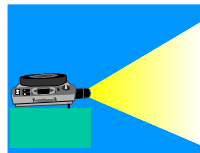# Leadership in S/390 Enterprise Server Access
Part 2 - Leadership in TCP/IP networking

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Content

► **IBM S/390 Server Access Leadership**

➡ **Part 1 : Considerations for S/390 Server Access**

➡ **Part 2 : Leadership in TCP/IP networking**

➡ **Part 3 :Excellence in SNA networking**

➡ **Part 4 : Channel Performance Testing Chronology**

➡ **Part 5 : WSC performance testing results**

➡ **Part 5 : Why Choose IBM for S/390 Server Access**

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Market Trends

► TCP/IP mainframe will grow from 30% in 1995 to 96% in 2000 per IDC

► Over 70% of current mission critical business applications currently run on SNA
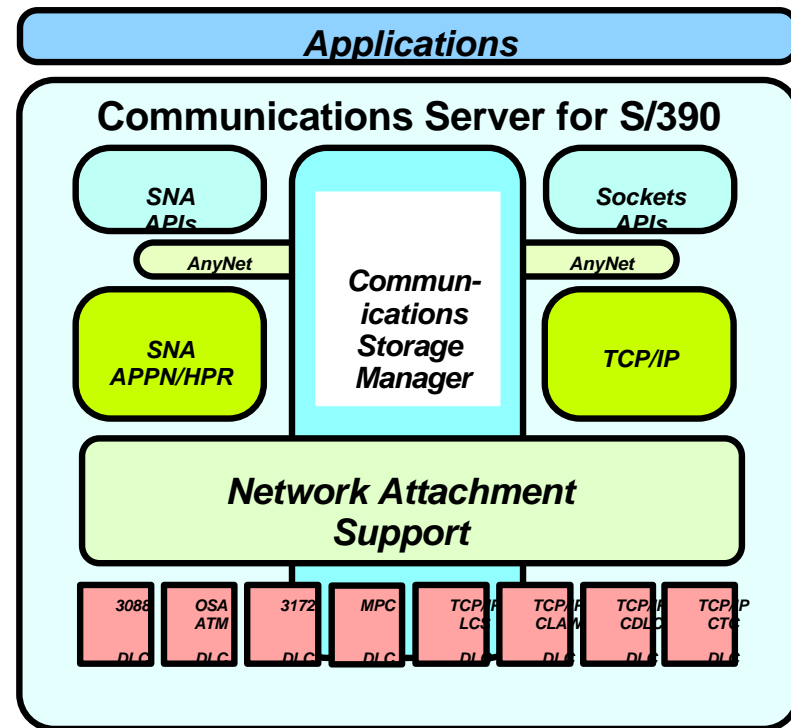
► Internet/Intranet fueling network growth

OS/390 Directions

Integrated Services

- Provide common services within the S/390 Communications Server
  - ‣ Storage Management
  - ‣ Network attachment

- TCP/IP and SNA integration
  - ‣ TN3270
  - ‣ Internal optimizations

Multiprotocol Solutions

- Sockets (TCP/IP) Applications
  - ‣ OpenEdition offers S/390 users access to a wide range of UNIX-based applications over a TCP/IP or APPN/HPR network

- SNA Applications
  - ‣ SNA applications are supported over the SNA and APPN/HPR network or TCP/IP network

Applications

Communications Server for S/390

SNA APIs		Sockets APIs
AnyNet		AnyNet
SNA APPN/HPR	Commun-ications Storage Manager	TCP/IP

Network Attachment Support

| 3088 DLC | OSA ATM DLC | 3172 DLC | MPC DLC | TCP/IP LCS DLC | TCP/IP CLAW DLC | TCP/IP CDLC DLC | TCP/IP CTC DLC |

Enterprise Class - Availability - TCP / IP

DNS
SYSPLEX
   9.37.83.1
   9.37.83.2
   9.37.83.3
   9.37.83.4
APPL
   9.37.83.1
   9.37.83.2
   9.37.83.4
APPL1
   9.37.83.1
APPL2
   9.37.83.2
APPL4
   9.37.83.4

