VM and VSE Vitality
- An ACTS research paper -

VM VSE White Paper

Abstract: This paper focuses on the strengths of S/390's VM and VSE operating systems and contrasts them with certain competitive-platform weaknesses. It also discusses the role VM and VSE can play in the development of new applications (especially for e-business), and examines each system's overall staying-power for the foreseeable future.

Prologue

Please note - While the official names of these two operating systems are VM/ESA and VSE/ESA, in this document they will simply be referred to as VM and VSE.

People who wonder about the vitality of VM and VSE are often under the impression that IBM is not working on either of these systems. In reality, IBM just this year has delivered significant new function for both VM and VSE, in the areas of DB2, CICS, MQSeries and ADSM. IBM has also added support to VM and VSE for leading edge storage technology as well as for a new generation of Multiprise 3000 processors. Since these enhancements only recently became available, VM and VSE customers have yet to absorb/exploit all of this new function.

From an overall standpoint, the VM and VSE marketplace still consists of thousands of users worldwide, representing in excess of $1 billion annual revenue to IBM. IBM reports that on average **90 out of IBM's top 100 customers are still using either VM, VSE, or both**, many in addition to using OS/390. Looking down the road, at recent conferences and customer gatherings, IBM publicly reaffirms its commitment to make future enhancements for VM and VSE to DB2, CICS, and TCP/IP, specifically to enhance performance in these products to meet demands for future bandwidth.

This document will focus on the VM/ESA and VSE/ESA operating systems for S/390, and consider their vitality for the foreseeable future.

Specifically, this paper will take a closer look the challenges that VM and VSE customers face, and examine each systems vital signs regarding recent enhancements, especially e-business readiness since the next new application in many companies will likely be related to e-business.

IBM is defining e-business as web-enabling core business processes, transforming the way a company conducts business, and combining web technology with existing mission-critical enterprise applications and data. As early as June 26, 1996, IBM projected revenue opportunity of over a trillion dollars in electronic commerce on the Internet by the year 2000. More recently, while speaking at a conference on February 23, 1999, Paul Otellini, executive VP at Intel, predicted electronic commerce revenues will reach one trillion dollars within the next few years, and said "The Internet is as important to Intel's future as silicon was in our past."

This paper will also provide examples of companies who have struggled seeking alternatives to VM and VSE so as to highlight the pitfalls associated with other environments, like Unix and Windows NT .

Part 1 is a discussion of customer challenges and industry trends. Part 2 looks at technologies important to both VM and VSE, while parts 3 and 4 offer a more detailed discussion of VM and VSE technology, respectively.

Part 1 – The VM and VSE customer challenges and industry trends

In recent years, companies have been spending large sums of money trying to integrate disparate systems and applications, all the while trying to curb IT spending. It is in these types of pursuits that the attention often shifts to the feasibility of eliminating platforms by migrating existing applications to new platforms. VM and VSE show up frequently of the list of candidates to be replaced.

Sufficient vs. Superior

When making business choices, sometimes the best business question to ask is, "What is sufficient?" instead of "What is superior?" Take car rentals, for example. Most companies have specific policy to exclude expensive luxury cars, to ensure people don't go beyond what has been determined to be sufficient. Companies should prioritize where and how they will spend money, and most agree that there is no need to pay top-dollar for luxury cars. Sometimes IT choices can take on the same rationale.

For example, many companies who are presently using VM and/or VSE for running core applications are wondering if what they have is sufficient for implementing new technologies, such as a new e-business application. Many are considering new things like web serving, e-business, browser-based applications, and wonder if VM and VSE have sufficient function and would become a logical place to deploy those applications. IBM has been working hard to ensure VM and VSE customers can answer "yes" to these questions.

On the other hand, for the company whose strategy is to be state-of-the-art and use state-of-the-art visual development tools, or buy a package on the open market built for a different platform, it is unlikely such workloads will be put on a VM or VSE system. For this type of customer, the key point is to make sure the systems you have are up-to-date and connect properly with each other.

Consider the Track Record

VM and VSE have a track record for being cost effective when hosting core applications. Core applications are certainly important to every business. When discussing core applications, an important question becomes "why mess with it if meets your needs?" See Sidebar - Who's Calling the Shots?

Sidebar: **Who's calling the shots?**

Often pressures to change or abandon a technology platform come from outside IT – as everyone from end-users to consultants claim to know better than IT professionals which technology is best for the company. For example, one embattled VM/VSE data center manager from a large mid-western municipality reports that the company's 2500 end-users are exerting tremendous pressure on IT to only produce applications that utilize a Windows GUI. His attempts to inform those outside IT about the merits of S/390 were futile in the face of a mob that says the mainframe must be replaced. In that company the end-users are calling the shots.

A large east coast furniture manufacturer with multiple divisions hired an expensive consulting firm to analyze the company's potential for implementing an Enterprise Resource Planning (ERP) solution. The recommendation that followed was to immediately phase out the existing operational applications running on IBM's S/390 and VSE/ESA operating system and implement a well known ERP package on Windows NT. However, rather than blindly follow the consultant's unproven prescription for success, this company actually examined the cost factors of the proposed Windows NT-based solution more closely. After quantifying the value of their operational systems, it became clear the consultant simply did not have a sound business case to support his "in vogue" recommendation to migrate everything off the mainframe. In this example, the consultant tried to call the shots, and was shot down.

