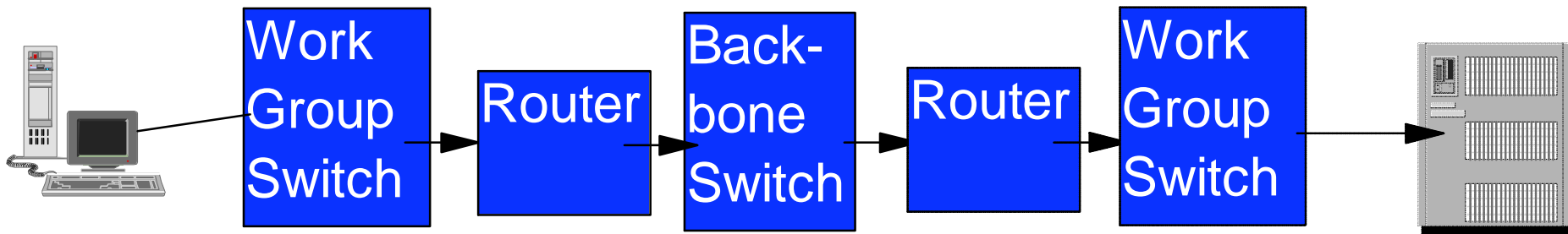
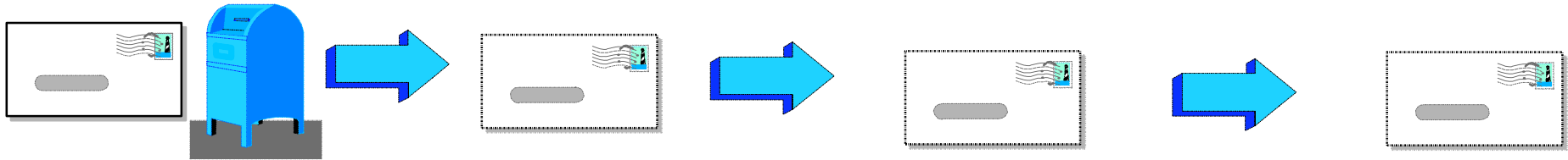
- No standalone Layer 3 routers needed!
- Variety of edge LAN switches w/ATM uplinks
- **Note: includes new desktop switches (3Com)**

U - User
 S - Server
 H - Hub
 Sw - Switch
 MSS - Multi-protocol Switched Services
 — Path

