

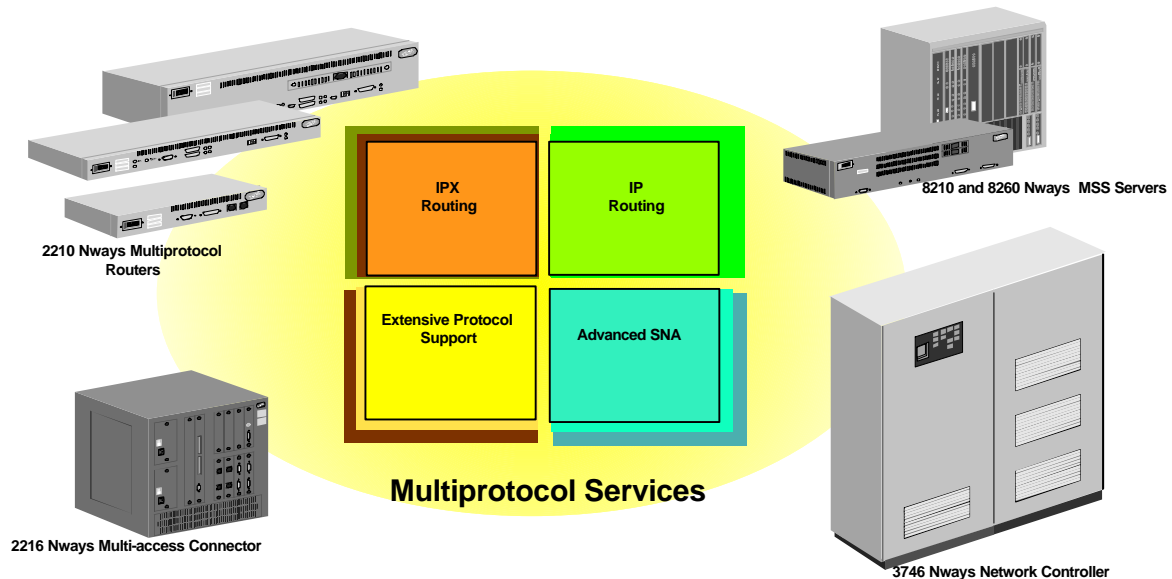
# **IBM vs Cisco Competitive Analysis 2210/2216 Part 1**

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05/97**

# Multiprotocol Services

Delivers interoperability and efficient use of skills and resources



## 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

# Family of Multiprotocol Services

- **Multiprotocol Switching Services**

- IBM 8210 Switching Services

- Integrated in 8260 or Stand-alone

- **Multiprotocol Access Services**

- IBM 2216 Access Services

- **Multiprotocol Routing Services**

- IBM 2210 Routing Services

## Multiprotocol Routing Services (MRS) Features

- **Common code based on award winning IBM 2210**
- **Data link controls (DLCs) including:**
  - **Token Ring, Ethernet**
  - **Point to point protocol (PPP)**
  - **Frame relay including boundary access node (FR BAN)**
  - **X.25, SDLC primary and secondary, ATM**
  - **Dial circuits including V.25bis, ISDN Basic and ISDN Primary**
- **Network protocols including**
  - **Bridging, including IP bridging tunnel**
  - **IP, DLSw, IPX, AppleTalk Phase 2, Banyan VINES**
  - **DECnet Phase IV and Phase V/OSI**
  - **APPN, HPR, ISR, DLUR**
  - **ATM LAN Emulation Client and Classic IP over ATM**
- **Dial support for dial backup and dial on demand**
- **SNMP network management and LAN Network Manager (LNM) support**

