

Maximizing Business Value With Resurgent zSeries Mainframes

Platform Readiness Key in 2005

About this Executive Overview

The IBM mainframe underwent a sustained, dramatic and radical platform transformation of technology, economics, capacity, capability, open standards support, and software stack enrichment. Since its dark days of 1993, cumulative changes have transformed the platform in every dimension. This sparked a growing revival and revaluation, from the 2000 zSeries introduction onwards. By 2004, the revival had swelled worldwide to become a full-on market resurgence. Now in 2005, the mainframe offers unrivalled mixed and new workload capabilities, economics that are superior to distributed alternatives, deep open standards support, rapid and continuing hardware and software technology advances, and delivers unique qualities of service that no other platform can equal.

In the faster-moving era of On Demand, enterprises are radically changing their business processes to respond more quickly to customer demands and integrating their people, processes and information. The resurgent zSeries mainframe has a central role to play in this new era, and can now deliver new levels of unique business value.

And yet, whilst many large users have rapidly adopted and implemented these mainframe innovations, others were slower to upgrade to the newest hardware, z/OS operating systems, and middleware software engine releases that have all seen rapid continuing advancement.

This Executive Overview provides a concise summary of our recent, full-length, new White Paper of the same title, published in April 2005. This explored and assessed the business case and arguments for a new "Platform Readiness" strategy. This advocates more systematic and rapid adoption of the new mainframe hardware, operating system releases and major software subsystems. The rate of advance of the platform on all these fronts has, and continues to be, more rapid and substantial (under continuing high IBM R&D investments) than in earlier years, and has brought numerous advances that support the On Demand enterprise with superior business value.

1. Executive Summary

This Executive Overview Paper summarizes our full new White Paper on the business value of "Platform Readiness" strategies for mainframe/zSeries customers. The Executive Summary below highlights our main findings, assessments and recommendations. These are detailed more fully in rest of this Executive Overview, as well as in the full-length, original White Paper. It was written for C-level executives in medium and large enterprises and for their senior IT executives.

- **zSeries "Platform Readiness" Strategies Championed:** "Platform Readiness" advocates that more zSeries mainframe customers should take-up/deploy the newest zSeries hardware, operating systems and principal middleware software subsystems faster, to become and remain "current" with their rapid advances. Is this just obvious vendor self-interest to push sales, or are the customer benefits real?

- **Large Business Benefits Claimed:** "Platform Readiness" exponents argue a powerful case that adopting this strategy enables those enterprises to gain significant business value. It claims they can more rapidly exploit their large inventory of zSeries mainframe software applications, databases and skills in the new On Demand business world of rapid change and closer integration (see *below*). We assess and evaluate these claims.
- **On Demand Business Takes Off:** On Demand enables enterprises to become more responsive and flexible. They can detect and react quickly to changes in supply, demand, pricing, and competitors' moves, shifts in customer preferences and other marketplace dynamics. Computing architecture advances enabling greater variability and interoperability among previously disconnected IT systems are needed for On Demand. Technical integration allows new end-to-end business integration, both among internal operations and with external ecosystem partners historically kept separate.



On Demand has taken off rapidly, with thousands of enterprises en route with their transformation. A radically improved IT infrastructure, called an On Demand Operating Environment, is needed to support this. The zSeries mainframe and its software has been continually re-engineered and developed. These developments are claimed to have made zSeries the most advanced On Demand Operating Environment available, and have also fuelled market resurgence (*see below*).

- **40th Birthday Sees Strong Resurgence:** 2004 saw the 40th anniversary of the IBM mainframe (*latest models shown in Figure 1*). The platform had been transformed by radical changes, investment and development, and saw a market revival beginning from the 2000 zSeries introduction. By 2004, this revival became a strong market resurgence. Today, the mainframe is again widely recognised as the “Gold Standard” enterprise-computing platform, because of the leadership and value it now offers in supporting transformed On Demand businesses.
- **Business Value Advantages:** The sustained investments IBM made in transforming mainframe technology has delivered differentiated capabilities unmatched by any other IT platform. These leadership business value factors are amplified in Section 3. Customer-based research and our analysis identified the highest business value-generating advantages these systems now offer as:
 - **Lowest Cost of Outages.**
 - **Lowest Security Breach Risks/Costs.**

- **Highest Resource Use Efficiency/Utilization.**
- **Highest Scalability & Capacity.**
- **Lowest Total Cost of Ownership (TCO) & Cost/User.**
- **Low Risk Via World-class Support.**
- **Facilitates Reuse/Modernization of Mainframe Application Assets.**
- **Highest Performance & Quality of Service (QoS).**
- **Much-improved System Costs.**
- **Business Value Gains Available Argue Platform Readiness:** With these business value advantages from latest mainframe technologies, enterprise mainframe users should now rethink their practices and policies. Accelerated adoption of newest hardware, operating systems and middleware software releases under Platform Readiness brings large gains from these business values, and speeds users’ On Demand transitions.
- **Latest Findings Show Mainframe Lowest User Cost Platform:** A useful proof point (*summarised in Section 3*) underlines one of the above mainframe advantages. Fellow analyst Arcati’s latest 2005 study found the total cost per user over five years (*the fairest measure*) of UNIX systems was almost three times higher (\$19,650) than for the mainframe (\$6,750), and that for Windows-Intel platforms almost 4 times higher (\$26,750) for 2005. These dramatic differences highlight the major cost advantage the zSeries mainframe now offers over its main competitors for enterprise workloads.

