Today's building block for tomorrow's networks

IBM 2216 Nways Multiaccess Connector Model 400

Highlights

Leader in IP and SNA integration

ESCON and parallel channel support for server access to as many as 256 System/370 and System/390 hosts or logical partitians

TCP/IP 3172 emulation or bridging provides function similar to 3172 Interconnect Controller

Enhanced TN3270E server support for over 15000 sessions and over 1000 transactions per second performance

Integrated Network Dispatcher for load-balanced traffic to IP Web servers, file transfer, mail news, Telnet and TN3270 servers

Web Server cache for high-speed access to Web pages and extending Web server capacity

VPN security features for secure exchanges over insecure networks

Network administration with policy-based networking

Virtual private networks (VPNs) with Internet Key Exchange (IKE) automated key management

Data and voice consolidation with voice packet forwarding and segmentation over frame relay

Differentiated Services for Quality of Service (QoS) and security profiles

SDLC support for migrating 3720 and 3725 controllers

Latest IP enhancements include IPv4 Differentiated Services, dynamic IP services and IPv6 dynamic reconfiguration

Thin Server support for network computers

Standard Virtual Router Redundancy Protocol support for redundant default router gateways

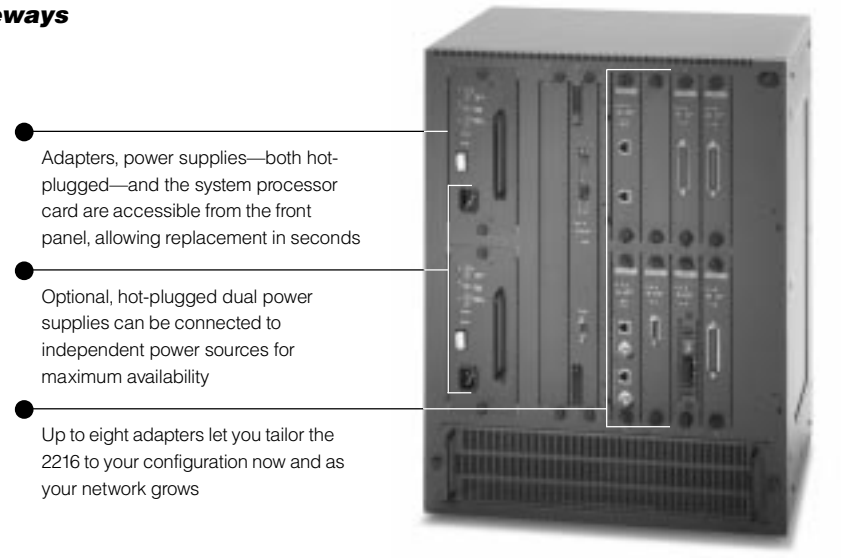
Data Link Switching to support SNA protocol traffic over IP backbones

Enterprise Extender technologies for APPN/HPR QoS and dependability for SNA traffic over IP backbones

Full APPN support includes Extended Border Node and up to 15000 DLUR sessions

Previewed VPN management application—Nways VPN Manager—monitors security and QoS

IBM 2216 Nways Multiaccess Connector



Cost-effective solution for S/390 or S/370 server access, TN3270 access to SNA applications, and WAN router network concentration

Demand the most from your network—its users do

Overburdened networks can (and sometimes do) fail, preventing mission-critical information from reaching field organizations, product development teams, customer service personnel, suppliers, and, most importantly, customers. To prevent catastrophic network outages and fully exploit the enhanced access to the internal information that intranets provide, deploy the IBM 2216 Nways® Multiaccess Connector Model 400.

At home providing access to System/370™ or System/390® hosts, and as a scalable, dependable WAN concentrator for downstream routers, the IBM 2216 Nways Multiaccess Connector Model 400 is a versatile addition to your network infrastructure. Use it for directing access to the company intranet or for concentrating access to the Internet for electronic commerce. No matter how you choose to deploy the 2216 Nways Multiaccess Connector, you can rely on advanced security and QoS features—including the ability to configure a virtual private network—to ensure that only authorized users are granted access.

With integrated Network Dispatcher, you can load balance Web, file transfer, news, mail and TN3270E servers more effectively by supporting protocol advisors for HTTP, FTP, Network News Transfer Protocol (NNTP), Post Office Protocol (POP3), Simple Mail Transfer Protocol (SMTP) and Telnet. With the Network Dispatcher, the advisers query the servers and analyze the results to help determine the best distribution of incoming requests. Users always get the least-busy available server.

No matter where you install the 2216, you'll know that your networks will keep pace with future demands and also provide the dependability today's users require.

Deploy the highly rated, multiprotocol 2216

Optimize your network and address multiple network design challenges with the IBM 2216 Nways Multiaccess Connector Model 400. Rated more than twice as fast as the competition by the Tolly Group*, an independent testing lab, the 2216 delivers both Systems Network Architecture (SNA) and Transmission Control Protocol/Internet Protocol (TCP/IP) traffic to S/390® hosts with tremendous throughput. Whether deployed as a wide area network (WAN) concentrator or to provide S/370™ or S/390 server access, the high-capacity 2216 fits naturally with IBM's campus switches, broadband switches and branch office routers, presenting a new and exciting network-computing building block for a variety of network infrastructures.