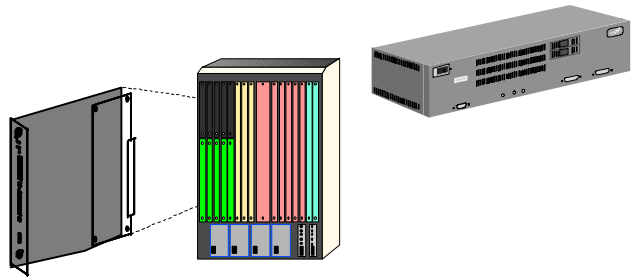
# MRS SNA Support

- **Leading , industrial strength, World-Class SNA support**
- **High Performance Routing (HPR) and APPN**
  - APPN Version 2 Network node
  - Edge/Intermediate Node (RTP/ANR)
  - Includes ISR-HPR Gateway, ISR-ISR Routing
  - HPR Link Support types: LAN, Frame Relay, PPP, V.25bis, ISDN and ATM LANE
  - ISR Link Support types: Same as HPR plus SDLC and X.25
  - Dependent LU Requester (DLUR) for dependent SNA Subarea devices (LAN, Frame Relay, X.25, SDLC, ISDN and ATM LANE)
- **Data Link Switching ( DLSw V2 )**
  - AIW Version 1 (RFC 1795)
  - SDLC to LLC conversion
  - NetBIOS Tower
  - AIW DLSw MIB
  - Frame Relay, PPP, X.25,V.25bis and ISDN, LAN and ATM
- **SDLC Primary, Multipoint Secondary and PU 4/5 INN**
- **Frame Relay Boundary Access Node (BAN)**
  - Direct Frame Relay connection to 3745/46 and AS/400

# Switched Virtual Network (SVN) Routing

*Scalable connectivity, common software base  
Priced right for customers and business partners alike*

