Premier S/390 Gateway for SNA and IP Access

IBM 3746 Nways Multiprotocol Controller

Significant 1999 announcements—
in preparation for the Year 2000 and beyond

Highlights

Offers increased S/390 and network connectivity

- *100% connectivity increase for S/390 server access*
- *300% increase in TN3270E session connectivity*
- *50% increase in end-user attachments for Type 3 Token-Ring Processors*
- *OSPF support on the ESCON Type 3 Processors*

Enhanced APPN/HPR and systems management functions

- *Extend 100% availability from Parallel Sysplex to the far ends of the network*
- *Significant systems management enhancements for TCP/IP and APPN/HPR configurations*

New enhancements available as licensed code upgrade enabling you to install the hardware today, upgrade the microcode later in 1999

Offers risk-free option for increased network capacity to support the expected traffic growth during the last quarter of 1999

IBM 3746 enhancements take you to the Year 2000 and beyond

Year 2000 uncertainties are putting unique requirements on S/390® server access. The main focus in 1999 is to ensure that mission-critical applications are Year 2000 ready. Most of these applications are SNA-based.

In addition to ensuring Year 2000 readiness, increased connectivity and capacity will be required in 1999. Users will need a proven and dependable product to minimize the risk associated with these increased connectivity and capacity needs.



IBM 3746 Nways Multiprotocol Controller

In 1999, IBM is significantly enhancing the connectivity of the 3746. On May 11, IBM announced a number of new functions for the 3746. The new connectivity enhancements apply to subarea NCP traffic (where most mission-critical applications exist) and to APPN®/HPR and IP environments. This new support is planned for availability starting July 30 of 1999. However, most of the new functions will be delivered as an upgrade to licensed internal code (microcode).

The objective here is twofold:

- Users with installed equipment will be able to take advantage of the increased connectivity through existing hardware or upgrading their installed 3746. Their investment is protected.
- Users requiring an increase in network connectivity can install the appropriate hardware today and upgrade the 3746 microcode later in 1999 to achieve the additional connectivity benefits.

The IBM 3746 delivers significant new enhancements! Addresses increased 1999 capacity needs based on Year 2000 requirements

New function summary

The following is a summary of the new functions announced in May for the 3746 Multiprotocol Controllers:

- 100% increase in connectivity on the ESCON® channel adapter (ESCON Type 3 Processor) which connects the 3746 to the S/390 server
- 50% increase in connectivity on the Token-Ring adapter (Token-Ring Type 3 Processor)
- 300% increase in the number of TN3270E sessions
- New facilities for spreading workload over frame-relay and token-ring connections
- Enhanced network management, mainly for APPN/HPR but also for NCP traffic reporting

Apart from the increase in the number of TN3270E sessions, which requires additional memory in the 3746 Multiaccess Enclosure (MAE), all these features require only a licensed internal code upgrade to enable the new functions. This licensed internal code upgrade is planned for availability starting July of 1999.

The 3746 has proven to be a dependable and reliable gateway to the S/390 server. IBM has increased its capacity, connectivity and performance over the years, while reducing the cost per port. The new functions show that the 3746 is a highly scalable device which enables you to increase connectivity significantly without the need to purchase additional 3746 footprints. This latest set of announcements protects your investment and demonstrates that the 3746 is truly the premier gateway to the S/390.

Year 2000 drivers on S/390 server access

Providing connectivity enhancements with minimal changes on the 3746 hardware is an important message for our S/390 enterprise users in 1999. Many consultants have written their views on what will happen in Year 2000. There are different ideas on what the impact may be. The following is the general consensus regarding S/390 server access:

