IBM 3090

Product Enhancement

IBM Corporation will deliver the 3090 Model 400, its most powerful processor, in fourth quarter 1986 rather than the second quarter of 1987, the previously announced delivery date. In addition, IBM has announced a new Vector Processor facility for scientific and engineering applications, along with several related operating-system software products.

The October 1 announcement of the latest 3090 features and the confirmation of an earlier delivery date for the Model 400 were seen as a partial response to critics and IBM observers in general who believed IBM left many unanswered questions when it first announced the new processor family in February 1985. The initial 3090 announcement left many IBM customers wondering whether the new top-end processor family was more impressive than IBM was making it out to be. A larger concern was the delivery date of the Model 400. Customers outgrowing other IBM processors said they could not wait another two years for the delivery of the Model 400. The delivery date question became even more compelling when National Advanced Systems, Burroughs, and Honeywell announced new mainframe products comparable to both the Model 200 and Model 400 that would be delivered much sooner than the Model 400.

Highlighting the IBM announcement was the new Vector Facility feature, a hardware product that can perform 108 MFLOPs (millions of floating-points) per second. IBM has targeted the Vector Facility towards applications with high computation requirements such as structural design, reservoir modeling, fluid dynamics, and load flow. A Vector Facility can be installed on each processor within a Model 200 or Model 400 processor complex. Also announced was a series of related software products dealing with scientific/engineering applications. Software products announced include MVS/SP Version 2 Release 1.3 Vector Facility Enhancement; VS Fortran Version 2, a new version of Fortran enhanced for vector operations; IBM Fortran Language Conversion Program for converting earlier Fortran source language statements to the new Fortran; the Engineering and Scientific Subroutine Library, an enhanced set of vector-related mathematical subroutines; Assembler H Version 2 with Vector Facility Enhancement, and Vector Processing Subsystem/Vector Facility for simulating the IBM 3838 Array Processor.

The new Vector Facility is a field-installable option that is implemented in both hardware and software. The facility can be installed on each processor of a dyadic Model 200 or a four-way Model 400, and will be supported by MVS/XA and VM/SP High Performance Option. The Vector Facility feature adds 171 new, instructions and 16 vector registers each containing 128 32-bit elements. Other features include binary, 32-bit, and 64-bit floating point operands, using contiguous, noncontiguous, and random addressing.

The new features should produce results using fewer machine cycles. Multiplier and arithmetic/logic units using pipelining techniques can produce 32-bit or 64-bit sums, differences, or products during each cycle. Compound operations are able to produce both a product and sum during each cycle. Other features designed to improve the performance of engineering/scientific jobs include high-speed multiply, fast floating-point add/subtract, fast loop control execution, and 64-bit wide data paths.

According to IBM, the facility can improve system performance for vector, parallel, and scalar operations. Engineering/scientific (E/S) jobs using the Vector Facility had 4.1 to 9.2 times the internal throughput rate of a 3081 Model Group KX per central processor. E/S jobs measured for engineering/scientific scalar processing performance had 2.1 to 3.1 times the internal throughput of a 3081 KX for each central processor. E/S jobs using the Vector Facility had 1.5 to 3 times the internal throughput of the 3090 Model 200 per central processor running in scalar mode.

A dual-processor 3090 Model 200 with two Vector Facilities yields 1.87 to 1.99 times the performance of a single-processor Model 200 with one Vector Facility.

In addition to hardware announcements, IBM also announced the following vector-related software products:

Multiple Virtual Storage/System Product 2.1.3 Vector Facility Enhancement supports the Vector Facility. The software product lets systems using the Vector Facility recognize a vector user and assigns the vector job to the central processor set up for vector processing. The software release features vector affinity, System Management Facilities, enhanced operator commands, and serviceability enhancements.

Product Enhancement

Operating under MVS/XA, a vector affinity feature automatically allows the users to run on the central processor that has the Vector Facility. System Management Facilities provides accounting information detailing Vector Facility usage and affinity. New operator commands let operators display systems using the Vector Facility and to bring the processor equipped with the Vector Facility on- or off-line. The Vector Facility can be brought off-line independent of the central processor. Additionally, the Interactive Problem Control System and standalone dump have been enhanced. Checkpoint restart supports the Vector Facility.