MSS blade in 8260 or Standalone 8210



**MSS**

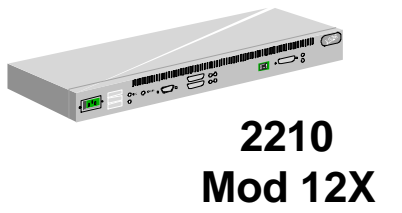


**3746-9XX**

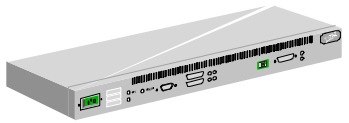
**2216**



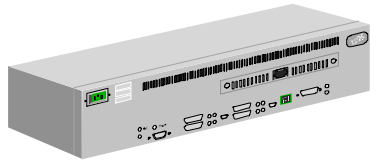
**2210  
Mod 1SX, 1UX**



**2210  
Mod 12X**



**2210  
Mod 14T, 24X**

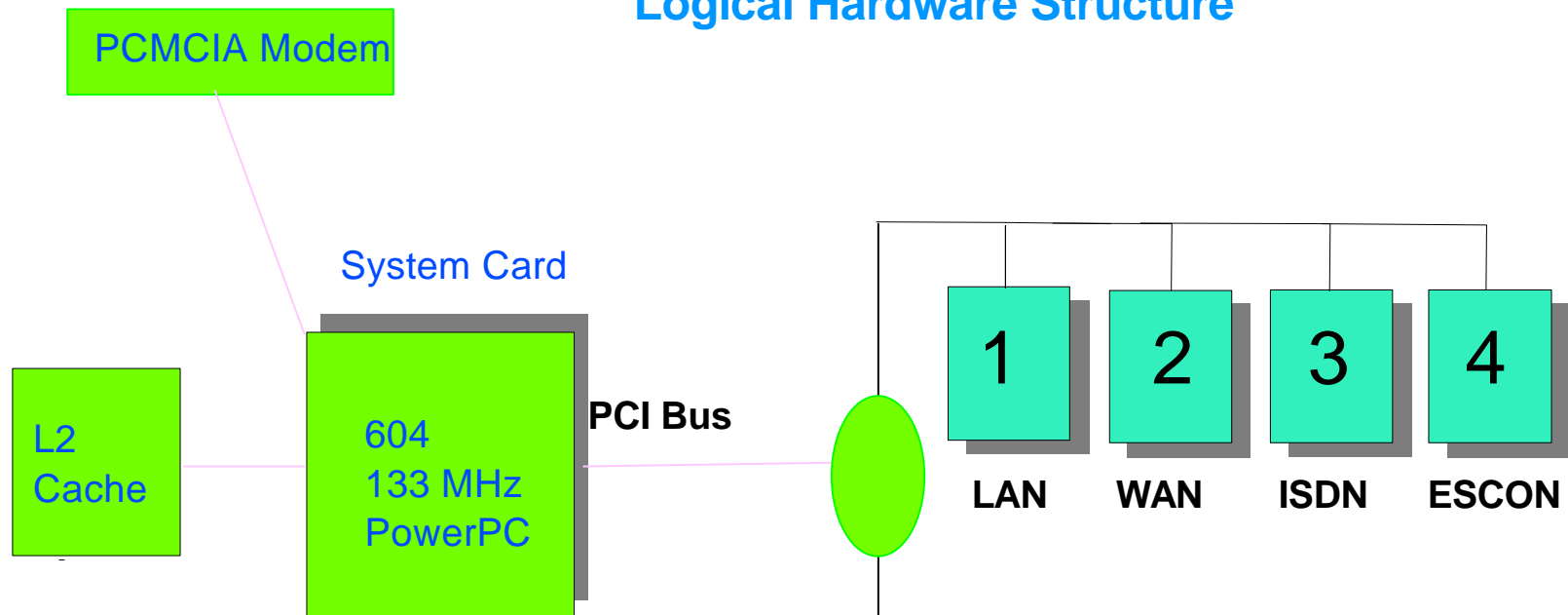


**Competitive end-to-end with *any* router vendor**



# IBM 2216 Nways Multi-access Connector

## Logical Hardware Structure



**Theoretic Avg. Bus Capacity = 640 Mbps. (80 MBytes)**

- Throughput in/out = 320 Mbps. (40 MBytes)  
(not including arbitration, etc.)

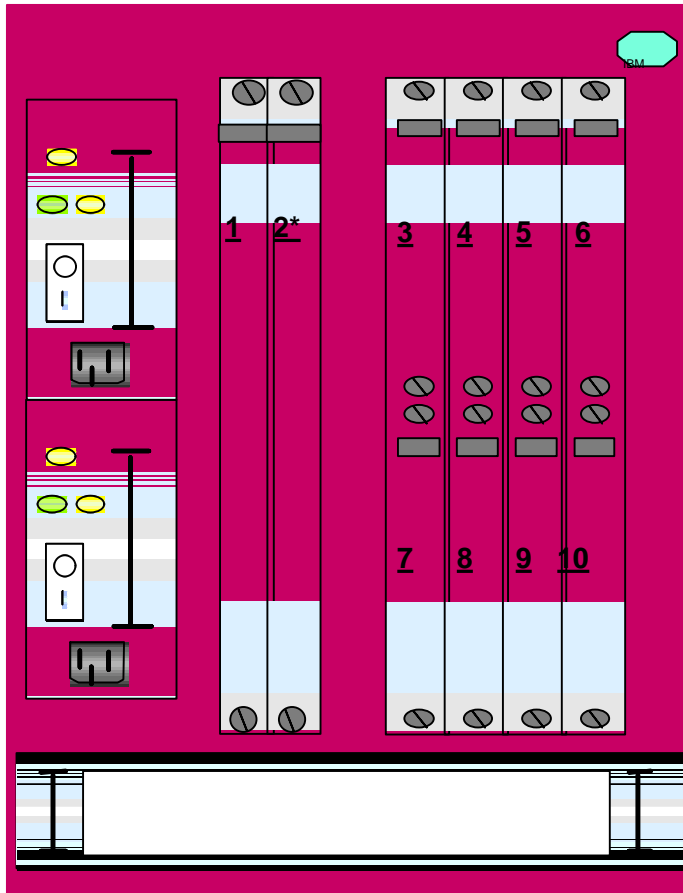
**Max. Bus Throughput (measured to date)**

- Throughput in/out (ATM) = 214.4 Mbps. (26.8 Mbytes)
- Throughput in/out (ESCON) = 224 Mbps. (28 Mbytes)



# Nways 2216 Multi-access Connector

## Hardware Platform



\* Reserved for Future Use

## Processor Support

- PowerPC System Processor
  - 604 133Mhz PowerPC w/ 512KB L2 cache
  - 64MB memory
  - Hardrive
  - 2 service ports-RS232 & PCMCIA 28.8 kps modem

## 8 Adapter Slots

- Hot-swap
- 1 port Escon
- 2 port Token-Ring
- 2 port Ethernet
- 1 port ATM 155Mbps MMF
- 1 port ATM 155Mbps SMF
- 1 port ISDN PRI (T1/J1)
- 1 port ISDN PRI (E1)
- 8 port V.24/RS-232
- 6 port V.35/V.36
- 8 port X.21