- The main focus will be on mission-critical applications and the work required to make them Year 2000 ready. Most effort will concentrate on the two-digit versus four-digit Year 2000 date problem. Extra S/390 capacity and network products will be required to test and implement the required changes.
- Normal year-to-year traffic will increase in 1999 as the new millennium approaches, due to unique Year 2000 events. These include:
  - Normal year-end traffic will be skewed earlier in 1999.
  - There will be a "pull-in" of first-quarter Year 2000 traffic into 1999 based on Year 2000 uncertainty.
  - There will be an increase in normal application traffic as people become anxious over the uncertainties of Year 2000. These include increased banking ATM usage, increased purchases of airline and other transportation services, increased inventory stocking, and more retail purchases before the end of 1999.
  - There will be an increased workload due to additional system backups being taken. These could start as early as October or November 1999 and continue until year end.
- There will be increased purchases of infrastructure equipment earlier in 1999 and increased capacity needs.
- Due to the uncertainty of Year 2000 readiness, most organizations are expected to freeze new applications and infrastructure changes sometime in the second half of 1999. However, this will not apply to existing S/390 server gateways already installed and tested to be Year 2000 ready. These products can be safely expanded to meet the extra traffic demand generated by the Year 2000 effect.

Because of the Year 2000 impacts shown above, users will be looking for increased capacity and performance from their S/390 server and networks during 1999. However, a stable, dependable and reliable environment is needed to provide a continuous service to end users through the end of 1999 and into the year 2000. For these reasons, upgrading and enhancing installed equipment is the optimum solution. The 3746 controller platform will be one of the most important assets to handle the increased Year 2000 traffic needs.

Details of 3746 enhancements for 1999

The functions announced on the 3746 in 1999 fall into four general areas. Each of these areas addresses specific user requirements. The new functions are:

- *Increased connectivity and improved performance through workload balancing.* Significant performance and connectivity improvements have been achieved on the 3746 Type 3 Processors. If you have older Type 1 or 2 Processors installed, these can be upgraded in the field to Type 3 or you can install additional processors. These enhancements apply

to both the NCP and Network Node Processor environments of the 3746 (APPN/HPR and IP). Specific enhancements are:

- *ESCON Processor Type 3 support increases from 16 stations (or logical partitions) to 32*. This 100% increase in the number of channel connections will allow you to connect to more partitions of the S/390, which is particularly important in the S/390 Parallel Sysplex® environment.

  In addition, IBM is announcing additional protocol support on the ESCON Processor Type 3. Many enterprises use a number of IP routing protocols, the most relevant being OSPF and RIP for S/390 server access. The ESCON Type 3 Processor, under the control of the NNP, will be enhanced to add OSPF to existing RIP Version 2 protocol support. The ESCON adapter on the 3746 MAE already supports OSPF and RIP Version 2.
- *Token-Ring Processor Type 3 will now connect 3000 physical units (PUs).* Previously the maximum was 2000 PUs, an increase of 50%. Additional connections will allow more end users to be supported on existing Token-Ring processors.
- *Token-Ring connection balancing on the Token-Ring Processor Type 3*. This enables you to balance the workload among multiple Token-Ring processors on a 3746 or multiple 3746s, thus increasing throughput.
- *Frame-Relay Boundary Access Node (BAN) connection balancing on the Communication Line Processor Type 3*. This allows you to balance the connections (PUs) and workload among multiple processors on the same or multiple 3746s, thus increasing throughput.

- *SNA and IP integration on the 3746*. Many users have a need to transport SNA traffic over an IP backbone. One of the techniques to accomplish this is TN3270E. In 1999, IBM is significantly increasing the number of TN3270E sessions supported on the 3746 and enhancing TN3270E management functions. In addition to the number of TN3270E sessions supported on the 3746, additional sessions can be supported by attaching the new IBM Network Utility to the 3746 (externally through a LAN connection). The new IP enhancements for the 3746 are:
  - The number of TN3270E sessions supported is increasing from 4000 to 15000[1] – an increase of over 3 times. To enable the increased TN3270E session support, additional memory on the MAE is required (up to 512 MB).
  - Functions to enhance the management of TN3270E sessions will be available, including the addition of multiple LU pools, IP address-to-LU name mapping and the dynamic definition of dependent LU names.
  - A new IP Passthrough capability is now available, which will facilitate the easy replacement of IBM 3172s in the data center.

  These new TN3270E and IP Passthrough capabilities are supported through the hardware integration feature of the Multiaccess Enclosure (MAE Feature Code 3001).