APPL1   APPL2   APPL4

TCP/IP1   TCP/IP2   TCP/IP3   TCP/IP4
9.37.83.1 9.37.83.2 9.37.83.3 9.37.83.4
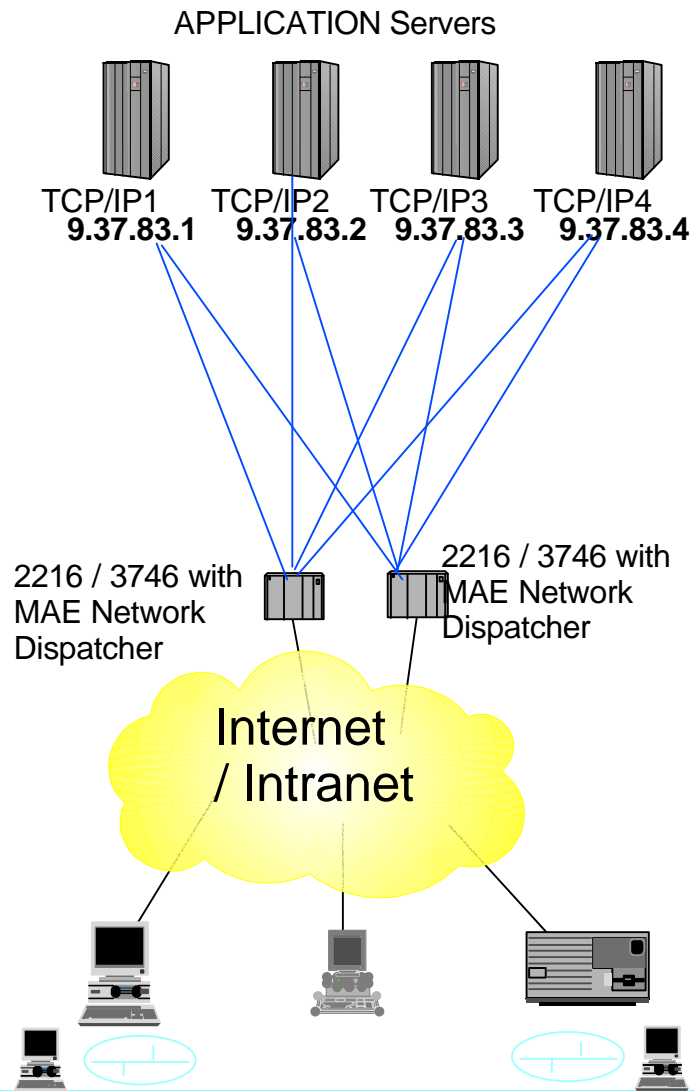
SYSPLEX   ESCON
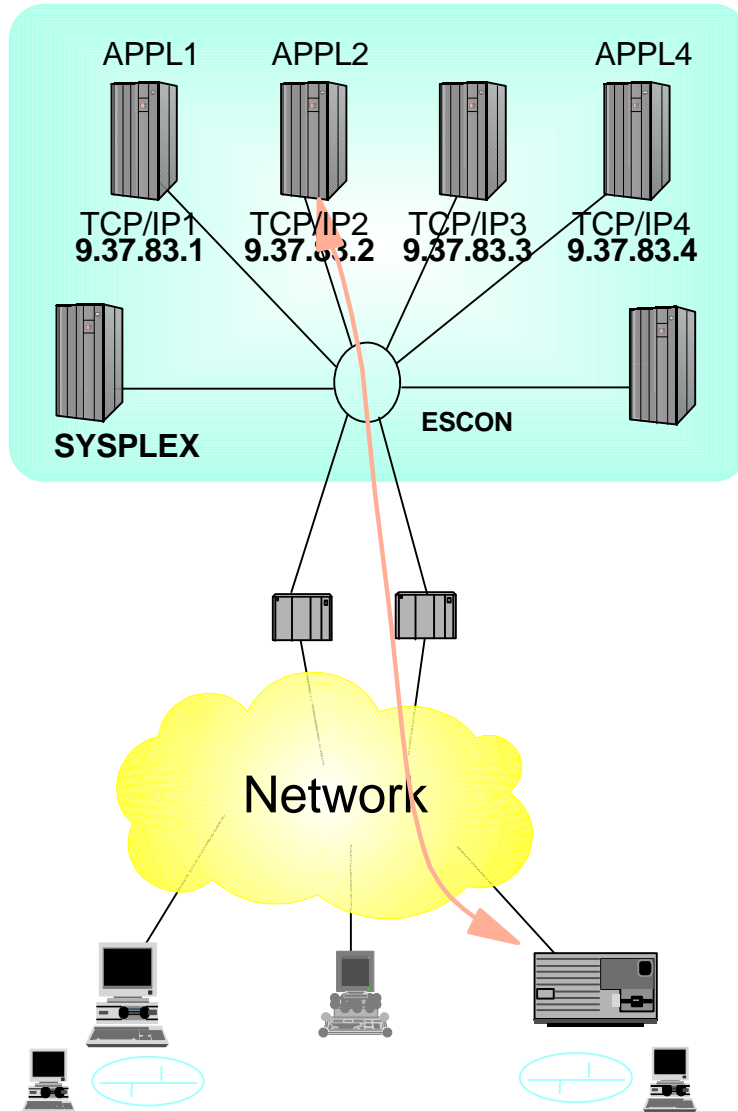
Network