## Power

- 110/220V Autosensing/loadsharing
- Optional 2nd power supply for redundancy
- dual power cords

## Dimensions

- 22.75" H x 19" W x 14" D
- 19" rack mount or Tabletop
- fully front access all indicators,cables, & features

## **2216 Nways Multi-access Connector**

### ***Highly available, high-density WAN connectivity***

- **8-slot, PowerPC, PCI-based**
- **Redundant power; hot plugging adapters**
- **Excellent for concentrating multiple remote branches**
- **Up to 12 Ethernet/Token-Ring connections**

### ***Offers key high-end features***

- **High-speed 155 Mbps ATM**
- **ISDN PRI for dial-up redundancy**

### ***Uses same routing code as award-winning 2210***

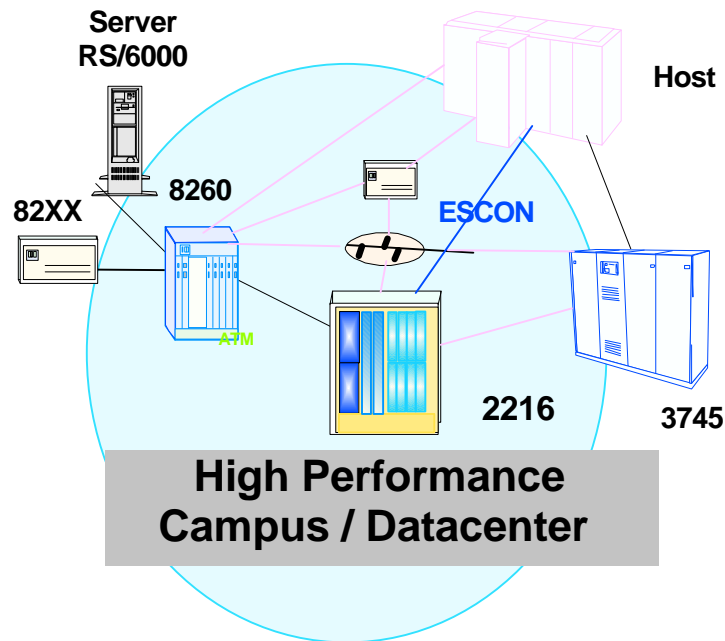
- **Lowers training and operating costs**

