IBM's large systems: The evolution continues

More options for the '80s

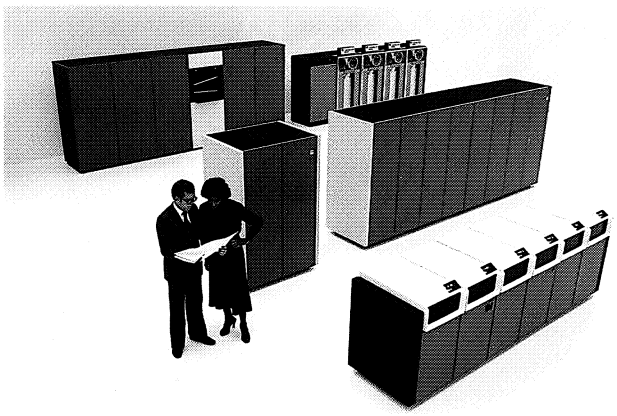
Users are demanding more from data processing systems than ever before—and these demands will continue to increase in the future. To be effective, systems must do more than just address immediate needs, they must meet tomorrow's needs as well. And that's exactly what IBM's large systems are doing.

IBM's current large-system offerings continue to evolve to meet new challenges. New products and features emphasize IBM's commitment to its 30XX Processors, the MVS/System Product, and the VM/System Product. The continuing evolution of hardware, software, microcode and technology demonstrate IBM's intent to create and enhance systems that can adapt to a changing data processing environment.

This large-system evolution is supported by a wide range of new and recent enhancements to the 30XX product line and its associated software and I/O subsystems. These include:

- Enhancements to the IBM 3033 Processor Complex Model Group N: for increased performance and additional channels.
- Greater processor storage for the IBM 3033 uniprocessor and Attached Processor: up to 24 megabytes of real processor storage.
- Data Streaming: available on all models of the 4341, 3033 and 3081 Processor Complexes, and supports a three-megabyte-per-second data transfer rate.
- Enhanced function for the 3033 Extension feature: providing 3033 MVS installations with significant throughput benefits.
- The recently announced large-systems growth option: the 3081 Processor Complex Model Group D.
- MVS/System Product Version 1 Release 3: supporting the 3081 and the 3033 Extension feature with new function and performance.
- Improved configuration management: achievable with the 3814 Switching Management System.
- The new 3081 Processor Complex Model Group K: extending the performance of the 3081 Model Group D.
- System/370-Extended Architecture (370-XA): a new hardware architecture option for the IBM 3081 Processors.
- Powerful new enhancements for increased performance and additional real processor storage: up to 16 megabytes on the entry-level 3033 Processor Complex Model Group S.
- MVS/Extended Architecture (MVS/XA): consisting of MVS/SP Version 2 and the Data Facility Product on an MVS Release 3.8 base supporting the 370-XA option of the 3081 Processor Complex.
- VM/System Product Release 2: offering the Programmable Operator Facility as well as enhancements to CMS and other areas.
- VM/System Product High Performance Option: providing new function and near native performance for an MVS/SP, V=R virtual machine on a 3033 or 3081 Processor Complex.
- Two new models of the 3880 Storage Control: employing buffer storage to further enhance the impressive storage system support introduced with the 3380 Direct Access Storage, the 3880 Storage Control Models 1 and 2 and the 3375 Direct Access Storage.

Together, these enhancements combine to provide IBM large-system users with solutions they can count on to help meet their needs... now and in the future.



MVS options for large-system users

MVS/System Product continues to evolve, and the large-system user may now select from two versions of the System Product. MVS/System Product, Version 1, Release 3 (MVS/SP 1.3) is available to users of all models of the IBM 3033 and 3081 Processor Complexes. MVS/SP 1.3 provides the following new functions and enhancements:

- Throughput improvements in the range of 6 percent to 10 percent when used in conjunction with the 3033 Extension feature on a 3033 UP in comparison with MVS/System Extensions Release 2. 3033 AP and MP environments should experience even greater improvements.
- Support for up to 32 megabytes of addressable processor storage utilizing the Extended Addressing feature.
- Extensions to the Global Resource Serialization facility introduced in MVS/System Product Release 2.
- The potential for additional savings in the common service area virtual storage requirements through the utilization of Cross Memory Services.
- The potential to eliminate up to 19 percent of a 3033 installation's unscheduled IPLs.

