

IBM 3746 Nways Multiprotocol Controllers Models 900 and 950

April 3, 1998
(Revision 4)



Link your Servers and Critical Applications to your Network

0. Contents



0. Customer Value/Customer Needs

1. Controller Evolution Strategy

2. Latest announcements

- Dec 2nd, 1997 (IBM 3746)
 - New LAN/WAN adapters
 - TN32790c Server
 - Enterprise Extender
 - IP & UDP over MPC+
- Feb 17, 1998 (IBM 3745)
 - Lower entry price (models 31A/61A)

3. Reminder (up to September 1997 announcement)

- IBM 3746

4. Preview

- Extended Border Node

5. Summary

- Single Access Platform

0. IBM 3745/3746 - Customer Value



- Leverage Customer's Investment in 37xx Product Family
- Enhance Leadership in Server Access
- High Speed Networking
- Prime S/390 access platform for IP and SNA
- Strengthen current Multiprotocol and Attachment Support
- Within IBM Strategies
 - Switched Virtual Networking
 - Network Computing
- 3746 Evolution

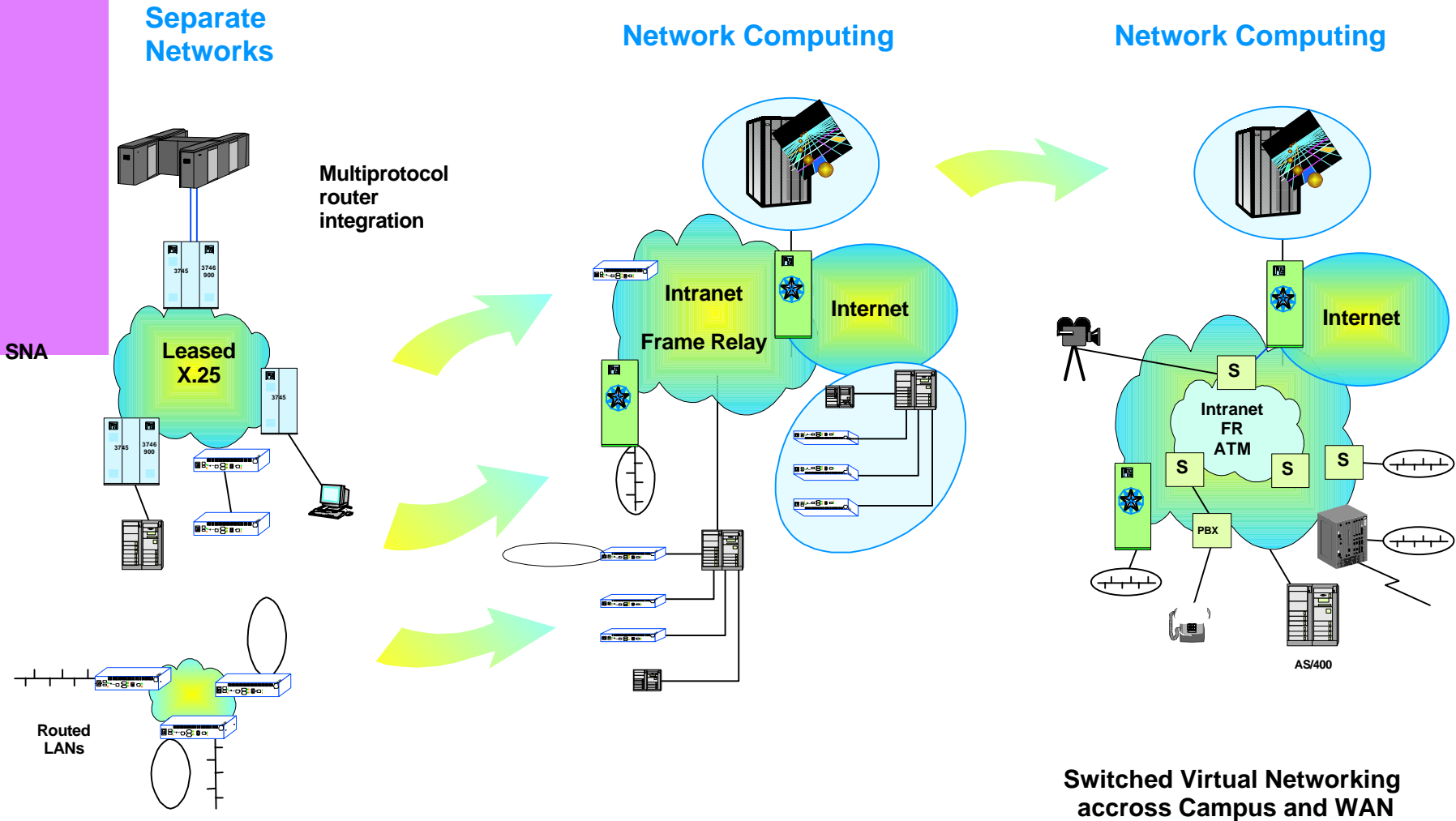
95	96	97 => 98
SNA	SNA-HPR-IP	High-Speed

0. Customer Needs



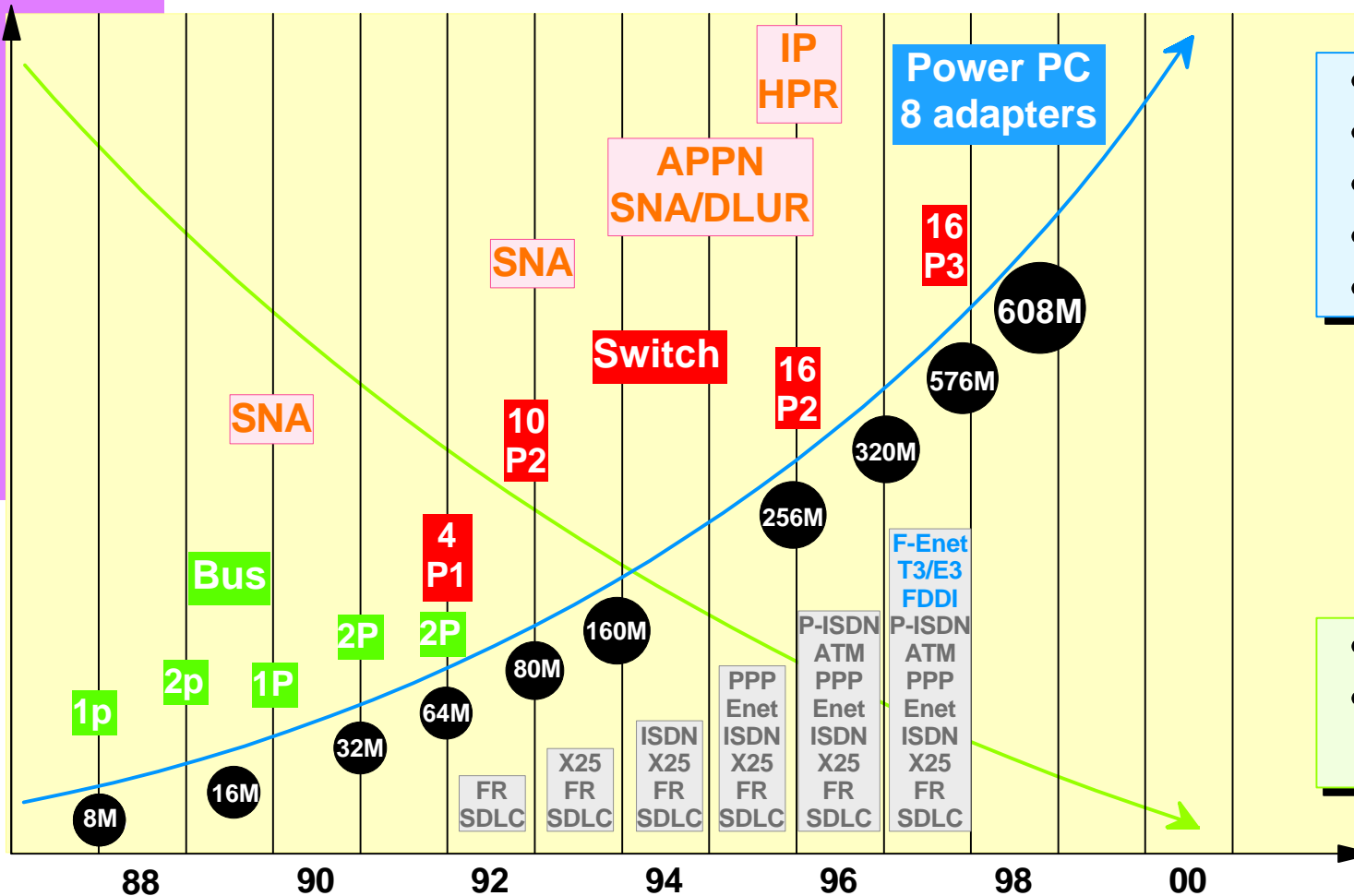
- **Adopt the Intranet/Internet (IP) model**
- **Access to critical SNA applications**
- **Network support simplifications**
 - Reduce number of protocols
 - Any to Any Communication
 - Workstation mono stack
- **Bandwidth increase (high speed media)**
 - Servers into the Network
 - New applications (Image, Web, DB2, ...)
 - Traffic growth (back-up, code distribution, more users, ...)
- **Easy to use / Easy to change**
- **Applications availability**

1. IBM Multiprotocol Strategy



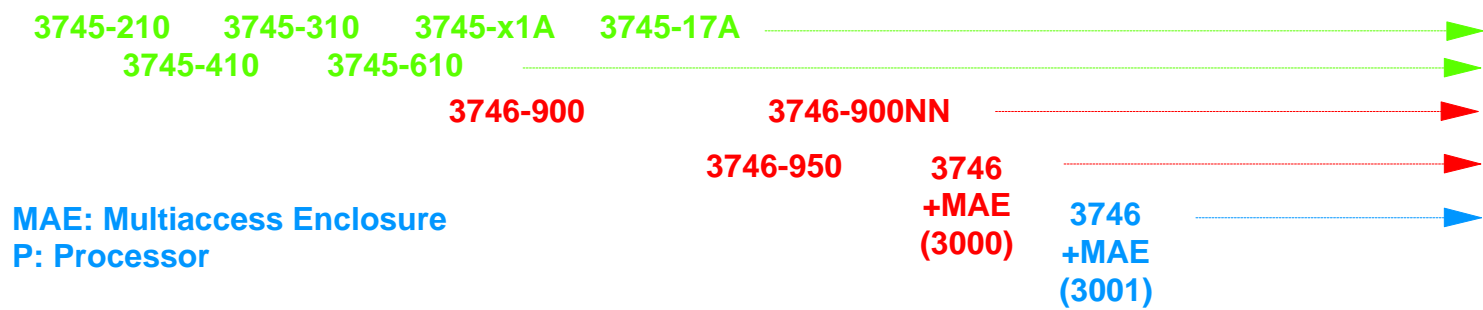
Natural path from SNA, IP to SWITCHING

1. IBM 3745/3746 - Product Line Evolution



- Mips
- Memory
- Protocols
- Media speeds
- Connectivity

- Price/Port
- Parameter definitions



MAE: Multiaccess Enclosure
P: Processor

2. December 2nd, 1997 Announcement



- **CD-ROM**

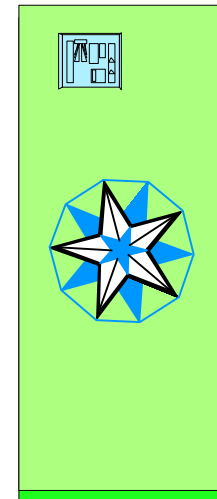
12/12/97

- Code delivery
- Product documentation
- Two levels of code

- **Multiaccess Enclosure Enhancements (FC #3000 and FC #3001)**

06/12/98

- TN3270e Server
- Enterprise Extender
- IP and UDP over MPC+
- Channelized T1/E1
- Ethernet 100 Mbps
- FDDI
- HSSI T3/E3 speed

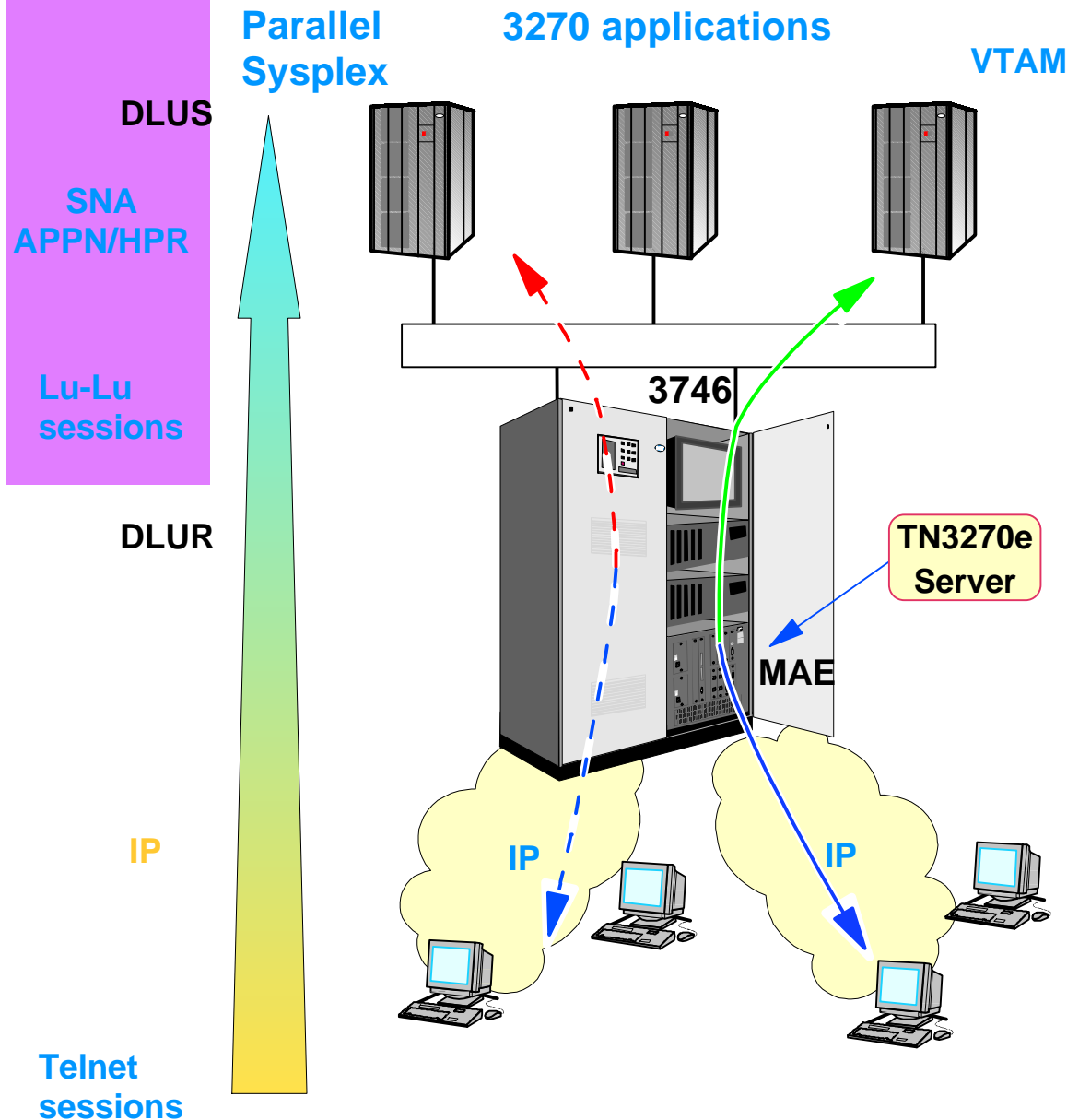


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2. IBM 3746 - TN3270e Server



06/12/98

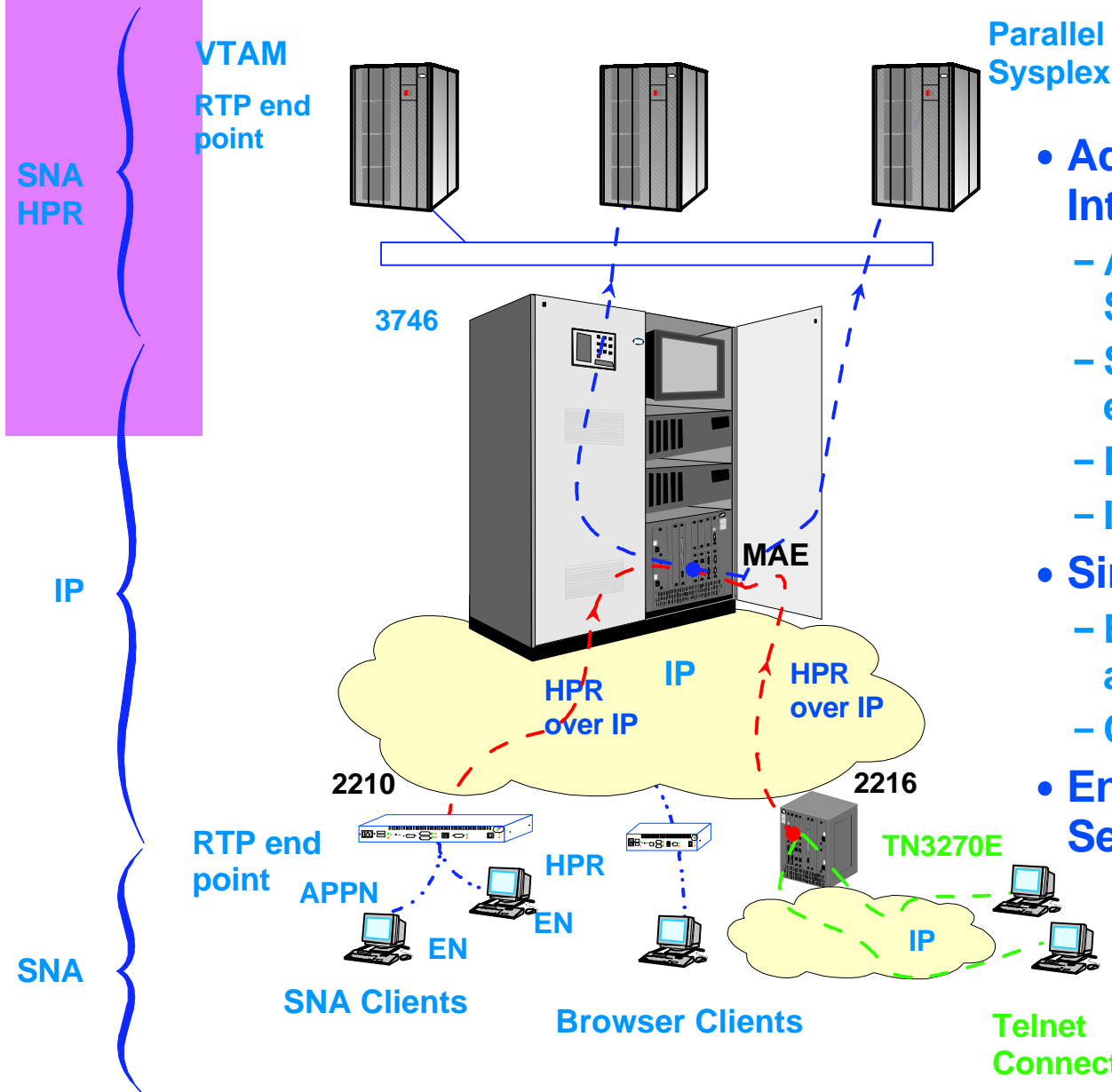


- Complement TN3270e IBM Solution
- Offload Mainframe from TCP/IP cycles
 - Max 4000 Telnet sessions
 - < 1.9\$ per session
- APPN/HPR benefits from TN3270e Server up to the application
 - DLUR/APPN used for upstream SNA
 - Along with Parallel Sysplex
- Support RFC 1576, 1646, 1647
- Prerequisites:
 - FC #3000 or FC #3001
 - NNP + IP Routing features
 - FC #5806 + FC #5804
 - VTAM DLUS Function