Risky business

Technical analysis is not always simple, but the business world is full of end-users who may think it is. One embattled CIO quipped, "If another person tells me how simple all this is, I'm going to scream!" Granted, IT professionals should always be responsive to end-user needs, but it is taking a great risk to let end-users dictate technology choices. Why? Because end-users seldom choose what is optimal, and because many times there are a wide range of multimedia services solutions depending on a company's requirements. Therefore, great care should be taken to choose the best solution that meets business needs in terms of both functionality and cost. For example, it is usually desirable to replace unappealing 3270 green-screens with mouse-accessible GUIs. Also, it is important for users to have the ability to send file attachments, and to import data into PC-based productivity software, such as spreadsheets. However, when putting these important basics in place, customers should ensure that their strategy allows for a next step, such as introducing more advanced techniques for collaboration that will allow

users to streamline business processes.

Replacing applications:
the best use of money?

Even though political pressures can become intense, don't assume that the best technical solution is always to replace existing applications. Responsible decision-makers are those who assess the cost at which the addition of GUI support and file transfer justify the investment. The larger the company, the more care should be taken to decide the best way to improve applications. Since platform migrations cost money, sometimes the best business decision is simply to leave things where they are. One large aerospace manufacturer estimated it would cost $billions just to migrate applications, so they chose to maintain existing applications and use the $billions to acquire companies instead.

Along these lines, consider the surprise of an oil company executive, who on the spur of the moment made what seemed to be a logical and simple decision to standardize the entire company's e-mail software for 20,000 users. By the time the migration was completed to Microsoft Exchange, it had cost the company over $80 million! Obviously, this executive had underestimated both the financial and the technical ramifications associated with his technology directive!

One Company who chose
to stay put

One company who looked at the alternatives and chose to stay put is Timken Company of Canton, OH. Timken is a manufacturer of roller bearings and specialty steels. At Timken, PCs have replaced dumb-terminals for the most part. "Our strategy is any-to-any connectivity, so they only need one device on the desktop," says Terry Moore, Senior IS Technical Specialist. "We have 14000 VM logon IDs company wide, and though LANs can do end-user computing, they simply don't do it as cost effectively as VM."

Is Timken typical or atypical? "I've been active in VM user groups for a number of years, and there are a lot of shops that have an official position not to do new development on VM," says Moore. "However, very few have moved to point of eliminating VM, as such a strategy is more of a management desire than an actuality." Moore states he is aware of one large company that spent a lot of money to successfully eliminate MAC PCs and VM because they went out and found the resources and did a switch-over rapidly, but suggests that most organizations aren't equipped to accomplish such a feat.

Replace vs Refurbish

Some companies have had sticker shock when calculating what it costs to replace an application, or to standardize applications. As mentioned previously, IT managers are recognizing that it isn't mandatory to replace existing systems to take advantage of new technology. This assumes, of course, that there are legitimate alternatives that would allow existing applications to be refurbished and revitalized by extending their functions. Such are the issues at hand as VM and VSE customers consider their options.

Good news for Vendors

Out of 33 VM and VSE customers queried when researching this paper, 24 said they will continue to invest in these environments.

This should please vendors who have a stake in this arena. Even one large retailer who some time ago officially placed VSE is on its sunset list, concedes that VSE applications are growing and still a vital part the daily computing operations. This company has multiple divisions and multiple locations operating VSE. Despite the companies official policy to migrate off the platform, VSE is still active, and they just again approved the purchase of the most recent VSE upgrade. A technical manager interviewed at the company states "VSE is scheduled to be replaced, but we all know that VSE will be with us a long time. In fact, we are expanding our point-of-sale application that is on VSE to analyze our customer loyalty data."

Connectivity is key

IBM regularly emphasizes the importance of connectivity. The director of the VM and VSE business unit, Ying Chu, states "We know that to make any platform work in this mixed workload, multi-platform computing environment, you need to be connected. First things first, we always focus on connectivity."

More Clarity -
what not to expect

David Steinhoff, marketing manager for the VM and VSE business unit, states "As far as the future goes, we will continue to promote VM and VSE applications. We will also leverage other IBM solutions to solve customer problems where other IBM servers offer better technology options and can supplement their IT strategy."

What does this mean? It simply means that with proven solutions spread across numerous platforms, naturally IBM hopes that customers who move beyond the limits of VM and VSE will stay in the IBM fold. For example, customers interested in business intelligence should expect IBM to promote Intelligent Miner on an RS/6000, or perhaps as part of an e-business solution, it might make sense to deploy Websphere or Java on a Netfinity box connected to a VSE system.

So here is what appears to be the main points on IBM strategy for the VM and VSE operating systems: 1) form a business unit to sharpen overall focus, 2) reuse OS/390 development where possible, and 3) encourage customers to consider increased application coexistence with Netfinity, AS/400, RS/6000, and OS/390 via improved IBM connectivity options.