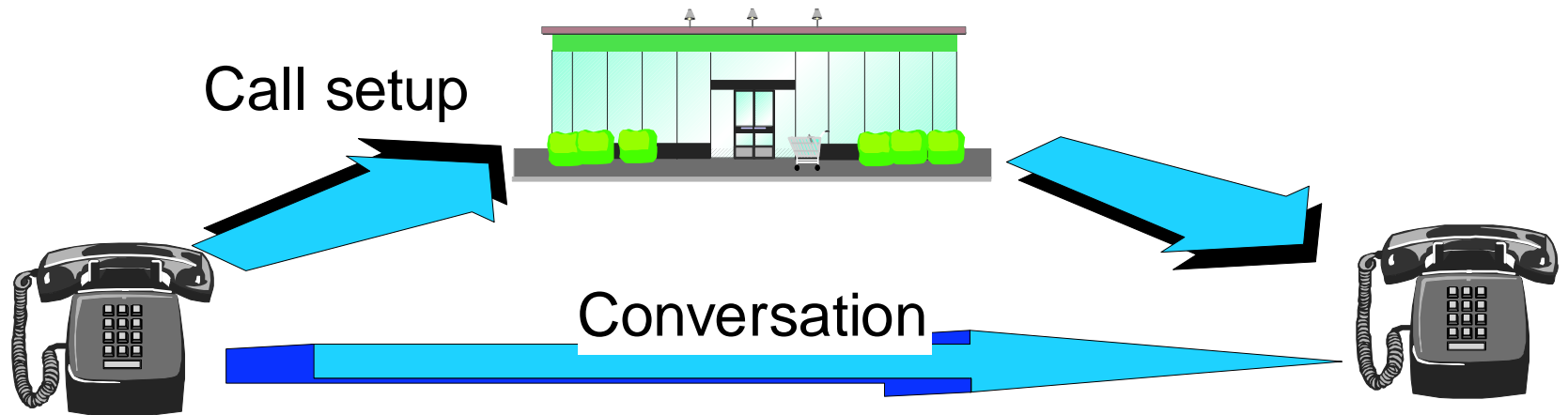
IBM's Switched Virtual Networking SVN



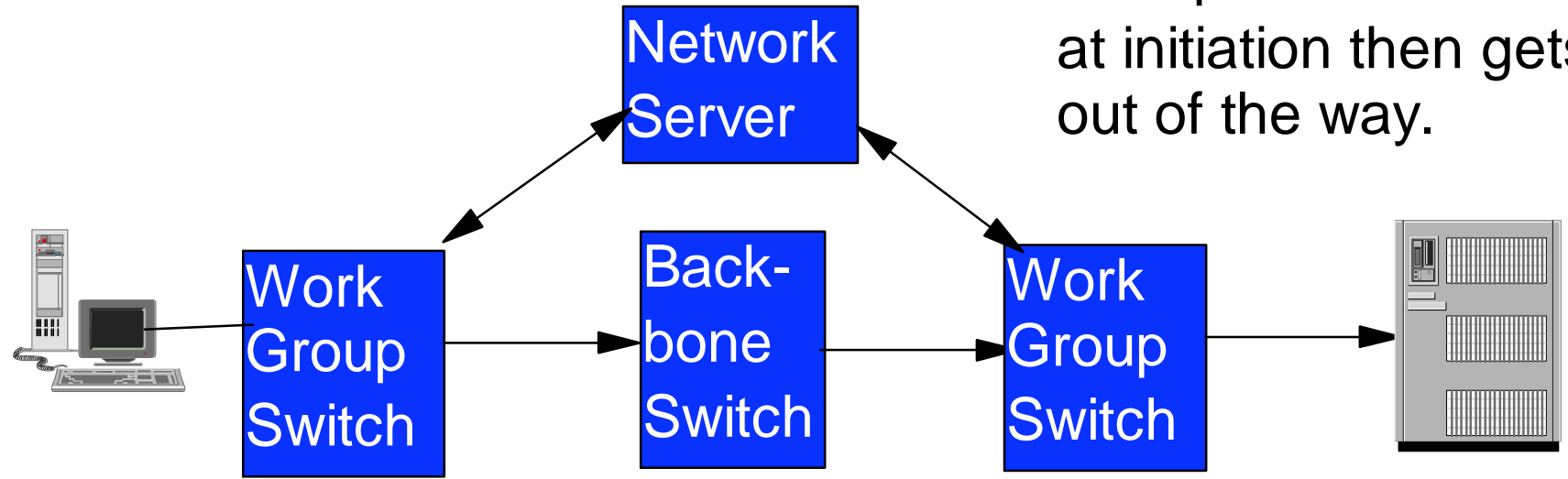
1. SERVICES , ROUTE-PATH set up at INITIATION ,.... then **CONNECTION oriented SWITCHED SESSION**
3. **SIMPLE MIGRATION** path at INCREMENTAL pace (workgroup , backbone at a time)
4. **COLLABORATIVE** applications (**VIDEO conferencing , Multimedia**)
5. **MOBILE WORKFORCE** access to Network,...**NO ADMINISTRATIVE INTERVENTION**
6. **NEW SERVICES** added (..... to the **SERVER** , away from the **TRANSPORT PATH!**)
7. **STANDARDS BASED SOLUTIONS**,... **IETF , ATM Forum**

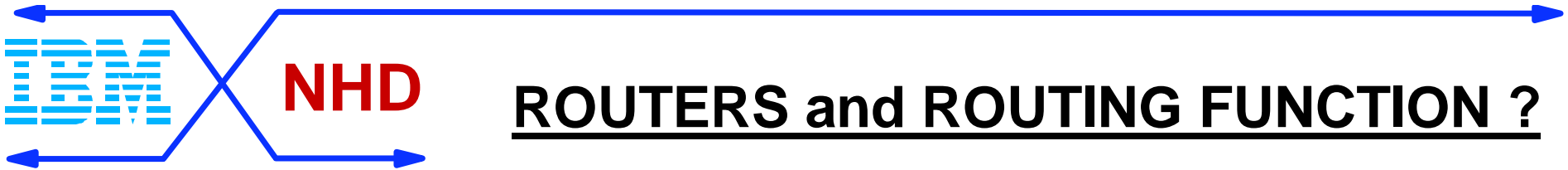


In router networks, every packet is screened at every router hop for specialized service processing. As services are added capacity drops and latency increases.