MVS/Extended Architecture (MVS/XA) will be available to users of all models of the IBM 3081 Processor Complex. It is designed to support System/370-Extended Architecture while providing for compatibility and coexistence with MVS/SP 1.3. The major enhancements of MVS/XA include:

- Support for 31-bit real and virtual addresses.
- Support for the new channel architecture.
- Enhanced trace capability.
- Page protection.
- Support for larger I/O configurations (up to 4,096 devices per I/O configuration and up to 256 channel paths and four paths per device).
- Enhanced system RAS.
- Enhanced usability, particularly in operator commands.
- Potential virtual storage savings below 16 megabytes.

New releases of many software subsystems capable of executing on both MVS/System Product, Version 1, Release 3 and MVS/XA have been announced to allow Version 1 users to position their systems for future migration to MVS/XA.

New options for VM/System Product

Two new options are offered to the VM system user. The VM/System Product Release 2 provides:

- CMS enhancements.
- Serviceability enhancements.
- Dial Command support for remote terminals.
- Improved 3800 support.
- Enhanced ASCII support.

Plus a major new facility for distributed system control—the Programmable Operator Facility. When used in conjunction with the VM Pass Through Facility Release 2, RSCS Networking Release 2 or 3, and the Remote Operator Console Facility available on 4300 systems, it provides the basis for centrally controlling a distributed VM network.

The VM user may also choose the VM/System Product High Performance Option offering significant throughput improvements for an MVS/SP guest system. Through the facilities of the Preferred Machine Assist, an MVS/SP V=R virtual machine may operate with over 90 percent of native performance. The Preferred Machine Assist supports all models of the 3033 and 3081 Processor Complexes.

In addition, the VM/System Product High Performance Option provides new function and performance, including:

- Support for all models of the 3033 and 3081 Processor Complexes.
- Support for the segment protect capability on the 3081 which can improve CMS performance.
- Support for 3880 Model 11.
- Enhancements to single processor mode under Preferred Machine Assist allow an MVS/SP V=R system to switch from UP to AP or MP mode without re-IPLing.

System/370 architecture

The System/370 architecture has evolved with the introduction of new hardware and microcoded capabilities. These new extensions can enhance the throughput of your 3033 or 3081 system when used with the appropriate release of MVS/System Product Version 1. They also can allow you to take advantage of new options which can help relieve, or avoid, virtual storage constraints.

These architectural extensions are standard on the IBM 3081 and available via an Extension feature on the 3033 Processors.

MVS/System Product contains the programming to take advantage of these enhancements. Some of the areas in which 30XX Processor facilities are extended include:

- Cross Memory Services: extends the capability of programs to communicate between address spaces through enhanced data movement and program calling mechanisms.
- Paging: part of the paging subsystem of MVS has been restructured to maximize its efficiency on large processors and with the new 3380 Direct Access Storage. The 3033 Extension feature has been enhanced to allow the processor execution time for paging operations to be reduced.
- I/O processing: some of the I/O processing formerly handled by MVS on the processor has been offloaded to the channels; this allows MVS/System Product Release 3 to utilize the available cycles for productive work in parallel with the channel.
- Real Storage Management: use of the 3033 Extension feature and code optimization have reduced processor execution time for several frequently used real storage management functions.

The System/370-Extended Architecture option

System/370-Extended Architecture (370-XA) provides an optional processing mode for users with very large application environments. 370-XA is selectable, via microcode load, on all models of the 3081 Processor Complex. It builds upon the base of System/370 architecture and MVS to extend the range of real and virtual storage and I/O subsystem configurations available to users of IBM's largest processors.

The 370-XA option provides the following capabilities:

- Real and virtual storage address capability to two gigabytes.
- Bimodal execution of program modules using either 24-bit or 31-bit addressing under program control.
- Dynamic channel subsystem which allows any channel to operate with any central processor.
- Offloading of channel path selection from software to hardware.
- Queuing of all I/O functions in the dynamic channel subsystem.

370-XA is designed to coexist with System/370 architecture, to support a common set of subsystems, and to provide upward compatibility of application programs. Hence, you may continue to expand your MVS/370 applications with the assurance that you can take advantage of the 370-XA option whenever your application workload requires these extended facilities.

Storage systems: A growing part of the evolution

The IBM 3380 Direct Access Storage provides up to 2.52 billion bytes of online storage in a single unit—almost four times the storage capacity of the IBM 3350. A string of four 3380s can store over ten-billion bytes. In addition, the 3380 provides quick access to your data. Read/write heads, disks and four actuators are integrated into two components called head and disk assemblies (HDAs). Innovations in actuator design provide an average seek time of 16 milliseconds. And each of the four actuators accesses 630 megabytes of data. New film head technology also enables data to be read and written at a rate of three megabytes per second.

With the 3380's new technology and compact design, you can save both power and space. When compared with an equivalent capacity of 3350 storage, the 3380 can reduce power consumption by up to 70 percent, floor space requirements by up to 65 percent and heat load by as much as 75 percent.