Customer Awareness -
Only the music should live

IBM's attempts to bring its different server products closer together is in response to a change in customer thinking that has resulted from the largely unsuccessful attempts at scattered computing, of the multi-vendor, multi-architecture, multi-platform, hodgepodge variety. The fads of the 90's - client/server, open systems, network computing - are all concepts in search of an architecture and proper middleware glue. Customers are realizing the difficulty of becoming systems integrators, which is

the unavoidable role they assume when adopting multi-platform solutions, and especially multi-vendor solutions.

Actually, VM and VSE are benefactors of this growing customer savvy, where customers are learning that focusing on the final results can be more important that focusing on the tools. As one IT architect put it, "the emphasis should not be on the servers we use in IT, but rather the services we provide." A CIO put it this way, "IT departments should be like an orchestra playing beautiful music. While the underlying instruments are always important, the focus should be on the quality of the music being produced rather than the instruments each musician is using."

This type of focus plays well into the future of VM and VSE, as the focus is shifted away from platforms and toward how the business processes are supported by IT services. The client/server fiascoes of the 1990's have educated customers about what doesn't work. Consequently, savvy customers are now more inclined to leave data where it is, rather than do wholesale platform migrations in pursuit of the latest technology fad. Such thinking greatly benefits S/390 platforms in general, since S/390 is already in place managing the majority of business data at so many companies.

Unsuccessful attempt to abandon VM and VSE

One reason for the high numbers of customers still using VM and VSE is in part due to the lackluster results of alternative platforms. Unfortunately, many customers ventured into the wild world of scattered computing only to become fashion victims. Thus, numerous companies have collectively squandered $billions unsuccessfully chasing the client/server bandwagon, resulting in wide-spread disillusionment with smaller platforms. For example, one VSE customer threw away a lot of money only to discover that a large application that completed in two hours on VSE, took 30 hours to complete when migrated to a UNIX server.

Alleged S/390 Alternatives

Bad financial results invite the type of bad publicity companies want to avoid, and a company’s bad image is exacerbated when admitting the financial problems were caused by unwieldy technology. Why? Simply because such an admission reveals the company doesn't know what it's doing!

Along these lines, for many e-pioneers the uptake of electronic commerce opportunities has been hindered by deficiencies in many NT and UNIX-based servers in the areas of scalability, security, and availability. In light of the shortcomings of alternatives, cautions are high as businesses turn their attention to web serving and e-business. For many e-pioneers IT problems have resulted in PR disasters. Two examples are eBay and Hershey Foods Corp. See Sidebars: " Public Relations Disaster 1" and "PR Disaster 2."

Sidebar: **Public Relations Disaster 1**
eBay

Online auction house eBay (www.ebay.com) had numerous problems adopting a Sun UE10000 Starfire system. Postings on eBay's support bulletin board chronicle problems with the Starfire deployment involving memory, SCSI cards and software, all of which have adversely affected the site's uptime where live auctions are conducted.

One ZDNet headline from the afternoon of Friday August 06, 1999 read: "eBay Down Again." Here are some excerpts: "Online auctioneer eBay Inc. has suffered another outage. A company spokesman said the site has been down since 4:30 AM PT Friday morning... The auctioneer suffered its longest outage to date in June, when the firm experienced multiple problems with the databases that power its auction engine."

At one point eBay posted a note to their increasingly hostile customer base: "Please do NOT abuse the support people. It will do NO good and will not solve the problem." That outage forced the company to refund millions in listing fees, and was blamed along with costs for increased IT spending, when the company earnings for the second quarter fell 70 percent.

In his article "eBay online again after 14-hour outage" dated August 6, 1999, 2:50 p.m. PT

Tim Clark, Staff Writer, CNET News.com offers this assessment: "This latest glitch threatens to tarnish eBay's reputation with users and Wall Street. The popular person-to-person auction service has had repeated problems keeping its site running this year, including a 22-hour outage on June 10-11 that cost eBay $3 million to $5 million in revenue."

Remember, in the age of the internet, bad news not only spreads quickly, it can linger for a long, long time. For example, at the bottom of this previously quoted article were links under the heading "Related news stories:"

- eBay suffers outage despite assurances July 22, 1999
- eBay's Web site goes down again July 12, 1999
- Outages plague eBay again June 29, 1999
- eBay outages nothing new June 14, 1999
- eBay blacks out yet again June 13, 1999

Though Sun is involved in both PR disaster stories, scalability and availability problems are by no means isolated to a particular system or vendor. Consider Oxford Health Care, who in September, 1997 migrated its claims processing system to a Pyramid computer system with an Oracle Corporation database. The following month the company blamed financial losses on computer glitches. As a result of missed earnings, Oxford has the dubious honor of losing the most market capitalization of any company in the history of Wall Street. Reuters published a report on 10/27/97 that read: "HMO Oxford Health Implodes on Systems Snafu" - "Oxford made national news when their stock plunged from $65/share to $25/share, making it the biggest percentage loser in a day of historic losses on U.S. stock markets."