### ***Competitively priced against :***

- **Cisco 4XXX, 7XXX, routers**
- **Bay Network BCN, ASN routers**

# IBM 2216 Multi-access Connector

## Channel Connectivity



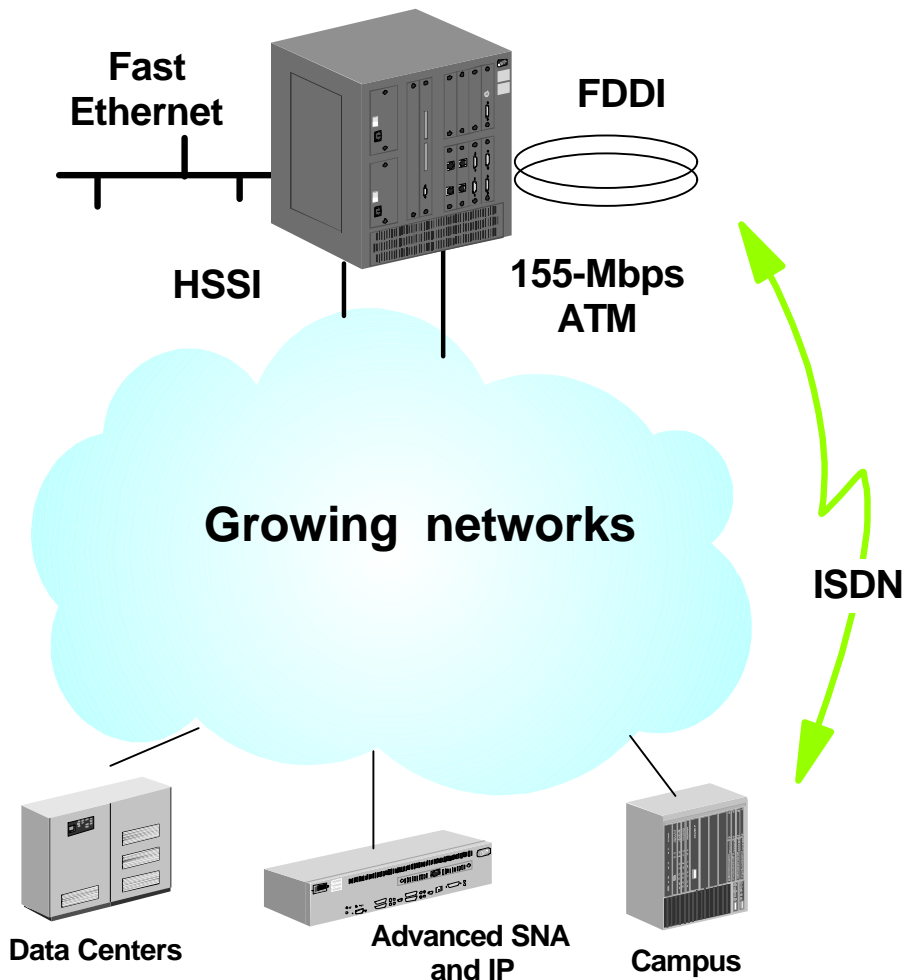
- **MPC+ - Multi-Path Channel**
  - Provided for ACF/VTAM 4.4 on VM, MVS, and VSE
  - Supports APPN HPR
  - Up to 16 MPC Groups per Adapter
- **LCS - LAN Channel Station**
  - Supports Host TCP/IP Applications
  - Appears as LAN to both Host and IP Routing Code
  - Up to 16 LAN Appearances Supported per Adapter
  - Takes Full Advantage of IP Routing Code (routing algorithms, filtering capabilities, etc.)
- **LSA - Link Services Architecture**
  - Supports SNA Applications for ACF/VTAM 3.4 or higher on VM, MVS, and VSE
  - Supports APPN ISR for ACF/VTAM 4.2 or higher
  - Supports DLSw
  - Up to 16 LAN Appearances per Adapter

# IBM 2216 Nways Multi-access Connector

## Channel Access Protocol Support

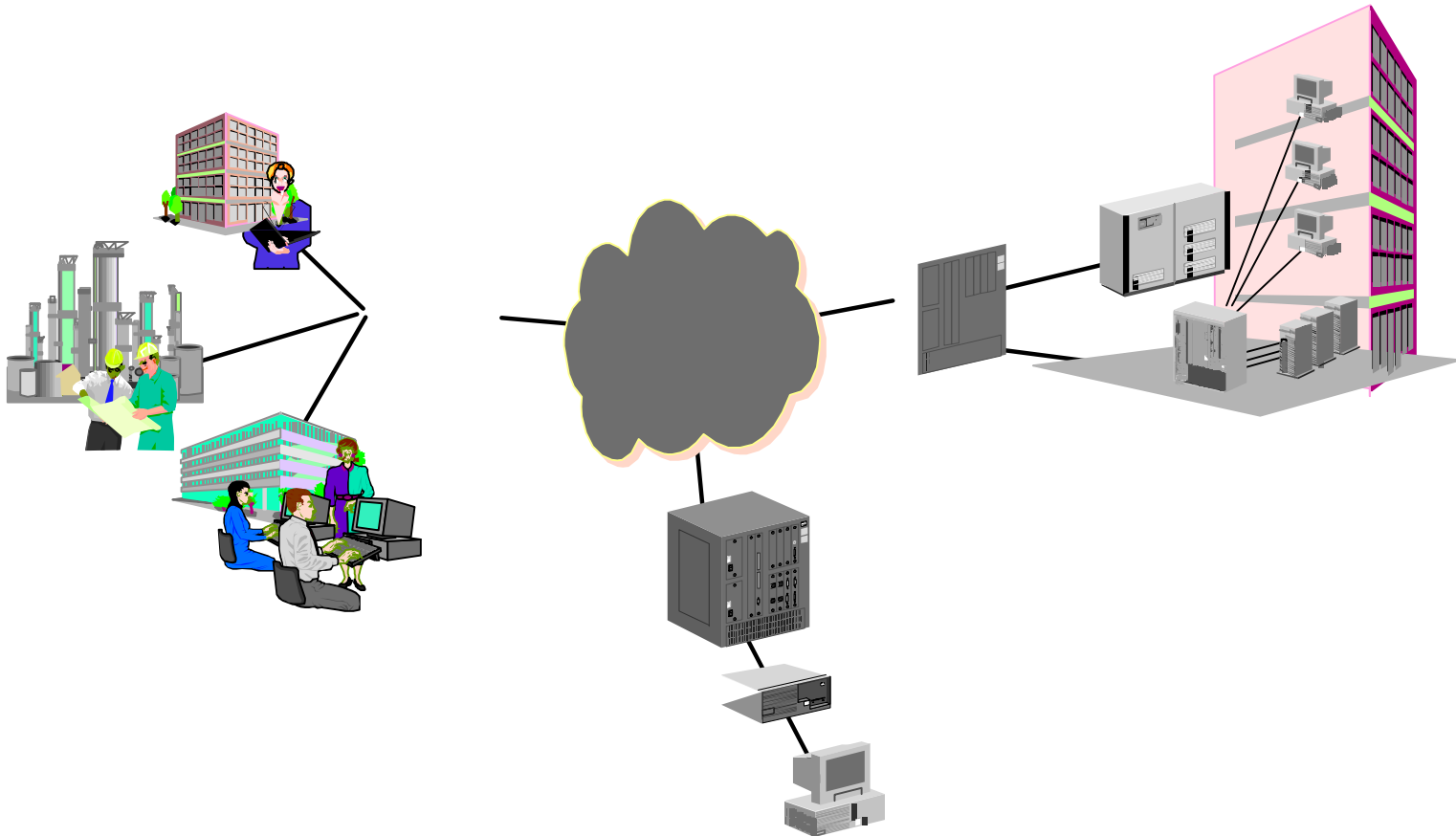
Protocol / Function	IBM Channel Access	Cisco Channel Access
TCP/IP	LCS	CLAW
DLSw SNA end systems	LSA	LSA
APPN: - ISR - HPR	LSA MPC+	LSA MPC (Not yet GA)
SNA LAN Gateway - Token Ring - Ethernet - ATM TR LANE - ATM EN LANE	LSA LSA LSA LSA	