SVN provides service at initiation then gets out of the way.





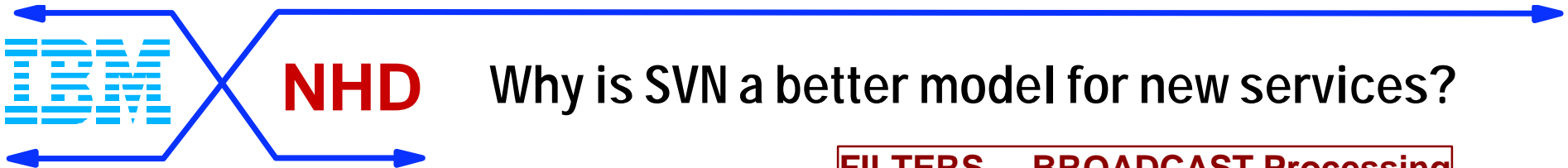
ROUTERS and ROUTING FUNCTION ?

*IBM's SVN Strategy does NOT REPLACE the NEED for the **ROUTING FUNCTION***

the DIFFERENCE is PATH DETERMINATION, SERVICES PROCESSING and

HOW IT'S DONE

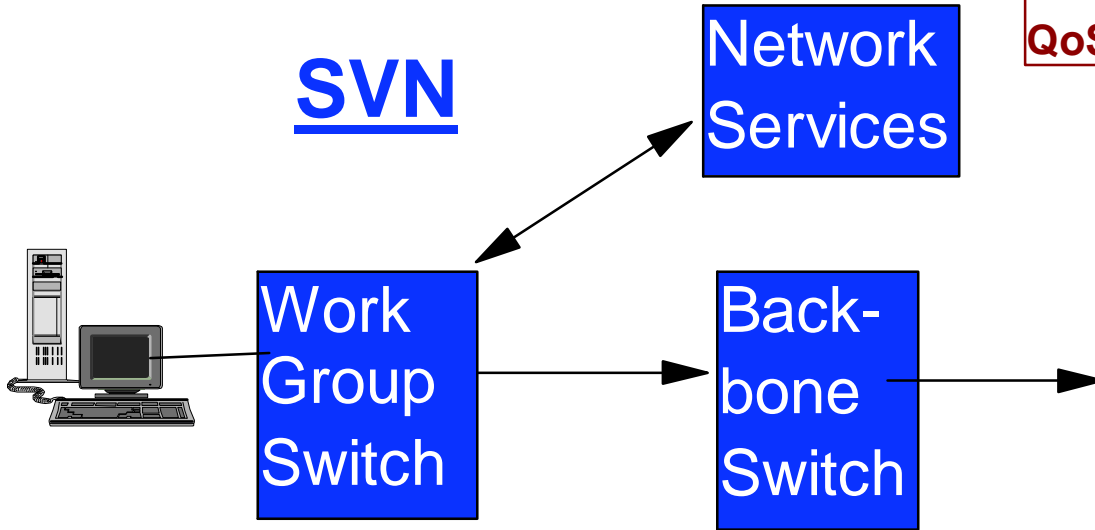
	SVN	ROUTER MODEL
WHERE	<i>in a SERVER</i>	<i>in every ROUTER</i>
WHEN	<i>at Connection SETUP</i>	<i>during the ENTIRE session</i>
HOW OFTEN	<i>ONCE</i>	<i>1/Packet/ROUTER</i>



Why is SVN a better model for new services?

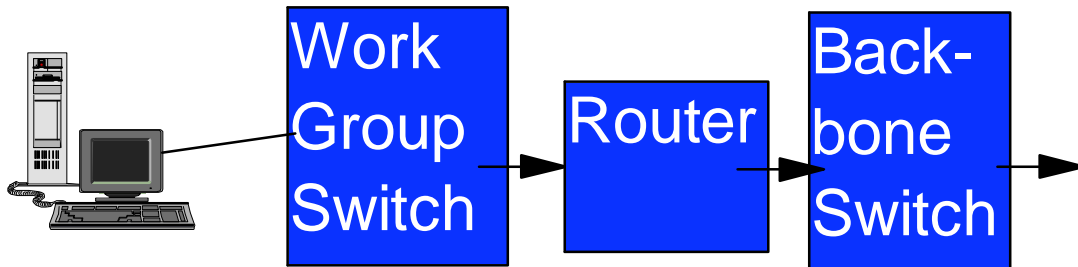
FILTERS **BROADCAST Processing**
LANE Services **Address Resolution**
QoS **Multicast**

SVN



New services are added to the Network Server in software.