Beware of the W2K Problem

When evaluating alternatives to VM and VSE, beware of the W2K problem.

Microsoft originally slated release of Windows 2000 (formerly Windows NT 5.0) in 1997. The reason they are late is due the massive complexity associated with a product that is > 35 million lines of code (>40 million by some estimates).

Two years ago, Bill Gates made it a marketing priority to dispel concerns about Windows NT scalability limitations. He did so by doing a benchmark of 1 billion transactions in a single day on an NT server farm, then publicizing this accomplishment at a media event. On May 14, 1997, Scalability Day was a media extravaganza complete with customers who touted the merits of NT. For example, Microsoft Corp. and Tandem Computers demonstrated the world's largest Microsoft Windows NT Server network operating system linking 64 Intel Pentium Pro processors in a cluster using Tandem's ServerNet interconnect technology. The system managed a 2-terabyte database with a 30-billion-row table, which was based on Dayton Hudson's data warehouse which manages retail outlets such as Target and Mervyn's stores.

That's fine for a test case, but the Microsoft propaganda doesn't even come close to reality, as evidenced by NatWest Bank in the UK and Social Security Administration in the US. Representing two of the largest attempts to date to deploy NT in production, these two customers alone have squandered untold hundreds of millions of dollars because NT cannot scale and simply has not functioned as promised by Microsoft.

In October of 1999, Microsoft recanted on its bogus scalability.

From Techweb Thursday, October 14, 1999:

Headline: ***Ballmer Downplays W2K Scalability***

Orlando, Fla. -- Faced with a barrage of questions about Windows 2000, Microsoft president Steve Ballmer this week backed away from the company's previous claims about the platform's ability to scale for enterprise applications.

Quizzed at the Gartner Group's Symposium/ITxpo99 conference about Windows 2000's ability to scale, Ballmer said: "I think it's fair to say we got ahead of ourselves. And I think it's actually probably fair to say market perception lags reality." He added that "part of the scalability argument wasn't about scalability; it was about reliability and availability."

Microsoft had previously promised that Windows 2000 would be as scalable as its Unix rivals. In a series of glitzy Scalability Days during the past few years, company officials said the software would be able to host a multi-terabyte database applications and perform 1 billion transactions per day.

He also acknowledged it is unlikely that the long-delayed operating system will ship this year. "We won't ship it until it's right. There's no need to ship at this point ... until it's absolutely, positively right," Ballmer said. -- Ellis Booker http://www.internetwk.com/story/INW19991014S0004

Comparing system sizes

Acknowledging that comparing millions lines of code (MLOC) is not a very scientific measure from a technical standpoint, even allowing for a wide margin of error the following information can be thought provoking:

VSE/ESA < 3 MLOC

VM/ESA < 5 MLOC

OS/390 > 25 MLOC

(The above numbers do not include CICS or VTAM)

LINUX kernel < 2 MLOC

Compared to Microsoft operating systems:

Windows 95 < 5 MLOC

Windows NT 3.5.1 5 MLOC

Windows NT 4.0 15 MLOC

Windows 2000 > 35 MLOC

One of the reasons W2K is so large is the device support it will include. According to PC Computing's 7/99 issue, W2K will support 4,200 modems, 2,000 printers, 700 network devices, 55 scanners, 41 digital cameras.

The size and complexity of Windows 2000 puts Microsoft in an arena where no company has ever been before, including IBM. Since Microsoft is not systematically reducing complexity, nor is it systematically eliminating bugs with a recovery architecture, the odds are high that reliability problems will make Windows 2000 unusable in the business world. Many predict that Windows 2000 will become widely known as the W2K problem. By the way, in stark contrast to IBM's commitment to compatibility, Microsoft Corp. recently exhorted corporate developers to write new applications to get the most out of Windows 2000, rather than overhauling existing ones. (see Computerworld 8/2/99)

Anticipated S/390 Growth

As more customers learn about the serious limitations and high costs of alleged mainframe alternatives, this will spur increased investment in S/390 and compatible systems. Since mainframes shine in the areas of availability and scalability, IBM has been positioning S/390 to exploit this growth opportunity, and in many instances it will be the only platform capable of meeting the demands of large companies. Therefore, the next three sections will take a more technical approach and examine just how well VM

and VSE are equipped for e-business, and look at how they are positioned from an overall technology perspective.

Sidebar: **PR Disaster 2**

Hershey Foods Corp

Similarly, even with the confines of the data center, Hershey Foods of Harrisburg, PA blamed low earnings to technology glitches. On 9/14/99 Hershey Foods, who is trying to use Solaris (Solaris is Sun's version of UNIX) systems to support mission critical business applications such as SAP R/3, issued a profit warning saying continued problems with a new computer system hurt their ability to fill candy orders and will cause third-quarter earnings to fall below estimates. Financial analysts reported that the new system is causing lost sales and alienating some Hershey customers. Then, the Friday before Halloween, more bad news was reported by Reuters (Friday October 29):

Headline: **Computer Glitch Haunts Hershey's Sales**, By David Morgan

PHILADELPHIA (Reuters) - Halloween could turn out to be a real horror story for Hershey Foods Corp (NYSE:HSY - news)., the leading U.S. candy maker, whose distribution channels continue to be haunted by problems with a new computer system, analysts say.