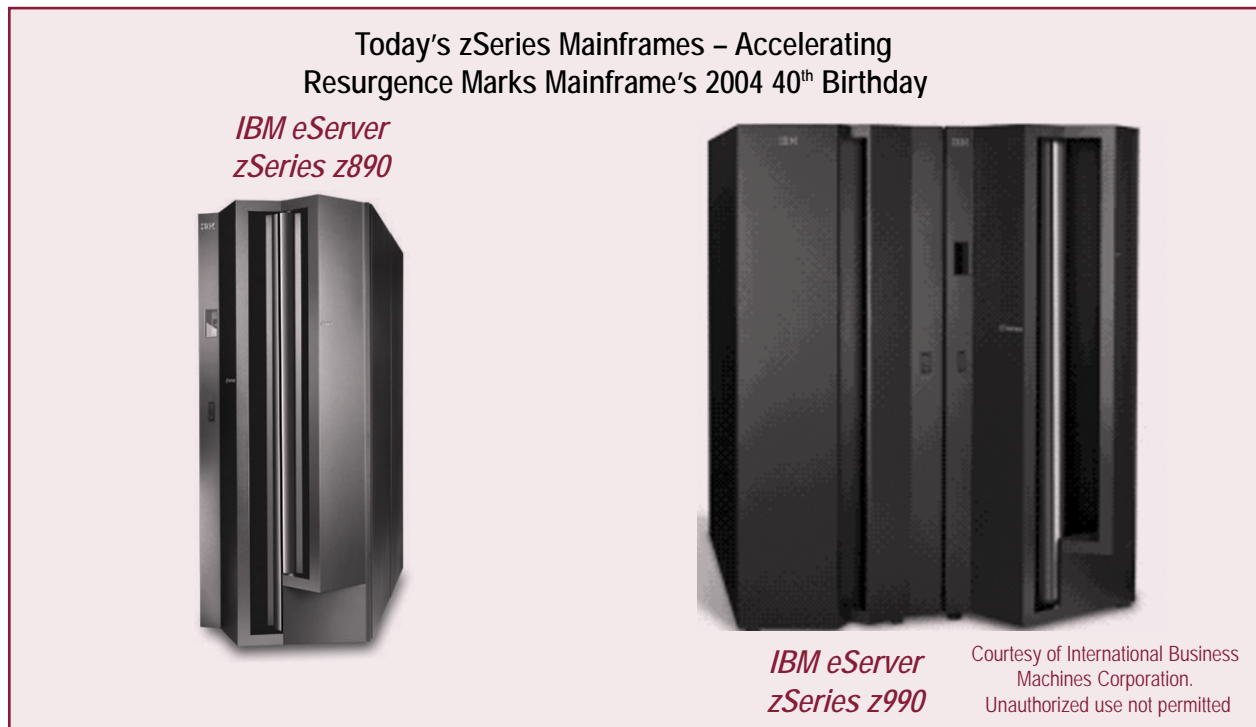


Figure 1: Today's zSeries Mainframes – Accelerating Resurgence Marks Mainframe's 2004 40th Birthday

- **Lowest Staffing Levels Drive Cost Advantage:** The same study found operating and support staffing levels and costs on distributed platforms (*UNIX and Windows/Intel*) averaged 2.5 to 3 times higher than on today's mainframe for equivalent workloads. Intensive development of autonomic self-managing capabilities, the study found, have resulted in a 10-fold reduction in mainframe staffing levels per MIPS over the last seven years, whereas distributed improvements have been small. Ongoing mainframe developments are also expected to halve today's level in the next five years, further extending this huge advantage.
- **Foundation Technologies Bring Mainframe Platform Readiness Advantages:** Our analysis identified ten foundation technologies/capabilities, most advanced in the mainframe platform, which underpin and deliver the business values above. These are:
 - **Deep, Optimized Support for Java/J2EE™ and Open Standards.**
 - **Resource Virtualization.**
 - **Continuous Availability.**
 - **Security & Business Resiliency.**
 - **Intelligent Workload Management.**
 - **Business Integration Support.**
 - **64-bit z/Architecture.**
 - **Special Designated Workload Processors.**
 - **Software Workload and Sub-capacity Licensing.**
 - **Extensive Support for Composite Applications, Web Services, and Service Orientated Architecture (SOA).**

We outline how these factors drive the business value strengths of the platform in Section 4.