A cost-effective solution engineered for S/390 and S/370 server access and concentrating multiple WAN remote locations into regional and data-center campus backbones, the 2216 can be tailored to meet a broad range of challenges. Its eight adapter slots are capable of up to 4 ESCON® and parallel channels; WAN speeds of 9.6 kbps to T1/E1/J1, High-Speed Serial Interface (HSSI) for T3/E3, 155-Mbps asynchronous transfer mode (ATM), 10-Mbps and full-duplex 10/100-Mbps Ethernet, and Token-Ring, Fiber Distributed Data Interface (FDDI), and Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) network connections including support for channelized T1/E1/J1. And the 2216 also supports all common networking protocols.

**Source: The Tolly Group, publication 7192, www.tolly.com*

ESCON channel for TCP/IP and SNA connectivity

The ESCON channel manages data movement between the 2216 and S/390 servers, making use of innovative technologies to transfer data across the channel independent of the 2216's processing load. The 2216 with ESCON is a good upgrade path for 3172 users looking to boost capacity and add new, high-speed media attachments, technology upgrades and more functions. It also includes LCS 3172 emulation and LCS bridging support that enables the channel to bypass the IP routing code. The ESCON Channel Adapter offers access to up to 32 TCP/IP or 64 SNA hosts, when used with an ESCON Director, or access to up to 32 TCP/IP or 64 SNA logical partitions (LPs) in a host capable of running the ESCON Multiple Image Facility (EMIF). It can be extended up to 3 km (1.86 miles) with optical fiber, using either the 9034 ESCON Converter or the 3044 Fiber Optic Channel Extender Link Model D02.

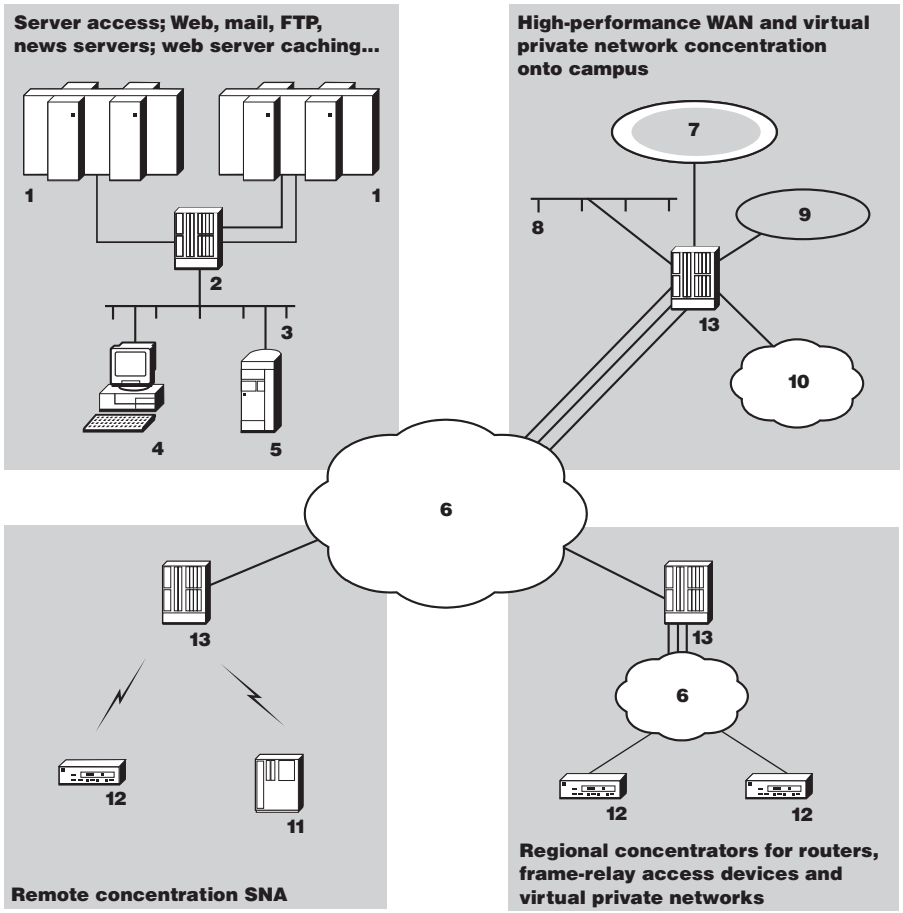
It includes:

- The ability to add a new logical partition or change an existing logical partition without disrupting the operation of other logical partitions.
- The ability to use the same logical CU address for multiple logical partitions, reducing system definition complexity.