The maker of Hershey's chocolate bars and Kisses, Reese's Peanut Butter Cups, Kit Kats and Twizzlers has not been able to get all of its Halloween inventory onto store shelves soon enough to fill the plastic orange jack-o'-lanterns of trick-or-treaters, who are expected to stalk American neighborhoods Sunday evening.

Analysts on Wall Street had expected the gremlin in Hershey's $112 million order-and-distribution system to be exorcised by mid-October. But now they fear lingering problems could jinx candy sales through Christmas and maybe even into Easter

``This is serious stuff. The fourth quarter represents about 40 percent of profits, and Hershey could lose $100 million in sales between back to school, Halloween, Thanksgiving and Christmas,'' said Merrill Lynch analyst Leonard Teitelbaum...

The disturbing reality is that Sun's UE10000 is arguably the closest thing to an S/390 mainframe in power, but is increasingly receiving bad publicity as news about customers experiencing outages (and causing the missed financials) continues to leak out.

Part 2 – Important Technologies to both VM & VSE

There are literally dozens of technologies and components that are important to both VM and VSE. However, this section will examine four areas that customers should keep a close eye on, primarily because of their strategic importance to VM and VSE customers. Those four areas are MQSeries, Linux/390, Enterprise Storage Server (ESS), and leveraging OS/390.

MQSeries

Forward-thinking companies have been trying to:
1) automate business processes and manage business resources more efficiently by integrating new applications with existing applications.
2) liberate business processes from the rigidity and complexity of heterogeneous systems and scattered applications.

MQSeries is IBM's 800 pound gorilla in the messaging-middleware marketplace and is designed to address these two goals. At a high level, MQSeries consists of multiple software tools customers can use to focus on messaging, workflow, and integration, giving developers an opportunity to integrate new and old applications into a single flow, allowing information to be more readily accessed among different platforms. The MQSeries messaging component provides the backbone which gives customers a single programming interface to use across the enterprise.

How diverse is it? MQSeries software operates at least 35 platforms without the need for a traditional network bridge or gateway. MQSeries messaging is used by thousands of customers world-wide to provide connectivity to many different environments, including Lotus Notes, SAP, Windows NT, and yes, VSE and VM both have the application interfaces for MQSeries messaging. The VSE offering also includes some MQ Server function as well.

MQSeries supports TCP/IP, SNA, NetBIOS, and other protocols, and will assure messages are delivered even when the network or system temporarily fails. MQSeries operation is asynchronous, meaning it allows a program sending a message to continue processing without having to wait for a reply. If the receiver, or the network path, is temporarily unavailable, the message is held and is forwarded later. MQSeries also provides mechanisms for providing acknowledgements of messages received.

All this means that MQSeries offers another tool for those VM and VSE customers who prefer to leave their core applications and data on S/390. Even when applications are migrated onto smaller servers, many customers especially don't want to move data down line because they like how S/390 handles their data.

Linux

Linux came on the scene in 1990 when a computer science student named Linus Torvalds took a teaching tool, called Minix, and turned it into Linux. Linux is a UNIX look-alike and its kernel code is available at no charge. That's right, no license charges! Many applications, but not all, are also available for Linux at no charge.

Linux runs on PCs, so it is an alternative to using Windows 95, Windows 98, and Windows 2000 (formerly Windows NT). It supports both 32 and 64 bit hardware and provides a stable multi-user internet-ready operating system. Linux continues to be ported to different platforms, including Alpha, MIPS, and PowerPC. Since Linux implements certain UNIX standards, application software written for many variations of UNIX will run under Linux. So what would happen if Linux were to run on S/390? Enter Linux/390.

IBM has made no formal announcements, but IBM unofficially acknowledges that Linux is being ported to run both in an LPAR, and as a VM guest, which is basically already operational.

Should Linux appear formally on S/390, the implications to VM and VSE customers are enormous. It would mean that many Unix applications which run on Linux could be adapted to run alongside VM and VSE on the same S/390 server, including Apache web server and SAP/R3.

Early indications are that Linux/390 runs well under VM, and consider the boost it would give to Linux to gain the sophistication afforded by VM's tools and framework, and S/390 architecture. Linux/390 could benefit in a similar fashion to how VSE benefits from running on VM, gaining new functionality in the areas of performance, productivity, reliability, and systems management. More specifically, the S/390 platform offers Linux robust I/O facilites, multi-processors, and the ability to run multiple Linux guests concurrently under VM. Also, the new S/390 Multiprise M3000 box offers a cost-effective entry system which can expand the reach of Linux/390 into small and medium-sized businesses, where it can run alongside VM and VSE.

Some customers are already porting Linux to S/390 themselves and, if IBM delays, may even beat IBM to the punch.

Update: During November of 1999, IBM announced interoperability of Linux with S/390.
See http://www.s390.ibm.com/stories/1999/linux_interop.html.