- *Increased number of APPN/HPR sessions on the 3746 MAE.* The MAE today is limited to 4000 APPN/ISR sessions. The 3746 is expanding the number of APPN/ISR sessions that can be supported through the MAE to *15000*.[1] These increased sessions are available with MAE Feature Code 3001 and will require additional memory (up to 512 MB).
- *Network management for high availability environments (APPN/HPR).* Many S/390 installations are implementing the S/390 Parallel Sysplex. This uses APPN/HPR to achieve 100% availability and workload balancing among S/390 servers. To extend 100% availability outside the S/390 data center, APPN/HPR needs to move into the network. To help manage the implementation of APPN/HPR, the 3746 is enhancing many network management facilities to provide functions similar to those available for an NCP subarea environment.

  Additional management facilites will be available to allow measurement of the 3746 system resources and to support remote configuration. These facilities are not unique to the APPN/HPR environment.

  A list of the additional management functions announced are:

  - Enhancements to the Controller Configuration and Management (CCM) to download/upload files from an AIX® workstation. Also CCM will now be able to display the count of active PU and LU sessions.
  - The RUNCMD command in NetView® can now be used for management requests of the 3746 APPN/HPR resources.
  - New information on the NNP utilization will be displayed on the 3746 Service Processor console
  - The number of active stations (PUs) per Token-Ring interface (TIC3) will be reported to NPM
  - Topology Safestore will periodically save the APPN topology on disk to enable faster restart of the 3746 and APPN network
  - Enhanced Topology Garbage Collection (APPN option set 087) enables network resources to be deleted from the topology data base of the NNP in a more efficient manner

In summary, the 3746 is positioned to be the premier S/390 gateway of choice as you move into the new millennium. The May announcement ensures the investment you have made in the 3746 is fully protected. The 3746 is the premier S/390 gateway for SNA and IP access, guaranteeing high network availability and performance for the move to the next millennium.

[1] *The total number of APPN/ISR sessions and TN3270E sessions through the MAE cannot exceed 15,000.*

Protecting your investment

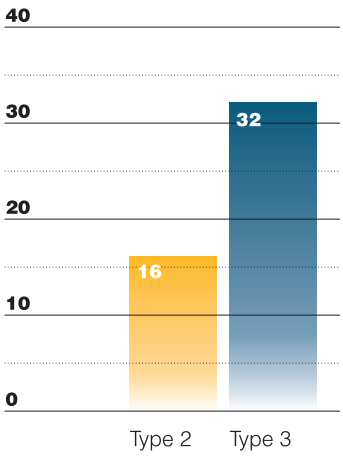
IBM has pursued two principles on the 374x product line evolution. One is to provide a nondisruptive migration path as S/390 access needs evolve. The second is to protect investment in existing 37xx footprints in the data center. In 1999, this strategy continues.

Having established that traffic will increase as the end of 1999 approaches, many organizations will be looking to provide additional capacity and throughput to their S/390 gateways. Upgrading and enhancing existing installed 374x equipment is the optimum solution for providing a secure and dependable environment as the turn of the century approaches. To support the demand for increased capacity, IBM is significantly improving the performance and connectivity of Type 3 Processors. ESCON, Token-Ring and Communication Line processors will be enhanced.

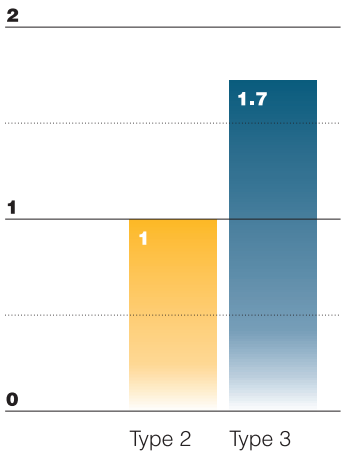
Technology comparisons	*Type 2 Processor*	*Type 3 Processor*
Processor Type	Intel 486™ DX2 32 bits	AMD 5x86 32 bits
Internal Processor Clock	50 MHz	100 MHz
External bus speed	25 MHz	25MHz
Internal Level 1 Cache (SRAM)	8 KB	16 KB
Internal Level 2 Cache (DRAM)	128 KB	256 KB
Local Store Memory	16 MB	32 MB
Data Store Memory	4 MB DRAM	4 MB SRAM (faster)
Scanner (CLP)	Base	Faster*

**Adds hardware assist to the processor (for example, CRC).*

ESCON connectivity
Number of connections
(logical partitions)



ESCON performance
Relative throughput
in an NCP environment



1999 Preview - 32 LPAR connections

Type 3 and Type 2 Processor comparison

In September 1997, IBM announced Type 3 Processors for the 3746. These processors were based on new technology and provided increased connectivity and performance compared with older technology in Type 2 Processors. Over the past year, significant enhancements have been made to improve the connectivity and performance of the Type 3 Processors.