With the ESCON Channel Adapter, the 2216 can be attached to the following hardware:

- ES/3090 Models 180J, 200J, 280J or other J-series models with System EC 227574 installed
- All models of the ES/9000 processors
- All ES/3090-9000T models
- All S/390 Parallel Transaction Servers
- All S/390 Parallel Enterprise Servers
- All S/390 Multiprise 2000 Servers

The versatile 2216 helps optimize your network in four key areas:



1. *Mainframe access (S/390, S/370); Server load balancing and Web server caching*
2. *2216 with IP, APPN, Enterprise Extender, DLSw and Network Dispatcher; or Server caching*
3. *Campus data center backbone (Token Ring, FasTR, 10/100-Mbps Ethernet, ATM, Fiber Distributed Data Interface (FDDI))*
4. *Client*
5. *AS/400 host*
6. *Leased-line, frame relay, X.25, ATM or ISDN network backbone*
7. *FDDI*
8. *Ethernet architecture*
9. *Token-Ring architecture*
10. *ATM architecture*
11. *3174*
12. *2210 and 2212 DLS, Enterprise Extender or IP*
13. *2216 with IP, APPN, Enterprise Extender, DLSw, SDLC*

Parallel Channel Adapter for S/370 and S/390 connectivity

The 2216 Parallel Channel Adapter provides a great upgrade path for IBM 3172 users looking to boost capacity and add new, high-speed media attachments, technology upgrades, and more functions. It also includes LCS 3172 emulation and LCS bridging support that enables the channel to bypass the IP routing code. This offers you a simplified configuration like the 3172 supports for easier migration when replacing the 3172s with the 2216s.

With the Parallel Channel Adapter installed, the 2216 can be connected to the following hardware:

- ES/3090™
- ES/9021
- ES/9121
- ES/9221
- ES/9370™
- 308x and 309x Processor series
- S/390 Parallel Transaction Server
- S/390 Parallel Enterprise Server™
- 3044 Fiber Optic Channel Extender Link, Models C02 and D02
- 9034 ESCON Converter Model 1
- Non-IBM hosts that support the OEMI interface standard
- Data transfer using Direct-Coupled Interlock (DCI) or at data-streaming speeds of 3.0 and 4.5 Mbps

Get high-speed System/390 and System/370 server access

For TCP/IP traffic, the 2216 uses LAN Channel Station (LCS) protocol. For three TCP/IP support alternatives:

- LCS routing between host and network in different subnets
- LCS bridging between host and network in the same subnets
- LCS 3172 emulation to associate a specific LAN to a specific host in the same subnet

For SNA traffic, the 2216 channel uses Link Services Architecture (LSA) protocol for subarea SNA, Advanced Peer-to-Peer Networking® (APPN®) and IBM High-Performance Routing (HPR) protocol.

In addition, the 2216 channels support Multi-Path Channel+ (MPC+), also known as High-Performance Data Transfer (HPDT) MPC, for both VTAM® and TCP/IP high-performance data transfer. MPC+ support reduces S/390 VTAM cycles and storage requirements. HPDT MPC connections provide a more efficient transfer of data and decrease consumption of S/390 CPU cycles, leaving more processing power for other demands. Additional S/370 and S/390 support features include:

- Support for over 10 000 link stations per SAP using the LSA channel protocol
- Multicast support over the channel allowing the use of multicast IP addresses over the ESCON and parallel channel
- On-board processing to reduce main CPU workload for efficient data transfers with S/370 and S/390 hosts
- Blocking of data for high efficiency and throughput
- APPN and High-Performance Routing (HPR) networking with VTAM Version 4.4 for MVS/ESA™ or Communications Server for OS/390® Version 1.3 or higher
- HPDT UDP for applications such as SAP R/3 using OS/390 UNIX® System Services UDP interface with OS/390 Version 2.4, or higher (ESCON only)
- Dependent LU Requester (DLUR) in APPN to provide connectivity between dependent downstream SNA devices and VTAM SNA applications
- Boundary Access Node (BAN) support for connectivity between downstream BAN Frame Relay Access Devices (FRADs), routers and VTAM SNA applications
- DLSw Version 2 for local (single 2216) conversion from SDLC to the channel and remote (using DLSw partners) connectivity to SNA devices on SDLC, LANs, and ATM Forum-compliant LANE
- APPN Extended Border Node (EBN) support for interconnecting separate APPN networks
- APPN EBN Session Services Extensions (SSE) support to allow VTAM end nodes to establish CP-CP sessions across border node boundaries Devices accessing the host can be connected with leased lines, frame relay, ISDN, ATM, X.25 or LANs.

The 2216 can accept any combination of up to four parallel channel and ESCON Adapters. Up to six parallel channel connections can be attached per parallel channel.

TN3270E connectivity between IP desktops and SNA servers

TN3270E support provides desktop users with access to SNA applications through the 2216. This allows network managers to take advantage of the growth in IP desktops and link them to SNA applications to maximize the efficiency of SNA-to-IP connections.