Enterprise Storage Server (ESS)

With e-business expected to drive a data explosion, possibly creating exponential growth in the need for high-performance storage capacity, people are looking to Storage Area Networks (SANs) to help manage the load. The emphasis this time around, is connectivity, distance, and sharing storage in a mixed server environment.

IBM's major thrust into this arena is the Enterprise Storage Server (ESS). Using the ESS, storage capacity is partitioned among the attached servers. The list of attached servers supported includes the RS/6000 running AIX and many leading UNIX variants, IBM NetFinity and other Intel-based PC servers running Windows NT and Novell Netware, and AS/400. In addition, the ESS supports System/390 servers running OS/390, VM/ESA, VSE/ESA and TPF. Any combination of these heterogeneous platforms may be used with the ESS. This is particularly good news for VM and VSE users to be able to take advantage of this technology.

Assistance for Coexistence with OS/390

VM and VSE customers always have the option to migrate to or coexist with OS/390, either by implementing new applications or transitioning certain workloads to OS/390. For customers who choose this path, IBM will waive some of its software fees if the customer meets certain criteria.

The purpose is to enable new workloads or transition VM and VSE workloads to OS/390. Specifically, the MP 3000 OS/390 Workload Transition Offering for VM and VSE waives OS/390 MP 3000 GOLC charges

for three years. Under this offering, IBM gives VM and/or VSE customers three years to get an OS/390 application in production using one of the three models of the Multiprise 3000 processors.

The VM and VSE customers are most likely to benefit from the MP 3000 OS/390 Workload Transition Offering are those that are growing and who want to implement an OS/390 environment in harmony with VM and VSE on any model of the Multiprise 3000 processor. The intent is primarily to provide the customer a reasonable time frame to install a new OS/390 operating system environment and bring applications into production under OS/390 as well as transition VM and VSE workloads to OS/390.

Part 3 – Key technical capabilities of VM

VM is a versatile operating system. VM has strong application development and debugging facilities, which makes it ideal for prototyping applications. The motive for prototyping applications is to get them into production quickly, usually in other environments such as OS/390 or TPF.

VM is based on a model of making services available to any client. This aligns nicely with IBM's campaigns to facilitate enterprise integration with products like MQSeries. Ultimately, to make integration happen customers will need to have a secure environment with reliable means of communication. They will also need to adopt a development mentality, as they undertake to weave applications together to provide better access to information, and to properly position their systems for e-business.

VM Web Serving and Rapid Application Development

The VM development group has gone to great lengths to ensure VM is well-armed for web serving. For example, in VM, CGI's can be written in REXX (a language known to many developers) to allow web servers to talk to existing 3270 applications to obtain operational business information. One benefit of using such an approach means new web-based solutions can be developed by sending commands to existing applications (just like users would), and letting these existing applications take care of the accessing the data to get the answer. Customers can rapidly develop web applications in this manner because the complexity of the file structure where the data is stored never comes into play as the browser is used to get data from existing applications. Also, web servers can talk to existing CMS application servers, such as Office Vision’s (OV) calendar server. Many IBM customers took OV's speed for granted and have since learned by migrating off of OV about its vastly superior price/performance over alternatives, such as Lotus Notes and Microsoft Exchange.

Web servers from Beyond (acquired by NEON Systems Inc.) and Sterling have been specifically designed to work with existing VM applications and servers to access the data so customers don't have to write everything from scratch.

DB2 is another source of data for webserving. Twenty percent of VM customers are using DB2. Customers who use DB2 like having just one database throughout the enterprise, letting them more

easily control the extent to which data is distributed or centralized. Also, TCP/IP support has been added for DB2.

The products coming from vendors include the following: NEON Systems Inc. offers Shadow VM Web Server with extensions for security, mail, calendar, and other areas, Sterling Software offers VM-Webgateway with specific extensions for OfficeVision and DB2, AONIX Corp. offers RP/Web, and Macro 4 offers EnterWeb.

These vendors take different approaches to their web server implementations. For example, to handle larger configurations, Beyond Software's web server replicates across VM systems, so more than one web server is active. On the other hand, Sterling's web server takes advantage of multi-tasking in VM and relies on one copy of web-server code being active.

Aonix also offers a product called UltraQuest Reporter to connect to databases. It extracts data and allows it to be accessed using web technology.

Alternatives to replacement

Office/Vision for VM is a long-standing 3270-based application that provides mail, calendar, directory, and limited document support. Depending on specific requirements, customers may have a couple of options to add a few bells and whistles, such as GUI and file attachment, rather than replace OV/VM entirely. One option is to make OV accessible from a web browser or Windows application to provide a GUI interface for some functions. A second option is to use Lotus Notes clients to access OV, which adds GUI capabilities and increases document support.

Certainly some will choose to migrate off of OV to another system if requirements are to have a complete GUI and extensive document support. Others may find the lure of advanced collaboration and workgroup functionality in products like Lotus Notes/Domino especially hard to resist.

The high cost and sometimes arduous task of replacing an application is fueling interest in deployment of web-enabled solutions, as customers are seeking affordable and practical ways to leverage existing applications while introducing new capabilities. That is why customers are advised to carefully calculate the ROI of changes made to production-application portfolios to ensure business execs aren't blind-sided by exorbitant costs.