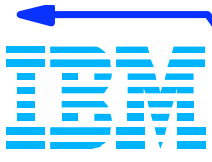
There is no need to change the switching code. This makes it easier to implement new functions.



Router

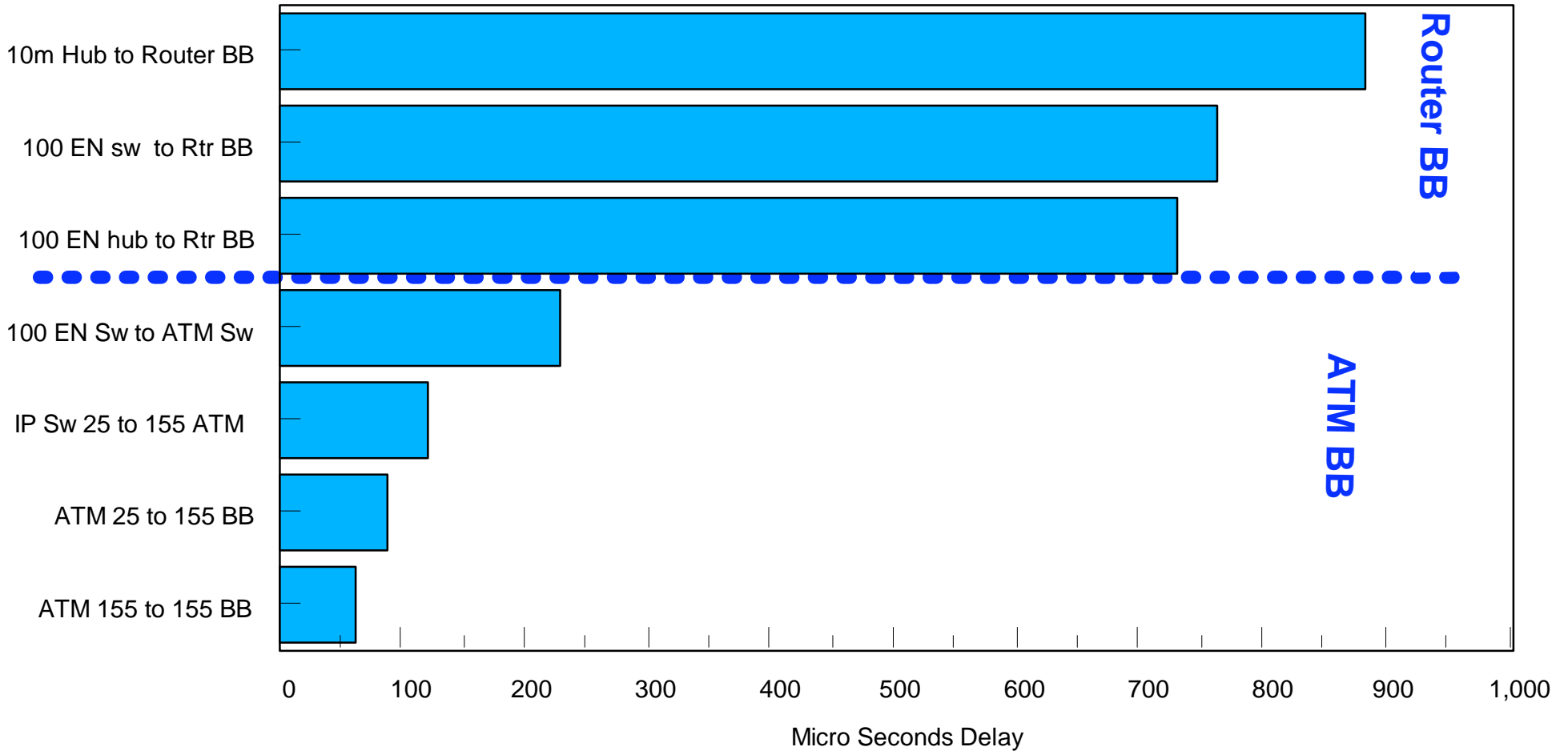
Introducing new functions often requires changes in the frame forwarding code. This introduces more risk to the customer and could require changes in hardware.