- **Platform Readiness in Action?** With the above business value gains obtainable from the rapidly advancing foundation technologies of the mainframe, what are the main changes customers wishing to benefit fully from these should implement? As readers might expect, the calls are that they should:
 - **Add New Workloads on the Mainframe.**
 - **Upgrade Hardware to the Newest zSeries & TotalStorage Platforms:** z990, x890, DS8000, and DS6000.
 - **Upgrade zSeries Operating Software to z/OS 1.6 and/or z/OS 1.7** (*expected later this year*).
 - **Upgrade Main z/OS Middleware Subsystems to:** DB2 UDB V8, IMS V9, CICS TS V3.1, Tivoli NetView V5.2, WebSphere Application Server V6, and WebSphere MQ V6.
 - **Utilize the Now-extensive zSeries Software Tools Portfolio Fully.**

We found there were considerable additional business values yielded by recent advances in each of these areas.

- **Hardware Case Strong:** We found that the zSeries 990 and 890 high-end and entry-midrange mainframe servers offer many advances that combine to enable these systems to deliver much higher workload throughputs at significantly lower costs. The DS8000 and DS6000 high-end and mid-range enterprise storage systems are complementary to the new mainframe servers. They bring a new enterprise storage continuum with much lower entry and top-end scale points, offer multi-fold advances in scalability and capacity, and performance, at much lower costs, and are bristling with significant On Demand innovation.
- **Operating Systems Enabler:** Operating systems are often seen as a necessary evil; less exciting than the gleaming new hardware or the middleware software engines that perform more easily-recognizable functions. However, their role in exploiting and supporting the latest hardware advances, open standards, programming models, and networking, etc., are all crucial to achieving an On Demand Operating Environment. Significant and important advances, in all these areas, and others, were found in the z/OS 1.6 and forthcoming 1.7 releases and we recommend customers accelerate their migration to these, to enjoy the combined benefits they support with the newer hardware beneath and middleware above.
- **Middleware Subsystems Central Pillars of Platform Capability:** In Section 5 we also summarize the six main middleware software pillar new releases, with our findings on each. Although the advances vary, support for J2EE™ and open standards, support for Web Services and SOA, performance, availability, manageability and supporting tool enhancements were common to most, and were substantial or very substantial in each product. Accelerating the rate of adoption of these new middleware releases makes good sense in most cases, given their additional business-value leverage. Again, cross-exploitation by the middleware of the hardware and operating system advances above brings higher synergistic benefits when all are combined in a holistic Platform Readiness strategy.
- **Software Tools Portfolio Makes Productive:** IBM has now built, refined, and continually enhanced a comprehensive, modern, attractive, well-integrated and entirely current portfolio of mainframe software tools, covering nearly all requirements and supporting all the main software subsystems on the platform. Attractively priced, supporting open standards, and including a lot of innovation, this portfolio has now become a real asset and advantage for the platform, rather than the weakness it was five years ago. We now rate this portfolio as more advanced, better-integrated, more productive and more comprehensive than the equivalent on UNIX platforms (*for example*).

- **Existing Skill-base Can Contribute Strongly:** IT organizations whose mainframe assets and staff skill bases are centred on traditional development models (*such as CICS/COBOL or IMS DC COBOL or PL/I*) are fully supported and included by the new software infrastructure and AD tooling of Platform Readiness. Development staff with these skills can therefore play an invaluable role in extending their traditional-language-based applications assets into new SOA-based composite applications, using their traditional language skills, with the middleware providing the integration with newer programming model components. The primary development tools, such as WebSphere Studio Enterprise Developer, provide a common advanced development environment for both the long-proven traditional programming models, as well as for new J2EE™ developments. This also helps traditional developers acquire the new skills over time.
- **Platform Readiness Has Powerful Appeal:** If enterprise users are already using the mainframe, there seems little merit in not systematically exploiting, in full, the many advances that have been made in the hardware, operating system and middleware; and that are continuing at a rapid rate today. These all offer substantially enhanced business value, and are further extending the already leadership technology strengths of the platform. Whilst not every main advance will apply to every customer, we now consider a switch to Platform Readiness is merited for all but the few, most disaffected and heavily-lagging mainframe users. "Get current or get off" would be our advice to the latter. New mainframe customers, without question, should begin only on the latest levels of hardware and software, and stay current with future developments.

...has now made the zSeries mainframe once again the pre-eminent "Gold Standard" of high-volume, commercial computing.

2. "Platform Readiness" Strategies for the Resurgent IBM Mainframe

Platform Readiness Strategies

Platform Readiness advocates that more zSeries customers should take-up/deploy the newest zSeries hardware, operating systems and principal middleware software subsystems faster, to become and remain "current" with their rapid advance. Many zSeries enterprise users are already enthusiastically following this track, and have reported reaping significant business gains from their investments. However, a majority of mainframe users are still moving more slowly, and are thus taking only partial advantage of the widespread development advances being delivered at faster rates than ever previously seen.