2. IBM 3746 - Enterprise Extender



06/12/98

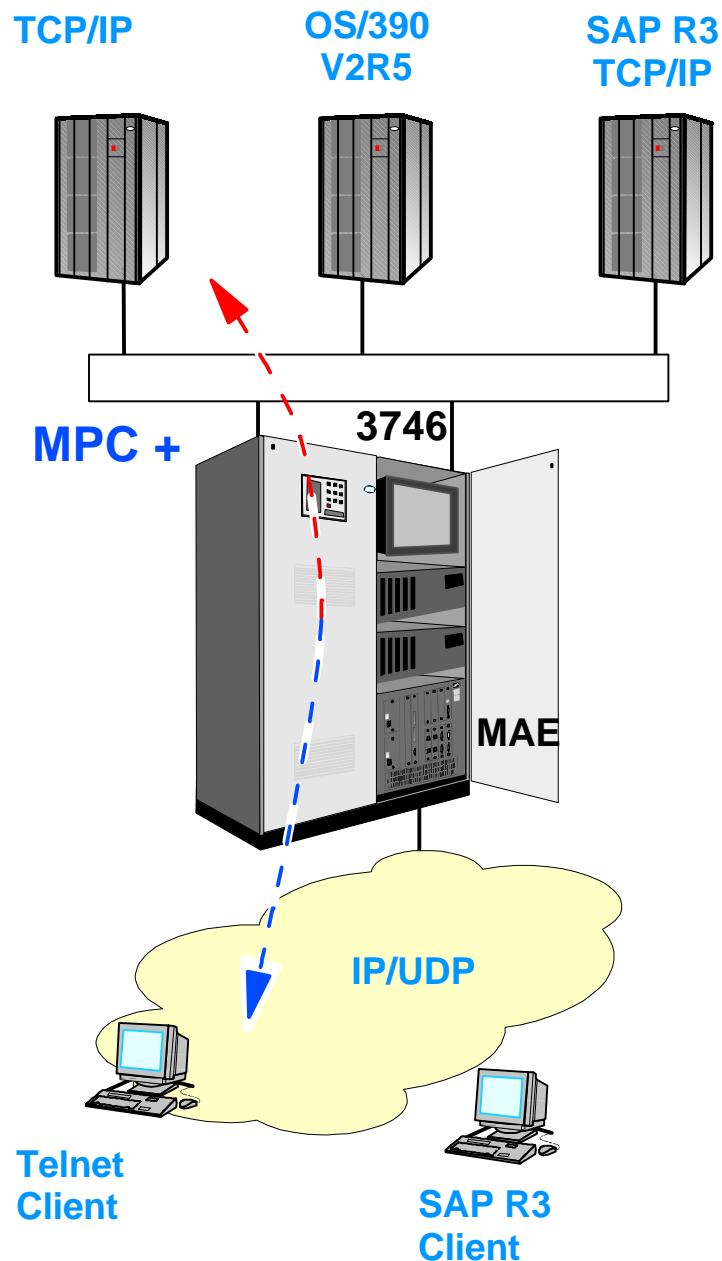


- **Advanced SNA and IP Integration Technology**
 - Along with SNA Parallel Sysplex
 - Scalable and cost effectiveness
 - Data prioritization end-to-end
 - IP network failure protection
- **Simple HPR Extensions**
 - Based on open HPR architecture
 - Contributing to AIW and IETF
- **Enable Distributed TN3270e Server**

2. IBM 3746 - ESCON MPC+ Enhancements



06/12/98

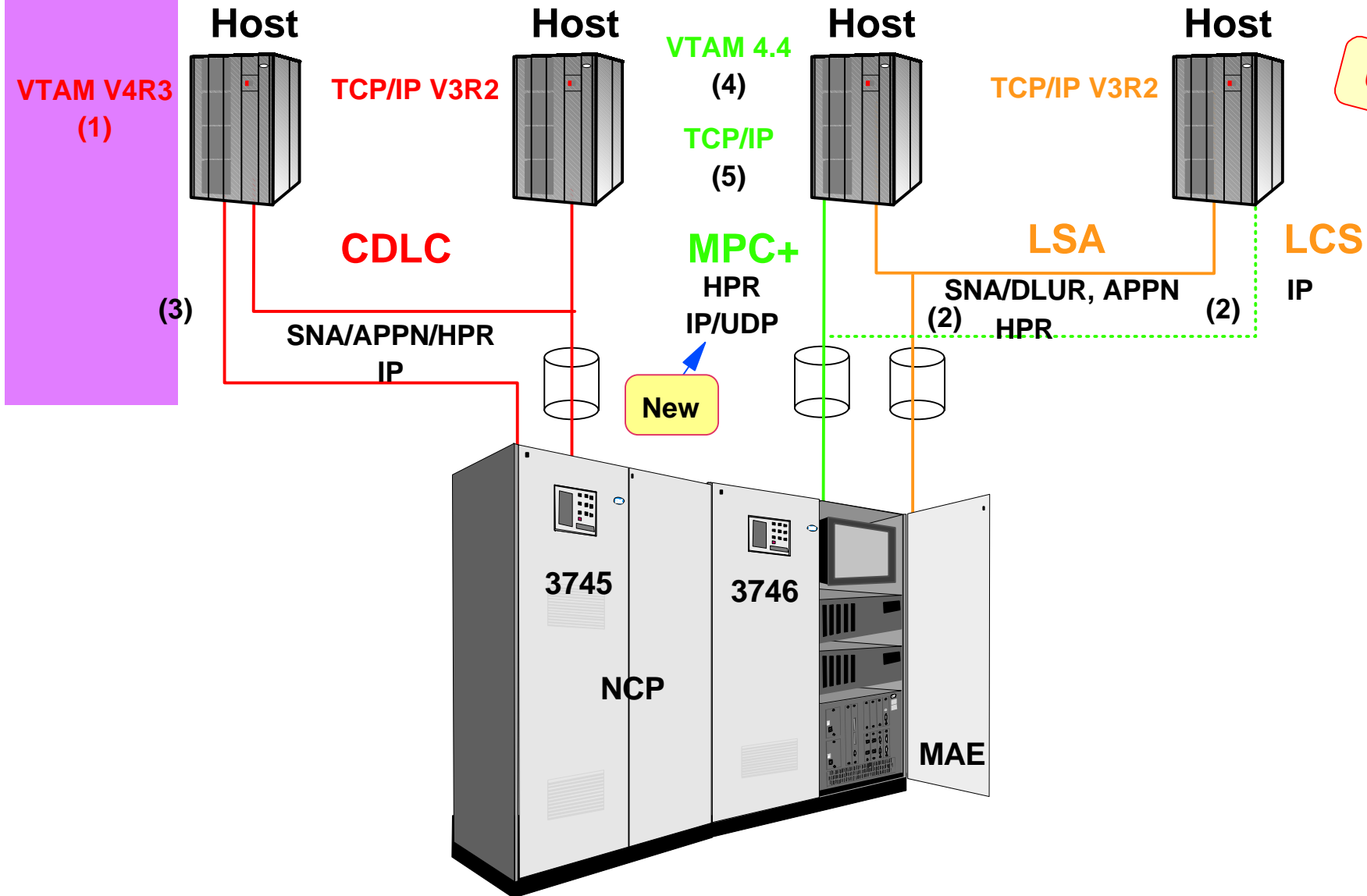


- MPC+ Support for UDP applications
 - SAP R/3 applications
 - NFS, DCE UNIX applications
- MPC+ Support for IP applications
 - TCP/IP MVS
- Reduce CPU Cycles consumption
- More Efficient Transfer of Data
- Prerequisites:
 - OS/390 V2R5 for IP over MPC+
 - OS/390 V2R4 for UDP over MPC+
 - MAE FC #3000 or FC #3001
 - FC #5805

2. IBM 3746 - ESCON Protocols



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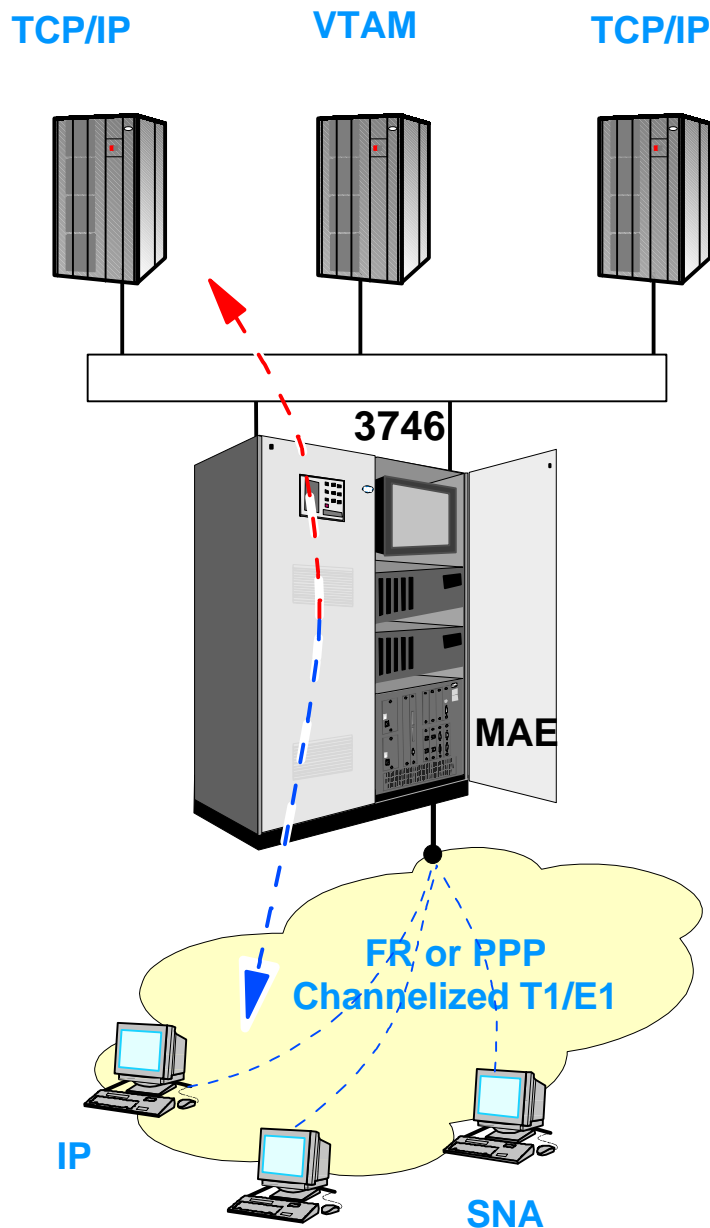
(1) Minimum level for HPR support
 (2) Same ESCON can share MPC+, LSA and LCS during Migration period (Not Recommended for long term)

(3) CDLC is also supported on 3745 BCCA/CADS Channels
 (4) Minimum level for MPC+ and HPR over LSA
 (5) OS/390 V2R5 Minimum level for IP over MPC+
 OS/390 V2R4 Minimum level for UDP over MPC+

2. IBM 3746 - Channelized/Fractional T1/E1

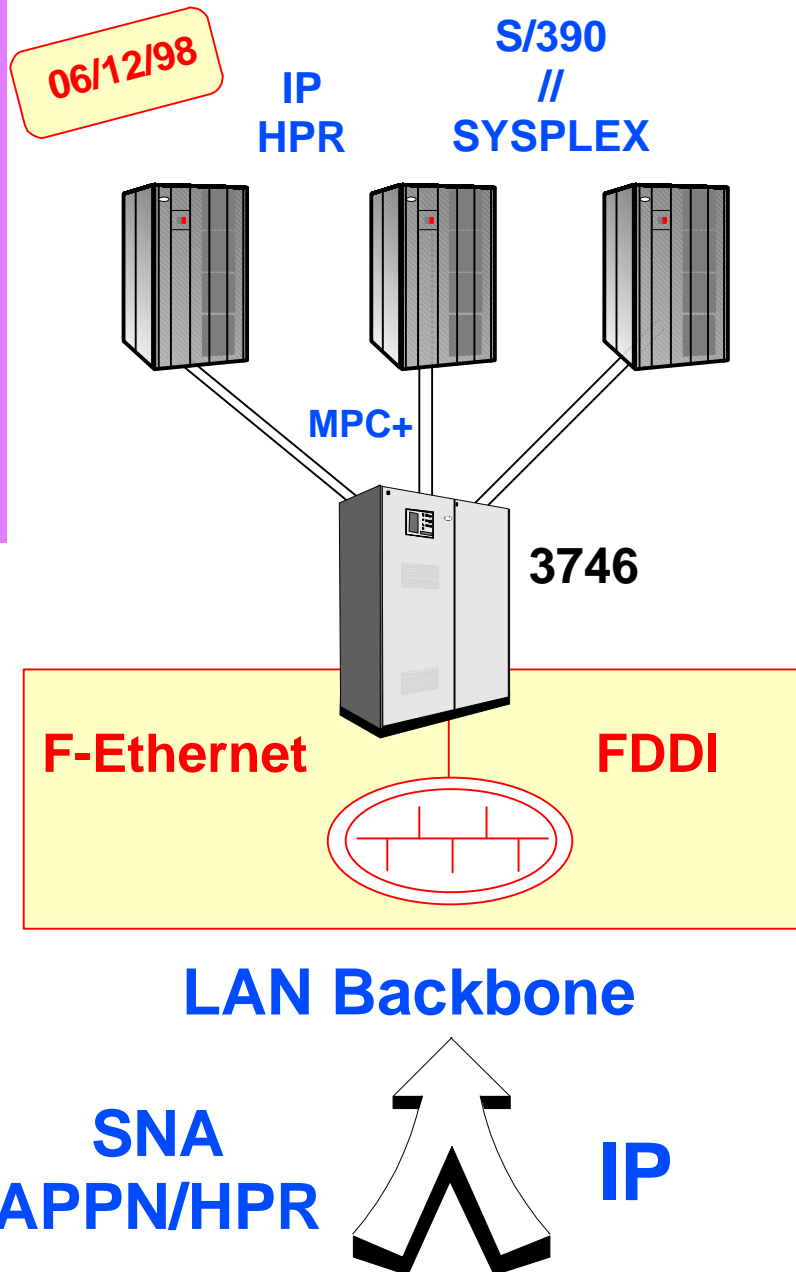


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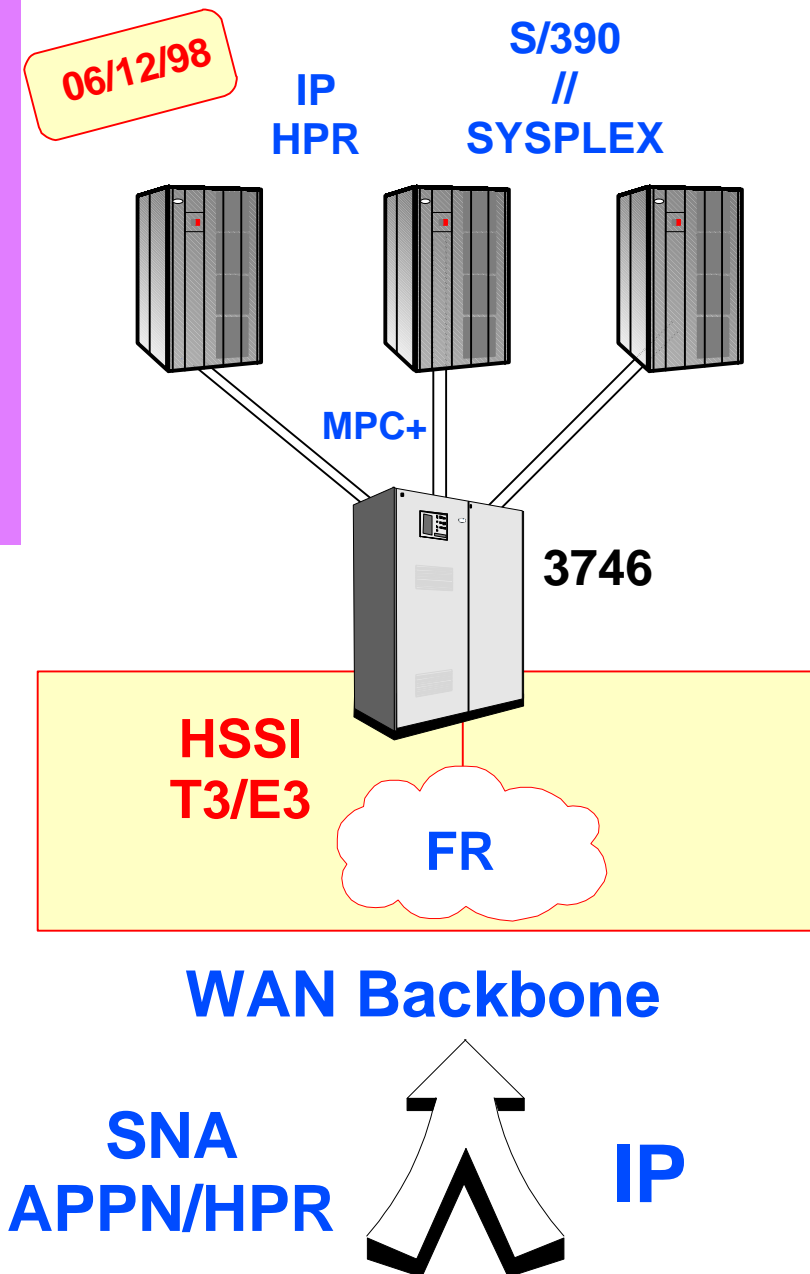
- Use Same Hardware than PRI-ISDN
 - T1 : 24 x 64Kbps channels (LIC 292)
 - E1 : 32 x 64Kbps channels (LIC 283)
 - One or Multiple Connections per Physical Interfaces
 - Microcode Upgrade only
- Protocols
 - FR and PPP channels on same port
 - Bundle several 64Kbps channels in one bigger channel (128Kbps, 256,...)
- Prerequisites:
 - FC #5805
 - MAE FC #3000 or FC #3001
 - FC #3292 or FC #3283

2. IBM 3746 - High Speed LAN (FDDI, F-ENET)



- Collapse high Speed LAN Backbones
- Efficient S/390 Servers High Speed LAN Access
- Fast Ethernet (FC #3288)
 - 10Mbps/100Mbps
 - Auto-negotiation
 - Hdx, Fdx
 - Standards:
 - IEEE 802.3 (10Mbps)
 - IEEE 802.3u (100Mbps)
 - Shielded RJ-45 connector
- FDDI Multi Mode Fiber (FC #3286)
 - 100Mbps
 - Standards:
 - ISO 9314-1
 - ISO 9314-2
 - ISO/IEC 9314-3
 - Station Management Rev 7.3
 - MMF SC media connector

2. IBM 3746 - High Speed Serial Interface (HSSI)

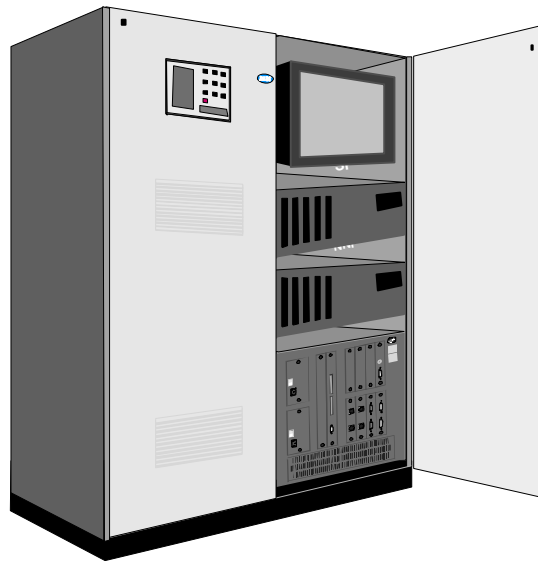


- One HSSI DCE Attachment per Adapter
 - DCE Interface
 - T3/E3 Speed
- Network Speed Range
 - 1.544Mbps up to 52Mbps
- Standards:
 - ANSI/EIA/TIA 612
 - ANSI/EIA/TIA 613
- 4.6m Cable provided
- Data Center Interconnection
- Cost Effective Consolidation of many FR connections
- Pre-requisites:
 - FC #3000 or FC #3001
 - FC #5805
 - FC #3289