Attracting Applications

As mentioned previously, VM has always provided a great environment for application development and prototyping. IBM is doing several things to improve VM connectivity and to attract solution developers and new applications to the VM platform. Specificially, VM has recently been enhanced to interoperate with other transaction systems using the popular MQSeries protocol. Support for UNIX services is continually being enhanced, which simplifies porting small or simple UNIX applications to run on VM.

NetRexx allows developers who know REXX to leverage that knowledge and writeJava applications without having to learn Java programming syntax. Additionally, to create a more flexible development environment, IBM has just released the Reusable Server Kernel designed for vendor partners to develop

new server function. This kernel provides the infrastructure to save developers from having to handle the basics, such as memory management and disk I/O.

For years, VM has provided a variety of benefits in the area of network services. RSCS (the Remote Spooling Communication Subsystem product which almost all VM customers have) controls communications with other systems and printers throughout the enterprise, including TCP/IP printers on LANs. VM can boot hundreds, even thousands, of IBM Network Stations (thin clients supporting terminal emulation and Web access). These new workstations are attractive alternatives to expensive and hard-to-manage PCs. VM and VSE customers can use VM to boot the Network Stations and they can then access VSE applications.

VM Futures

IBM's S/390 hardware will soon be introducing 64-bit capabilities. The first phases of this support are expected to appear in the next generation of CMOS processors, specifically when the G7 hardware is released sometime during 2000. At first S/390 will likely support 64-bit real storage addressing, and then add new capabilities over time to eventually provide 64-bit virtual storage where applications will run. The strategy for 64-bit support is to allow customers to run their 64-bit Java or UNIX applications on an S/390 host. The VM group has been working for some time to allow 64-bit guest systems to run under VM, so should be ready when the capability is available on S/390 hardware.

Ultimately, the VM group is focusing on e-business enhancements, such as NFS client support and important extensions to TCP/IP. (NFS stands for Network File Support and is the UNIX networking protocol that allows sharing of files and printers across the network.)

Finally, as mentioned in the previous section, in all likelihood customers will be able to run Linux under VM, which could have far-reaching implications depending on which popular Unix applications would eventually follow Linux to S/390.

Part 4 – Key technical capabilities of VSE

VSE is an entry system for S/390. When compared to OS/390, VSE has many of the same characteristics and a subset of the function. VSE and its precursors date back to 1965, and through the years it has primarily been recognized as an effective, reliable, and affordable OLTP system.

The VSE strategy since the VSE/ESA version of the system was first introduced in the late 1980's, is based on affinity. This means that when IBM is presented with a customer requirement for VSE, it first looks to see if that requirement already exists on OS/390 or another system. If it does, then wherever possible those components and enhancements will be adapted to run on VSE. This is feasible because VSE and OS/390 share many common subsystems, languages, and middleware products.

As a result, roughly a third of the code developed by IBM's VSE group comes from OS/390. For example, support for data spaces, OSA/2 adapter, and the hardware data compression feature all came from retrofitting OS/390 code to run on VSE.

Other examples of affinity include the CICS Transaction Server (CICS TS) and VTAM. CICS TS was first developed for OS/390 and recently introduced for VSE. As of the latest releases, CICS TS now has 95% common code between the different VSE and OS/390 implementations. Similarly, VTAM is based on a common subsystem that runs on VSE, VM, and OS/390.

What is the relationship between VSE and OS/390? Affinity doesn't mean everything in OS/390 eventually ends up on VSE, or else VSE would become OS/390. There are well-established components in OS/390, such as TSO and IMS, that will never become part of VSE. Similarly, the adaptation of evolving features of OS/390 to run UNIX applications and to handle e-business are not the focus of affinity plans. IBM appears content at present to leave the development of VSE e-business solutions for business partners and ISVs. What affinity does mean is that VSE will continue to refine its core system functions like transaction and batch processing, connectivity (VTAM and TCP/IP), languages, middleware (MQSeries), utilities, and DB2.

By keeping the core VSE system code tracking closely with OS/390, there are three significant advantages. First, it makes it easier (requires less work) for IBM developers to retrofit OS/390 code to VSE. Second, it makes it easier for VSE customers to migrate to OS/390, protecting a significant part of their overall investment in software that runs on the S/390 architecture. Considering the widely-reported headroom (limited scalability) and availability problems with UNIX and NT systems, having a simplified migration path to OS/390 is an attractive option to have in reserve. Third, code brought over from OS/390 has been put through the paces in the production environments of IBM's most demanding customers, usually for a year or longer, which is more comprehensive than even the most rigorous of test environments. This means that by the time the code reaches VM and VSE, the porting is done from a highly reliable (well debugged) code base.

Using VSE for e-business

When asked what it will take for VSE customers to engage in e-business, John Rankin, President of Connectivity Systems that makes the TCP/IP component that IBM uses in VSE, states: "It's really going to take a lot of education and training. There are a few things remaining to do technically, but for the most part the technology is in place. It's a matter of actually getting the customers to sit down and talk about what they want to use, teaching them how, and showing them. We do have some customers today actually doing commerce over the Internet with VSE, who are mostly using products they developed themselves. What is needed are packages to help VSE customers more quickly implement e-business solutions."