Behind the call for Platform Readiness stands a massive, sustained R&D investment, measured in several \$B, that IBM has made since the late 1990s, and is continuing to make in the zSeries hardware, operating systems, middleware software systems and software. Two of our earlier studies found this effort has clearly now made the zSeries mainframe once again the pre-eminent "Gold Standard" of high-volume, commercial computing. In our considered assessment, it has become clearly the most advanced On Demand Operating Environment, best able to support the new business models that enterprises are rapidly adopting.

The Mainframe Transformation 1993-2005

Figure 2 shows our summary of the timeline of the mainframe's transformation milestones and changes.

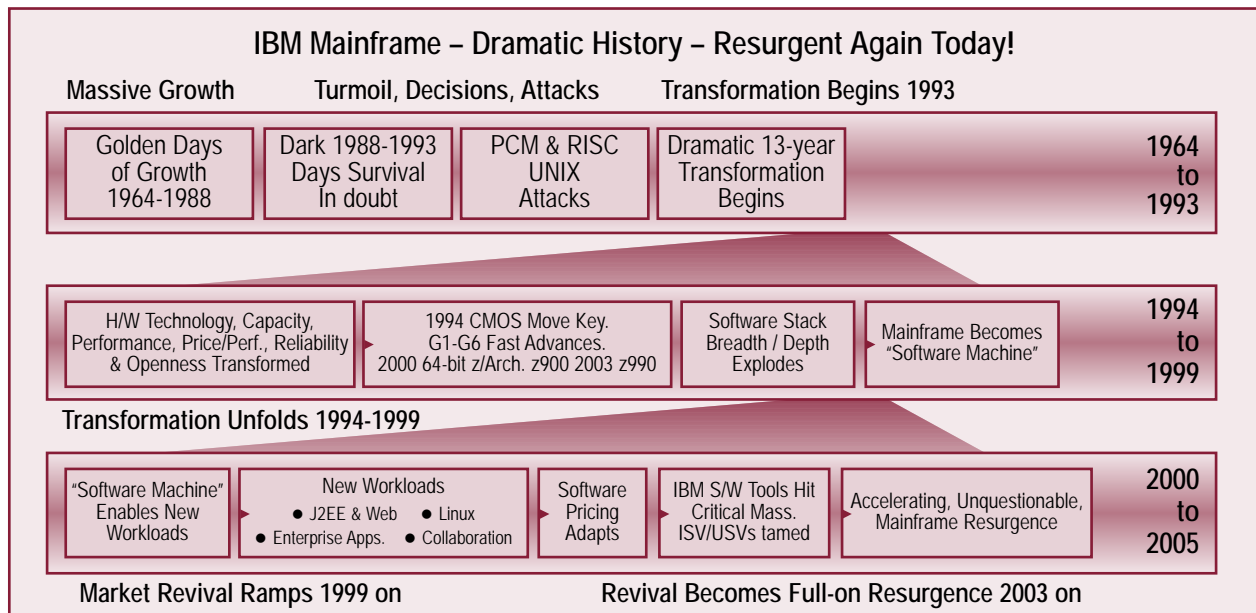


Figure 2: IBM Mainframe – Dramatic History – Resurgent Again Today!

Over this period, the IBM mainframe underwent the most sustained, dramatic and radical platform transformation of technology, economics, capacity, capability, open standards support, and software stack enrichment ever seen. From the dark days of 1993, these cumulative changes transformed the platform in every dimension. This in turn sparked its growing revival and revaluation from the 2000 zSeries introduction onwards. *(This introduced the 64-bit z/Architecture technology that lifts mainframe headroom for another generation.)*

Mainframe Revival and Resurgence

2001-2005 – z990, z890

By 2004, this revival had swelled worldwide to become a full-on market resurgence, and the zSeries mainframe has again become the recognized, pre-eminent, high-end commercial computing platform for medium and large enterprises. We assessed the newest z990 high-end *(first introduced in 2003)* and the z890 entry-to-mid-range mainframes *(first introduced in 2004)* as technological tours de force. Now in 2005 the mainframe offers mixed and new commercial workload capabilities and capacity, economics greatly superior to distributed alternatives, deep open standards support, rapid and continuing hardware and software technology advances, and truly unique QoS that no other platform can provide.

Numerous studies by other leading analysts, and our own, have confirmed the mainframe as today's unrivalled "Gold Standard" enterprise computing platform...