- **Application Recovery**
  - 24x7 applications
    VIPA Support
    Connection recovery
    Application transparency
  - DNS Workload Balancing
    Balance Workload within Parallel Sysplex
    Reliability
    Minimize Appl. failure impact

- **Network Recovery**
  - TCP/IP protocol reroute around failures
  - VIPA for S/390 attachment failures

Network Dispatcher

APPLICATION Servers

TCP/IP1   TCP/IP2   TCP/IP3   TCP/IP4
9.37.83.1   9.37.83.2   9.37.83.3   9.37.83.4

2216 / 3746 with
MAE Network
Dispatcher

2216 / 3746 with
MAE Network
Dispatcher

Internet
/ Intranet

- *Servers appear as a single IP address to the clients*

- *Network Dispatcher routes the requests to the servers*

- *Uses dynamically set weights to distribute the work loads*

- *Optional Interactive Session Support (ISS) links multiple local or remote Network Dispatchers*

TCP/IP rewrite from IBM

- Protocol stack rewritten for performance
  - ▸ Base for further significant improvements

- Multi-processing capability

TCP/IP Release	3.1 Non-OE	3.1 w/ PTF Non-OE	3.1 OE	3.2 Non-OE	3.3 OE	3.+ OE Non-OE
GA Date	9/94	8/95	12/95	9/96	3/97(LA)	9/97
TCP*	Base	20%	40%	65%	70%	Cont.
UDP*	Base	20%	50%	65%	UDP 80% UDP/MPC 90% UDP-SAP 95%	Cont.

- Pathlength reductions for send/receive
- Check it out on www.raleigh.ibm.com/tcm/tcmprod

* Targets
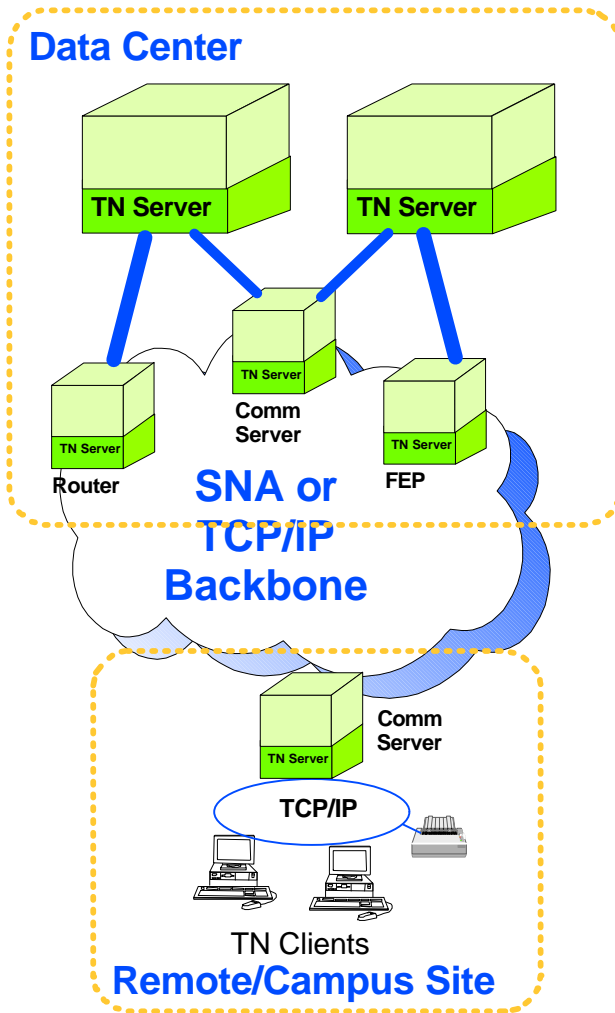
What is a Telnet Server?
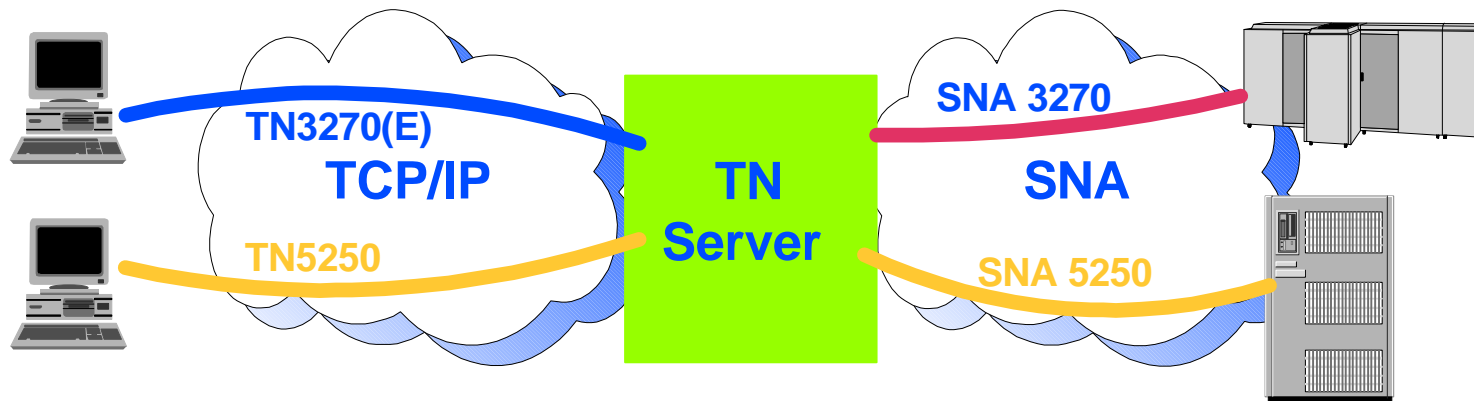
Gateway that enables clients and workstations on a TCP/IP network to access applications in an SNA network