3. IBM 3746 - Multiaccess Enclosure



06/12/98



Multiaccess Enclosure

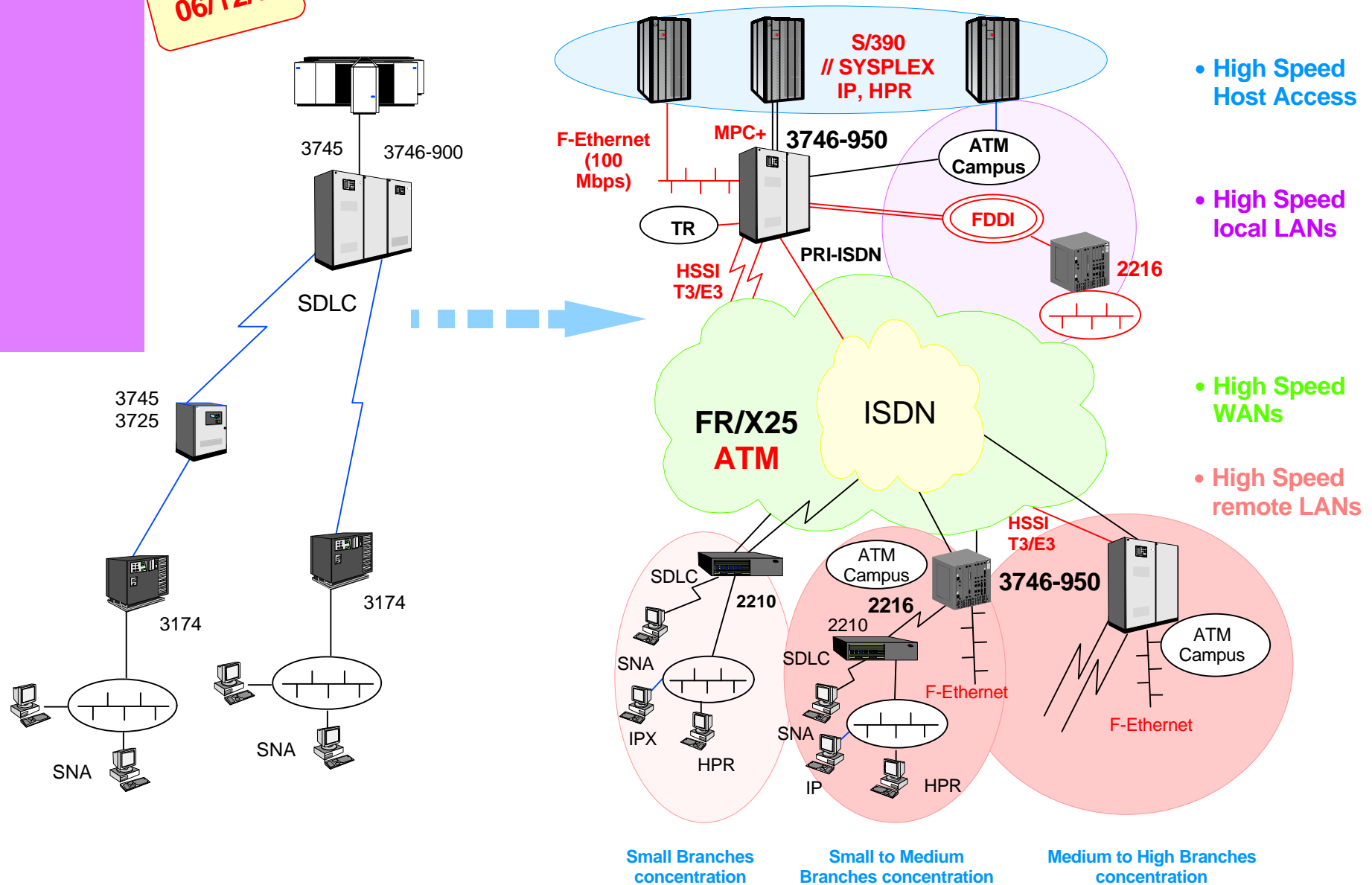


- **Strengthen 3746 connectivity/scalability**
 - Add 8 new adapter capacity
 - Deliver High Speed Connectivity
 - Add new ESCON capabilities
 - MPC+ for APPN/HPR, IP and UDP
 - SNA passthrough (3172 like)
 - Expand Protocols/interface support
 - TN3270e Server, Enterprise Extender, IPX, DLSW
 - WW ISDN, more T1/E1
- **Strengthen 3746 performances**
 - MAE directly connected to the 3746 switch
 - Deliver high speed adapters
 - ATM, FDDI, HSSI, F-ENET
- **Strengthen 3746 Server Access functions**
 - Network Dispatcher for Intranet/Internet
 - TN3270e Server for SNA applications
 - Fast data transfer (ESCON, ATM)
 - Enterprise Extender for SNA benefits over IP infrastructure

2. IBM 3746 - Network Computing Solution



06/12/98



2. 3745-31A/61A : Lower Entry Price (1/2)



Offering

02/20/98

Up to 2/17/98

CCU 16MB NCP	
Basic features *	(NNP)
3745-31A 61A	3746-900

Today

CCU 16MB NCP	
No basic features *	(NNP)
3745-31A 61A	3746-900

★ Basic features

- 8 x LICs (8 to 32 WAN ports)
- 2 x Low Speed Scanners
- 1 x LIC Unit

★ Optional features

- may be ordered instead

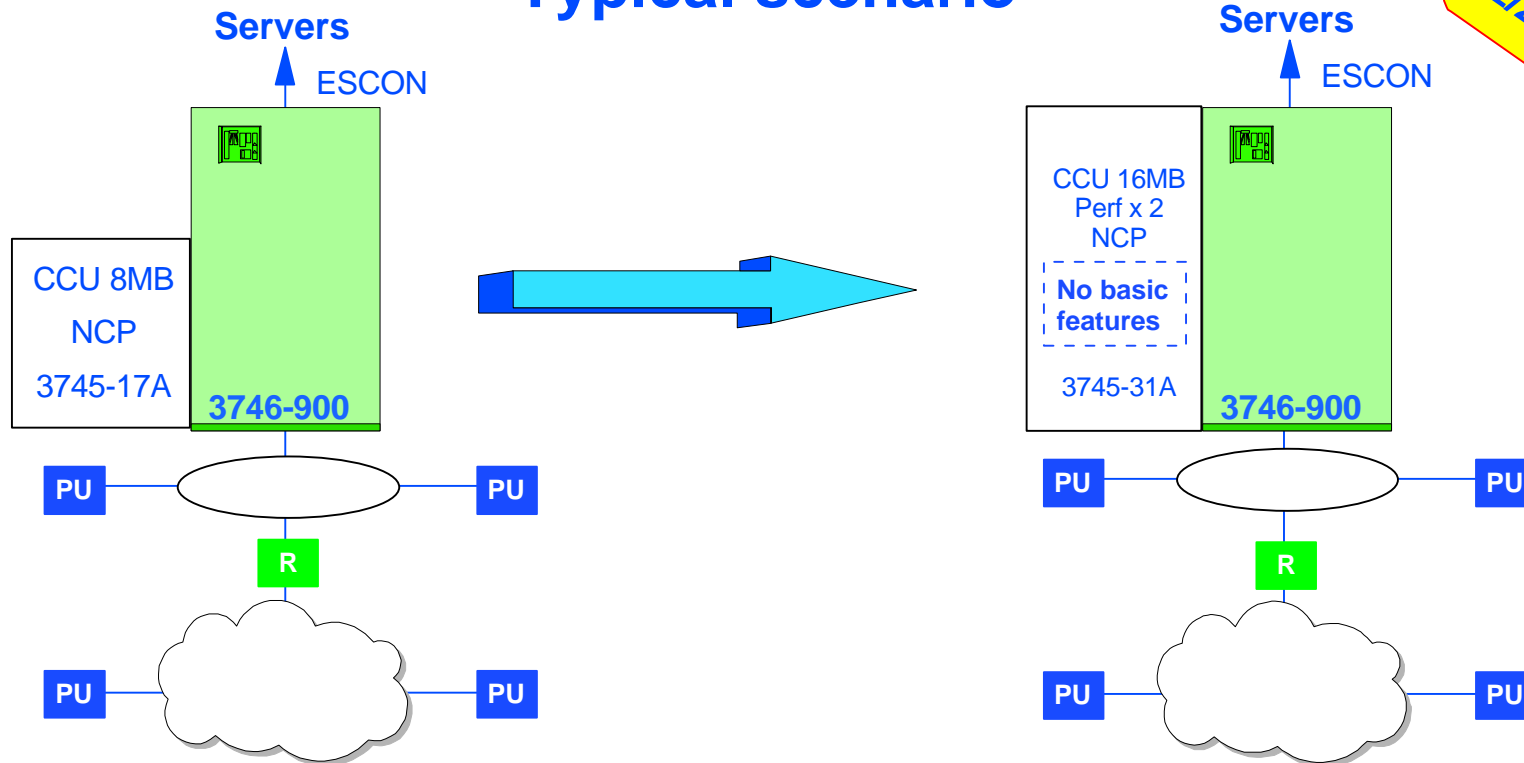
Benefits

- Lower cost solution for 3746-900 users (SNA, IP, APPN/HPR)
 - all WAN ports in the 3746
- Complements NCP Tier C (no-charge) for 3746-900
 - 3746 equipped with NNP

2. 3745-31A/61A : Lower Entry Price (2/2)



Typical scenario



- **3745 hits CCU limit (SNA traffic)**

- Storage
- Cycles

- **Impact: Network Growth**

- Number of users and sessions (storage)
- Number of transactions per sec (cycles)

- **Solution**

- Replace 3745-17A by 3745-31A
 - Storage x 2 (16 MBytes)
 - Cycles x 2

- **Future growth/Consolidation**

- 3745-31A upgrade to 3745-61A
 - Twice as much storage/cycles

3. IBM 3746 - Sept. 9th, 1997 Announcement



- **New 3746 Processor Type 3**

- ESCP3, CLP3, TRP3, CBSP3 **9/16/97**

- **Multiaccess Enclosure**

- New Faster ATM adapters **12/12/97**
- RIP V2 on MAE ports **12/12/97**
- HPR over ATM **12/12/97**
- Network Dispatcher **12/12/97**
- Direct attachment to 3746 switch **6/12/98**
- Single IP router image **6/12/98**
- SSE (Session Services Extended) **10/30/98**

- **3746 IP internal coupling to 3745**

- With NCP V7R6 **9/16/97**

- **APPN/HPR Enhancement**

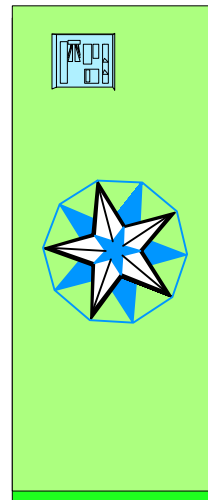
- APING from Service Processor **12/12/97**

- **3746 Machine availability improvement**

- Active and non active code selection **12/12/97**
- 80% time reduction for code upgrade **12/12/97**

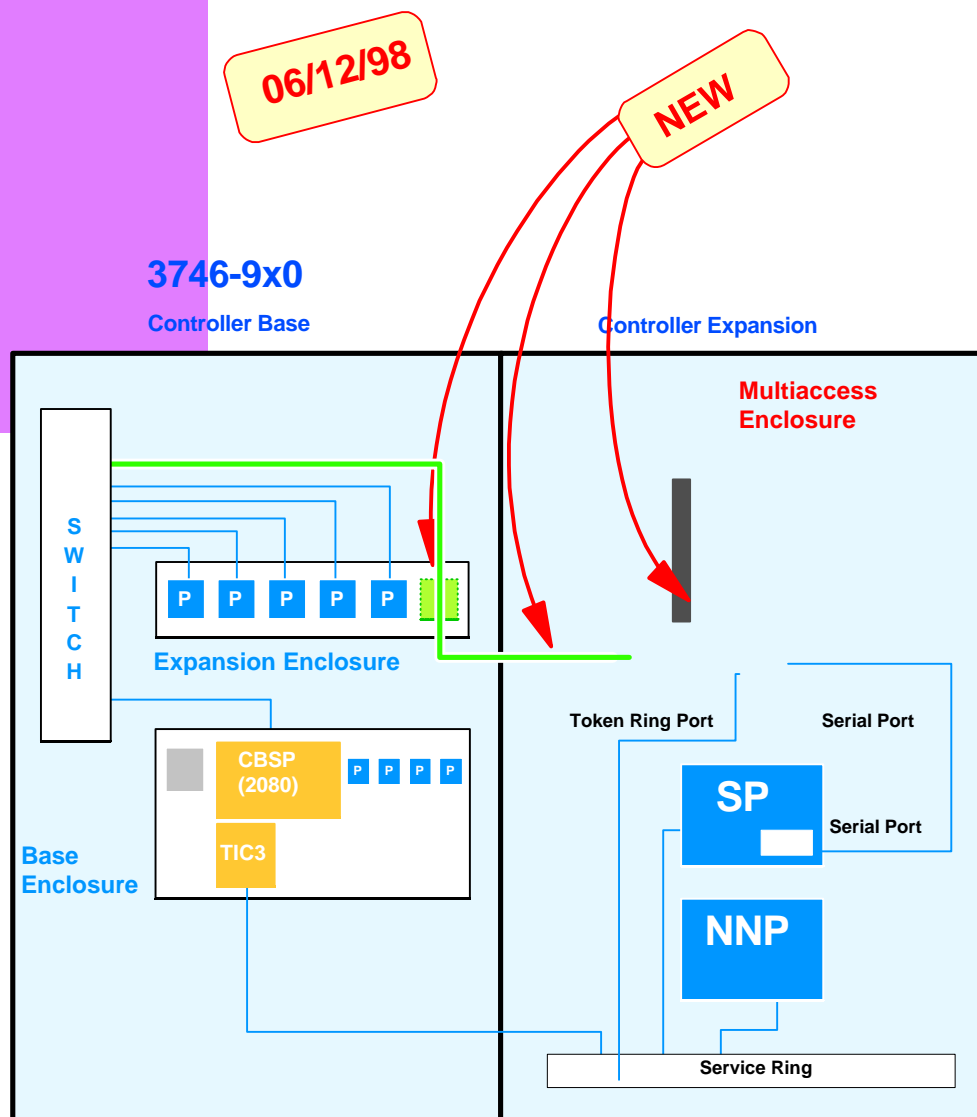
- **3746 connectivity**

- 30 000 LU-LU Sessions **10/30/98**
- 240 lines (IP and APPN/HPR) **10/30/98**



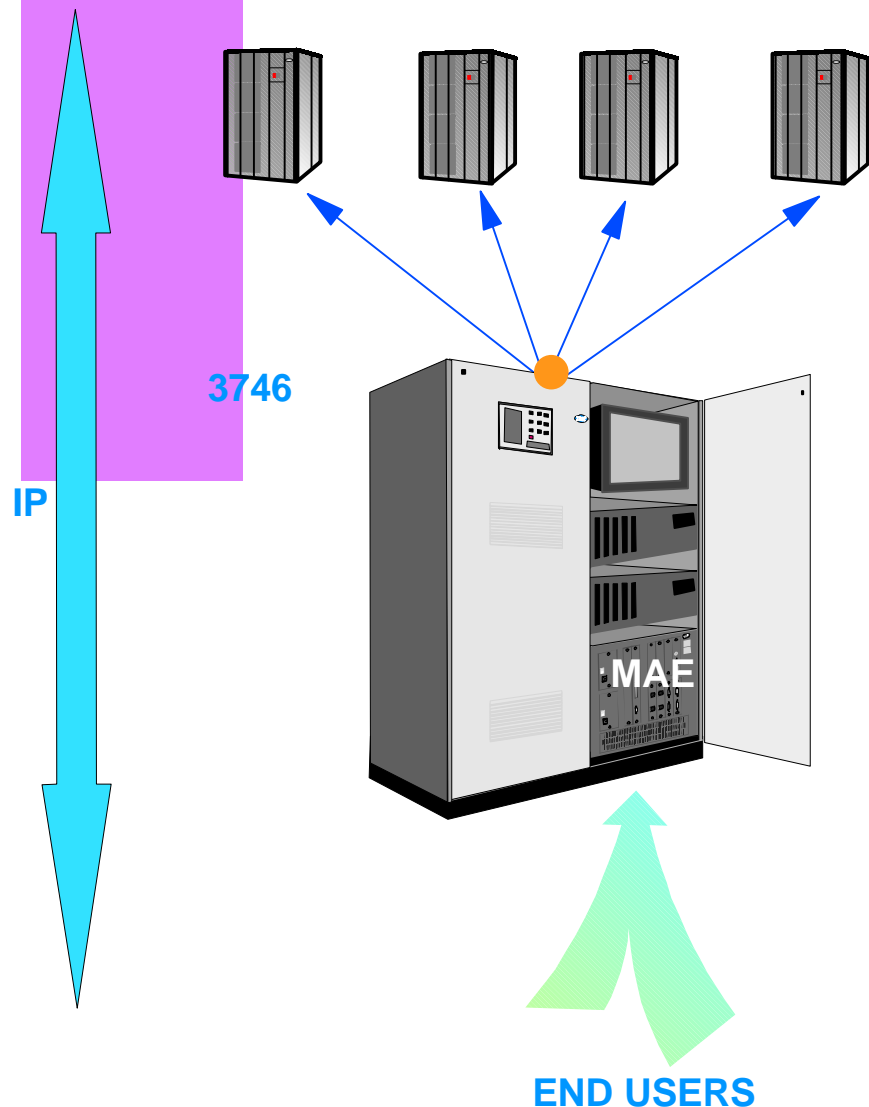
IBM 3746

3. IBM 3746 - Multiaccess Enclosure (FC #3001)



- **MAE hardware coupling**
 - 2 cards provided
 - Switch Interface Extended (3746)
 - Switch Access Card (MAE)
 - MAE can be 6 meters away of the 3746
- **MAE IP resources**
 - Own by 3746 IP "Control Point"
 - Configured from Service Processor
 - Single IP Router image
- **MAE maintained from SP**
- **Prerequisites**
 - 3746-900 + NNP or 3746-950
 - 3746 IP Routing (FC #5033)
 - SP type 2 FC #5052
 - 1 x 3746 Processor slot

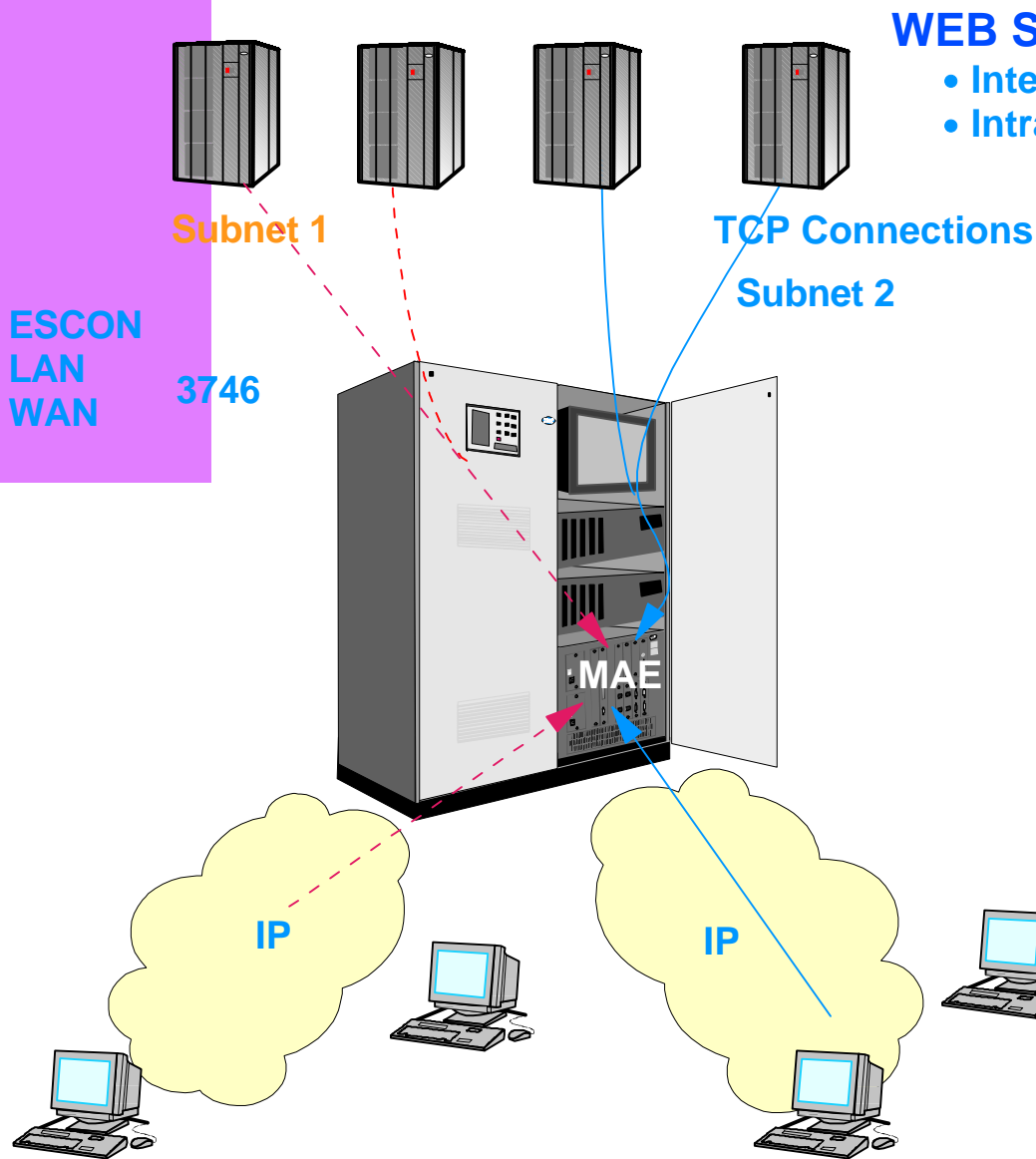
3. IBM 3746 - Network Dispatcher



- **IBM UNIQUE function**
- **Strengthen servers efficiency**
 - S/390
 - Other servers
- **Used by IBM for Web sites access**
 - 1996 summer olympic Web site
 - 1997 "Deep blue" Web site
 - 1998 winter olympic Web site
- **Spray IP traffic load to the servers**
- **Single IP address**