Our Analysis

This three-decades-long rise, dramatic 1990s fall, and now resurgence of the IBM mainframe has been obscured by persistent myths and legends that still have some currency in business executive and IT leader circles. Fuelled for years by aggressive UNIX and Intel-based competitor marketing, these portrayed the mainframe as a costly, closed and proprietary dinosaur. These myths/legends were finally demolished over the last 2-3 years, evidenced by climbing mainframe capacity sales, the rapid spread of new workloads onto the platform, and the addition of several-hundred brand new customers to the mainframe-installed base *(for the first time since the 1980s)*. Numerous studies by other leading analysts, and our own, have confirmed the mainframe as today's unrivalled "Gold Standard" enterprise computing platform, and have recognized its dramatic advances in capability, capacity, price/performance, software functionality and their resultant business value. A heavy, sustained IBM investment of several \$B lies behind this transformation, and is extending the mainframe's lead at a rapid pace in 2005. This is pledged to continue under the Mainframe Charter manifesto IBM announced in 2003.

Given this robust and healthy position, should many more mainframe user enterprises now rethink their practices and policies for adopting and embracing new mainframe hardware, operating systems and middleware software releases and advances? Whilst many mainframe customers have actively and enthusiastically embraced the "Platform Readiness" strategy fully, and are briskly exploiting these mainframe advances across the board, the majority have yet to do so. These users have updated more slowly and cautiously, and are therefore not current with the latest mainframe hardware and software advances. We found these users can now make a big positive business value impact by doing so.

3. Business Value Drivers of the Mainframe

The most reliable and valuable source of trustworthy information on the real, differentiating zSeries mainframe business value drivers come from real-world customer experience and assessment.

Mainframe Business Value Drivers from Unique QoS

The business value delivered by the zSeries mainframe has reached a new high-point in 2005. Below, we synthesize research that highlights and ranks these compelling business value sources/drivers, and the broad competitive advantages which today's zSeries mainframes offer. The most reliable and valuable source of trustworthy information on the real, differentiating zSeries mainframe business value drivers come from real-world customer experience and assessment. A recent major survey-based study performed by Mercer Management Consulting interviewed a substantial sample of zSeries mainframe customers in diverse industries and geographies, to determine which QoS they considered delivered the greatest business value to their organisations. We have reanalyzed and summarized this material, to provide a concise, high-level view of these findings in Figure 3 on page 6.

These customer business value advantages underpin and explain the resurgence of the mainframe that has occurred in the market over the last several years. In the following subsections we comment on two specific areas of mainframe business value enhancement to illustrate some of the prime drivers at work here. We discuss these fully in our main White Paper.