- ▸ **3270 applications on a mainframe in an SNA network**
- ▸ **5250 applications on an AS/400 system in a peer-to-peer network**

Provides TCP/IP to SNA protocol conversion for SNA 3270 and 5250
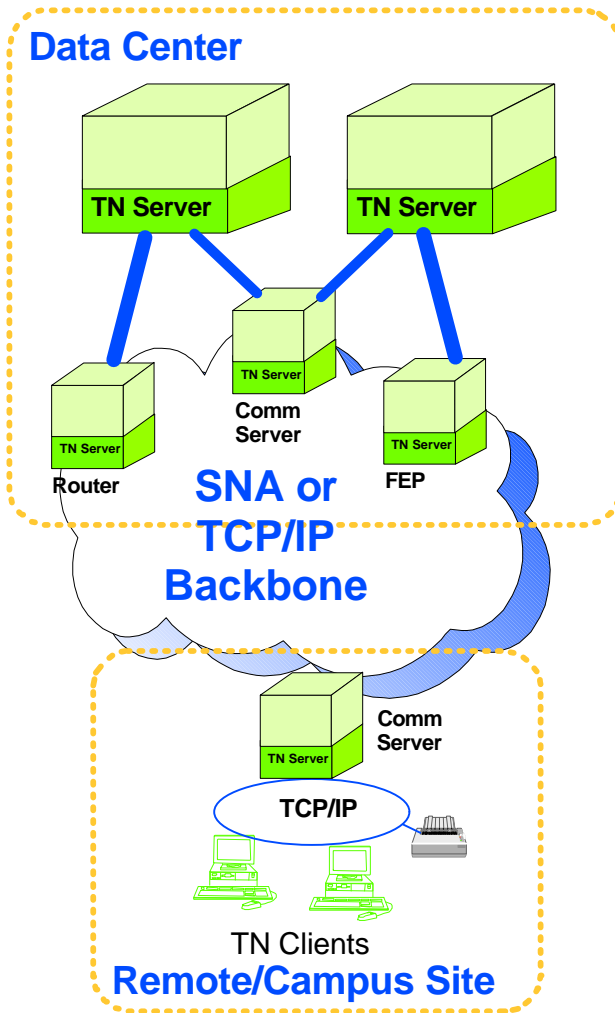
Where can a TN Server be?

Data Center

TN Server

TN Server

TN Server

Comm
Server

TN Server

Router

TN Server

FEP

**SNA or
TCP/IP
Backbone**

Comm
Server

TN Server

TCP/IP

TN Clients

Remote/Campus Site

Data Center:

- ▸ **On-board mainframe gateway**
- ▸ **Channel Attached Communications Server gateway**
- ▸ **Channel -attached gateway or router**

Remote Site:

- ▸ **Remote Communications Server gateway**

The Total TN Server Solutions Available from IBM

Data Center

TN Server   TN Server

TN Server

Comm
Server

TN Server

Router

TN Server

FEP

**SNA or
TCP/IP
Backbone**

Comm
Server

TN Server

TCP/IP

TN Clients

Remote/Campus Site

TCP/IP for Mainframe:

CS for OS/390
TCP/IP for MVS
TCP/IP for VM
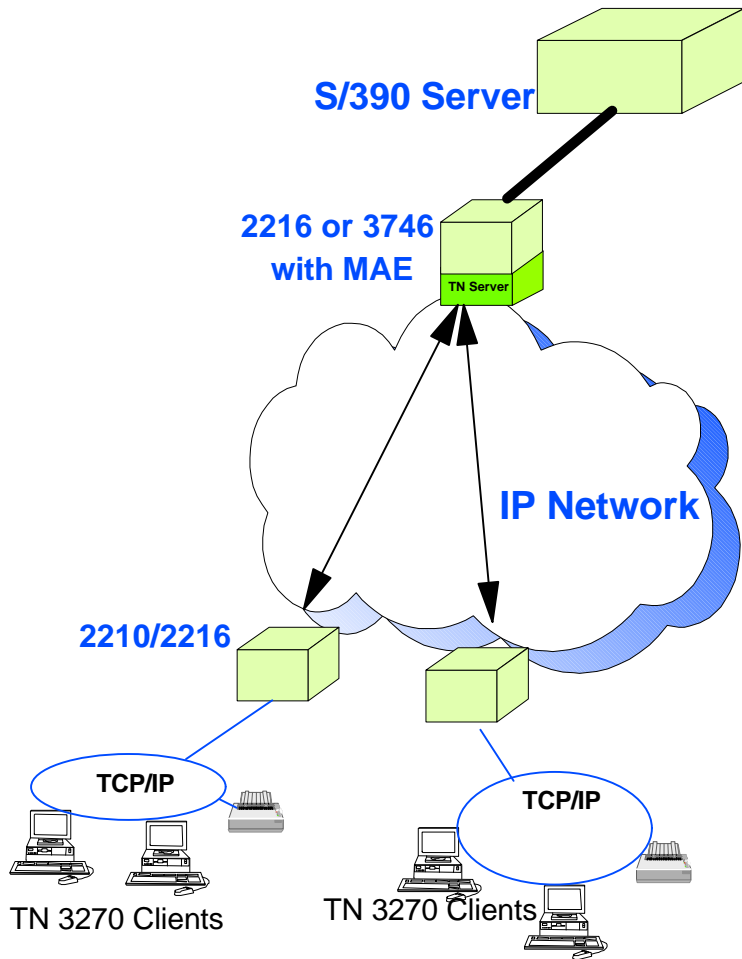CS for MVS/ESA

TN Server:

2216/2210
3746- 9X0
TCP/IP for Mainframe
CS for AIX with SNA Client Access
CS for NT
CS for OS/2 Warp
Netware For SAA

Emulation:

Host On-Demand
Personal Communications
Other TN3270 Clients

**... where
you want
it!**

Data Center: Channel-attached gateway solution

Centralized Model

S/390 Server

2216 or 3746 with MAE

TN Server

IP Network

2210/2216

TCP/IP

TCP/IP

TN 3270 Clients

TN 3270 Clients

Benefits :
→ **Centralized control**
→ **Simpler network management**

Target : Year end 1997

Note: Cisco can provide TN3270 Server function only in their channel attached router similar to the configuration shown here

Data Center: Channel-attached gateway solution

Distributed Model

S/390 Server

2216 or 3746 with MAE

IP or HPR Network

2210/2216

TN Server

TN Server

TCP/IP

TCP/IP or SNA

TN 3270 Clients

TN 3270 Clients

SNA Client
(Any LU type)
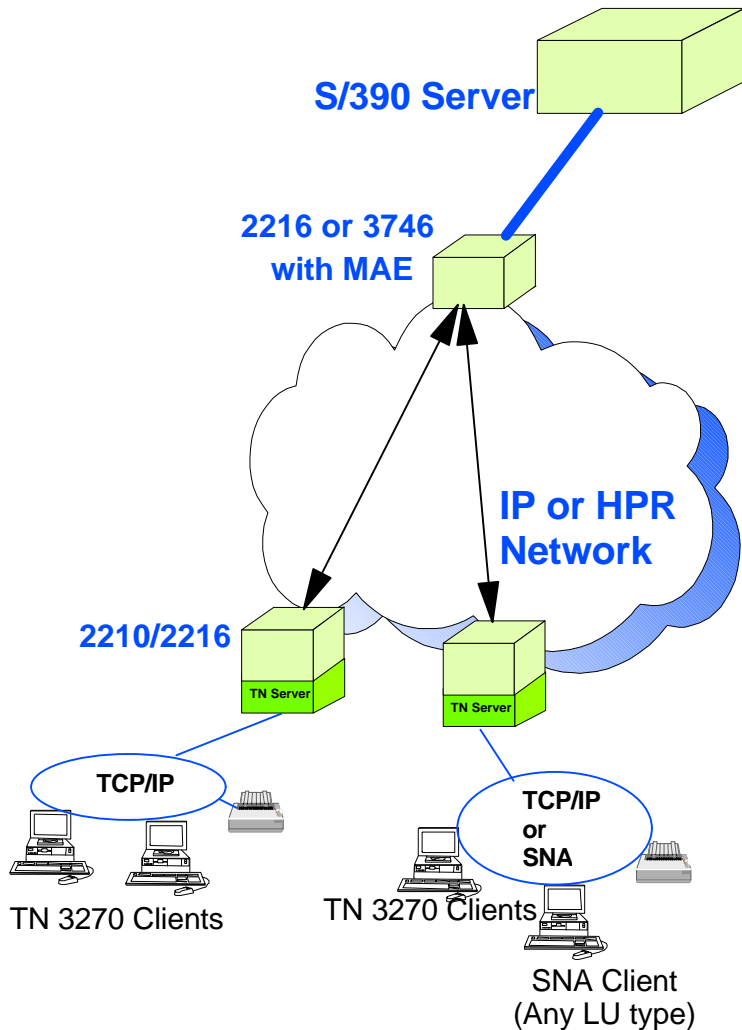
Benefits :