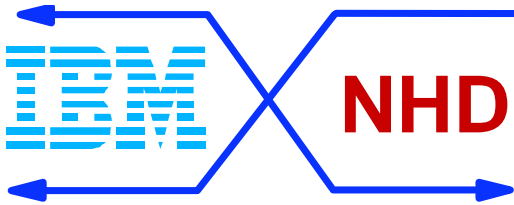


NHD

Bypassing router significantly reduces delay!



Configuration: 16 desktops per floor
3 Floors to a building
Source: INfonetics Research 12/96 Data Communications

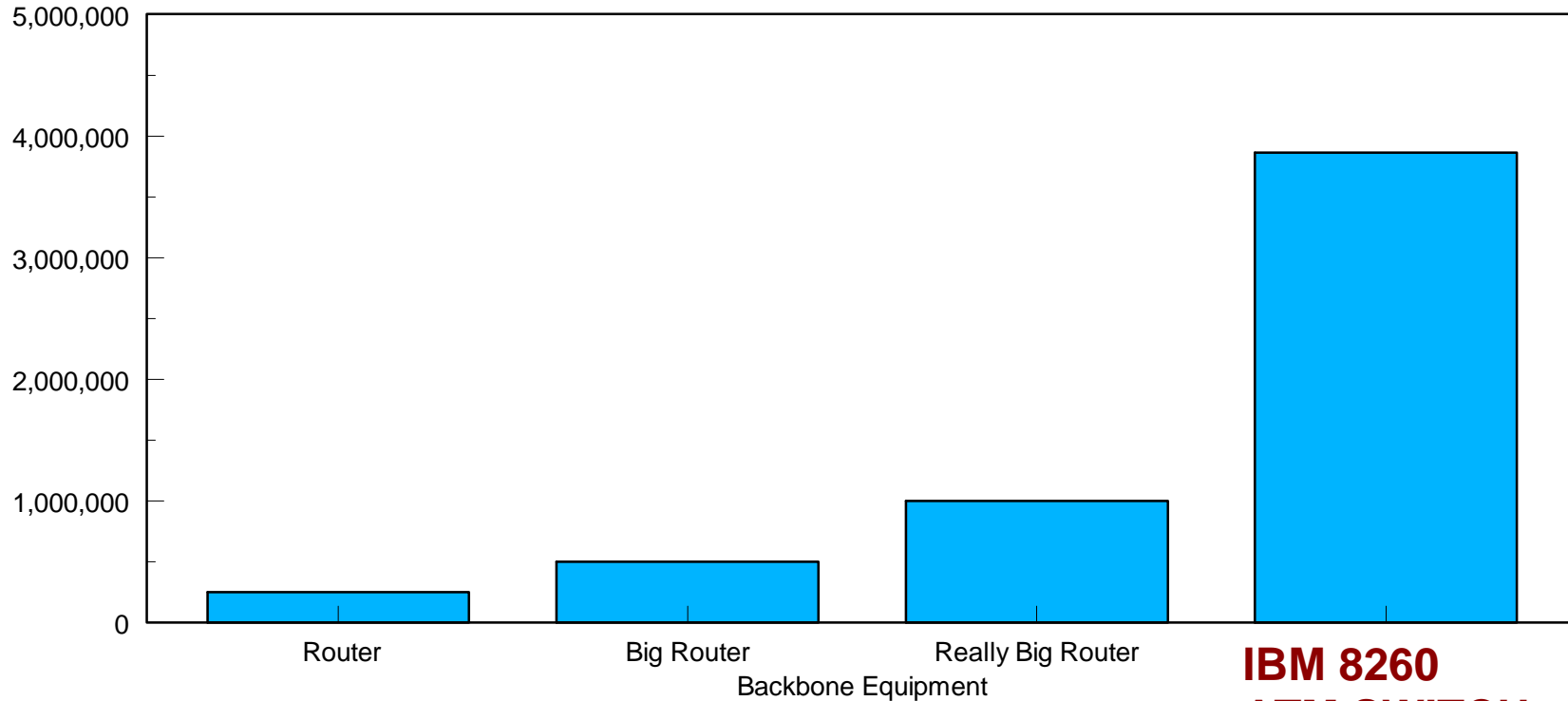


ROUTER , 8260/5 Switch Throughput Comparison

next floor ↑

PACKETS
per SECOND

Effective Throughput



Router assumes 64 byte packets
8260 assumes 96 byte packets (64 byte packets would yield same number)