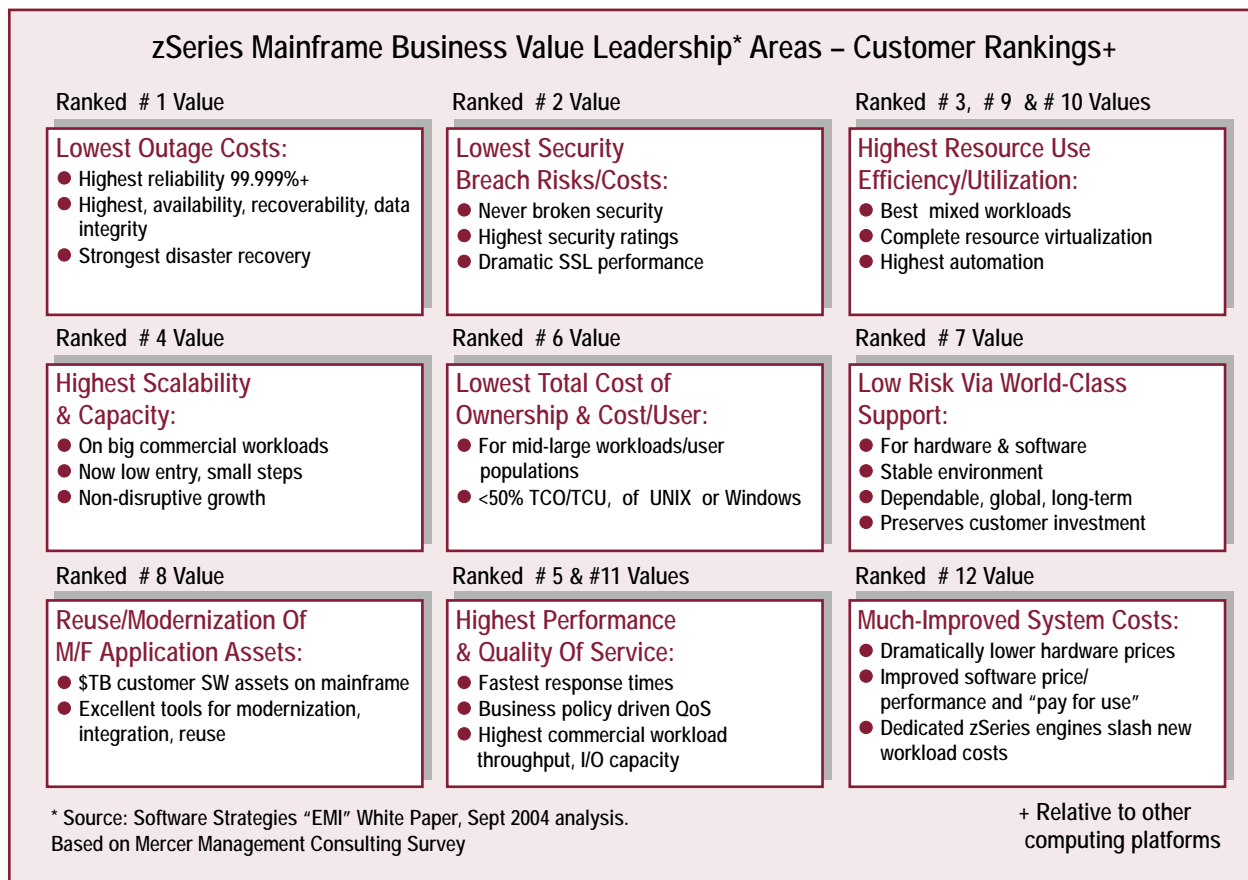


Figure 3: zSeries Mainframe Business Value Leadership Areas – Customer Rankings

Mainframe – Lowest Cost Platform – Arcati Findings

The most recently published fellow analyst study (*Arcati Research Note – “Dinosaur Myth 2004 Update” – January 2005*) to focus on the comparative total system costs per user (TCU) of mainframes compared to UNIX and Windows-Intel distributed systems lends a useful proof-point to the myth-breaking, customer experience-based findings above. Arcati updated and extended its earlier comparative costs analysis, rightly arguing that the most appropriate metric for comparison should be the TCU over a five-year period.

Arcati found the cost per user for UNIX was almost three times higher (\$19,650) than for mainframe (\$6,750), and that for Windows-Intel platforms almost 4 times higher (\$26,750) for 2005. The figures changed only slightly looking ahead to 2010, factoring in the main trends and developments expected. These dramatic differences highlight the major cost advantage the zSeries mainframe now offers over the main current competitors. These comparisons are for equal new workloads on all three platforms, and do not include any migration costs, and apply to medium to large enterprise-type workloads with user populations in the mid-high hundreds or thousands.

The biggest factor in these wide TCU differences is the much lower operating/support staffing levels and costs incurred today on mainframe platforms than on UNIX or Windows.

Lowest Staffing Levels Key Value Contributor

Staffing costs for operations, software, systems and user support are often the largest lifecycle cost element. Distributed platforms, with their profusion of separate server and storage hardware and software, as Arcati found, often require 2.5 to 3 times more staff than today’s mainframe to support similar workloads, and are still unable to approach mainframe QoS levels. Behind this lies the dramatic reductions in mainframe staffing levels that have been achieved through IBM’s systematic, years-long development of self-healing, self-managing, self-protecting, autonomic technologies for the mainframe that have reached high levels. Arcati reports that these have resulted in a 10-fold reduction in mainframe staffing levels (*operators and systems programmers*) per MIPS in the last seven years, and are expected to halve this again in the next five years under the sustained and continuing developments being made.

Our Analysis

The mainframe's sophisticated and optimized hardware and software technology today definitively delivers high business value to customers/users in the important areas discussed above, and offers clear superiority over alternatives. Most of the lingering "legacy platform" mainframe misconceptions widespread in the market in the late 1990s have now been fully demolished by the transformation and advances mainframe technology and economics has undergone since then. Many medium-large enterprises with experience of the platform recognize and value these strengths, and have voted with their feet by increasing their mainframe investments, and by placing the new workloads on the platform which have fuelled its market resurgence and renewed growth

The rate of mainframe technology advance and improvement has been substantial, effective and productive in extending these business value-generating strengths, and is continuing through 2005 and beyond (*pledged to do so by the Mainframe Charter*) under IBM's sustained R&D investment.

4. zSeries Mainframe Platform Readiness Strategies – Maximizing Business Value

"Platform Readiness" Overview

For customers to fully reap the business value benefits of zSeries mainframes, better integrate their business processes, people and information, improve their IT infrastructure management, and control their costs, adopting a mainframe **Platform Readiness** strategy offers real and substantial benefits.

Platform Readiness calls for keeping the customer's mainframe hardware, operating system and middleware software stack current and up-to-date with the latest advances and generations of the principal hardware and software subsystems.

Figure 4 shows the elements and layers of the mainframe environment that combine to synergistically support and deliver the overall Platform Readiness attributes, and thus offer the highest business values now obtainable on the platform.