➡ **High session availability**

➡ **Scalable functionality**

➡ **Preserves SNA priority for SNA applications**

➡ **Flexible solution options**
  - **Backbone can be IP or HPR network**

➡ **Eliminate single point of failure**

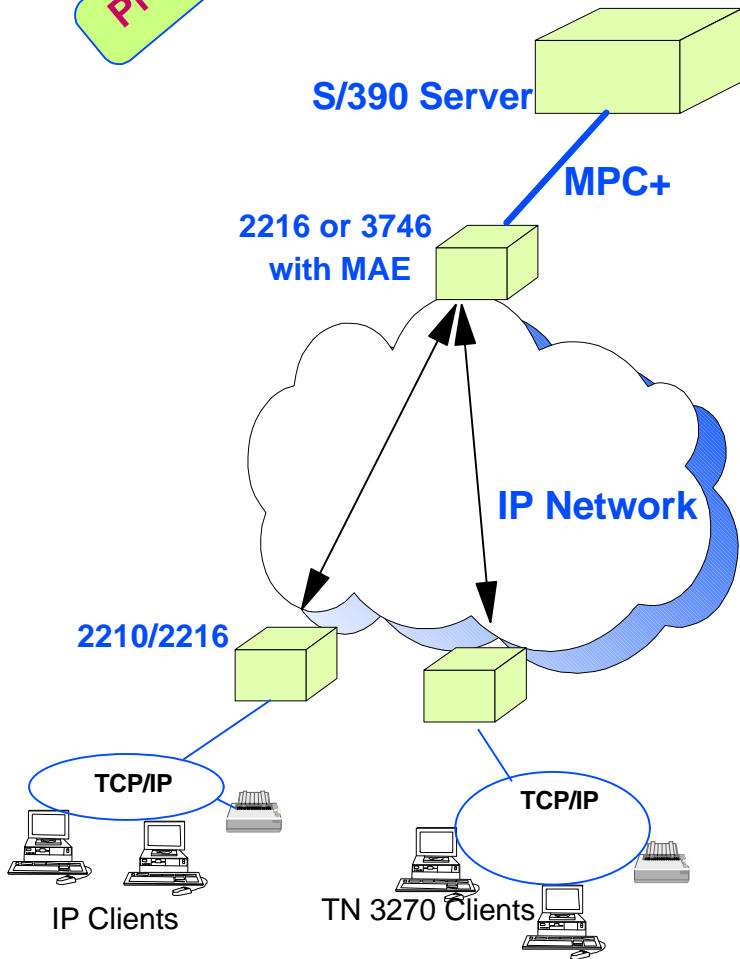➡ **Proactive congestion control**

➡ **Lower cost per session**

Target : Year end 1997

Strengths of IBM's TN3270 solutions

- **Total Solution from a single vendor**

- **Support for MVS, VM and VSE**

- **Enterprise Gateway Support for S/390s and AS/400s**
  - **TN Server**
  - **SNA Gateway**
  - **Multiprotocol support**

- **Solution Scalable to Customer needs**

- **Host On-Demand Java-based emulator supported by all Communications Servers**

- **Both TCP/IP and SNA/APPN-HPR backbones supported**

- **TN Server where you want it**

- **Multiple platform support**

Enahancements to S/390 TCP/IP Support

IP/UDP over "MPC +" Channel

S/390 Server

MPC+

**2216 or 3746
with MAE**

IP Network

2210/2216

TCP/IP

TCP/IP

IP Clients

TN 3270 Clients

Benefits :

→ **High thruput for TCP/IP applications**

→ **Reduces host cycles
(20% better than intial version of MPC)**

This function has been previewed by IBM only so far !!