## 2216 support for higher speeds and enhanced functions



### • Previewed Commitments:

- Provide higher speeds and connectivity
  - Fast Ethernet and FDDI
  - High Speed Serial Interface (HSSI) for E3/T3 speeds
- Add TN3270E server functions for host offload
- APPN/HPR over ATM
- X.25 QLLC
- X.25 APPN ISR and DLUR



## Feature Comparison between Cisco routers & IBM 2216

Specifications	Cisco 4700	Cisco 7204	Cisco 7206	IBM 2216
Processor Type	133 MHZ ORION	150 MHZ MIPS	150 MHZ MIPS	132 MHZ 604
Memory (DRAM)	16 MB (32 MB)	16 MB (128 MB)	16 MB (128 MB)	64 MB
Memory (Flash)	4 MB (16 MB)	8 MB (40 MB)	8 MB (40 MB)	Hard Drive ( 512K Flash for IMPL)
System BW		600 Mbps	600 Mbps	PCI Bus (1.29GB)
Chassis Slots	4	4	6	8
Configurable Slots	3	4	6	8
E'net (10Bae T)	1 Port (\$1,800 ) 2 Port (\$3,000) 6 Port (\$6,000)	8 Port (\$8,000 ) 4 Port (\$4,500 )	8 Port (\$8,000 ) 4 Port (\$4,500 )	2 Port (\$4,000)
F.E'net(100 base T)	NA	1 Port (\$3,000) (TX) 1 Port (\$3,700) (FX)	1 Port (\$3,000) (TX) 1 Port (\$3,700) (FX)	Preview
ESCON	NA	NA	NA	1 Port (\$20,000)
HSSI	NA	1 Port (\$6,000) 2 Port (\$10,000)	1 Port (\$6,000) 2 Port (\$10,000)	Preview
FDDI	MM Dual (\$7,300) MM Single (\$6,300)	1 Port MM (\$10,000) 1 Port SM (\$15,000)	1 Port MM (\$10,000) 1 Port SM (\$15,000)	Preview
Token-Ring	1 Port (\$2,300) 2 Port (\$4,600)	4 Port (\$ 7,000) 4 Port (\$10,000) FDX)	4 Port (\$ 7,000) 4 Port (\$10,000) FDX)	2 Port (\$4,000)
Serial	2 Port (\$2,300) 4 Port (\$4,600))	8 Port (\$8,000)	8 Port (\$8,000)	8 Port (\$4,000 ) RS 232 6 Port (\$8,000 ) V,35 8 Port (\$8,000) X.21
ATM	1 Port MM (\$9,500) 1 Port SM (\$11,500)	1 Port SM (\$10,000) 1 Port MM(( \$8,000)	1 Port SM (\$10,000) 1 Port MM(( \$8,000)	1 Port MM (\$7,500) 1 Port SM (\$10,000)
ISDN PRI	1 Port (\$2,750)	2 Port (\$4,500)	2 Port (\$4,500)	1 Port (\$7,500 )
Base Box Price (HW Only)	\$8,500	\$4K +4k or 5K + 1K or 3K)	\$5K + 4K or 5K + 1K or 3K	\$8,250
Software	\$1,700 to \$9,100	\$3,000 to \$11,000	\$3,000 to \$11,000	\$4,000