TN3270E support includes:

- Host–initiated dynamic LU definitions, which allow creation of LU addresses or names that are configured upon user connection to the 2216 TN3270E Server
- Host on-Demand client caching that supports browser access to the TN3270E server
- Subarea SNA connections between the TN3270E server and host over DLSw, SDLC, X.25 and frame relay
- Up to 15 000 sessions with 512 MB of system memory
- LU pooling to balance the traffic, increase reliability, availability and improve scalability
- IP address-to-LU name mapping that enables administrators to control client access to particular LUs or LU pools
- Self-Defining Dependent LUs (SD-DLUs)/ Dynamically Defined Dependent LUs (DDDLUs) that allow VTAM to create its LU definitions dynamically during the user connection process
- Multiple TCP ports to support older TN clients
- Integrated load balancing distributes traffic to the least busy, available server

The 2216's preloaded code provides support for subarea SNA connections from TN3270E servers to SNA hosts along with improved management. Multiprotocol Access Services also supports IBM APPN/HPR technologies that significantly improve network reliability and data transmission rates. Management Information Base (MIB) capabilities for TN3270E Servers—including Response Time Monitor (RTM) features—ensure that the 2216 remains an efficient network building block.

The 2216's TN3270E Server capacity can be incremented with the addition of the IBM Network Utility to the campus backbone. User connections will be balanced among the 2216 and Network Utility TN3270E Servers, providing users access to the least busy, available server.

Web server cache capabilities

An optional 2216 code image allows it to function as a cache support of a Web server, especially S/390 Web servers. The Server cache provides high-speed access to Web pages extending the Web Server's capacity and flexibility to build redundancy. With the 233-MHz processor system card and 512 MB memory, the 2216 provides approximately 400 MB of memory cache for Web objects. The cache supports:

- Caching of static Web pages
- HTTP 1.0 and 1.1 servers and clients
- Flexible caching policies for the objects to be cached, object size, cache partitions and objects to include or exclude based on URL masks
- Up to 16 independent cache partitions in support of multiple server clusters
- Full TCP/IP support
- Load balancing of server requests for Web pages not found in the cache
- Active or passive backup cache for high availability
- Scalability to combine up to 16 individual server cache machines into a single operational cache
- New externalized API permitting Web servers to more precisely control the cache content

Take advantage of IBM reliability
The 2216 Multiaccess Connector is designed for maximum availability. With hot-plugged, load-sharing power supplies and current-limiting circuitry to prevent a single adapter failure from corrupting other adapters and the power supply, the 2216 is a network stalwart. Front panel access to the adapters, power supplies and system card allow for quick replacement without removing the 2216 from a rack.

The 2216 maintains its configuration and operating history in nonvolatile storage to reduce offline diagnostics and servicing. Additionally, an integrated modem is available in most countries for remote diagnostics.

Each of the 2216's power supplies has its own power cord for connection to independent power sources; and its hot-plugged, multi-fan cooling system can prevent catastrophic network failures. An optional second power supply is available. Individually powered, hot-plugged adapters can be inserted or removed while the 2216 is operational and without rebooting the software.

Most adapters can be installed without taking the network down. This dynamic reconfiguration capability coupled with globally available on-site support and field replacement of failed components 24 hours a day, 7 days a week, will keep information flowing.

Use virtual private networks to prevent unauthorized network access
Multiprotocol Access Services provides a comprehensive set of multiprotocol routing protocols and transport code for the 2216 Nways Multiprotocol Connector Model 400. The MAS features IP Security (IPSec) for authentication, encryption and IP packet tunneling over insecure IP backbones—including the Internet—that pose security hazards. Using IPSec to secure IP connections over insecure networks can eliminate the need for leased lines between sites and allow the use of virtual private networks to reduce networking capital expenses.

A virtual private network can be deployed as an extension of your corporate intranet across a public network (the Internet or service provider networks) to create a secure connection through an encrypted "tunnel." With three broad applications, virtual private networks are proving to be powerful enterprise solutions.

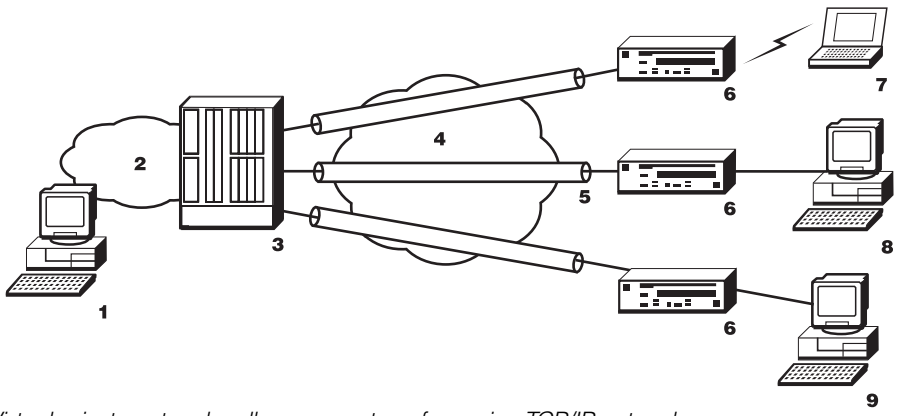
- The first application is dedicated to the remote user who needs access to the corporate intranet using the Internet.
- The second application is for branch office connection to the central corporate intranet without leasing or installing frame relay, leased lines, X.25 or similar telecommunications connections.
- The third application is intended for corporate business partners or suppliers who need access to internal corporate data but are not privileged with a dedicated connection.