The Four Layers of zSeries Platform Readiness

Platform Readiness considers the mainframe environment as a four-layer architecture:

- Layer 1 is the **mainframe server and storage hardware** platforms themselves.
- Layer 2 is the **z/OS operating system** native to, and fully exploiting, the z/Architecture 64-bit zSeries hardware platform, and providing the foundation for the other software layers.
- Layer 3 comprises the **principal middleware software subsystems** that combine to provide much of the advanced workload capabilities, support for SOA and Web Services, and the application and data integration of the platform.
- Layer 4 is the **extensive range of mainframe software tools** that IBM now provides to support all stages of the enterprise modernization, application and data integration lifecycle, and to monitor and manage the environment efficiently.

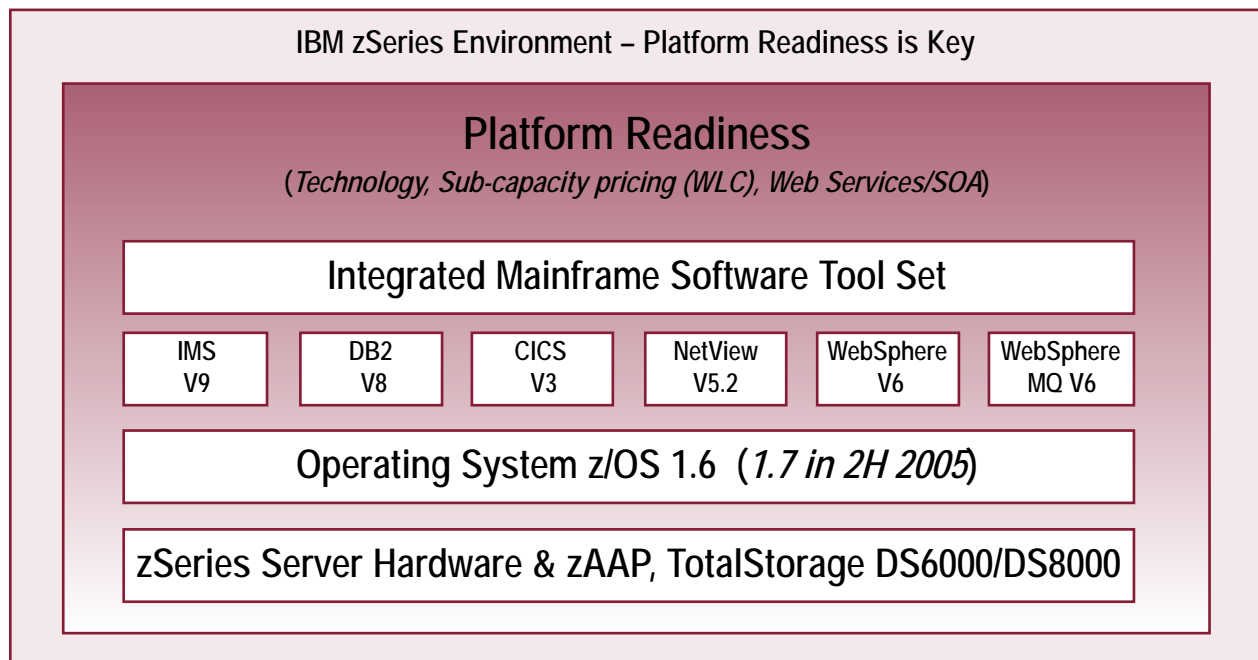


Figure 4: IBM zSeries Environment – Platform Readiness is Key

There is close integration, synergy, and incremental value-add not only between the components within each layer, but also between each other layer and its components. Newer operating system releases support the most advanced capabilities of the hardware. The newest middleware subsystems provide On Demand integration, support for new workloads, enterprise modernization capabilities, and fullest exploitation of the unique zSeries hardware and operating systems capabilities. The software tools portfolio fully supports the main middleware subsystems. They enable users to develop and deploy new-generation business applications on the platform, and to monitor, manage and optimize performance at all levels of the whole system. Much of the enhanced business value of the mainframe platform comes from these combined synergies that are fully obtainable only under an active Platform Readiness strategy.

Platform Readiness – The Hardware Layer

This Executive Overview focuses mainly on the two middle layers of zSeries software. However, recent hardware advances are also compelling and significant, and we provide below our concise assessments of these, based on our other published research, to provide a complete platform picture here:

- **Newest zSeries Servers:** This Platform Readiness layer demonstrates the value of running the latest **zSeries 990** and **zSeries 890**, along with z/OS. These systems now come in a wider and more granular range of models (*from a far lower entry point to a 3-fold higher capacity top-end system*). They also support sub-capacity pricing, support larger numbers of virtual servers per system, introduce the dedicated zAAP Java offload processing engine facility (*that runs Java workloads with no additional software costs*), and provide 2X-4X higher I/O capacities. These advances combine to enable these systems to deliver much higher workload throughputs at significantly lower costs.
- **Newest TotalStorage Enterprise Storage Systems:** The other enterprise platform hardware component needed is enterprise-class storage. Late 2004 saw IBM introduce two groundbreaking, innovative, enterprise-class storage systems based on advanced server technologies. These are complimentary to the zSeries mainframe server platform (*but also support iSeries, UNIX open systems and Windows/Intel platforms*). The new DS6000 brings enterprise-class storage capabilities at a radically lower price point, in the smallest-ever form-factor, and is an ideal complement to the entry to mid-range z890 server. It also provides a lower-cost second-level platform in tiered enterprise ILM storage hierarchy configurations. The high-end DS8000 provides the storage complement to the high-end z990 mainframe servers. It offers 6X the capacity/performance of its predecessor (*ESS Base*), massive scalability up to 192TB, and the industry's first implementation of storage systems LPARs (*which allows two separate storage images to be run concurrently on a single DS8000*). The DS8000 uses dual-clustered POWER5 processor-powered pSeries server engines in the initial 2-way and 4-way models introduced so far to deliver its striking scalability and performance gains.