3. IBM 3746 - Network Dispatcher Added Value

12/12/97

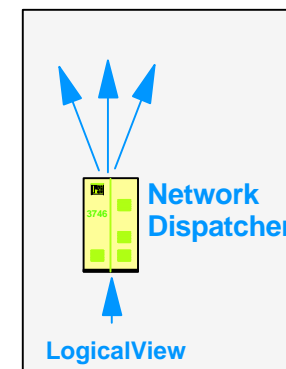


WEB Servers

- Internet
- Intranet

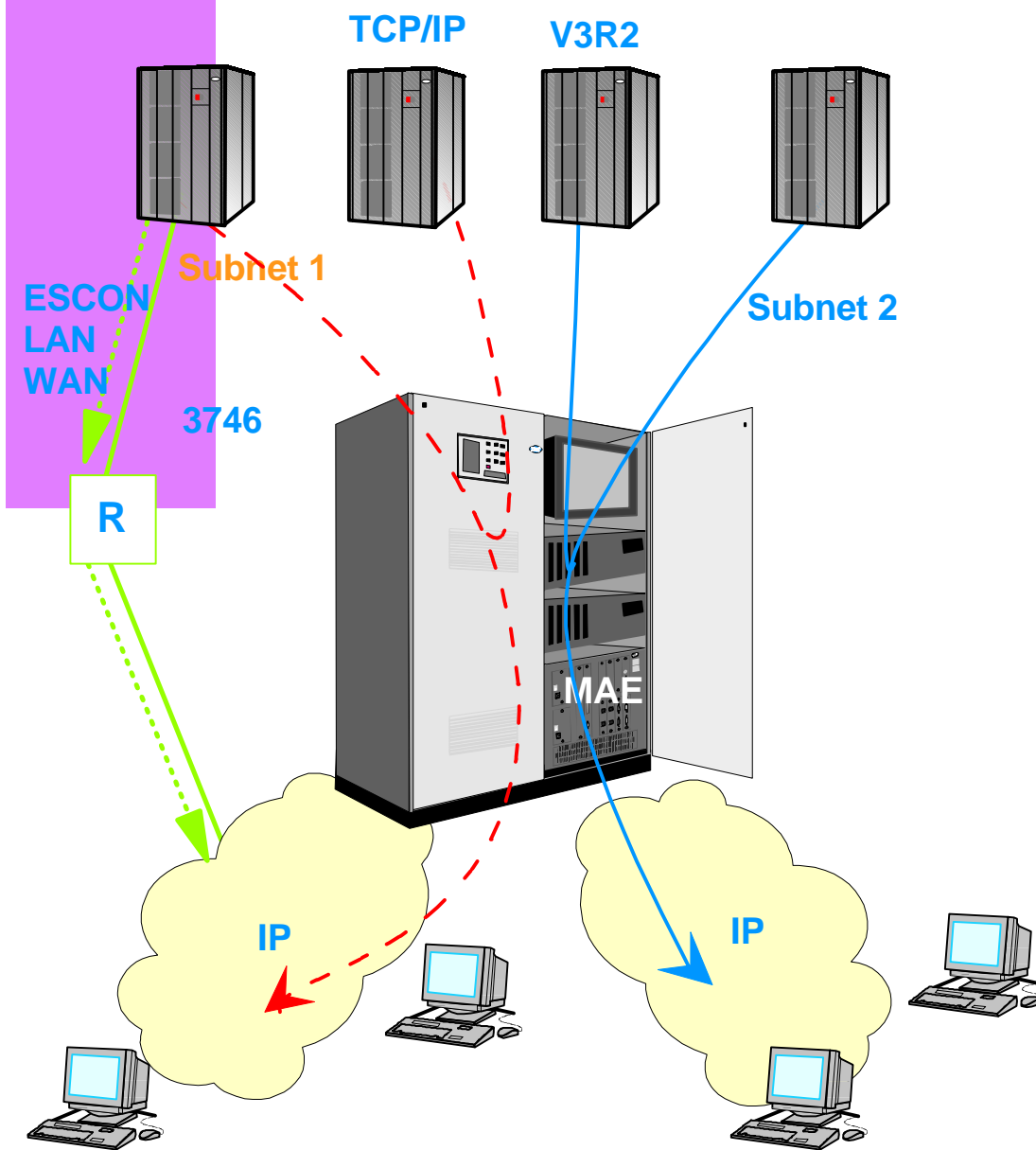
- Allow IP packet balancing on Servers
 - Thru all interfaces
 - Including 3746* and MAE
 - Including ESCON/LAN/WAN
- Load balancing based on
 - Round robin algorithm
 - Failure of server (back-up)
 - No response from a server (back-up)
- End users see a single IP Server address for the set of servers

(*) later date



3. IBM 3746 - RIP V2

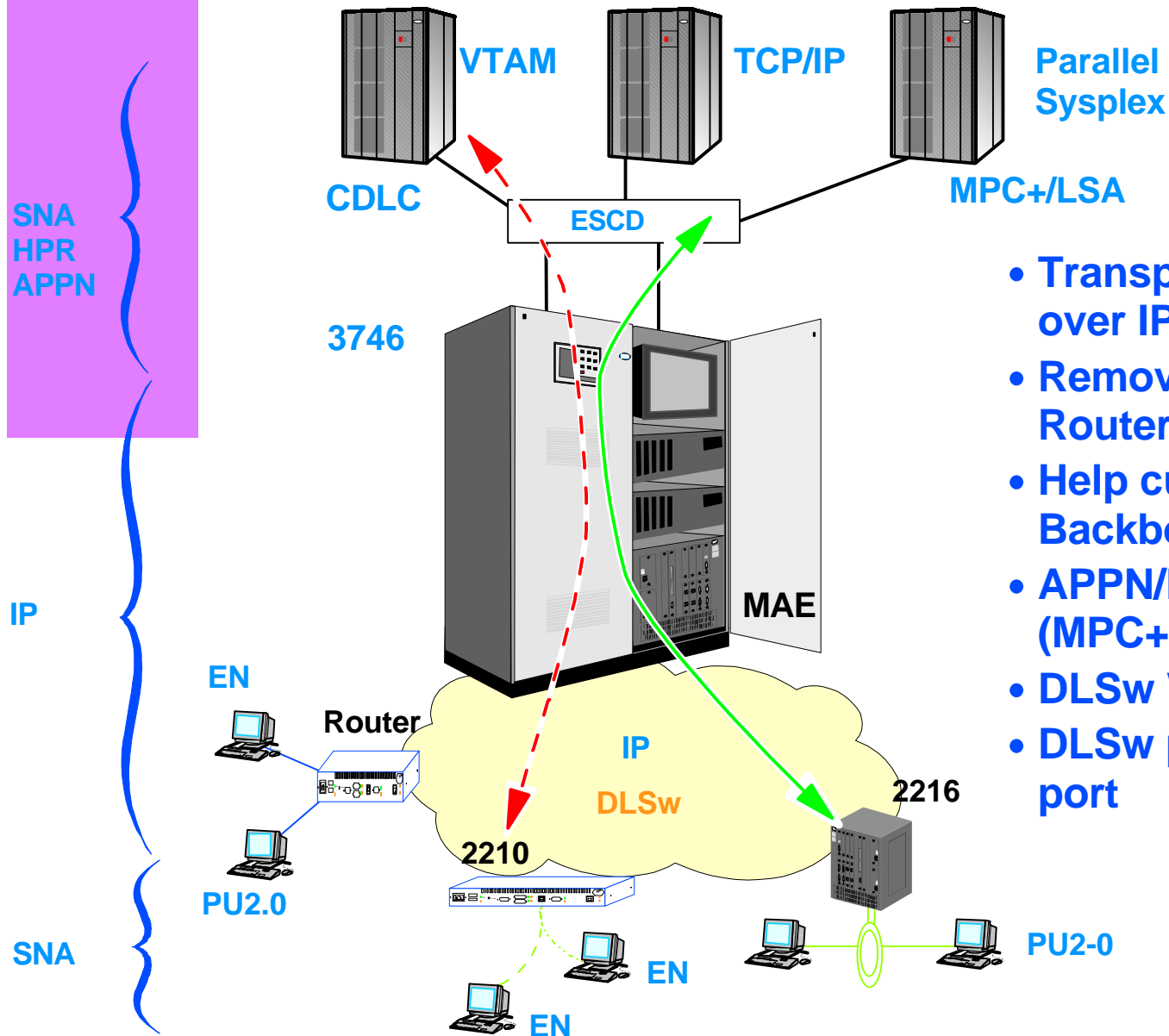
12/12/97*



- **RIP V2**
 - TCP/IP V3R2 + PTFs min level
 - Thru all MAE interfaces
- **Extend 3746/MAE Routing protocol support**
 - RIP V1, RIP V2
 - OSPF V2
 - BGPV4
- **RIP V2 add subnetting capability to RIP V1**
 - Available on all MAE ports (on FC #3000)

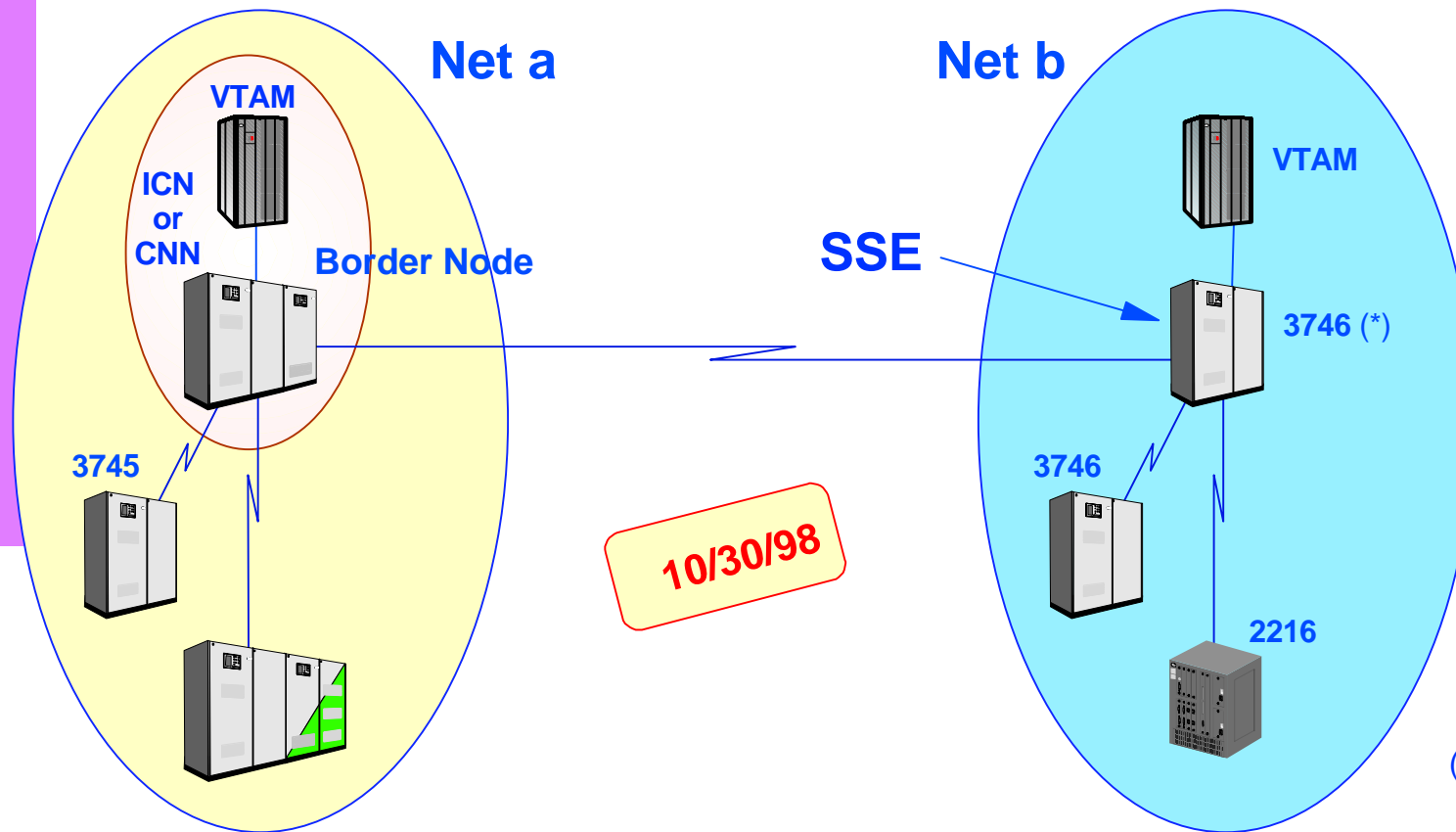
(*) later date for MAE 3001

3. IBM 3746 - DLSw



- Transport SNA/APPN traffic over IP network
- Remove need of a Front end Router
- Help customers with Router Backbone installed
- APPN/HPR over ESCON (MPC+, CDLC, LSA)
- DLSw V2
- DLSw packets over any 3746 port

3. IBM 3746 - Session Services Extended



(*) with MAE

Mixed Subarea/APPN Network

- Link different Networks
- Allow SNA environment migration
- Allow multiple SNA domains migration
 - SNI

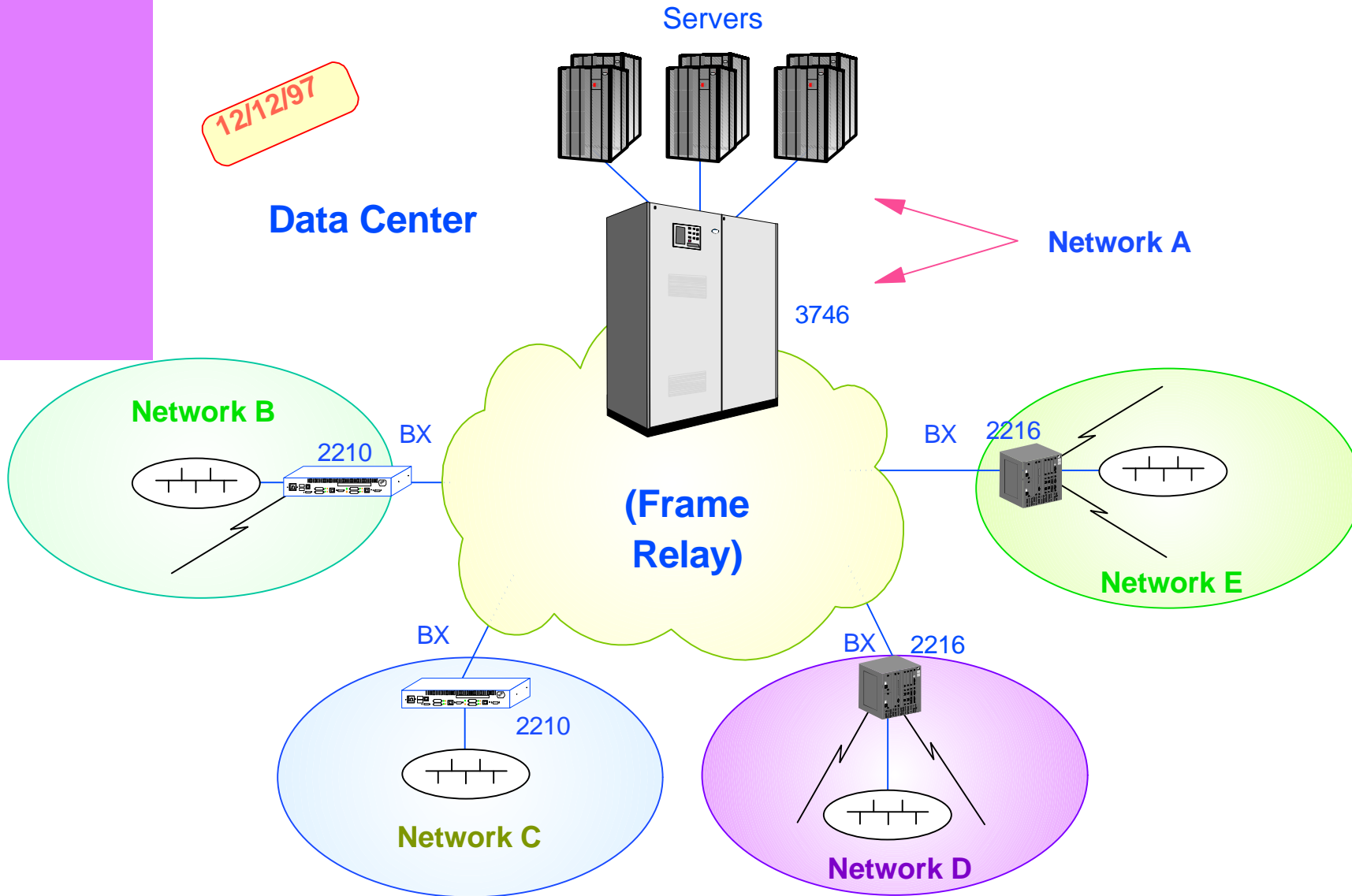
APPN/HPR Network

- Offload VTAM cycles
 - EBN required only in one side
- APPN scalability implementation
- Network Node Server of VTAM End Node

