S/390 UNIX Fast Facts #1

This is the first in a series of Field Facts about S/390® UNIX® (also known as OS/390® Unix System Services). We are providing these to help you better understand the strategy we are executing for UNIX on the S/390 platform and the actions we have taken.

We have come a long way since we first brought the UNIX functions to the platform. We have improved the functionality of the services, we have significantly improved performance of the services and the environments that use those services, vendors have aggressively brought their products from other UNIX platforms to S/390, and many customers are receiving significant business value from the products that use and exploit those services.

Today, WebSphere, Intelligent Miner(TM), Net.Commerce, BaanERP, Component Broker, SAP R/3, Lotus® Domino(TM), Oracle Web Server, and OS/390 Print Server, just to name a few, are enterprise applications that use and get value from S/390 UNIX.

We are committed to enhancing these strategic APIs because of their importance to the S/390 platform. New applications, middleware products and application development tools will all be dependent on these services. In the future, you will see many more IBM, vendor and customer applications using S/390 UNIX system services for their Application Enablement, Server Consolidation, Business Intelligence, and e-business strategies.

Al Hechler, Program Director S/390 UNIX

Fact 1. S/390 UNIX is built for the enterprise

S/390 is a superior enterprise UNIX because of its underlying design, giving it a powerful, secure, scalable and reliable base for applications.

S/390's system structure has the power to support concurrent, diverse, mixed workloads. You can run batch, online transaction processing, Enterprise Resource Planning apps, e-business Business Intelligence, and UNIX apps simultaneously, and you can selectively allocate resources to each. This means that you can run your hardware consistently near 100% utilization, far above the 50% - 70% where traditional, dedicated UNIX platforms must run.

OS/390's Workload Manager (WLM) provides the ability to manage the allocation of physical resources to maximize system responsiveness. WLM gives UNIX applications extra resources to manage request spikes that can often cripple traditional UNIX environments. WLM manages the importance of each transaction, instead of managing the importance of applications that support a set of transactions.

With OS/390's Security Access Feature, you can manage and secure system resources from a single point, with flexibility and reliability that do not exist on traditional UNIX platforms.

OS/390's address space structure ensures complete isolation of processes from the system, providing reliability and protection against program errors. If a program fails, it will not affect the operating system.

When you run your UNIX applications on S/390, you eliminate the cost, time and processing associated with downloading S/390 data to a different platform.

With major applications such as BaanERP, Lotus Domino, SAP R/3, WebSphere and earlier S/390 Web servers, and Net.Commerce, users today are realizing the value of S/390 UNIX.

Fact 2: S/390 UNIX is fully integrated into OS/390

S/390 UNIX is woven into OS/390. Since OS/390 V1R3, the kernel has been integrated into and anchored in OS/390. This gives S/390 UNIX all of the world class traits of OS/390. The kernel tracks processes, threads, open files, shared memory, message queues, semaphores and other UNIX constructs. The kernel also supports the hierarchical byte file system, validates user access to the file system, and performs filename lookup.

S/390 UNIX uses the OS/390 dispatcher, paging subsystem, accounting and hundreds of other components where appropriate. Some examples of OS/390 components that were modified to provide performance improvements to the S/390 UNIX environment are:

> In Virtual Storage Manager, significant changes were made to improve the performance of fork operations.
>
> The dispatcher was rewritten so that the system can efficiently handle the hundreds of threads that UNIX applications may create.
>
> In the Real Storage Manager, code was added to improve shared memory capabilities.

In the file system, a RAM disk facility was added, called the TFS. The TFS exploits the expanded storage on OS/390 for storage management of real storage backing the TFS.

> OS/390 is branded UNIX '95. We have begun to deliver key functions associated with UNIX '98 branding, as driven by customer needs. We will continue to do so with future OS/390 releases.

Fact 3. Performance improves aggressively with each release

Recent dramatic improvements in TCP/IP, the HFS, the Compiler, NFS, Web-serving, and Java (TM) continue to demonstrate the importance of UNIX workloads to the S/390 platform.

Communications Server (CS) OS/390 (TCP/IP)

On an S/390 3-way multiprocessor, CS V2R6 performance has improved 5.66 times compared with TCP/IP V3R2 for handling an interactive workload (interactions/second). For file transfer, CS V2R6 has improved 2.35 times compared with TCP/IP V3R2.