## Functional comparison of Cisco & IBM 2216

Feature	Cisco 4700	Cisco 7024	Cisco 7206	IBM 2216
Performance	80K PPS	140/150K PPS	140/150K PPS	80- 100 K PPS
OIR Support (Hot plug )	No	yes	yes	yes
Dual Power supplies	no	yes	yes	yes
Universal Power supply	no	yes	yes	yes
Redundent Cooling	no	no	no	yes
Environmental monitoring	yes	yes	yes	yes
Status LEDS	yes	yes	yes	yes
POST	yes	yes	yes	yes
On line reconfiguration	yes	yes	yes	yes
SW readable ID & Sr. Nbr.	??	yes	yes	yes
Web enabled	no	yes	yes	yes
Multi-services platform	no	no	no	yes
Security	yes	yes	yes	yes
Management	SNMP	SNMP/RMON	SNMP/RMON	SNMP
APPN Support	yes	yes	yes	yes
IBM Support	yes	yes	yes	yes



# Functional comparison of Cisco & IBM 2216

## Maximum number of active ports per machine

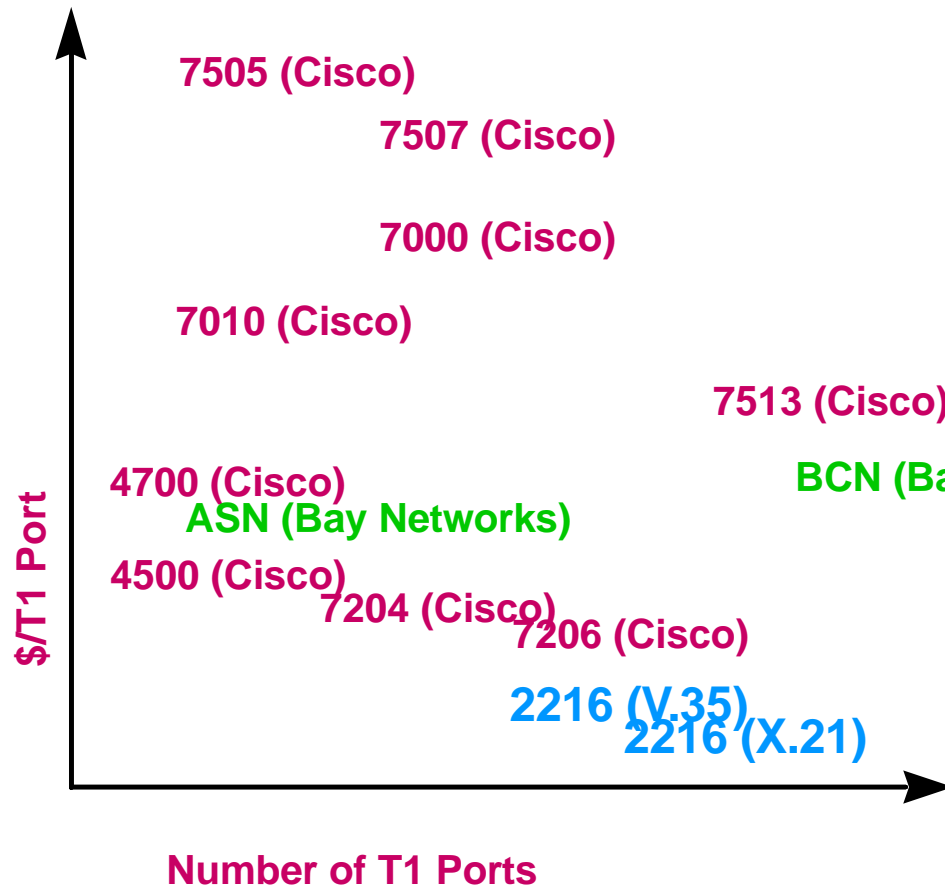
Feature	Cisco 4700	Cisco 7204	Cisco 7206	IBM 2216
ESCON	NA	NA	NA	4
ATM 155 Mbps	1	3	3	2
ISDN PRI	2	8	12	4
RS/232	12	32	48	64
V.35	12	32	48	48
X.21	12	32	48	64
Token Ring	6	16	24	12
Ethernet	18	32	48	12
HSSI	2	8	12	Preview
FDDI	2	4	6	Preview
Fast Ethernet	NA	5	7	Preview