3. IBM 3746 - Multinetwork Environment with Branch Extender (2210, 2216)



12/12/97

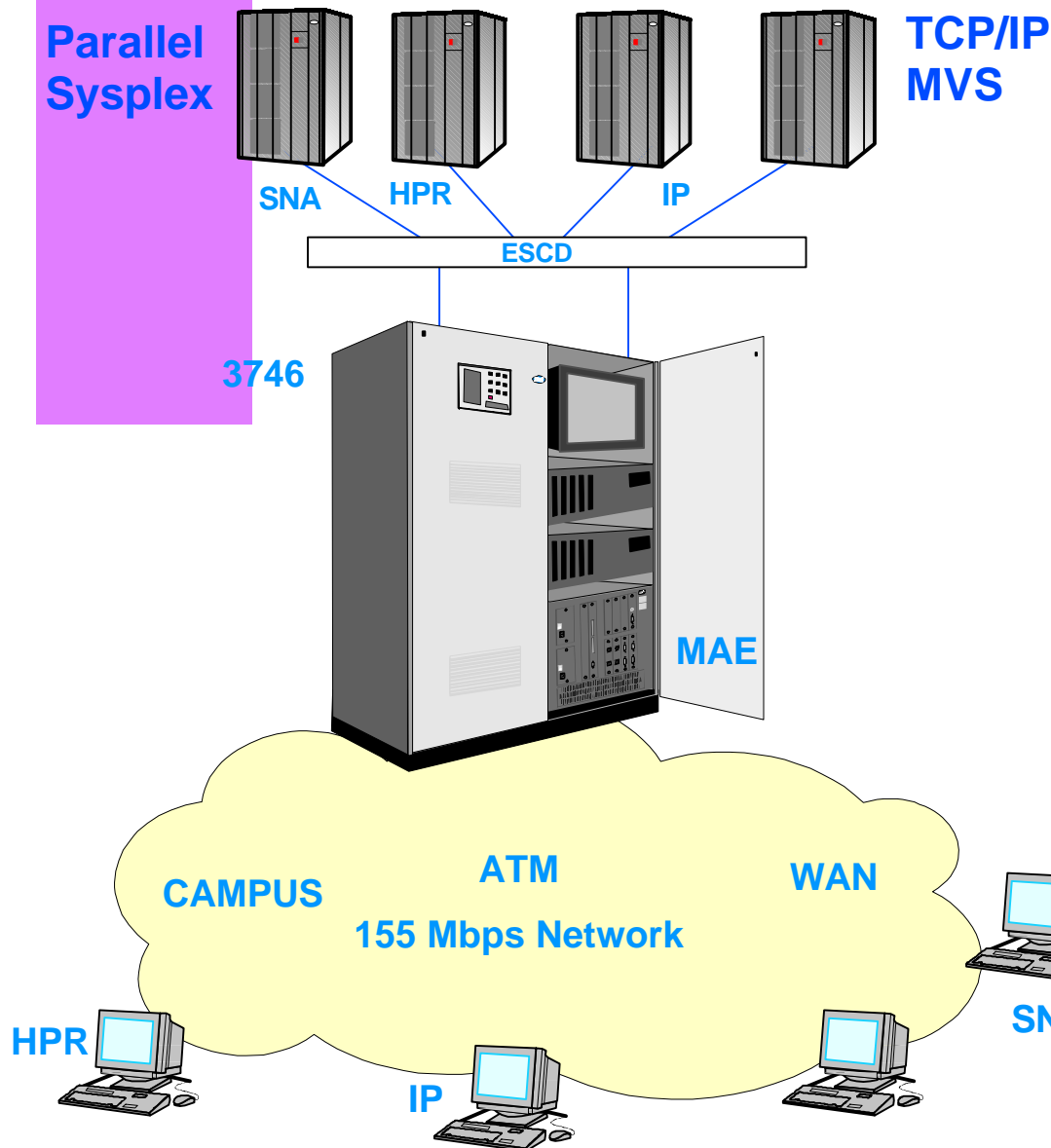


Networks B, C ... = ENs, PU2s ... (No NN)

3. IBM 3746 - ATM Enhancements

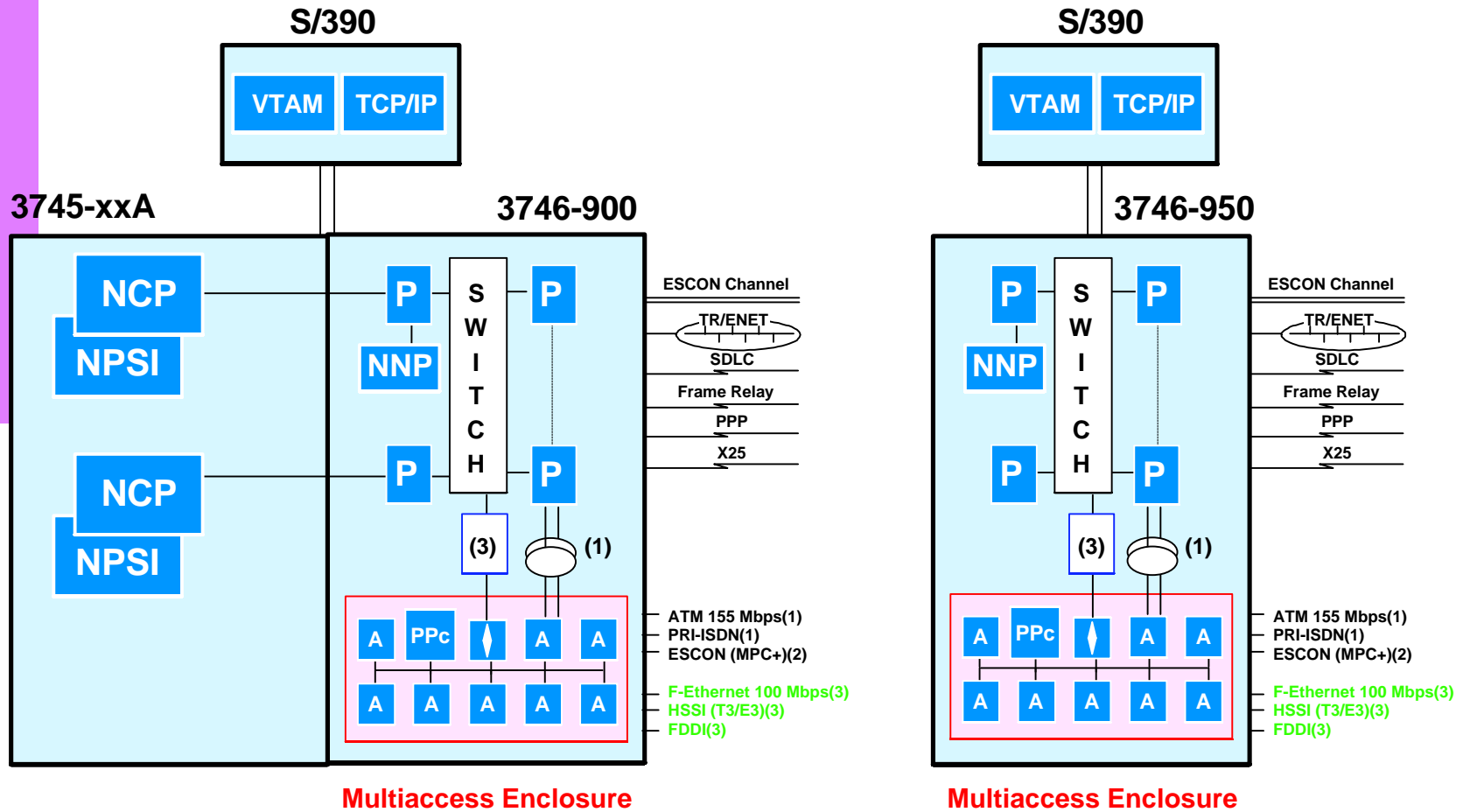


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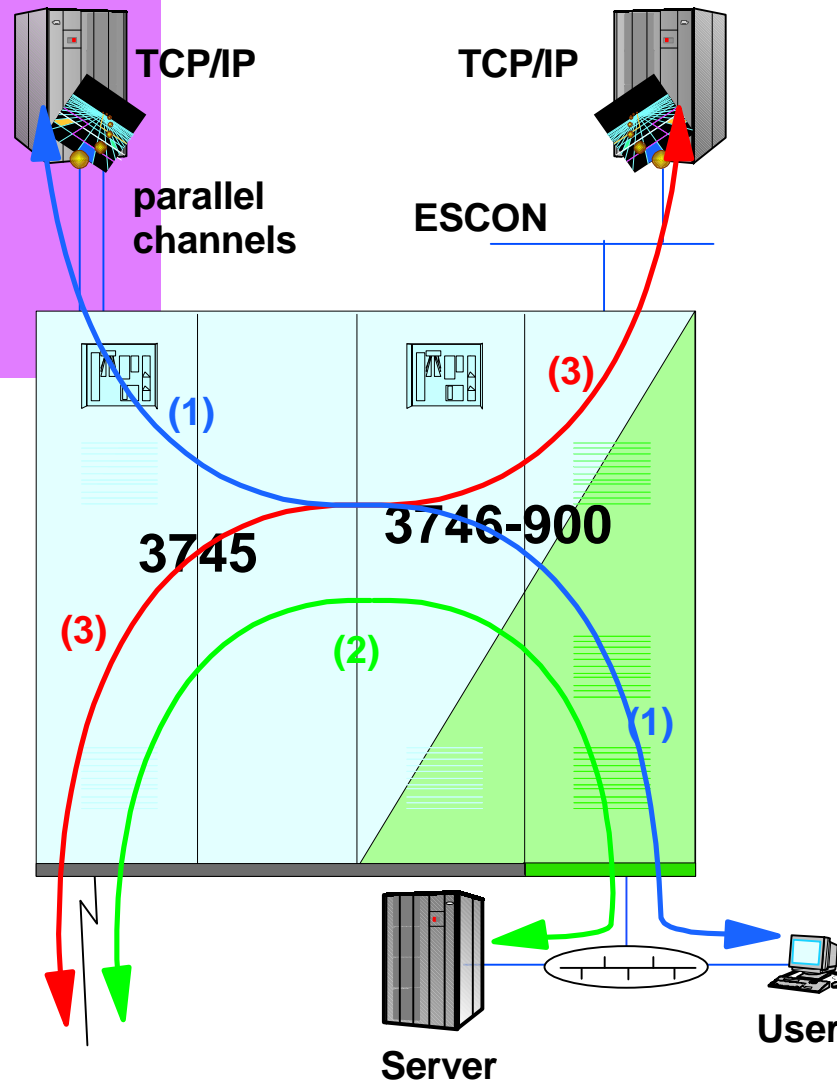
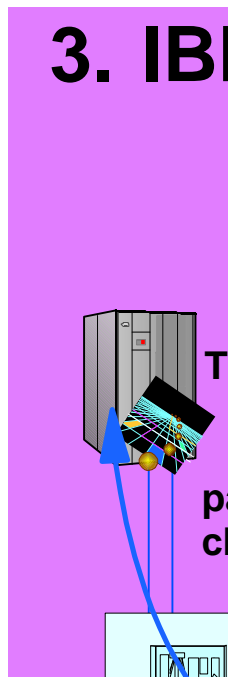


- **New high performance ATM adapters**
 - SMF/MMF
 - 15% to 25% performance improvement for small packet
- **Native HPR thru ATM**
 - AIW 8192 compliant
 - No need of LAN emulation/classical IP
 - HPR benefits thru ATM network
- **Next Hop Resolution Protocol (NHRP)**
 - Short cut router for IP over ATM
 - Zero Hop routing for end station with NHRP
 - MAE 3000 only
- **3746 ATM full solution**
 - LAN emulation client
 - Classical IP
 - Native HPR over ATM

3. IBM 3746 - Architecture



3. IBM 3746 - IP routing to 3745 NCP IP

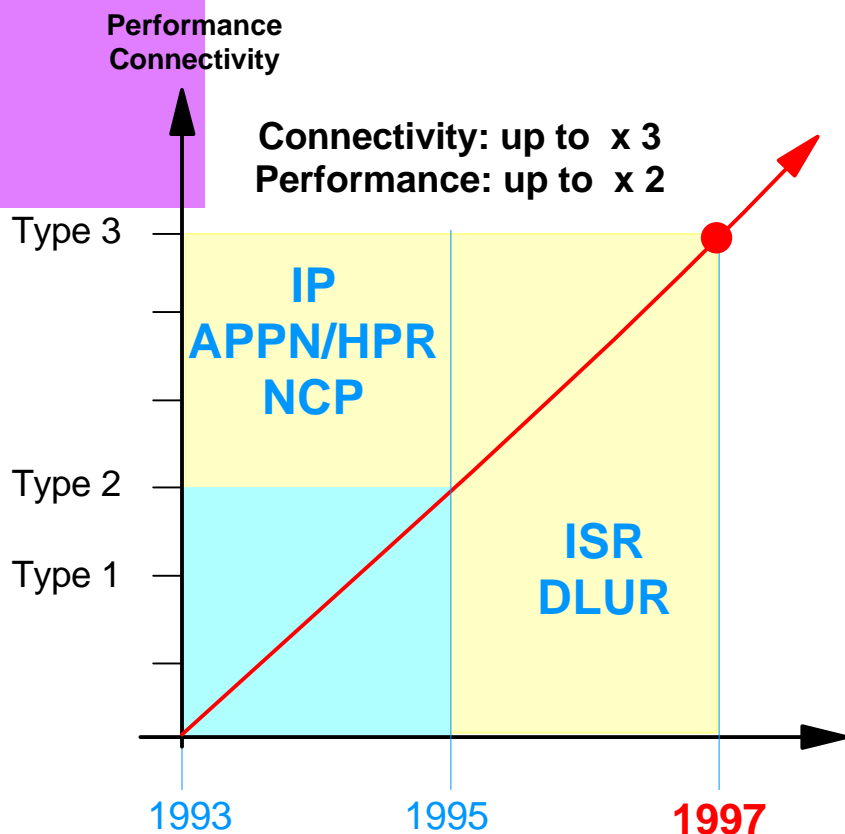


- Allow 3746 IP traffic to flow thru the parallel channels (1)
- No need for external connections
- One TRP2 (or 3) required to route traffic ("proxy")
- IP traffic can be routed between any adapter of the 3746 and any adapter of the 3745 (2)
- Prerequisites:
 - NCP V7R6
 - 3746 Extended Functions (FC #5800)
 - 3746 IP Routing (FC #5033)
- Note: not required for 3745/NCP IP routing to ESCON (3)

3. IBM 3746 - Processors Type 3



9/16/97



- New TRP3, ESCP3, CLP3, CBSP3
- Performance increase by up to 100%
- APPN connectivity per adapter increased by up to 200% (*)
 - ESCP3: 16 PUs and 12500 ISR/DLUR
 - TRP3: 2000 PUs and 7800 ISR/DLUR
 - CLP3: 2000 PUs FR and 7500 ISR/DLUR
- Benefits to NCP traffic
 - CLP3 connectivity (number of lines) increased by up to 100 %(*)
 - Processor Load reduced by up to 50% (*)
- Processor Upgrades to Type 3
- Coexistence with other Processor Types

(*) expected

3. IBM 3746 - Processor Type 3 Connectivity



9/16/97

• Connectivity : Up to 3 X

ESCP

Example	ESCP2	ESCP3	Ratio
PU's (Stations)	16 and	16 and	X1
Sessions (ISR/DLUR)	3500	12500	X3.5
Sessions (ANR or NCP)	No Limit	No Limit	

(16 = MAX)
(14000 = ESCP3 MAX)
(4900 = ESCP2 MAX)

• Connectivity : Up to 3 X

TRP

Example	TRP2	TRP3	Ratio
PU's	650 and	2000 and	X3
Sessions (APPN/DLUR)	2650	7800	X3
Sessions (ANR or NCP)	No Limit	No Limit	

(2000 = MAX)
(14000 = TRP3 MAX)
(4700 = TRP2 MAX)

3. IBM 3746 - CLP3 vs CLP Connectivity (1/2)



- **Connectivity : Up to 3 X**

9/16/97

Example	CLP	CLP3	Ratio
Lines (SDLC)	20 and	60 and	X3
PU's (SDLC)	300 and	1000 and	X3
Sessions (ISR/DLUR)	2000	7900	X4
Sessions (ANR or NCP)	No Limit	No Limit	

Example	CLP	CLP3	Ratio
Lines (FR, X25)	120 and	120 and	X1
PU's (FR, X25)	650 and	2000 and	X3
Sessions (ISR/DLUR)	1900	7500	X4
Sessions (ANR or NCP)	No Limit	No Limit	

3. IBM 3746 - CLP3 vs CLP Connectivity (2/2)



9/16/97

NNP
Controlled

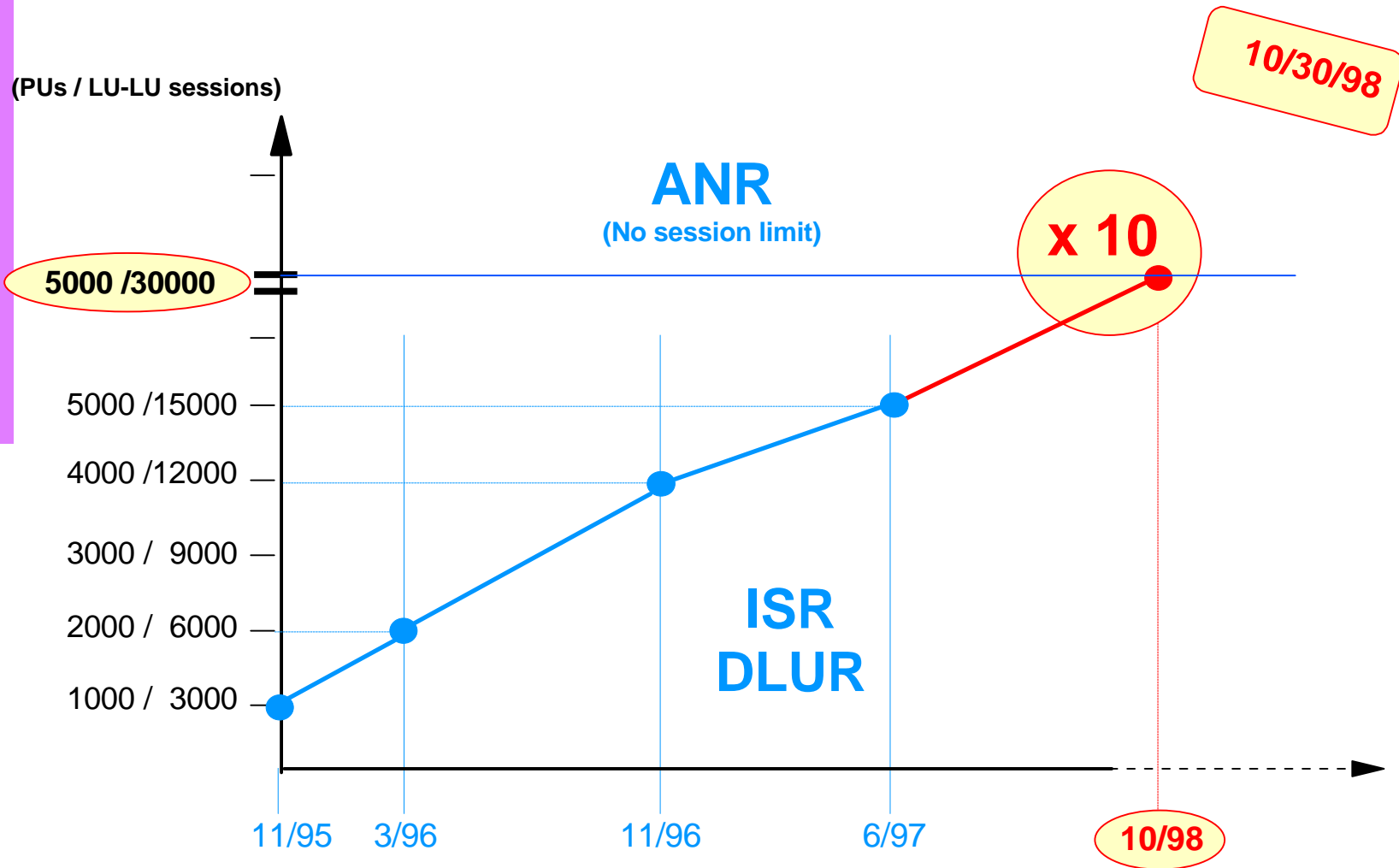
Limits	CLP	CLP3	Ratio
Lines	120	120	X1
PUUs (SDLC)	1000	1000 and	X1
PUUs (FR, X25)	1000	2000 and	X2
FR DLCIs	500	2000	X4
Sessions (ISR/DLUR) (FR)	3300 (1xPU)	12500 (1xPU)	X4
Sessions (ANR)	No Limit	No Limit	

NCP
Controlled

Limits	CLP	CLP3	Ratio
Lines	120	120	X1
PUUs (SDLC)	1000 and	1000 and	X1
PUUs (FR, X25, ISDN)	3000 and	3000 and	X1
FR DLCIs	3000	3000	X1
Sessions (SNA/APPN)	(1)	(1)	
Sessions (ANR)	No Limit	No Limit	