On an S/390 10-way multiprocessor, CS V2R6 performance has improved 14.97 times compared with TCP/IP V3R2 for handling an interactive workload (interactions/second). For file transfer, CS V2R6 has improved 5.31 times compared with TCP/IP V3R2.

Hierarchical File System (HFS)

With DFSMS(TM)1.3, throughput for small files increased by 50%, and the typical time spent on a "make" was reduced by 30%.

Early tests of the OS/390 V2R7 restructured file system show 23 - 40X performance improvement for files under 512K bytes. Build times could improve by 4X or more. The restructuring dramatically reduces response time and improves scalability and capacity.

OS/390 C/C++ Compiler

For OS/390 V2R4, the C/C++ Compiler provided aggressive Dynamic Link Library (DLL) loading, which can provide 25% run-time improvement for applications that are DLL intensive. For OS/390 V2R6, the C/C++ Compiler and Utilities were built with optimization to provide compile-time reductions.

Network File System (NFS)

For OS/390 V2R6, pathlengths shrunk by up to 80%. Multiple clients reading files via NFS on an S/390 server see up to 180% improvement, and expanded security protection via PCNFS. Multiple clients writing files via NFS on an S/390 server will see improvements as much as 50%. In the V2R7 time frame, NFS will deliver more pathlength reduction and full multitasking.

Web-serving

From the first release of Internet Connection Server (ICS) with TCP/IP 3.1 to Domino Go Webserver (DGW) 5.1 with CS for OS/390 V2.7, performance tests show a 99% reduction in Web serving pathlength, and 200X increase in connections per second. For V2R7, the Fast Response Cache Accelerator - a large kernel-managed cache of URLs - is key to this significant Web performance improvement.

Net.Commerce V3 shows a 100X improvement in browsing transaction throughput over Net.Commerce V1.

Java for OS/390

Between Release 1.1.1 and 1.1.4, multithread performance improved by over 900%, and single thread throughput improved by 80%. In October 1998, a beta version of JDK 1.1.6 posted another 60% performance improvement over the previous release.

With the coming Java support of S/390 G5 Server IEEE hardware, IEEE operations will improve by at least 100X. In 1999, you can look for the same dramatic improvements in performance for Java for OS/390 that we have delivered with TCP/IP, HFS, NFS and web-serving.

The Kernel

In MVS(TM) 4.3.0, the callable service layer had 6,000 instructions. By OS/390 V2R4, the layer had just 130 instructions. These path length performance improvements in calls for kernel services positively affect all OS/390 UNIX processing, including file access and TCP/IP performance.

Fact 4. ISVs are porting apps to S/390 UNIX

One of S/390's platform strengths is the extent of software vendor support in the marketplace. The applications ported to S/390 include business applications, Web server applications, middleware, system management applications and tools.

Here is a sampling of the vendors who have moved some of their portfolio to the S/390 UNIX platform:

Alternative Resources Corporation	Gateway Series
Baan Company	BaanERP
BEA Systems, Inc	Tuxedo 6.1
Bristol Technology	Wind/U
Candle Corporation	Candle Command Center
Computer Associates	CA-ACF2 6.1

Consul Risk Management B.V.	Consul/Audit for RACFTM, Consul/RACF
Far West Systems, Inc.	Data Management Services
Flight Data Management, Inc.	Debit Card System
Forte Software	Forte Application Environment
Hudson Williams Inc	Enterprise Chargeback for CPE/MVS
Hyperion Solutions	Hyperion Essbase Product Family
Information Analysis, Inc.	UNICAST/2000
Intec Products	VISUALWAREHOUSE
Intercope GmbH	Fax/Plus Open
Interlink Computer Sciences, Inc.	TCPaccess, TCPAccess Fault Tolerant
Iona Technologies	Orbix for OS/390
Isis Distributed Systems	Isis Database, Isis SDK, Isis Availability Manager
Mortice Kern Systems, Inc.	MKS Code Integrity
New Dimension Software	Control Family
Open Evironment Corp.	OLEnterprise, Entera Runtime Support, Entera Client
Phoenix Software International	(E)JES
Pro-Cubed Corporation	Zela - The Removable Media Maximizer
Platinum Technology Inc.	InfoReports Server
Quality Decision Management, Inc.	Business Bureau
Recognition Systems Group PLC	Relationship Manager
Rocket Software Corp.	QMFTM for Windows®
RogueWave	DBTools.h++, Tools.h++, Threads.h++
SAP	SAP R/3
SAS Institute	SAS/C, SAS/C Compiler, C++ Development System
Software AG	SourcePoint, DCOM for MVS/OE
StarQuest Software, Inc.	StarPipes, StarSQL
Sybase	C/Cobol Precompiles, OpenClient, OpenServer
Talarian Corporation	SmartSockets
The BMS Group, Inc.	The IBM Business Intelligence Product Set
The Fillmore Group	Relational Database Solutions
Tone Software Corporation	OMC-TCP/IP, OMC-FLASH, OMC-Print
Uniquest	Credit Management Solutions
Universal Software Inc.	Universal-Link
Walker Interactive Systems	Horizon Financial Consolidation