.....not to mention the \$\$\$\$

8265 vs. 1010 / 7507
(8 x OC3 ports)

\$ 77 K vs. \$ 79 K

\$ 72K on Cat 5500

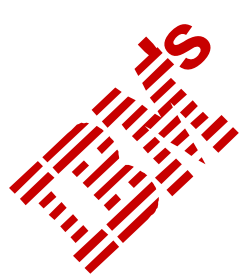
w/ RSM etc.

8
&& 19



SWITCHED NETWORK ALTERNATIVES

- Flat LANs
 - Problem: Flat LANs lack scalability
- Edge Switch/Core Switch with 1 Arm Router
 - The links to the router become the bottleneck
- Hardware Router model
 - Challenges in adding new services
 - SOLUTION = the "WATER COOLED Router"
- Switched Virtual Networking model
 - Routing and switching provide integrated services



SVN

Switched Virtual Networking

-it's a philosophy **(to SWITCH)**
-it's the culture **(to minimize RTG)**
-it's the rulebook **(Routing to the EDGE)**
-it's the GAMEPLAN ! **(FAST , GTD)**

"...it's IBM's Networking FRAMEWORK to ENSURE STANDARDS based SWITCHING solutions..."



The BUSINESS ISSUES of Networking

....as the MOVE TOWARDS the Network Computing Model evolves...
 (....or "PRESSURES on the PLUMBING"....)

.... and the OSCAR goes to

IBM MSS!

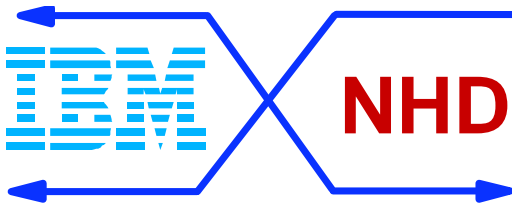


- | | | |
|---|---|------------------------------------|
| 1. BOTTLENECKS ... at the key access points (Servers...) | ➔ | <u>8260 , 8265 , MSS , LAN Sw</u> |
| 2. new BandWidth hungry applications (Voice , Video , Multimedia) | ➔ | <u>ATM QoS @ 155,622 Mbps</u> |
| 3. "access to / availability to" INTERNET is becoming KEY PART of BUSINESS OPERATION | ➔ | <u>SVN , ATM QoS , MSS</u> |
| 4. Quality of Service expectations of DATA N/W , INTERNET becoming close to PHONE / POWER | ➔ | <u>SVN , MSS redundancy , BCM</u> |
| 5. SECURITY and ACCESS Control | ➔ | <u>LECS, Policy based VLAN</u> |
| 6. MOBILITY of workforce | ➔ | IBM VLAN membership |
| 7. adding more BandWidth cannot be the solution | ➔ | <u>BCM , SuperELAN</u> |
| 8. STANDARDS BASED solutions.... not PROPRIETARY | ➔ | ATM Forum Compliant , IETF |
| 9. leave LEGACY applications , NETWORKS alone to evolve | ➔ | LANE, Classical IP |
| 10. have big investment in ROUTERS | ➔ | Migration scenarios , "ATM around" |



WHERE SHOULD YOU SPEND YOUR NEXT NETWORKING \$?

- a bigger or another ROUTER ?
- OR....moving towards TOTAL SWITCHING, and IBM's SVN ? ## 9



Competitive Positioning

■ First, DISCUSS the TECHNOLOGY decision...

- ▶ ATM (for the CORE)
 - The SVN Philosophy
 - MSS Implementation
 - Legacy LANs at edge

vs.

- ▶ LAN switches *and* ROUTERS
 - Fast / Giga Ethernet backbones
 - Stand-alone Routers

■ If ATM...

- ▶ 8265 (8260,8210)
 - MSS

vs.

- ▶ ATM switches *and* ROUTERS from
 - Cisco , Bay , 3Com

■ If ~~ATM~~

- ▶ 8274
 - RouteSwitch VLANs
 - HRE
- ▶ 8260
 - Switch Module series

vs.

- ▶ LAN switches *and* ROUTERS from
 - Cisco , Bay , 3Com