Type 1 or Type 2 Processors can be upgraded to Type 3 Processors. The goal is to protect the investment in existing 3746 footprints.

The next section qualifies benefits of the new Type 3 Processor technology. Upgrading the 3746 with this latest technology provides the maximum return on investment.

ESCON Processor Type 2 and Type 3 comparisons

The ESCON Processor Type 3 provides significant improvements over the existing Type 2 ESCON Processor in both NCP and Network Node Processor (NNP) environments.

In 1999, the ESCON Processor Type 3 delivers twice the connectivity previously available on the ESCON Type 2 Processors (from 16 to 32 subchannels). This is important on a 3746 that supports a combination of SNA, APPN/HPR and IP traffic. The increased number of connections reflects the maximum number of logical paths to different VTAM® and TCP/IP applications running in the S/390 logical partitions.

In benchmark testing, the ESCON Processor Type 3 delivers up to 1.7 times the throughput of the ESCON Processor Type 2. The improvement will depend on the type of traffic and the message sizes.

Another enhancement to the ESCON Type 3 Processors is the addition of the OSPF routing protocol. This will be supported for the NNP environment, providing increased options for accessing TCP/IP applications on the S/390 server.

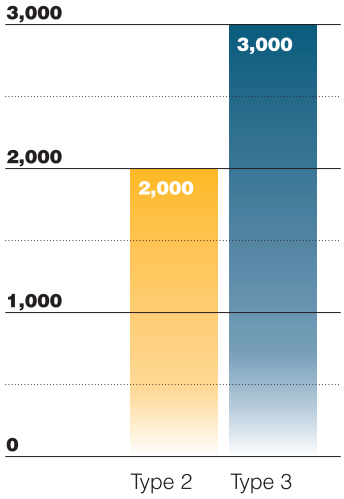
Token-Ring Processor Type 2 and Type 3 comparisons

IBM is announcing a 50% increase in the number of physical units (PUs) that can be connected to the Type 3 Token-Ring Processors on the 3746 (from 2000 to 3000). This enables a greater number of end users to be connected to each token-ring.

In benchmark testing, the Type 3 Token-Ring Processors provide up to 1.8 times the throughput of older Type 2 Processors. The improvements will depend on the type of traffic and the message sizes.

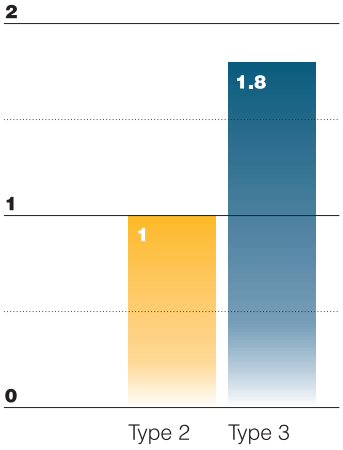
An additional enhancement to the Token-Ring Type 3 Processors is the new Token-Ring connection balancing function. This enables the existing Token-Ring workload to be balanced, across multiple token-ring adapters, thus providing more throughput.

Token-ring connectivity
Number of Physical Units (PUs)



1999 Preview - 3,000 PUs

Token-ring performance
Relative throughput
in an NCP environment



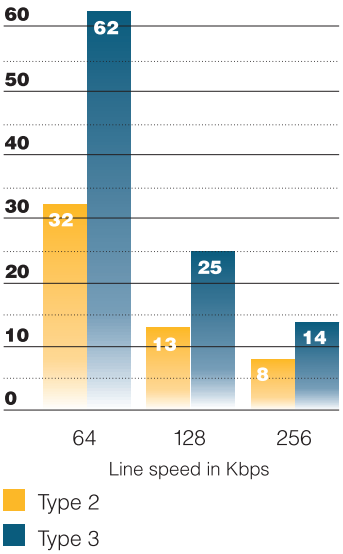
Communication Line Processor Type 2 and Type 3 comparisons

IBM is also announcing additional connectivity and performance for the Communication Line Processor Type 3 (CLP3) compared to the CLP2.