(1) CCU storage dependent

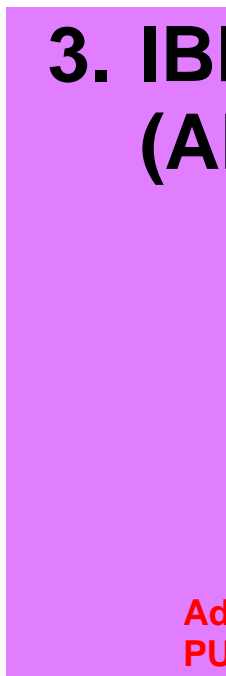
3. IBM 3746 - Connectivity Increase



- 240 lines (3746 NN and IP)
 - Service Processor type 2

- 30000 LU-LU sessions (APPN/ISR, DLUR)
 - Network Node Processor Type 2
 - CBSP type 3
 - Service Processor type 2

3. IBM 3746 - 30.000 LU-LU Sessions (APPN/DLUR)



10/30/98

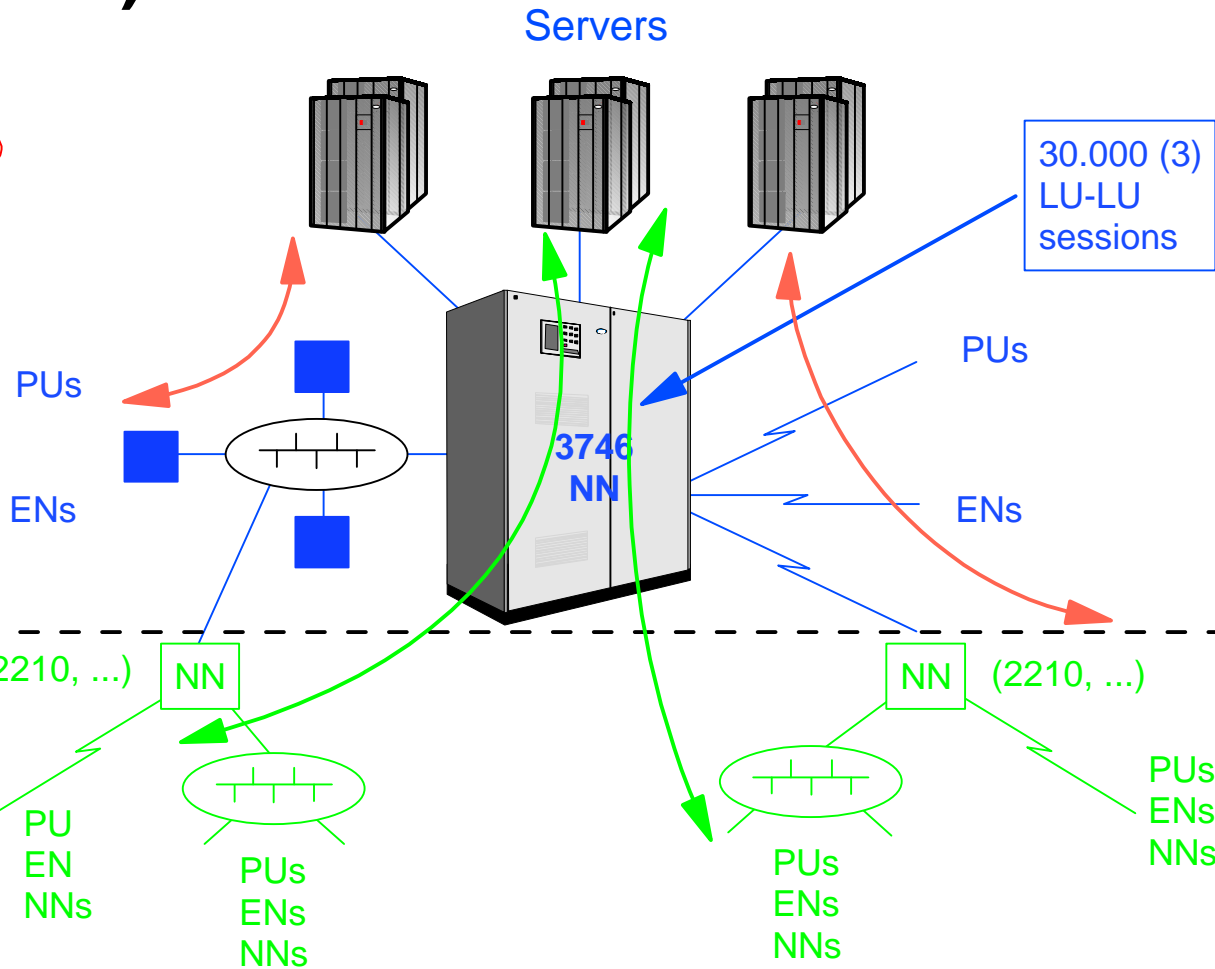
Adjacent PUs/ENs: 15.000 (1) Sessions

Non Adjacent PUs/Nodes: 15.000 (2) Sessions

- (1) Max number of LU-LU sessions with adjacent PUs/ENs: 15.000
- (2) Max number of LU-LU sessions with non-adjacent PUs/ENs: 30.000
- (3) Total number of LU-LU sessions: 30.000 maximum

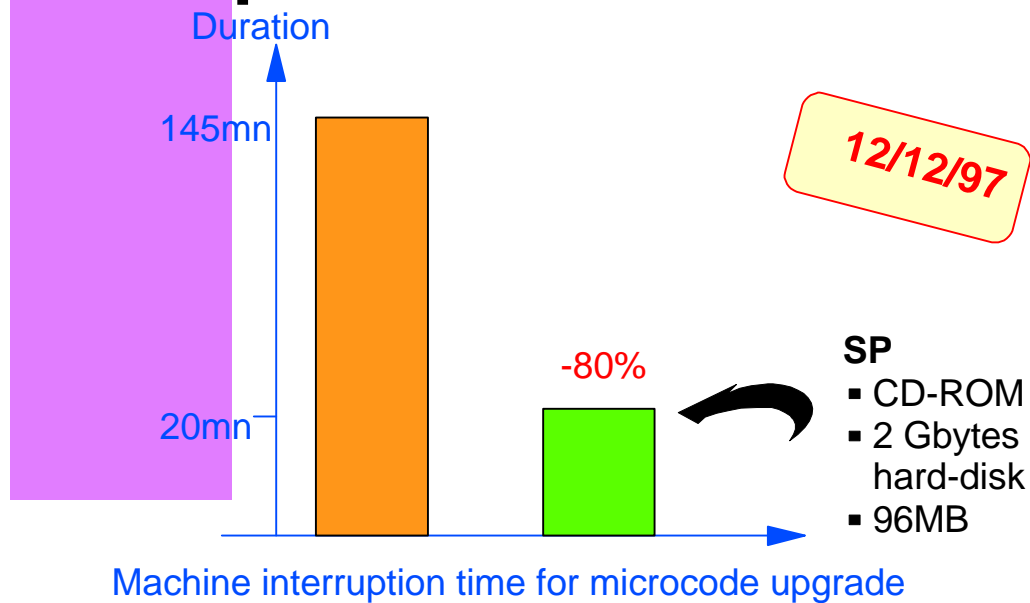
ANR and SNA (NCP) sessions : no 3746 Limit

Note: PUs/ENs connected to MAE are "non-adjacent" (MAE = NN)

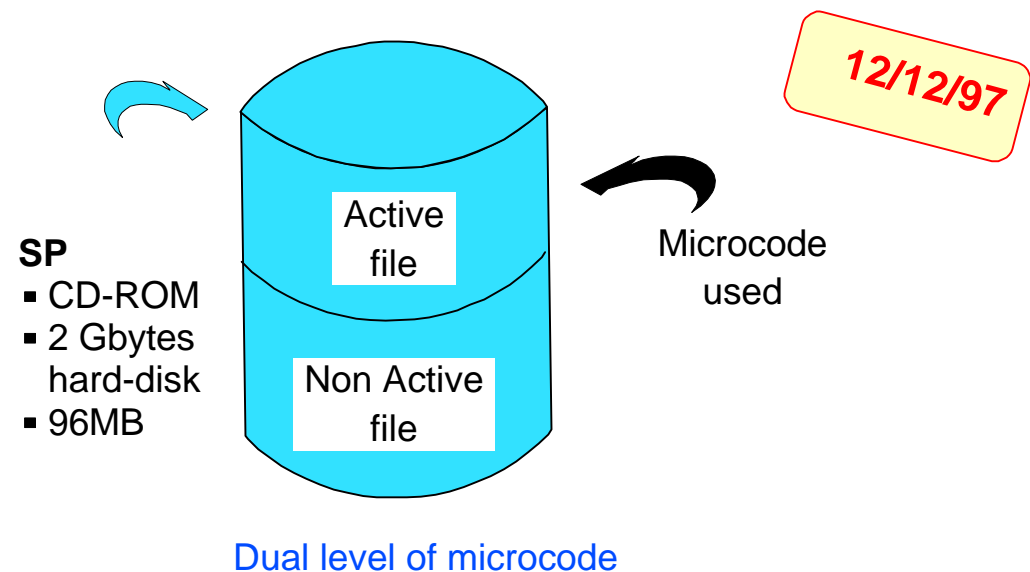


30.000 (3) LU-LU sessions

3. IBM 3746 - Microcode upgrade Improvements - Increased Availability



- Reduce by 80% machine microcode upgrade time
- Machine interruption equal to a general IML
- Reduce maintenance window requirements
- Applications availability improved

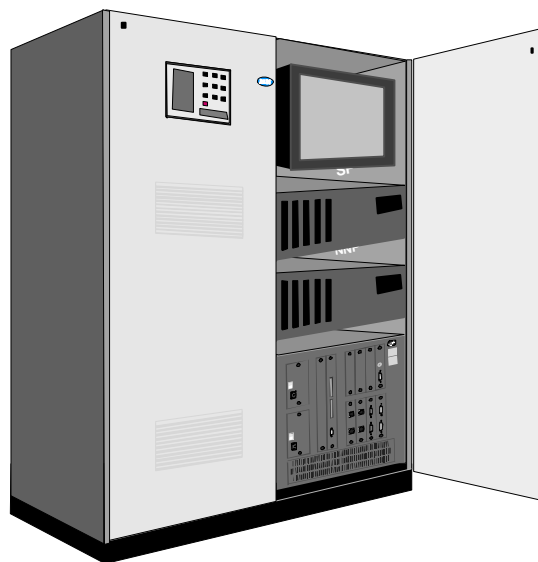


- Protect your production code level
 - Upgrade done on non active level
 - Operator switching control
 - Easy switch back in case of problem
- Improve machine time efficiency
 - Unused machine time dedicated to trial
 - New level of code
 - new function
 - Production level not impacted

3. IBM 3746 - Service Processor & Network Node Processor



Available



- **New SP Type 2 (FC #5052)**
 - Previous functions supported
 - 96 MB base memory, Pentium 200 Mhz, 2GB HD, CD-ROM Drive
 - Smaller Size than previous FC #5020 and FC #5021
 - Service Processor FC #5021 no longer available
- **New NNP Type 2 (FC #5122)**
 - Previous functions supported
 - 64 MB base memory (+64 MB), Pentium 200 Mhz
 - Enable for 1998 APPN enhancements (30 000 sessions)
 - Smaller Size than previous FC #5022
 - NNP FC #5022 no longer available

3. June/October, 1996, March 1997 Announcements

• High Performance Routing (HPR)

- ANR Available
- RTP Available
- ARB Available
- MLTG Available

• SNA/DLUR, APPN/HPR Routing

- over TR, ESCON, SDLC, FR Available
- over X25 Available

• IP Routing

- over TR, ESCON Available
- over PPP(LL), FR Available
- over X25 Available
- BRS Available

• Frame Relay

- FRFH Available
- CIR+ Available

• Hardware Feature

- NNP memory Expansion Available
- SP Memory Expansion Available
- X.25 Support for 3746-950 Available
- Service Processor upgrade Available
- Network Node Processor Type 2 Available
- Service processor Type 2 Available

- NCP V7R5 Available

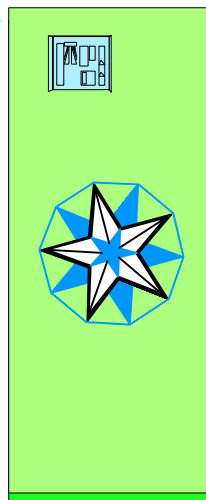
- PRI-Euro ISDN (LIC16) Available
- Up to 16 Processors Available
- Ethernet Port Available

• Box Connectivity

- 5000PUs/15000 ISR sessions Available
- Adapter type 2 connectivity/performance improvment Available

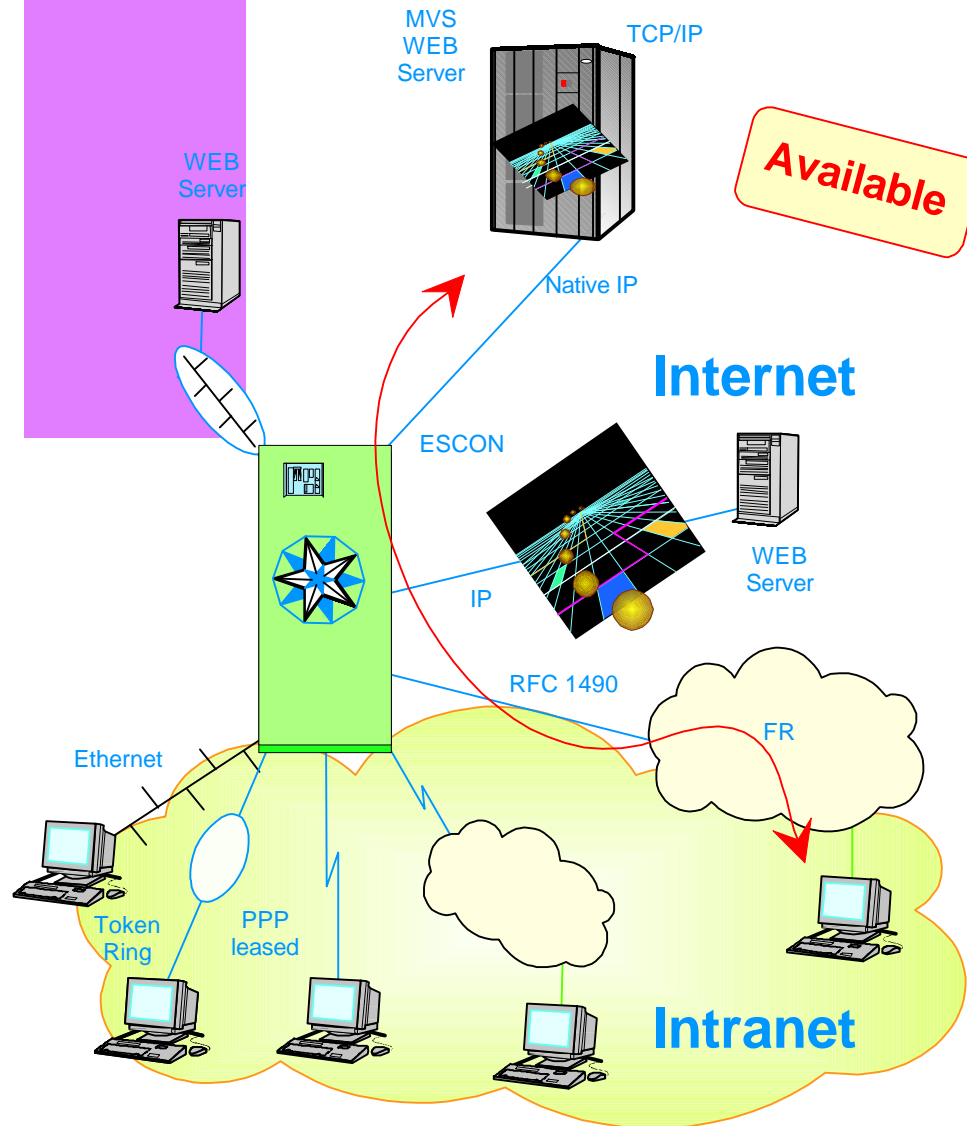
• Multiaccess Enclosure

- ATM, ISDN, LAN, WAN Available
- ESCON (MPC+) Available



IBM 3746

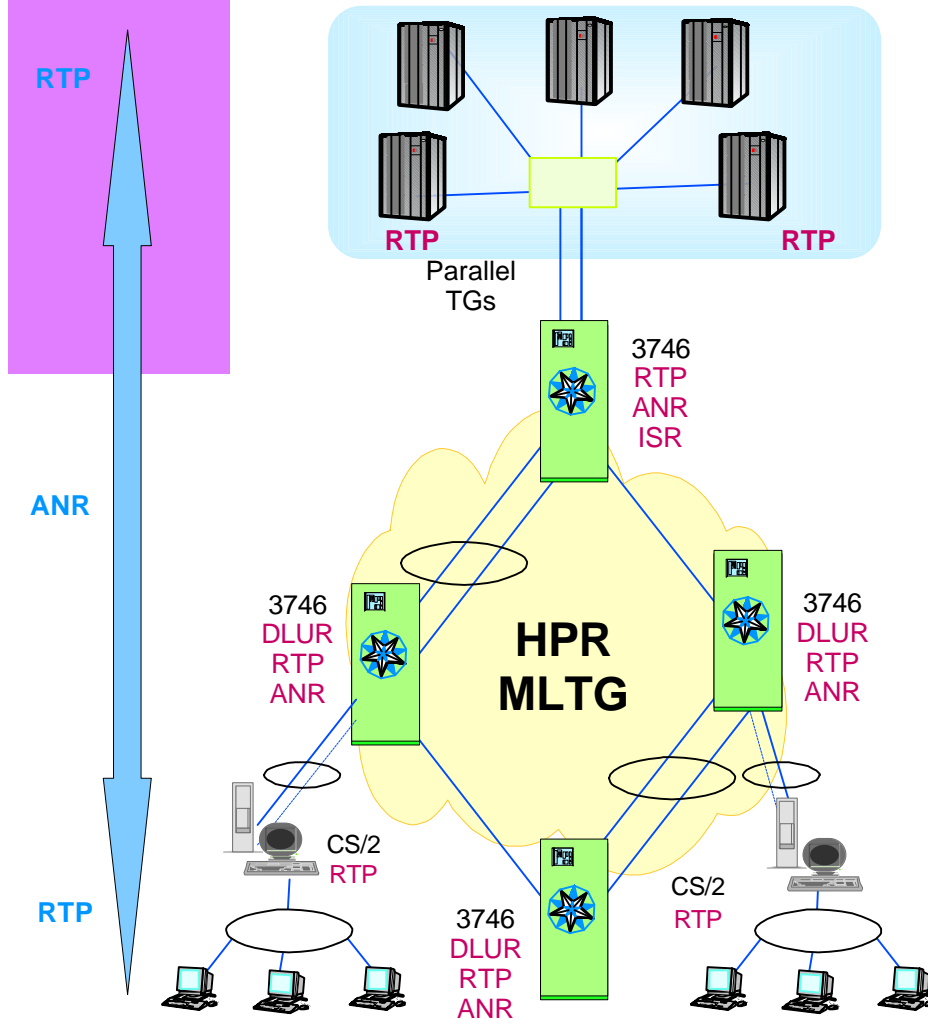
3. IBM 3746 - Full IP Router



- **Native IP routing over**
 - LAN : Token-Ring, Ethernet
 - Channel: ESCON
 - WAN : Frame Relay, PPP (Leased Line)
- **RIP (V1), OSPF (V2), BGP (V4)**
RIP V2 (MAE)
- **Filtering, Access Control**
- **Multiple IP addresses per interface**
- **Header compression on WAN**
 - RFC 1144
- **Variable length subnet addresses**
- **IP application prioritization**
 - Bandwidth Reservation System (BRS)
- **Routing in the 3746 adapters**
- **Adapter sharing between IP/SNA/APPN/HPR**
- **SNMP support**
 - Netview for AIX