With these applications, virtual private networks use the Internet for data transfer through secure connections. Encryption is used for packet transmission, and hosts use firewall technologies to prevent unauthorized access. Most importantly, based upon research completed by Infonetics Research, Inc., virtual private networks can save 20 to 47% in WAN costs and can reduce remote access costs by as much as 60 to 80%.

VPN IPSecurity (IPSec) support is enhanced with the introduction of Internet Key Exchange (IKE) support for automatic key management. IKE is an amalgam of three protocols:

- Internet Security Architecture Key Management Protocol (ISAKMP)
- Oakley key determination protocol
- Secure Key Exchange Mechanism (SKEME)

The IKE function enables you to automatically set up security associations and manage cryptographic keys. It also ensures that your company's VPN policy is conveniently and accurately implemented throughout the extended network with little manual configuration. IKE defines a standard framework to support automated negotiation of Security Associations and initial generation of all cryptographic keys.



Virtual private networks allow secure transfers using TCP/IP networks

1. *Enterprise workstation*
2. *Enterprise intranet*
3. *2216 Nways Multiaccess Connector*
4. *TCP/IP network*
5. *Encrypted transmission tunnels*
6. *2210 Nways Multiprotocol Router or 2212 Access Utility*
7. *Remote end user*
8. *Branch-office desktop user*
9. *Supplier/vendor desktop user*

Multiprotocol Access Services supports Layer 2 Tunneling Protocol (L2TP) for secure tunneling of multiprotocol data from remote users. The Layer 2 Tunneling Protocol has been enhanced so that the 2216 can initiate an outgoing call from the L2TP Access Concentrator (LAC), like the 2210 or 2212, when its traffic has been designated for a remote user. Microsoft® PPTP and Cisco L2F are mechanisms for tunneling of Layer 2 frames (such as PPP) over IP in support of virtual private networking. PPTP and L2F tunnels can coexist with L2TP tunnels on the same box with virtually the same configuration and setup—providing a migration path for customers that already have PPTP or L2F deployed and plan to move to L2TP.

For additional security, the code also allows external TACACS+ or RADIUS servers to authenticate, authorize and account for logon requests either for operations access to the 2216 or for Point-to-Point Protocol (PPP) connections to ensure that potential users are authorized to access network resources. Multiprotocol Access Services also provides Network Address Translator (NAT) to prevent unauthorized users from determining the IP address of any of the servers or nodes on your private network.

Another new MAS function is policy-based networking. The combined policy engine (CPE) principal function is to search through a set of user-configured rules to retrieve the right set of actions that the box needs to perform on a given packet. The LDAP is a standard client/server, TCP-based protocol that allows the user read/write access to information stored in a directory server. With LDAP client support, the 2216 can retrieve policy information for IPSec, Differentiated Services, RSVP and IP filters from a central LDAP directory server, simplifying the network configuration and administration for Application Virtual Network.

2216 IP enhancements include:

- IPv6 support for delete interface, activate interface, reset interface, reset IPv6, reset parameter and PIM6 talk commands
- RSVP to reserve network resources to achieve a desired quality of service for packet delivery
- IP Precedence/TOS bits to classify, filter and route packets
- IPv4 type of service (TOS) Precedence Setting/Filtering Support for APPN/HPR, SNA/DLSw and TN3270E servers to extend SNA priority queuing over IPSec virtual private network connections
- IPv4 Differentiated Services for QoS mapping of bandwidth and latency characteristics
- Standard PPP multilink support including multichassis support.
- Frame relay SVCs and PVCs
- X.25
- Frame relay or PPP over V.25 bis, Dial circuit or ISDN Dial circuits

A range of WAN support

The 2216 offers a range of WAN adapters to connect downstream 2210 Multiprotocol Router and 2212 Access Utilities. The IBM 2216 Nways Multiaccess Connector WAN adapter cards provide the following features:

- Support for T1/J1 data transfer rates up to 1.544 Mbps; E1 support for 2.048-Mbps transfers
- T1/J1: Twenty-three 64-kbps B-channels for data and one 64-kbps D-channel for signaling for ISDN or twenty-four 64-kbps DS0s when used as a channelized T1/J1
- E1: Thirty 64-kbps B-channels and one 64-kbps D-channel or up to 30 DS0s when used as a channelized E1
- Up to eight ISDN Primary Rate or channelized attachments by installing optional adapter daughter card. In addition to PRI connections, the 2216 can also be configured with channelized T1/E1/J1 interfaces to offer as many as 248 DS0 connections. These 2216 adapter cards can support a combination of PRI and DS0 connections
- Frame relay and PPP encryption
- Dial-backup support with up to 240 active ISDN B-channels with proper configuration and storage for 1000 remote sites
- Termination of hundreds of L2TP tunnels
- Software that uses the award-winning Bandwidth Reservation System (BRS) to assign traffic priority and maintain throughput