IBM TCP/IP vs Cisco IOS 390

● **Claim :**

Cisco IOS 390 is fast, efficient implementation of TCP/IP for MVS

■ *IBM Response :*

Raw performance, such as how many characters per   second are useful numbers on small platforms that support small numbers of users, but on large systems such as s/390, scalability (the ability to grow) are key. For example, IBM TCP/IP can support over 25,000 telnet connections per single stack. Interlink brags about a mere 10,000 per single stack (and that is only if you restricted the LU name to 3 characters). running multiple stacks produce additional complexity / cost in the areas of installation, maintenance, day to day operation (network mgmt) and etc..

IBM TCP/IP vs Cisco IOS 390

● **Claim :**

Cisco IOS 390 provides full application compatibility for new and existing applications from its support of application to application communication APIs. This allows exploitation of third part software for C / S applications

■ *IBM Response :*

IBM TCP/IP for MVS is an integral part of IBM's networking blueprint for providing open , multivendor
multi-protocol solutions . In a complex networking environments, IBM TCP/IP for MVS has performed extremely well and this is evident for the installed base of over 5000 licenses in the field. The design   provides extensive C / S application support programming interfaces and connectivity options. IBM TCP/IP directly exploits the MVS / ESA architecture.

IBM combined   the product service organizations (VTAM + TCP/IP) into a single group focused on S/390 Networking. Many customers have commented on the significant improvements that they have in service quality (especially for TCP/IP);   and they liked the idea of having a single point of contact for networking problem. With Interlink TCP/IP, who do you call ?   CISCO - a router vendor who is not equip to solve your networking problem on the host (and eventually they have to pass the problem to Interlink). IBM TCP/IP is the only TCP/IP   products has been thoroughly tested with other OS/390 elements (over 30 elements) for the purposes of interoperability, quality, and installability.

IBM TCP/IP vs Cisco IOS 390

● **Claim :**

**Cisco IOS 390 is a collection of native MVS-based TCP/IP protocols and applications, allowing simple, direct
and efficient interoperation with MVS**

■ *IBM Response :*

*IBM TCP/IP for MVS supports industry-standard APIs . Multiple sites can share applications and data
transparently across MVS, UNIX, VAX, OS/2, Windows95, Windows NT, Windows 3.1,
DOS and other environments. Sites can also connect CICS, IMS, DB/2 applications to TCP/IP or Internet
networks. Support for HPNS enables efficient data transfer and cross memory communications. Provides
optimal functionality for Enterprise TCP/IP needs*

*TCP/IP Open Edition (GA'ed 6/97) was developed 'from the ground up' with OS/390 in mind. It fully
supports multitasking. It exploits the operating services of OS/390. It is a truly native MVS offering.
Significant improvements -supports four times the number of web server connections per second (while
reducing CPU by 52%) than did the previous TCP/IP stack(3.1). significant CPU reduction in FTP, range
from -32% to -54%. also significant CPU reduction for c-socket, range from -50% to -65% while increasing
thruput (0 to 300%).*

IBM TCP/IP vs Cisco IOS 390

● **Claim :**

Cisco IOS 390 is the industry leader in TCP/IP networking, bringing together the leadership of Cisco IOS with the excellence of Interlink's TCP/ IP

■ *IBM Response :*

IBM TCP/IP for MVS is the leader in S/390 TCP/IP with an installed base of about 80% market share. With the new release of TCP/IP for MVS, IBM has set a benchmark in this market and will continue to demonstrate leadership

On the other hand, Cisco IOS 390, as announced currently, is merely a branding of Interlink's TCP Access product to create marketing hype.

A recent   Gartner report said "IOS is a marketing program to create brand awareness and a value-proposition for Cisco's software   capabilities. IOS shares none of the important traits of an Open OS, such as the ability to license code for use in a variety of hardware platforms."   not much technically, just marketing gimmick.

 Paul Bloom, an analyst with Volpe Brown Whelan and Company stated in a recent report " Shares of networking-software developer Interlink Computer Sciences Inc. fell to a new 52-week low on concerns a marketing deal with computer-networking giant Cisco   Systems Inc. wasn't yielding the sales boost for Interlink some had expected.

Cisco salesperson are the only ones who can write orders for the product in the Cisco installed base, but they are more interested in selling routers, Cisco's   big cash cow, than Interlink's software." appear Cisco is not interested in S/390 communications software. Do you want to place your future in those hands ?

IBM TCP/IP vs Cisco IOS 390

● **Claim :**

Cisco IOS 390 supports a wide variety of connectivity options like Open Edition for MVS sockets, 3745/46 FEPs, Enet, Token-Ring and FDDI ....