Models 2 and 3 of the IBM 3880 Storage Control allow the 3380 to be attached to the IBM 3031, 3032, 3033, 3042 AP Model 2 and 3081 processors. The Model 2 provides for the attachment of 3330/3350 or 3340/3344 storage units to one director while the 3380 attaches to the other one. This allows you to use your current storage devices as the system evolves.

The performance of IBM's storage systems is being extended again with the introduction of a new paging subsystem consisting of the 3880 Model 11 and 3350, and a new application data subsystem, the 3880 Model 13 with 3380s.

The 3880 Model 11, with eight megabytes of dynamically managed subsystem storage, offers the potential for increased system throughput and more consistent online response time in high paging environments. The 3880 Model 13, with four or eight megabytes of dynamically managed subsystem storage, provides improved performance in managing user data sets.

The 3880 Models 11 and 13 offer:

- Greater system throughput than with unbuffered models.
- Increased system programmer productivity derived from a potential reduction in system tuning requirements.
- Opportunity for reducing the number of devices required to achieve high performance.
- Improved I/O configurability, since it is possible to provide high performance with fewer paths.

These benefits of the 3880 impact the whole large-system environment with advantages that extend beyond the device performance, providing significant enhancement to both 3033 and 3081 Processor Complexes.

The IBM 3033 Model Group S: Powerful new enhancements

The IBM 3033 Processor Complex Model Group S, a cost-effective option for the emerging large account, has been enhanced in two important areas —up to 16 megabytes of processor storage can be attached and its instruction execution rate has been projected to be 8 to 10 percent more than that of a currently available 3033 Model Group S with similar configuration and identical programs running under MVS/System Product Version 1 Release 1 licensed program. It also offers most of the function available for larger 3033 models at a very attractive price. Plus, the 3033 Model S is upgradable in incremental steps or directly to a 3033 Model U.

Highlights

- 4, 8, 12, or 16 megabytes of four-way interleaved processor storage.
- 12 channels.
- 57-nanosecond processor cycle time.
- Optional features include the Data Streaming feature, 3033 Extension feature, channel-to-channel adapter, and the Preferred Machine Assist RPQ.
- Programming support includes:

-MVS/Release 3.8
-MVS/System Extensions
-MVS System Product
-VM/System Extensions
-VM/System Product
-OS/VS1
-DOS/VSE

The IBM 3081: New large-system growth options

The evolution of power, function, performance and technology announced with the 3081 Processor Complex Model D is extended with the introduction of a new model—the 3081 Processor Complex Model K. The 3081 Model K further exploits the very large-scale integrated circuit technology introduced with the 3081 Model D.

The evolutionary departures in the IBM 3081 design—its integrated, two-way processor structure, and a new dimension in logic circuitry, packaged in a Thermal Conduction Module (TCM)—are extended in the Model K. These enhancements are achieved with the same impressive space and energy savings of the Model D.

Highlights

- The Model D has an instruction execution rate generally in the range of 1.8 to 2.1 times that of a 3033 uniprocessor running under MVS/System Product and using identical programs and comparable I/O configurations.
- The Model D can be field upgraded to a Model Group K in approximately 14 system hours.
- The Model K has an instruction execution rate ranging from 1.3 to 1.4 times that of the 3081 Model D.
- Both the Model D and Model K offer the option of either System/370 architecture or the new, System/370-Extended Architecture (370-XA) invoked via new microcode.
- As implemented on the 3081, the System/370 architecture incorporates the 3033 Extension feature, System/370 Extended Facility, Extended Addressing, Data Streaming, Preferred Machine Assist, and segment protect as standard features.
- The System/370-Extended Architecture incorporates:

-Bimodal execution of program modules using either 24-bit or 31-bit addressing under program control.
-Real and virtual storage addressability to two gigabytes.
-A dynamic channel subsystem which allows any channel to operate with any central processor.
-Channel path selection offloaded from IOS to channel hardware.
-All I/O instructions queued in the dynamic channel subsystem.

- Both the Model D and Model K feature:

-Dyadic structure consisting of two integrated central processors, each having access to channels and storage.
-16 or 24 integrated channels, all with data streaming capability.
-16, 24, or 32 megabytes of shared central storage.
-Up to 4,080 I/O devices.
-26-nanosecond machine cycle.

- The Model D has:

-32K-byte high-speed buffer storage per central processor.

- The Model K achieves its improved performance through design enhancements:

-64K-byte high-speed buffer storage per central processor.
-Additional overlap in the machine organization.
-Adding high-speed buffer to high-speed buffer communication.