Nways 2216 attachments support diverse network architectures

IBM offers several attachments designed to make the 2216 your network's cornerstone. The 2216 Multiaccess Connector features the following adapters:

- 1-port Parallel Channel
- 1-port ESCON Channel
- 1-port ISDN PRI/Channelized T1/J1
- 1-port ISDN PRI/Channelized E1
- 4-port ISDN PRI/Channelized T1/J1 (with an optional 4-port daughter card)
- 4-port ISDN PRI/Channelized E1 (with an optional 4-port daughter card)
- 8-port EIA 232/V.24
- 6-port V.35 or V.36
- 8-port X.21
- 1-port High-Performance ATM MMF
- 1-port High-Performance ATM SMF
- 2-port 10-Mbps Ethernet
- 2-port Token Ring
- 1-port 10/100-Mbps Fast Ethernet (full duplex)
- 1-port FDDI
- 1-port HSSI

Flexible adapter configuration
Adapters can be positioned in any slot, with the following exceptions:

- Token-Ring or two-port Ethernet adapters in slots 3 or 7 require the adjacent slots (4 or 8) to be kept free. Token-Ring or two-port Ethernet adapters in slots 4 or 8 require the adjacent slots (3 or 7) to be kept free.
- Up to two ATM adapters can be used.
- Up to four one-port ISDN adapters can be used.
- Up to four channel adapters, any combination of ESCON or parallel, can be used.
- Only one 4/8 port ISDN PRI/Channelized T1/J1/E1 adapter can be used.
- Maximum of eight of any combination of ISDN PRI/Channelized interfaces can be used.

Note: You can configure the 2216 with up to eight high-speed adapters (HSSI, FDDI and Fast Ethernet). However, you may not be able to achieve full media throughput concurrently on all the adapters. When planning the installation of such adapters, review system performance expectations with an IBM representative.

Easy to install and administer
Get the most from your 2216 with IBM Nways Multiprotocol Access Services Version 3.3 code. To route information to its destination, your network relies on hardware and code to make sure that information is delivered efficiently. IBM Nways Multiprotocol Access Services was engineered to support the 2216's hardware and ensure optimum network operation, while offering reliable security and significantly improved network availability and scalability.

A typical 2216 hardware installation requires less than two hours. Following the hardware installation, the 2216 can be configured to a network with a local ASCII terminal or an ASCII terminal connected by modem. GUI configuration programs running on IBM AIX®, OS/2® or Microsoft Windows® 95 or Windows NT® can then tailor the 2216 to meet enterprise-specific demands.

Once configured, a Simple Network Management Protocol (SNMP) manager can direct the 2216 over a TCP/IP network. IBM provides comprehensive, easy-to-use GUI software to support the 2216 Nways administration, management, problem analysis, and reporting capabilities. Current management applications include Nways Manager for AIX Version 1.2, Nways Workgroup Manager for Windows NT Version 1.1, and Nways Manager for HP-UX Version 1.2.

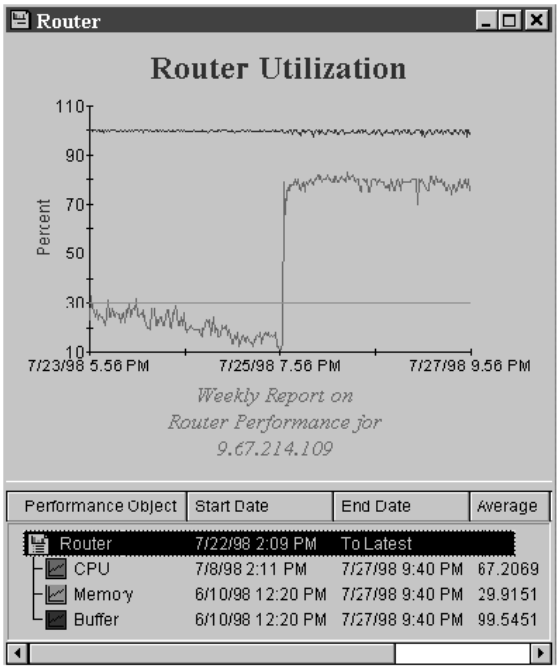
These manager products take advantage of Java™ technologies to deliver real-time network performance characteristics to network administrators when a Java-enabled browser is used to access management features.

You can monitor the 2216's CPU and memory either from the command-line interface or SNMP. This information can be used to determine network bottlenecks and daily load trends and also to map future capacity needs.

Increase network availability
Multiprotocol Access Services allows you the freedom to add or remove adapters without taking the 2216 down, diminishing the disruptions caused by configuration changes. Dynamic reconfiguration enhancements allow new adapters and protocols to be configured and activated without powering down or disabling the 2216.

Availability is augmented by the Virtual Router Redundancy Protocol (VRRP). VRRP specifies a standards-based protocol that provides backup among LAN-attached routers. This technology provides a higher availability default path without requiring dynamic routing or router discovery protocols on every end host.