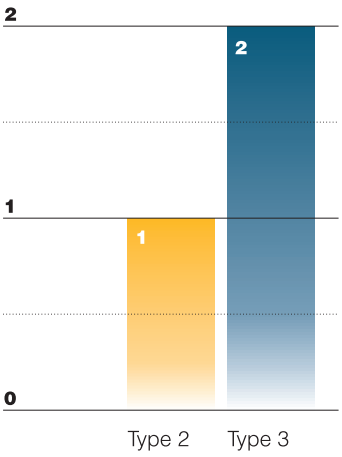
One of the ways IBM helps users to configure communication lines on the 3746 is through a performance monitoring and configuration facility using line weights. The increased performance and storage size of the Type 3 Communication Line Processor has enabled significant reductions in line weights to be achieved. Up to 100% more lines can be attached to a CLP Type 3 Processor, depending on the line speed.

The Communication Line Processor Type 3 (CLP3) provides up to twice the relative throughput of the CLP2. The improvements will depend on the type of traffic and the message sizes.

Communication line connectivity
Number of SDLC lines



Communication line performance
Relative throughput
in an NCP environment



In addition to these performance improvements, IBM announced Frame Relay boundary access node (BAN) connection balancing on the CLP3. This provides workload balancing for incoming frame relay traffic in both a NCP and NNP environment which further increases throughput.

Communication line increases for CLP3

Line speed (kbps)	CLP2 Maximum number of lines	CLP3 Maximum number of lines
2048	2	4
1544	3	4
1024	3	4
512	4	4
256	8	14
128	13	25
96	18	32
64	32	62
56	34	66
48	37	71
28.8	62	120*
19.2	100	120*
14.4	117	120*
9.6	120*	120*

** CLP2/CLP3 maximum physical connectivity*

Product Preview

In addition to the new 3746 functions announced in 1999, IBM is making a product preview on support of the 3746 for the Transaction Processing Facility (TPF) operating system on the System/390. TPF is the operating system used on the S/390 for very high volume transaction environments (examples include airline reservation and credit card processing businesses). TPF will be providing a new TCP/IP stack in a future release in 1999 which will contain native support for the 3746 as an IP router, for connections to IP networks. This will be done by providing support for the Channel Data Link Control (CDLC) protocol to connect to the S/390. The 3746 is the only S/390 access product that supports the CDLC channel protocol.

The TPF solution for connecting IP networks to the S/390 today is using the TCP/IP Offload function, which has limited performance. TCP/IP Offload is only supported from IBM on the 3172. The benefits of the new support can be summarized as follows:

Performance: The new TCP/IP stack will offer significant increase in throughput for TPF users over an IP backbone, compared to the current IP implementation with a 3172. This brings enhanced IP support to TPF users who need high volume transaction input to the S/390.

Migration: The new support will assist TPF installations who need to migrate to an IP backbone. Many customers have plans to move to an IP backbone to support their e-business strategy. TCP/IP Offload is unable to handle the enormous transaction volumes carried over SNA backbone networks into TPF today. This new support will enable SNA to IP bacbone migrations.

Investment Protection: Hardware costs required for TPF users over an IP backbone will be reduced, as no additional footprint is required. Users can consolidate into existing 3746 footprints, without the need to acquire another 3172. This is an exclusive for the 3746 as only the 3746 supports the CDLC channel protocol.

Management: Proven and dependable systems management is provided with the 3746. Users can depend on the proven 3746 for 24 x 7 availability requirements in a TPF environment.

Summary

In 1999, IBM is making significant investments on the 3746 to address the Year 2000 concerns you will experience in 1999. IBM's objectives are to protect the existing investment made on the 3746, to provide additional capacity and secure a safe environment to enter into the new millennium. IBM's goal is to continually enhance the 3746 as the premier gateway to the S/390 server, for all your SNA and IP access needs.



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