■ *IBM Response :*

IBM TCP/IP for MVS supports Enet, Token-Ring, FDDI...... It is fully integrated with IBM OS/390.
By combining IBM SNA/APPN and TCP/IP expertise(single development team) in delivering
industrial-strength solutions for the environment with the latest networking technologies, CS/390 provides
the foundation you need to capitalize on new technologies and improve the way you run your business.
CS/390 takes your heterogeneous networking environment, which may seem like an impossible collection
of incompatible protocols and architectures, and makes it all work together in a simple and consolidated
manner. The result from CS/390 is application freedom and network independence. For example, TCP/IP
applications, such as lotus notes or a web browser, can run over SNA networks; and SNA applications,
like many of your traditional business applications, can run over TCP/IP. There's no need to build new or
parallel networks. And with CS/390, you can deploy the applications that you business really needs, not
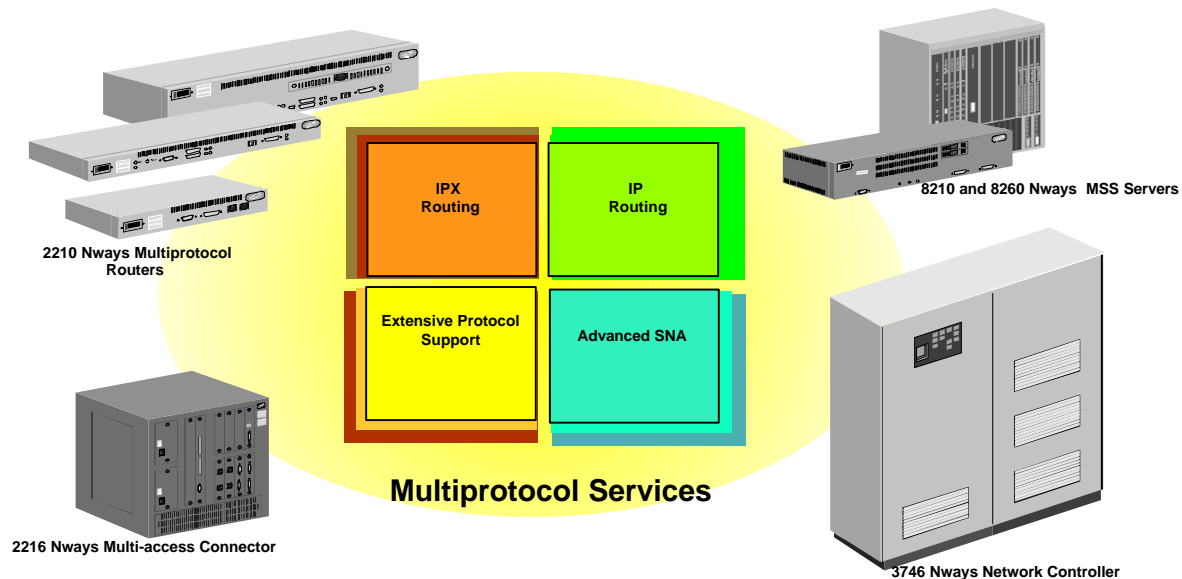*just the ones that work on your network.*

IBM competency in routing

✓ **Routing SNA for well over 2 decades**

✓ **IBM was the key player in setting up NSFnet - the Internet foundation**

✓ **IBM provides extensive product and technology support for TCP/IP**

✓ **IBM 2210 has been a rocksolid performer in the field**

✓ **IBM products 2210, 2216, MSS, and 3746-9X0 all share common routing code base**

✓ **IBM MSS has been chosen GRAND WINNER**

➡ **Best of Show - NetworkWorld + Interop, Atlanta (9/96)**
➡ **Best of Show - NetworkWorld + Interop, Paris (10/96)**

Multiprotocol Services

Delivers interoperability and efficient use of skills and resources

2210 Nways Multiprotocol Routers

8210 and 8260 Nways MSS Servers

IPX Routing

IP Routing

Extensive Protocol Support

Advanced SNA

Multiprotocol Services

2216 Nways Multi-access Connector

3746 Nways Network Controller

Common base of advanced, multiprotocol networking software
- **Proven in the award-winning 2210 Multiprotocol Router family**
- **Proven SNA from 374X family**
- **Fourth generation software**

Efficient use of customer technical-skill resources
- **Core development in common library**
- **Consistent / interoperable solutions to our customers**

Enables blending of historical WAN / LAN boundaries

All available today !!!

- **Multiprotocol Switching Services**

  → IBM 8210 Switching Services

    Integrated in 8260 or Stand-alone

    Corner stone of IBM SVN

- **Multiprotocol Access Services**

  → IBM 2216 Access Services

- **Multiprotocol Routing Services**

  → IBM 2210 Routing Services

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