Monitor the CPU and memory utilization of the 2216 using Java-based Nways management applications



Additional Multiprotocol Access Services features

Multiprotocol Access Services Version 3.3 allows a single network infrastructure to carry all common protocols: IP, IPX, AppleTalk 2, Banyan VINES, DECnet IV, SNA, APPN and DECnet V/OSI traffic can share common resources, helping to abate network expenses.

Multiprotocol Access Services offers innovative Enterprise Extender technology to bring APPN/HPR benefits to IP backbones. The code also features Network Dispatcher for high-capacity load balancing and high availability for IP client access to servers. Multiprotocol Access Services V3.3 and Network Dispatcher can balance traffic to the TN3270E server in the same 2216 as well as external TN3270E servers, like the IBM Network Utility.

MAS also supports Quality of Service (QoS) enhancements such as differentiated services, LDAP client and IP flow cache. Differentiated Services consist of delay and rate guarantees to provide an enhanced handling of selected packets. It also supports expedited forwarding, which emulates a leased line where incoming traffic is guaranteed a given rate and latency. Assured service provides rate guarantees without the associated delay guarantees. IP flow cache contains the traffic and service profile (loaded by the LDAP client) of the most recently active IP flows being serviced by the box. This allows the box to handle mapping QoS to IP packets in a much more efficient manner.

The 2216 also provides voice support in networks with integrated voice and data. It supports FRF.12 fragmentation and voice packet forwarding over frame relay. FRF.12 is used to allow real-time and data frames to share the same interface. Voice packet forwarding enables the 2216 to pass voice packets through it between frame relay PVCs.

The MAS also offers recent enhancements including:

- DHCP services for simplified administration of workstation configurations as well as flexible, highly-customized IPv4 route policies
- SDLC improvements for primary group poll and optional two-way simultaneous (TWS) scheduling to improve link utilization for full-duplex stations
- IPX enhancements
- X.25 dynamic reconfiguration
- BAN MIB
- DIAL MIB
- IPSec MIB
- WAN reroute MIB (WAN restoral, WAN reroute and DIAL-on-Overflow)
- Thin Server enhancements

Multiprotocol Access Services code supports multiple forms of data traffic over ATM links: ATM Forum-compliant LANE client, Classical IP, IPX bridging and native APPN/HPR routing. Multiprotocol Access Services can also integrate high-speed networking protocols, such as Fast Ethernet and FDDI for high-bandwidth, high-capacity access to campus backbones or servers from attached LANs, WANs, ATM networks, or ESCON and parallel channels. The 2216 with Multiprotocol Access Services also supports high-speed T3/E3 connections for connectivity between two sites using PPP or for cost-effective consolidation of many connections into a campus or data center.

Manage VPN security and Quality of Service with the new Nways VPN Manager

Monitor the security and Quality of Service of your virtual private network using the previewed IBM Nways VPN Manager. The VPN Manager monitors security over IPSec tunnels and Layer 2 sessions. The VPN Manager also monitors Quality of Service for ReSerVation Protocol (RSVP) and the Differentiated Services (DiffServ) TOS byte. Patent-pending, IBM-exclusive VPN Manager tests simulate the effect of traffic against router policies and measure response time for Layer 2 sessions. The VPN Manager supports the 2210, 2212, 2216, and Network Utility and is supported on Windows NT, AIX, and HP-UX beginning in the previewed Nways Manager Version 2.



A wide range of adapters tailors the 2216 to your configuration

IBM 2216 Multiaccess Connector at a glance

Models	Model 400 with 8 adapter slots
System Card	Optional PowerPC 604E 200-MHz processor, and 64, 128 or 256 MB of RAM Optional PowerPC 740 233-MHz processor supporting 64, 128, 256, 512 MB *Note: Both processors offer comparable performance*
Software	IBM Nways Multiprotocol Access Services V3.3 • Routing protocols: – TCP/IP including IPSec with Internet Key Exchange and digital certificates – IPX – AppleTalk 2 – Banyan VINES – DECnet IV – DECnet V/OSI • SNA Data Transport: – APPN NN/HPR/ISR/DLUR/Branch Extender/Enterprise Extender, Extended Border Node – DLSw (RFC 1795 and 2166) including NetBIOS support – Frame Relay BAN for subarea, HPR/ISR and Frame Relay Boundary Network Node for HPR/ISR – LAN Network Manager support • Bridging: Source-route, Transparent, Source-route transparent, SR-TB translational and IP bridging tunnel • ATM: – ATM UNI 3.0/3.1 – ATM Forum-compliant LANE Client (LEC) – Classical IP and NHRP – 1483 encapsulation for IP, IPX and bridging – Native HPR routing • Switched network access: – V.25 bis – Worldwide ISDN PRI—including support for DIALs clients – WAN reroute for frame relay, PPP or X.25 link failures – WAN restoral for PPP – Dial on demand, dial backup and permanent dial • WAN data link controls: – Frame Relay (RFC 1490) including BAN and BNN support, compression, encryption, congestion control and SVCs – PPP including compression and encryption, and multilink support including Bandwidth on demand and multilink multichassis – L2TP – L2F – PPTP – X.25 including QLLC and X.25 over TCP/IP – SDLC primary and secondary including PU4 to PU4 • IP and SNA over ESCON and parallel channels including HPDT MPC (MPC+) • TN3270E server support (optional feature) for both SNA subarea and APPN • Integrated Network Dispatcher for balanced traffic among IP servers • Bandwidth Reservation System (BRS) over frame relay and PPP • Differentiated Services over frame relay and PPP • Web server cache (optional image) • AAA through TACACS+ and radius servers