To view a more comprehensive list of applications, click on the Vendor Applications bar on the S/390 UNIX home page: **http://www.ibm.com/s390/unix/**

Fact 5. Customers use mission-critical apps on S/390 UNIX

Running your applications on the same platform as your data makes business sense and computing sense. For some customers that means porting their own apps to S/390 UNIX; for others, it means using off-the-shelf S/390 UNIX apps. Here's a sampling of customers who are using S/390 UNIX:

Banking and Financial Systems:

Bancaja, Spain
Banco di Sicilia, Italy
Bankers Trust
NatWest Bank, UK

Rabofacet, Netherlands

Insurance:
Insurance Services Office
Unipol Insurance, Italy

Manufacturing:
Caterpillar
Eastman Chemical
Carraro SpA, Italy
Mead Corporation
Reynolds Metals
Texas Instruments
Volvo, Sweden

Government:
City of Lincoln Nebraska
DGSI/Ministry of Justice, Portugal
Meteorological Office, UK
Texas Workforce Commission

Distribution:
Rite Aid

Telecommunications and Media:
MCI Telecommunications

Education:
Boston College
Case Western Reserve University
Rochester Institute of Technology
University of Miami

Consulting:
Tata Consultancy Services, India
R. STAHL AG, Germany

Additional information can be found at this internal Web site:

http://w3.ncs.ibm.com/ibmref.nsf

Contact the appropriate IBM representative before attempting to contact a customer.

Fact 6. Resources and support are in place

The **S/390 Partners in Development** program provides free assistance to ISVs for developing, porting, maintaining and marketing programs for the S/390 platform. Their Web site is:

http://www.ibm.com/s390/s390da/program/index.html

IBM Porting Centers assist ISVs and customers. For a list of contacts, see:

http://www.ibm.com/s390/unix/bpxa1rsc.html

The **JumpStart** program assists customers who want to adopt key S/390 technologies: e-business, server consolidation, ERP applications and Business Intelligence. For more information, e-mail:

Jumpstrt@us.ibm.com

IBM SmoothStartTM Services for S/390 Open Server:
IBM Global Services helps you plan, install, configure and train your staff to use the OS/390 UNIX System Services environment. For more information, see:

http://www.ibm.com/s390/sc/services.html

OS/390 UNIX Application Porting Assessment: IBM Global Services analyzes your current UNIX applications and reports on the steps required to port to an OS/390 UNIX environment. For more information, see:

http://www.ibm.com/s390/sc/services.html

Business Solution Assessment:
This program provides pre-sale technical support to assist S/390 Marketing and Sales. For more information, see this internal Web site:

http://wscvm.washington.ibm.com/bsa/

Up-to-date technical information and downloadable presentations are available at the OS/390 UNIX Web site: **http://www.ibm.com/s390/unix/**

Programmers can discuss their questions
with other S/390 UNIX users and IBM developers via IBM TALKLINK or the MVS-OE mailing list. For more information, visit:

http://www.ibm.com/s390/unix/bpxa1dis.html

Redbooks are available:

Selecting a Server -- The Value of S/390, SG24-4812
Consolidating UNIX Systems onto OS/390, SG24-2090
Porting C Applications to Lotus Domino on S/390, SG24-2092

For more information, visit:

http://www.redbooks.ibm.com

We hope this information has helped enhance your understanding of S/390 UNIX. If you have any comments or recommendations for future Fact Sheet topics, please send them to: bop@us.ibm.com.