VM/SP High Performance Option Release 4.2 Support for Vector Facility supports the Model 200 equipped with the Vector Facility and will support the Model 400 with the Vector Facility in partitioned mode only. This latest release of the High Performance Option contains all the functions of the currently available VM/SP HPO Releases 3.6 and 4. VM/SP HPO Release 4 supports the execution of vector applications while also supporting VS Fortran Version 2 on CMS, Assembler H, the Engineering and Scientific Subroutine Library, additional control program commands, and applications that use the Vector facility. Such applications do not require special set ups and programming.

VS Fortran Version 2 Compiler, Library, and Interactive Debug, an enhanced version of VS Fortran Version 1, Release 4.1 , contains new functions that support vector processing. It operates under MVS/SP 2 Release 1.3 Vector Facility Enhancement, and under VM/SP HPO Release 4.2 with Vector Facility Support. The new compiler can produce reports summarizing the vectorization performed. Other features include new mathematical routines that enhance performance, improve accuracy, and support interactive debugging. It also eases compile time restrictions involving the size and complexity of programs. The new Fortran compiler supports the Engineering and Scientific Subroutine Library, and also provides support for programs converted under the IBM Fortran Language Conversion Program.

The Engineering and Scientific Subroutine Library provides Fortran and Assembler applications programmers with a set of mathematical subroutines whose performance is enhanced through the IBM 3090 Vector Facility. The Library runs under MVS/XA or VM/SP HPO. Programs generated under VS Fortran Versions 1 and 2, or Assembler H Version 2 can take advantage of the facility. In addition to vector support, scalar versions of the subroutines are also supported.

IBM Fortran Language Conversion Program converts source code compiled under IBM Fortran IV and VS Fortran Level 66 to IBM VS Fortran 77. These programs can then be recompiled under Fortran 77 using either VS Fortran Version 1 Release 4.1 or later, or VS Fortran Version 2 compilers.

Vector Facility Enhancement to Assembler H Version 2 Release 1 lets Assembler H recognize and assemble new mnemonics for vector operations available under the new IBM Vector Facility.

Vector Processing Subsystem/Vector Facility simulates the IBM 3838 Array Processor. This lets users run 3838 applications on a 4381, 308X, or 3090 host system in System/370 Extended Architecture mode running either scalar or vector modes. The facility supports the concurrent use of real and virtual 3838s.

Pricing and Availability: The price list for the new vector hardware and software products follows. Users who want to obtain the vector-enhanced Assembler H must have Assembler H Version 2 Release 1. Charges, terms, and conditions for Assembler H with the Vector Facility Enhancement will remain the same. The Vector Facility feature for the Model 200 operating in System/370-XA mode is scheduled to be available by February 1986. Operating under System/370 mode for VM/SP HPO, the facility is scheduled to be available for the fourth quarter of 1986. The facility will be available for the Model 400 when the first models of the top-end processor are shipped.

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EQUIPMENT PRICES

		Purchase Price ($)	Monthly Maint. ($)	Monthly Rental Charge ($)
VECTOR FACILITY FOR THE IBM 3090				
1545	First Vector Facility for 3090 Model 200	370,000	350	30,830
1550	Second Vector Facility for 3090 Model 200; requires 1545	230,000	175	19,170
1545	First Vector Facility on A side for 3090 Model 400	370,000	350	30,830
1550	Second Vector Facility on A side for Model 400; requires 1545	230,000	175	19,170
1546	First Vector Facility on B side	370,000	350	30,830
1551	Second Vector Facility on B side; requires 1546	230,000	175	19,170

SOFTWARE PRICES

		Initial Charge		Monthly Charges		
		Basic License ($)	DSLO ($)	Basic License ($)	DSLO ($)	Monthly License Program Support ($)
5740-XC6	MVS/SP-JES2 Version 2 Release 1.3 Vector Facility Enhancement	12,840	9,630	4,280	3,210	673
5665-291	MVS/SP-JES3 Version 3 Release 1.3 Vector Facility Enhancement	14,430	10,821	4,810	3,607	1,335
5664-173	VM/SP High Performance Option Release 4.2 Support for Vector Facility	5,325	3,993	1,775	1,331	—
5668-806	VS Fortran Version 2 Compiler, Library, and Interactive Debug	—	—	750	563	—
5668-805	VS Fortran Version 2 Library	—	—	200	150	—
5668-863	Engineering and Scientific Subroutine Library	—	—	700	525	—
5668-864	IBM Fortran Language Conversion Program	*28,000	—	—	—	—
5665-368	Vector Processing Subsystem/Vector Facility	*40,000	*30,000	—	—	—

*Onetime charge. □