Configuring VSE for e-business

When configuring for e-business, VSE customers can basically choose between two alternatives: a 2-tier and a 3-tier approach. For both configurations the web-browser software runs on the client devices, and TCP/IP is used for the connection between the web-browser and the web-server across the Internet. In both models, VSE fills the role of data server and provides access to VSAM, DL/I, and DB2 data from the web-server.

The differentiation comes in deciding whether to run the web-server software directly on VSE, making a 2-tier environment, or to run the web-server software on a separate Lotus Domino Server which adds another tier (layer). The tradeoffs are that the 2-tier approach is easier to get started since is does not require the presence of another platform, and the web-sever code is benefactor of the highly reliable/available/scalable attributes of S/390. On the other hand, adding a middle server to host the web server outboard from S/390 will likely bring additional functionality and a richer tool set, and becomes a very reasonable alternative if the middle server is already in place at a company.

In many companies a middle server may already be in place, usually serving-up static information, but the system hasn't been linked to VSE to provide web-access to operational business data as part of e-business transactions. The challenge is finding the best way to do this, and it may a simple matter to make a connection to the S/390 server, to gain access to CICS applications or data, or to DB2. When using an outboard web server, the middleware that allows connection to S/390 include CICS Transaction Gateway (a component of CICS TS), MQSeries, DB2, ViaSQL to access VSAM or DL/1 data on S/390 (from ViaServe), and CrossAccess.

For 2-tier, coming in on a web browser and through a host firewall, IBM and some business partners offer solutions for VSE. Host On Demand is one IBM webserver. IBM TCP/IP Application Pak offers some basic web-serving capabilities and IBM is developing CICS TS CWI/3270 Bridge. The business partner product offerings include Web/VSE Host from Intelliware, WinJa from Seagull Systems, EnterWEB from Macro4, and a CICS-based web server named IpServer from Data21. Of course, each product has its strengths depending on what a customer hopes to accomplish. Take IpServer for example. For those customers who are heavily involved with CICS, IpServer may provide a natural and convenient launch point for getting into e-business.

Many companies are ready to move beyond serving static information and gathering data from website visitors, and begin conducting business transactions. Many of the existing, and even long-standing production applications are candidates to be enabled for e-business transactions.

VSE Futures

In the VSE arena, look for more of the same as has been observed in the recent past. IBM will provide incremental enhancements that will help connectivity in the mixed environment. Also look for IBM to continue working with independent software vendors. However, since a lot of the things that were driving affinity and capacity enhancement were recently completed and delivered, customers can expect the development emphasis to shift to connectivity items. For the time being, VSE remains a solid platform for running CICS and batch applications. For the immediate future, enough basic capabilities are in place for VSE to serve as a launch point for new e-business applications.

Summary

Technology decisions should be based on using tools properly, to provide business function in a timely fashion and at the optimal price points. Considering the current capabilities of VM and VSE, when

viewed in light of the limitations of alleged mainframe alternatives, it is easy to predict that many companies will be using these two platforms for many years to come. Considering the fact that worldwide a high percentage of all corporate data already resides on S/390 servers, coupled with the cost benefits of running on S/390, VM and VSE still offer a lot of technology options that customers can leverage both now and for the foreseeable future.

Many customers remain committed to and rely heavily on both operating systems. Referring once again to Timken Company, today the business is using over 200,000 VM programs, many which were written in house by business users, not the IT folks. The IT group itself has about 28,000 VM programs and REXX procedures. Moore states, "When issues are discussed comparing a large lump sum expenditure for the mainframe to the cost of distributed NT or UNIX complete with administrators and hidden costs, management laughs and says the cost of VM chargeback is so smallit's not an issue. From a vitality point of view, VM won't go away in our shop, simply because we couldn't afford to do all the applications over."

Both VM and VSE have a solid track record for providing cost-effective solutions in the arenas where they compete. Having important technologies such as DB2, CICS, ADSM, and MQSeries as part of the VM and VSE environments provides customers with important capabilities. With Linux/390 on the horizon, new application choices from the world of Unix will soon follow. Linux will create new alternatives on S/390, while S/390 will provide new capabilities for Linux.

So what is the vitality of VM and VSE? Despite the competitive forces seeking to displace the platforms, both VM and VSE not only survive, they continue to evolve. Both of these platforms have new features and functions that the majority of customers have yet to exploit. As the IT world becomes more complicated, IT staff has to be savvy when picking the optimal architecture and should do thorough technical and financial analysis as they deploy new applications. S/390 with VM and VSE continues to have a place in IT architectures, because there are still numerous IT strategy scenarios where they make good business sense.

ABOUT ACTS Corporation:

ACTS Corporation has one main goal: making our clients more successful. ACTS offers consulting services in many areas, including IT strategic planning. ACTS specializes in e-business consulting, with a strong focus on design and implementation of business-critical web sites that must maintain high standards for availability, performance, and manageability.

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