# Functional comparison of Cisco & IBM 2216

## Protocols Supported

Feature	Cisco 4700	Cisco 7204 / 7206	IBM 2216
TCP/IP	Yes	Yes	Yes
IPX	Yes	Yes	Yes
AppleTalk 2	Yes	Yes	Yes
Banyan Vines	Yes	Yes	Yes
DECnetI 1V / V	Yes	Yes	Yes
APPN, HPR	Yes	Yes	Yes
SNA (DLSw)	Yes	Yes	Yes
NetBIOS	Yes	Yes	Yes
BAN	Yes	Yes	Yes
SRB	Yes	Yes	Yes
TB	Yes	Yes	Yes
SRT	Yes	Yes	Yes
SR-TB	Yes	Yes	Yes
IP Br. tunnel	Yes	Yes	Yes
DLSw V 2.0	yes	yes	Yes

## 2216 -- Competitive cost per T1 Port



*“No one else has really looked at building a high port- aggregate router mainly for the wide area”  
Melinda LeBaron, Gartner Group, in PCWeek 10/7/96*

**Note: Cisco Fast Serial Interface Processor has 8 ports, but can handle only 5 full T1 lines**

## World Class Reliability Features of 2216

- ▶ ***Fault tolerant design***
  - ➔ ***Optional dual Power supply***
  - ➔ ***Can be connected to two independent power source***
  - ➔ ***64 MB DRAM with Error Correcting Code ( ECC )***
  - ➔ ***Hot pluggability of adapters***
  - ➔ ***Three out of four fans adequate for router operation***
  - ➔ ***Notification of fan failure for remedial action***
  - ➔ ***Clear visual indication with LEDs***
  - ➔ ***Thermal sensors provide staged warning and protection***
  
- ▶ ***Built-in standard PCMCIA modem***
  - ➔ ***Allows remote pre-configuration***
  - ➔ ***Enables remote diagnostics and servicing***

## World Class Reliability Features of 2216 .....

- ▶ *Highly reliable unique hard drive technology*
  - ➔ *Very high MTBF ; increases 25% with back-up power*
  - ➔ *Used for storage of code and configs only*
  - ➔ *Powers down after startup, NOT required for router operation*
  - ➔ *Enables storage of multiple images*
  - ➔ *Can boot from selected configs in the drive*
  - ➔ *Images stored in different tracks for reliability*
  - ➔ *Allows intensive error logging and data dump*
  - ➔ *With the 1.2 GB drive, eases adding new router functionality*

## Strategic industry leading product

- ▶ ***IBM 2216 delivers critical solutions to meet growing customer network demands :***
  - ➔ ***Full function multi-protocol router***
  - ➔ ***High speed LAN/WAN connectivity***
  - ➔ ***Superior S/390 gateway for small / medium networks***
  - ➔ ***High performance, robust SNA support***
  - ➔ ***Price / Performance leader in the industry***
  - ➔ ***Cost effective WAN / ISDN concentrator***
  - ➔ ***Complements award winning IBM MSS and 2210***