3. IBM 3746 - HPR (100% Availability Solution)

Available

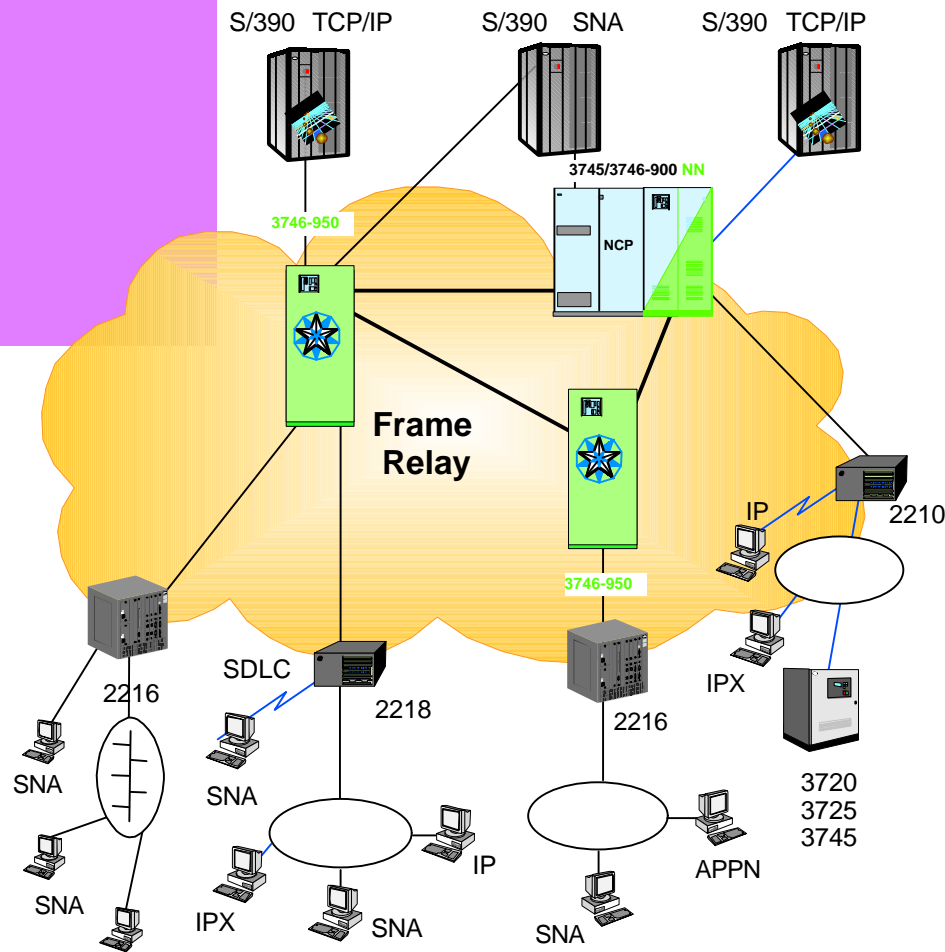


- **Network availability**
 - 24x7x365
 - HPR end to end non-disruptive session switching
 - Full APPN dynamics for routing
 - Complements application availability (MNPS)
- **DLUR support for non_APPN nodes**
- **Automatic Network Routing (ANR)**
 - Fast routing: x3 (vs APPN)
 - Unlimited number of ANR sessions
- **Rapid Transport Protocol (RTP)**
 - End to end error recovery
 - Border between HPR & APPN/DLUR traffic
- **Adaptive Rate Based (ARB)**
 - Network congestion control (end to end)
 - Maximizes link utilisation
- **MLTG HPR on SDLC, FR, X25, TR/Ethernet**
 - Parallel TGs on ESCON

3. IBM 3746 - Frame Relay Support



Available



- **Frame Relay Terminating Equipment**
 - Connectivity to public/private network
- **Frame Relay Frame Handler**
 - Build your own Frame Relay Switch Network
- **RFC 1490 compliant**
 - SNA/DLUR, APPN, IP, HPR
 - Multiple downstream PUs per DLCI
 - Single or multiple protocols per DLCI
 - FR-BAN for 2210, 2218, 2216
 - FR-BNN for 2217, 3174, 2216
 - FR-BAN for remote 37xx (INN)
- **FR Sharing**
 - Port and DLCI level (NCP, NN, IP)
- **First class bandwidth management**
 - Comrate, CIR with BRS

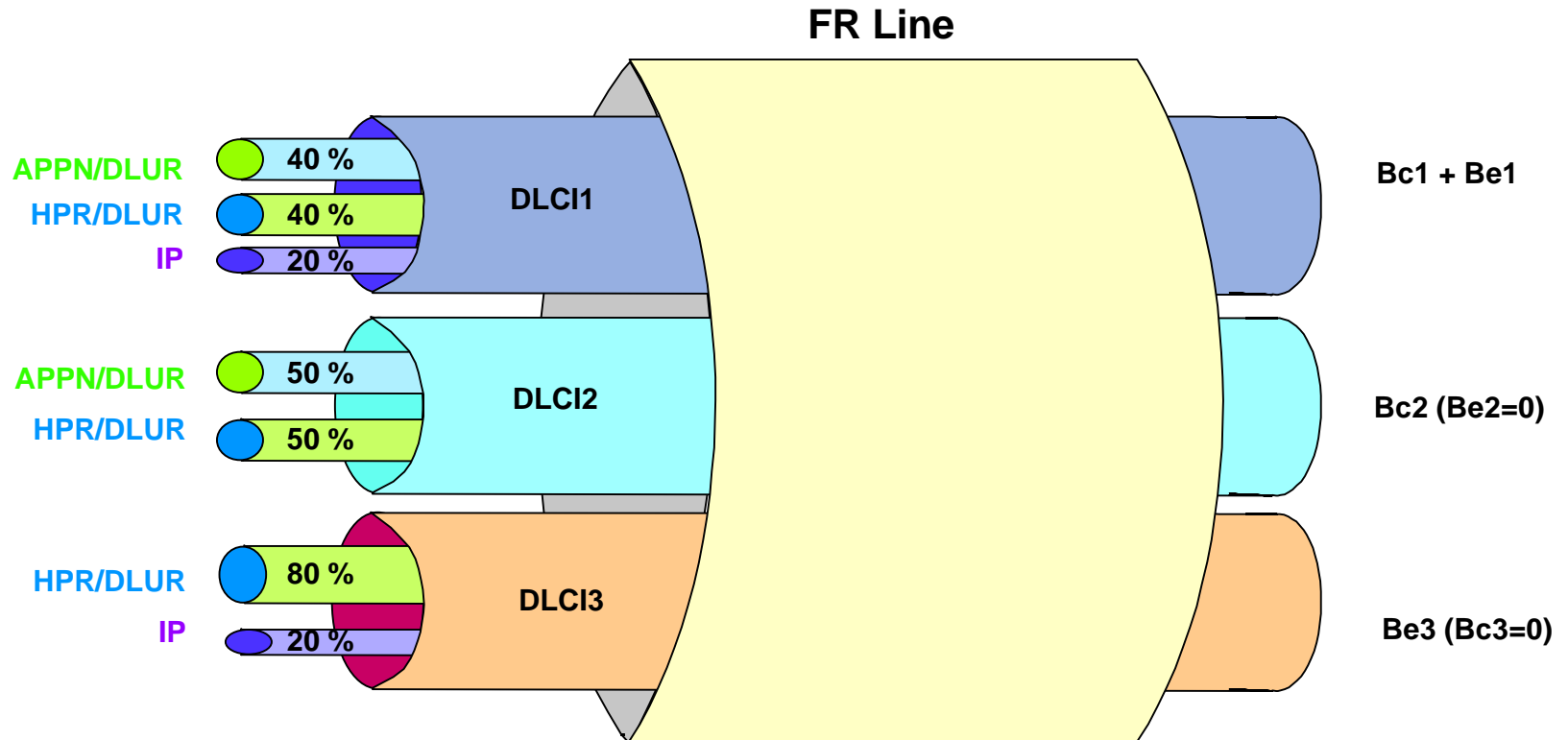
3. IBM 3746 - Frame Relay CIR+



Available

BRS over a DLCI

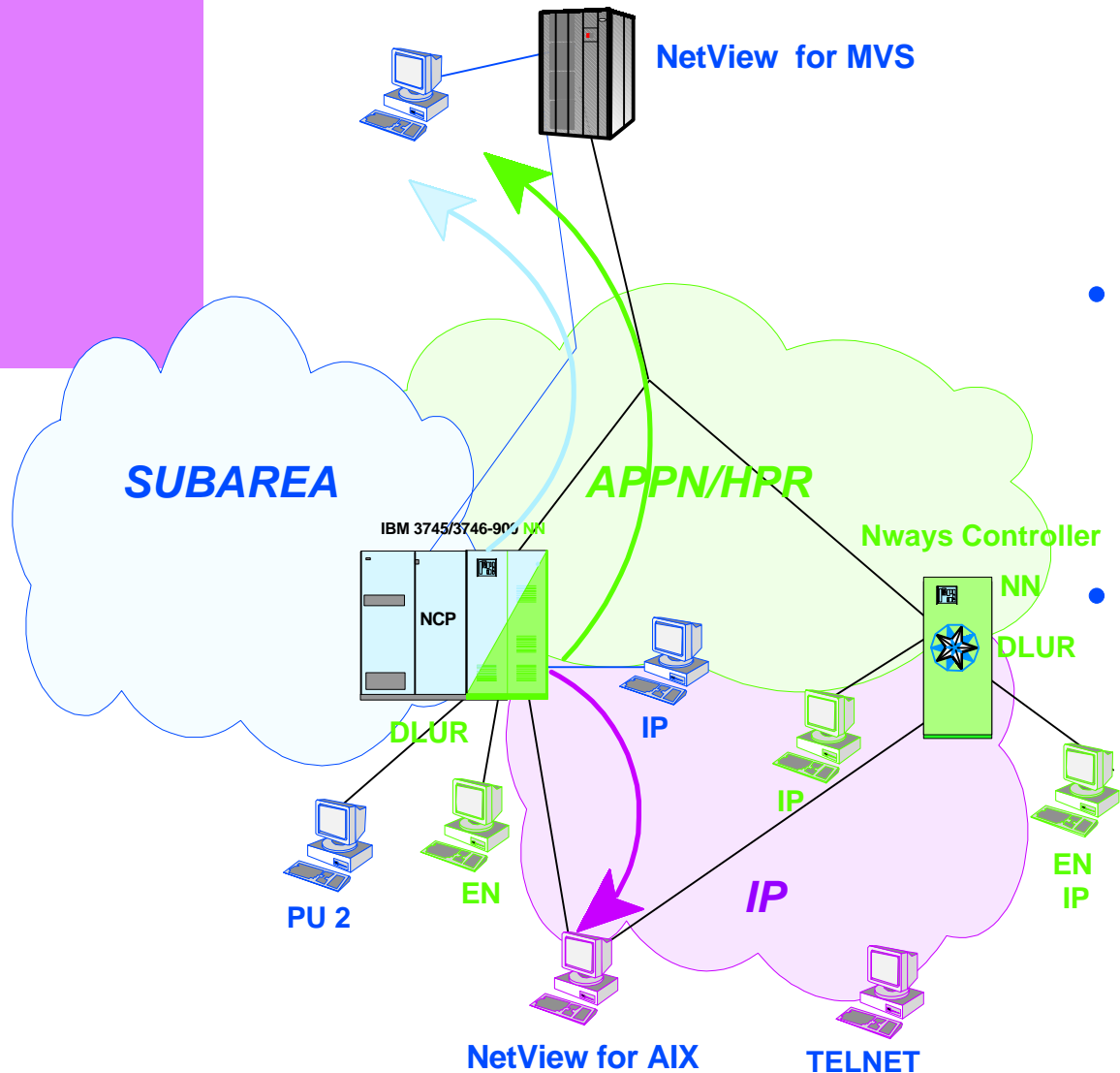
CIR per DLCI



- For a DLCI : $Bc + Be \neq 0$
- "Overbooking" allowed ($\sum Bc > \text{line speed}$)
- $CIR = Bc / Tc$ (network committed bandwidth per DLCI)

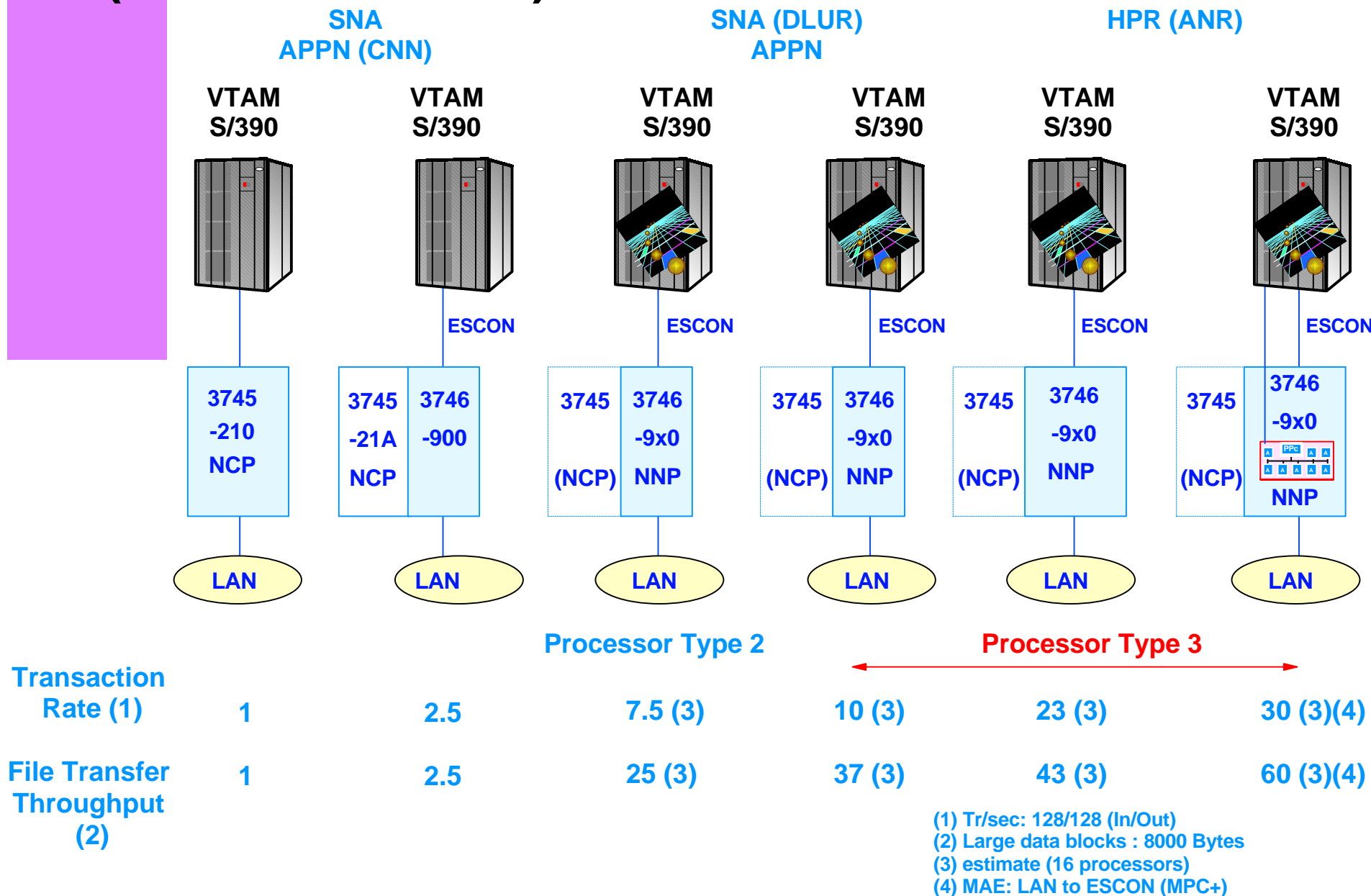
Be: Burst Exceeded
Bc: Burst Comitted
CIR: Comitted Information rate
BRS: Bandwidth Reservation System

3. IBM 3746 - Network Management

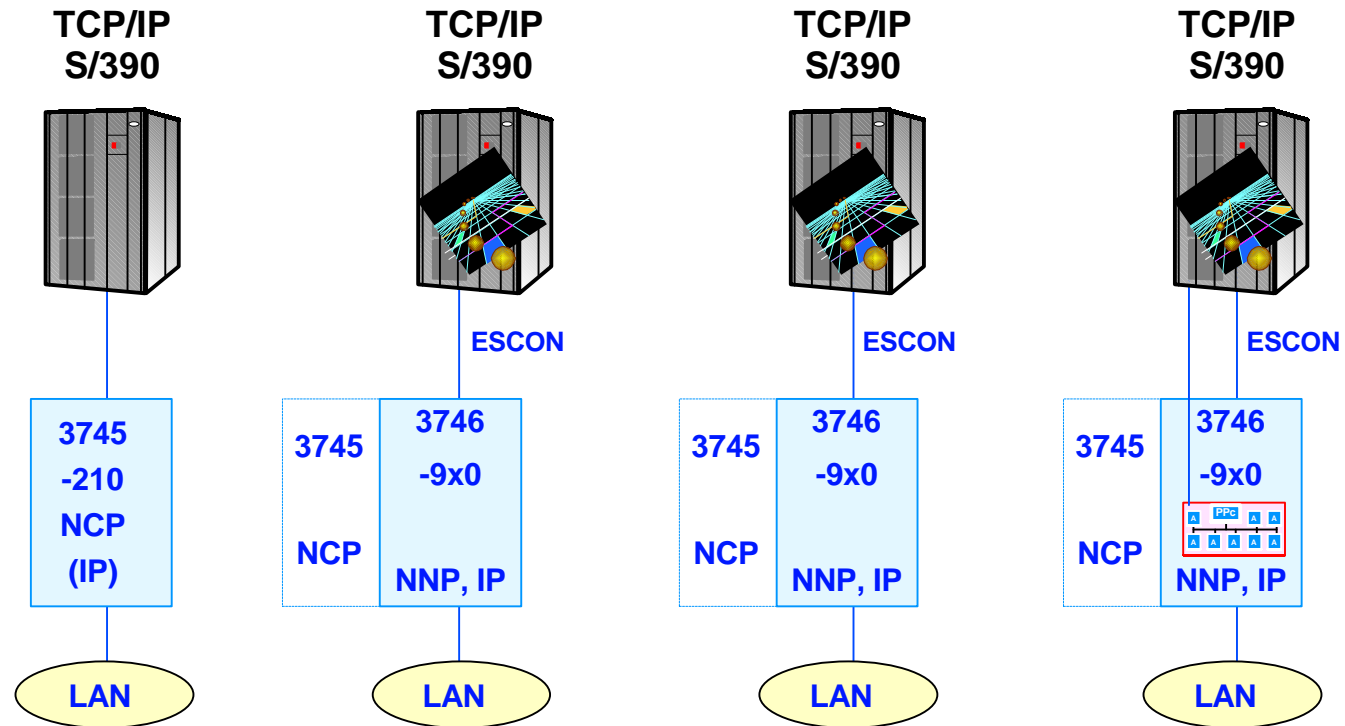


- **Netview for AIX**
 - Nways Enterprise Manager (SNA alert Manager)
 - Nways Campus Manager LAN version 2
 - Nways Campus Manager Suite version 2
- **Netview for MVS**
 - APPNTAM for 3746-9x0 APPN/HPR resources
 - Activation/Inactivation
 - Display
 - Topology
- **Network Performance Monitor (NPM)**
 - for all 3746-9x0 APPN/HPR & SNA resources