IBM 2216 Multiaccess Connector at a glance continued

Adapters	1-port Parallel Channel 1-port ESCON Channel 2-port Token Ring 2-port 10-Mbps Ethernet 1-port 10/100-Mbps Ethernet (full-duplex) 8-port EIA 232/V.24 6-port V.35 or V.36 8-port X.21 1-port ISDN PRI/Channelized T1/J1 1-port ISDN PRI/Channelized E1 4-port ISDN PRI/Channelized T1/J1 (with an optional 4-port daughter card) 4-port ISDN PRI/Channelized E1 (with an optional 4-port daughter card) 1-port High Performance ATM MMF 1-port, High-Performance ATM SMF 1-port FDDI 1-port HSSI
Capacity	Up to 8 slots available for communication adapters Up to 2 power supplies
Management	• SNMP Version 1 with configurable MIB information access and support for standard and enterprise-specific MIBs including: WAN interfaces including ISDN LAN interfaces ATM interfaces Bridging and routing DLSw APPN TN3270E Server and Response Time Monitor ATM LAN Emulation Client System-specific (CPU usage, memory usage, thermal sensing) Enterprise-specific • Java-based management • LAN Network Manager support • The following IBM Nways Managers, with 2216-specific support: Nways Manager for AIX Version 1.2 Nways Workgroup Manager for Windows NT Version 1.1 Nways Manager for HP-UX Version 1.2
Physical characteristics	Width: 440 mm (17.3 in.) without rack-mounting flange 480 mm (19 in.) with rack-mounting flange Depth: 358 mm (14.1 in.) Height: 572 mm (22.5 in.) (13 U) without rubber foot pads 576.1 mm (22.7 in.) (13 U) with rubber foot pads Weight: 31.6 kg (69.6 lb) base box with one power supply and power-supply filler plate 1 kg (2.2 lb) each adapter 0.1 kg (0.2 lb) each filler plate for unoccupied adapter slots 3.5 kg (7.8 lb) second power supply 0.2 kg (0.4 lb) power-supply filler plate

IBM 2216 Multiaccess Connector at a glance continued

Operating environment	Temperature: 10° to 40°C (50° to 104°F) Relative humidity: 8% to 80% Maximum wet-bulb temperature: 27°C (80°F) Calorific value: 547 kcal/hr (2171 BTU/hr) Electrical power: 0.65 kVA Capacity of exhaust: 2.0 m^3/min Noise level: 50 dB Leakage current: 1.5 mA maximum per power supply Starting current: 70 A per power supply
Electrical requirements	Automatically senses line voltage within a nominal input range from 100 to 240 V ac at 50 to 60 Hz.
Publications	All publications are on the CD-ROM: *Configuration Program User's Guide,* GC30-3830 *Protocol Configuration and Monitoring Reference (Vol. 1),* SC-3884 *Protocol Configuration and Monitoring Reference (Vol. 2),* SC-3885 *Code User's Guide,* SC30-3886 *Using and Configuration Features,* SC30-3993 *Event Logging System Messages Guide,* SC30-3682 *2216 and Network Utility Introduction and Planning Guide,* GA27-4105 *2216 Installation and Initial Configuration Guide,* GA27-4106 *2216 and Network Utility Service and Maintenance Manual,* SY-0350 *Channel Setup Guidelines,* G224-4599
ISO 9000	The IBM 2216 Nways Multiaccess Connector has been developed and is manufactured in IBM facilities that are fully compliant, and have been registered, with ISO 9000 standards.
Hardware warranty	The IBM 2216 Nways Multiaccess Connector is backed by a 1-year warranty. The hardware warranty and subsequent IBM Maintenance Agreements include IBM Onsite Repair. Installation of code fixes and upgrades from the 2216 Web page is a customer responsibility.
Year 2000	The IBM 2216 Nways Multiaccess Connector and Multiprotocol Services Version 3.3 are Year 2000 compliant when used in accordance with their associated documentation and are capable of correctly processing, providing, and/or receiving date data within and between the 20th and 21st centuries, provided all other hardware, software, and/or firmware used with the products properly exchange accurate date data with them.

For more information

To find out more about the IBM 2216 Nways Multiaccess Connector and other IBM communication and networking products, contact your IBM representative or call IBM Direct at 1 800 IBM CALL (1 800 426 2255). You can also access the IBM Networking Home Page at *www.networking.ibm.com* or you can go directly to the 2216 product information at: *www.networking.ibm.com/216/216prod.html*



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