3. IBM 3746 - Performance Ratio (SNA/APPN/HPR)



3. IBM 3746 - Performance Ratio (TCP/IP)



Processor Type 2

Processor Type 3

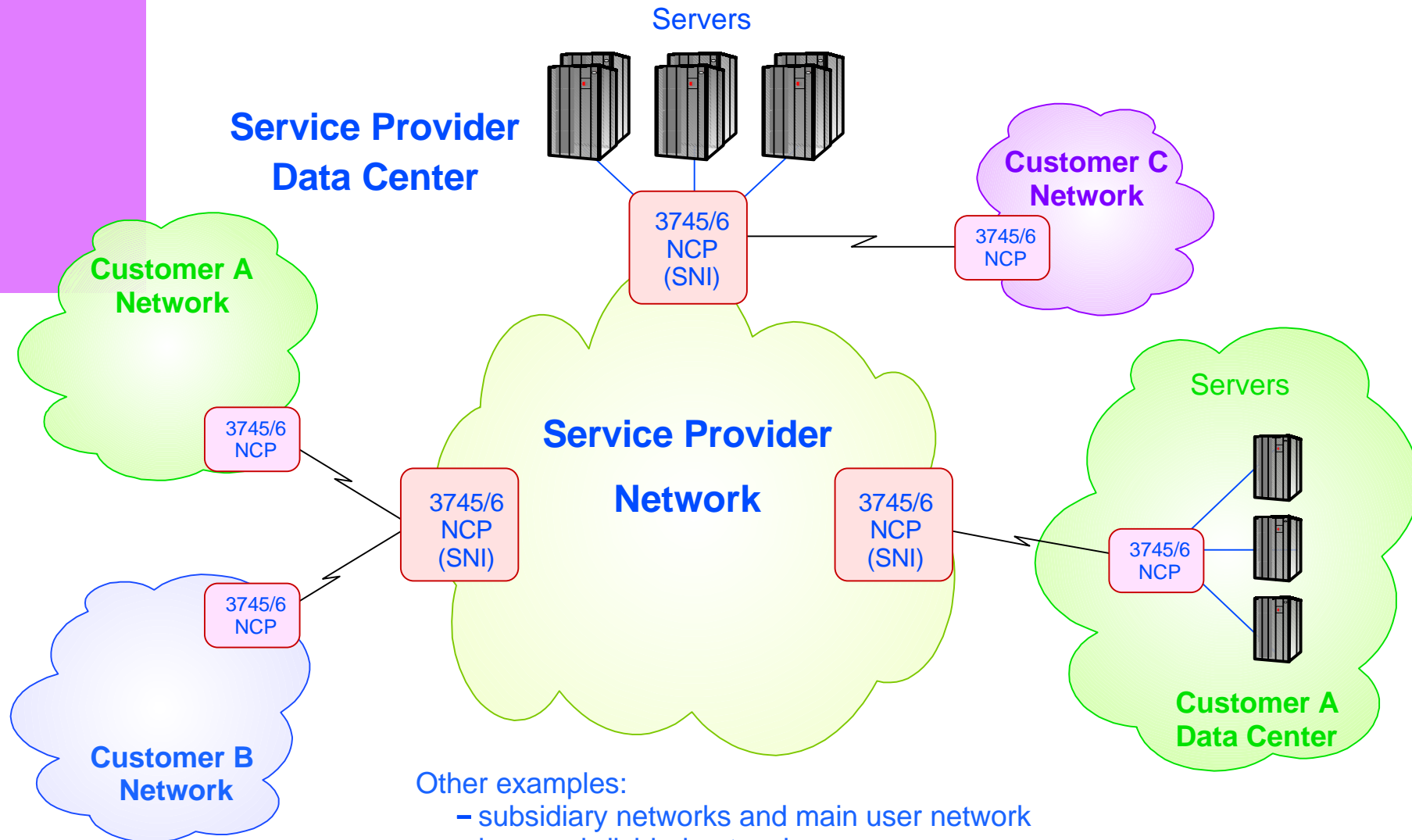
Transaction Rate (Telnet) (1)	1	18 (3)	25 (3)	60 (3)(4)
File Transfer Throughput (FTP) (2)	1	34 (3)	40 (3)	60 (3)(4)

(1) packets: IN=100 Bytes, OUT=1000 Bytes
 (2) packets: 4000 Bytes
 (3) estimates (16 processors)
 (4) MAE: LAN to ESCON

4. IBM 3746 - Interconnected Networks (1/2)



SNA Subarea Support (SNI)

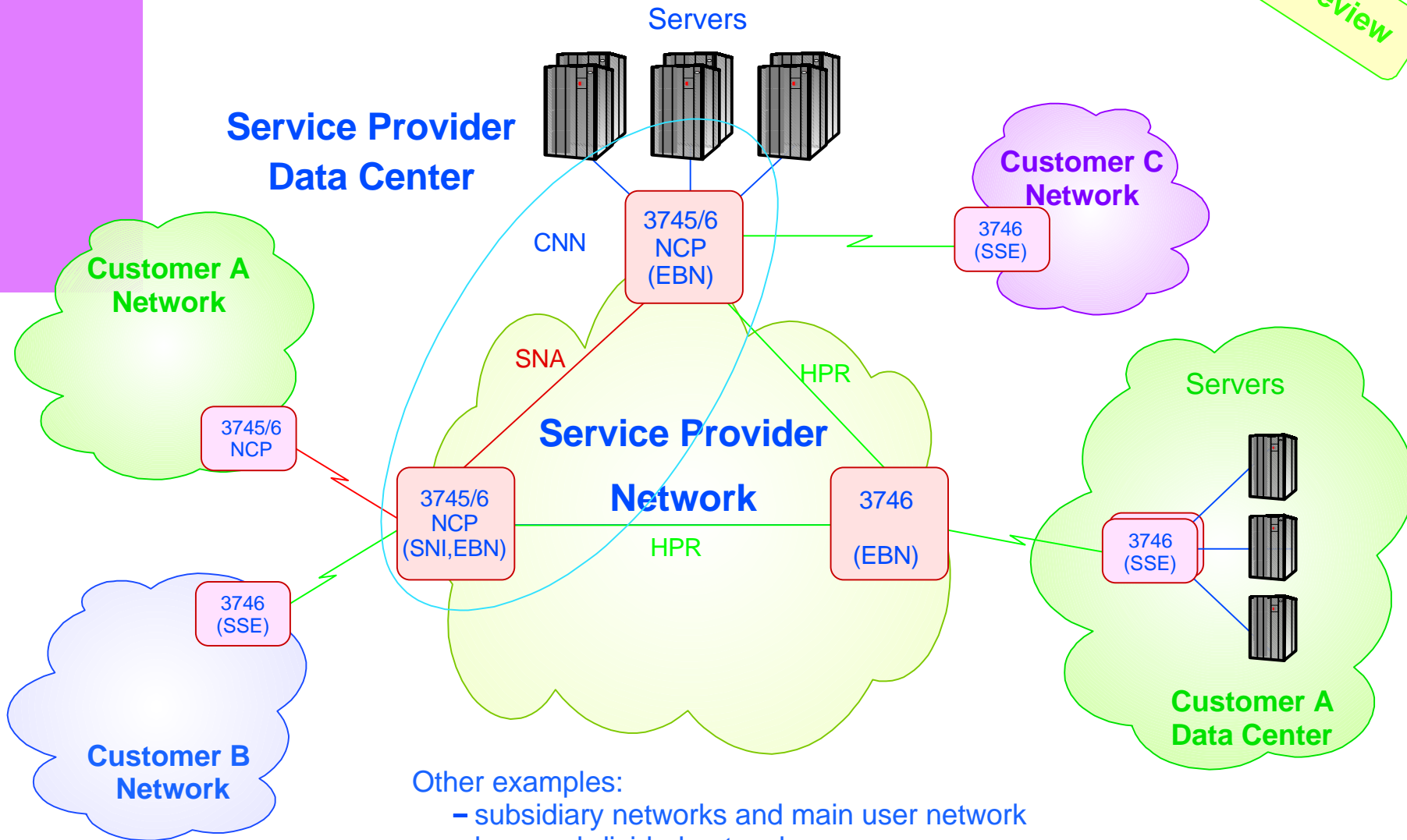


4. IBM 3746 - Extended Border Node (2/2)



SNA Subarea Migration to APPN/HPR

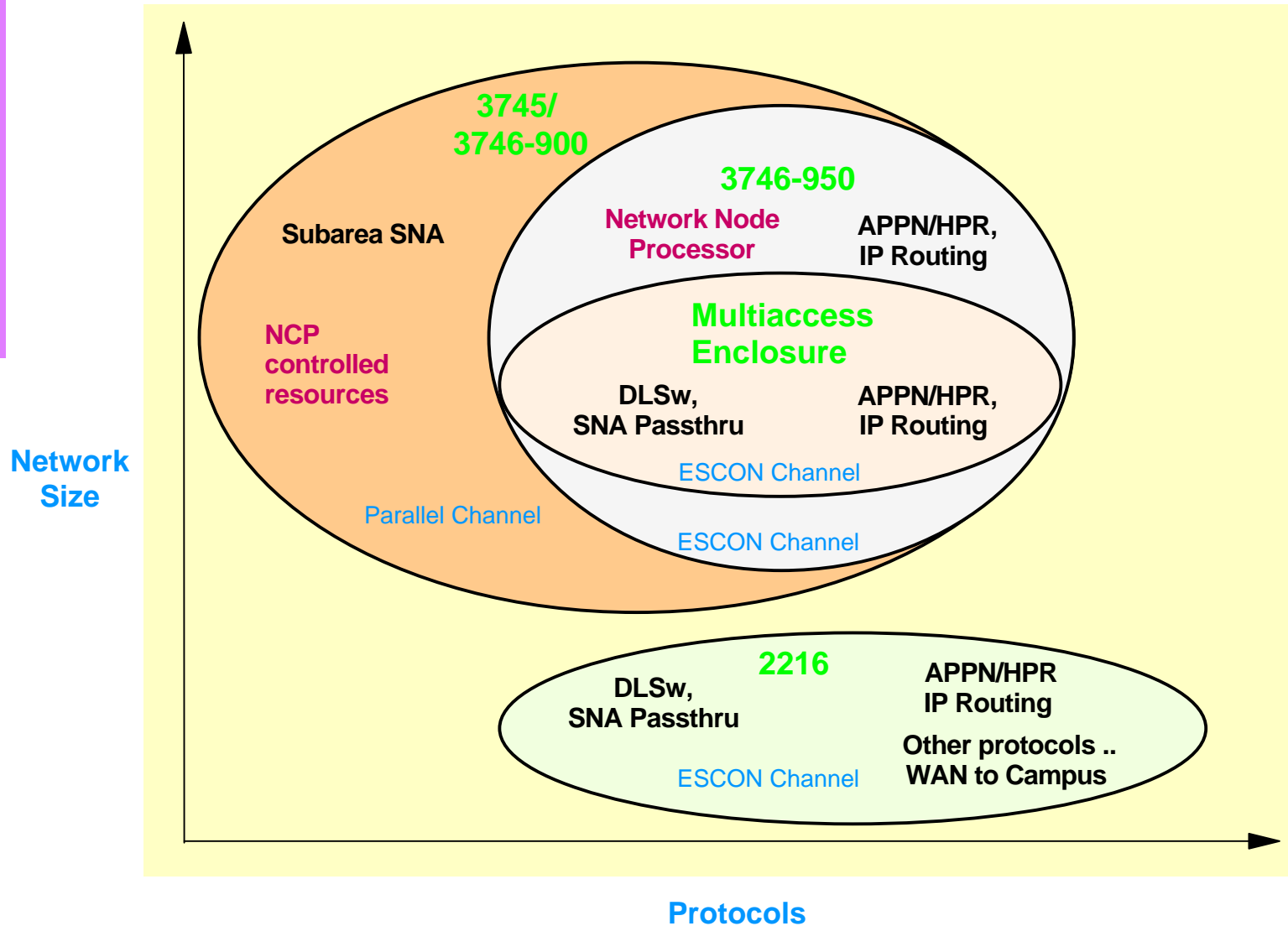
Preview



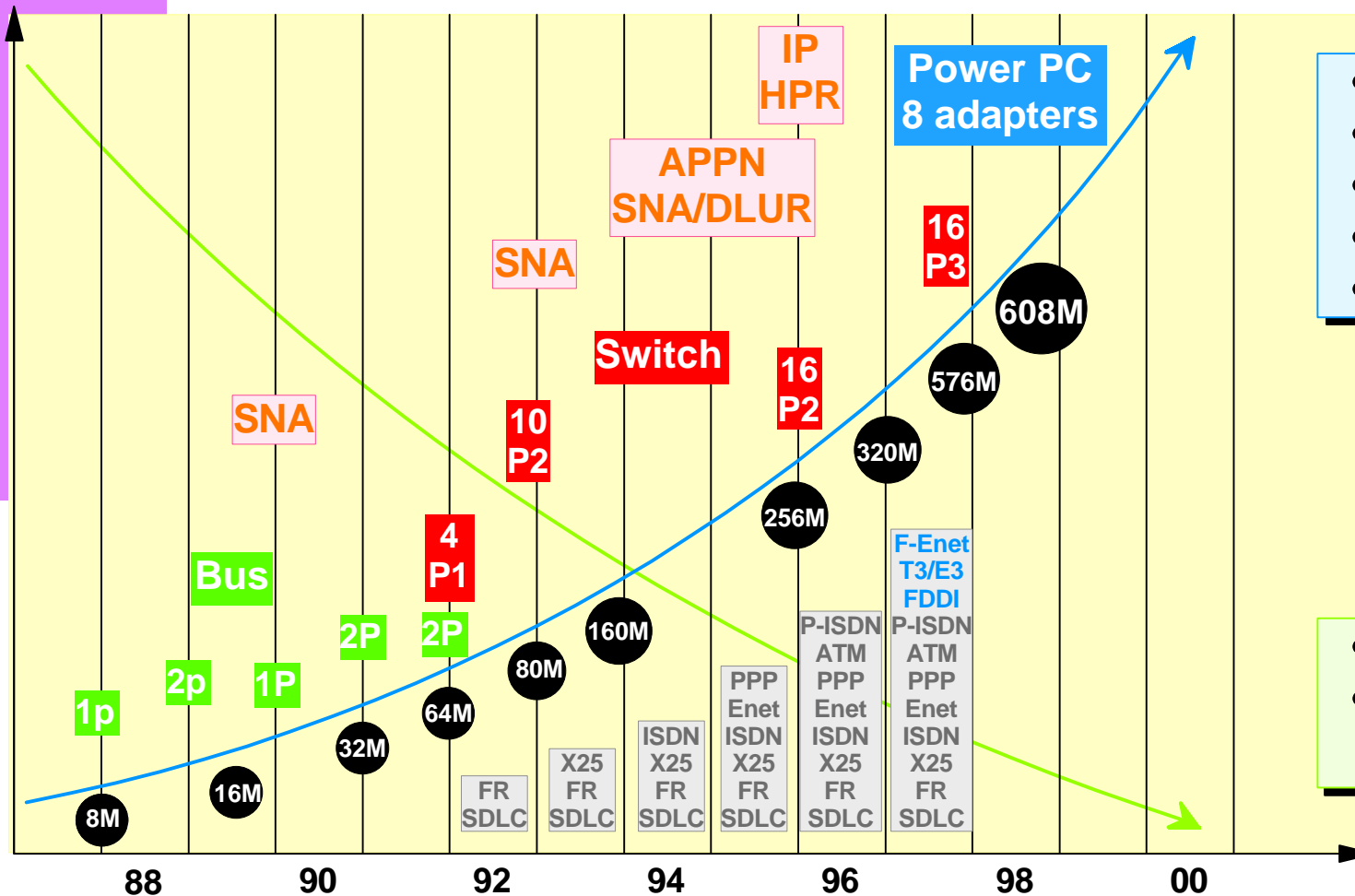
Other examples:

- subsidiary networks and main user network
- large subdivided networks

5. Positioning Summary 3745/3746 and 2216

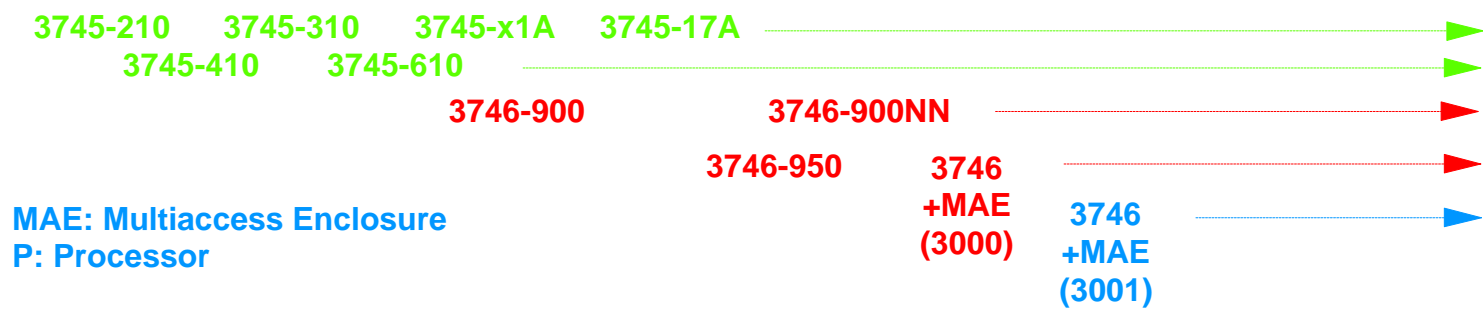


5. IBM 3745/3746 - Product Line Evolution



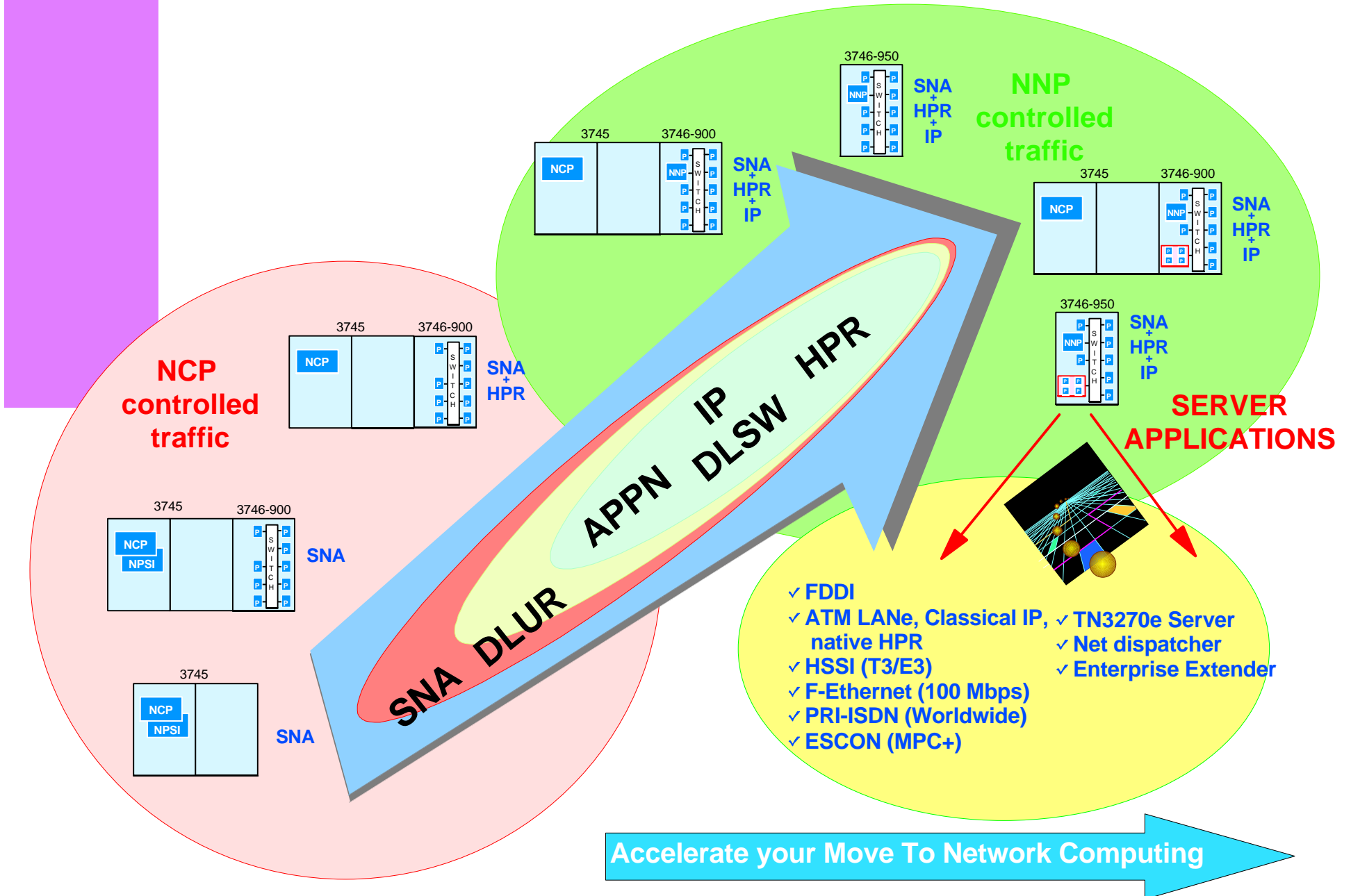
- Mips
- Memory
- Protocols
- DLCs sharing
- Connectivity

- Price/Port
- Configuration/Complexity



MAE: Multiaccess Enclosure
P: Processor

5. IBM 3746 - Field Evolution



Accelerate your Move To Network Computing