Foundation Technologies Enable Mainframe Platform Readiness Advantages

So what are the technologies and capabilities that combine to deliver the highly-rated business values (*highlighted and ranked in Section 3*) that customers so appreciate on the mainframe, and which are the most advanced for Platform Readiness adopters who benefit fully from the latest hardware models and software releases? A summary of these is shown below. Each is discussed in our full White Paper, some quotations from which are highlighted below.

- **Optimized, Deep Platform-wide Support for Java/J2EE™.**

The zSeries mainframe hardware, operating system, middleware software subsystems and software tools have been continuously extended and developed to support and enable wider use of J2EE™ on the platform.

- **Comprehensive Resource Virtualization.**

The zSeries mainframe provides undoubtedly the most advanced, comprehensive resource virtualization of any IT platform.

- **Continuous Availability.**
- **Security & Business Resiliency.**
- **Intelligent Workload Management.**
- **Business Integration.**
- **64-bit z/Architecture.**
- **Speciality Designated Workload Processors – The zAAP.**

In our assessment, the zAAP, which automatically and transparently offloads 50% of WebSphere application processing, is one of the most significant milestones in the continuing resurgence of the mainframe platform.

- **Software Workload and Sub-capacity Licensing.**
- **Extensive Support for Composite Applications, Web Services and SOA.**

With so much of the world's enterprise applications, transactions and databases residing on mainframes, they are now the primary hub platform for these new business solutions.

Getting to Platform Readiness – Roadmap

With the business value leadership today's mainframes now offer, and the continuing technology advances extending these regularly, Platform Readiness suggests mainframe customers should plan and implement systematic, regular and timely steps to take full advantage of these developments. This means:

- **Adding New Mainframe Workloads:** Mainframe customers should plan to move a higher proportion of their total IT workload onto mainframes, to enjoy these undoubted business value benefits more widely. Many customers are, of course, already actively doing just this in addition to continuing to run traditional systems there. The most popular of these new workloads include: new J2EE™ e-business applications, Linux workloads (*both infrastructure functions and the fast growing portfolio of Linux business applications*), and applications and database serving for large enterprise applications such as ERP (*SAP*) and CRM (*Siebel*), etc.
- **Upgrading Hardware to newest zSeries & TotalStorage Platforms:** Customers still running older generations of mainframe systems (*such as the S/390 G5 and G6 larger systems, as well as smaller systems*), and older operating systems such as OS/390, are missing out. They could gain the significant advances and improved business values newer mainframe hardware and software now provides. With substantial improvements in capacity and headroom, performance, reliability and price/performance, the economic, as well as the functional enhancement case, for upgrading is now persuasive. Delays in making the move up to new zSeries hardware, the latest z/OS operating system that exploits their 64-bit hardware technology, and the associated latest releases of the middleware subsystems, are deferring substantial business value that they could enjoy. Similar comments apply to enterprise storage, where the advances provided for zSeries customers by the new DS6000 and DS8000 storage systems are compelling and complementary.
- **Upgrading zSeries Operating Software:** zSeries customers still running earlier releases of z/OS should be planning to upgrade to the current z/OS Release 1.6 level, or to z/OS Release 1.7 expected later this year. These newer releases have added significant further exploitation of the zSeries hardware and middleware software advances, improved performance and communication, extended support for standards, and brought other important advances.
- **Upgrade the Middleware Subsystems:** New releases of all the main zSeries middleware software subsystems over 2004/2005 have brought extended support for Web Services, composite applications and SOAs, performance gains, new zSeries hardware exploitation and optimization, improved software licensing price/performance, plus other advances, which we evaluate in Section 5.

Our Analysis

With the strength of its overall business value proposition (*see Section 3*), the leadership technologies that support it (*described above*), and this decade's much faster rates of advance under heavy R&D investment, we consider more/most mainframe users should accelerate adoption by implementing a Platform Readiness strategy. Supporting the new world of On Demand business is a compelling driver for keeping IT environments up-to-date with new technology and enhancements, but many specific and tangible benefits also flow.

Rather than evaluating and justifying each individual hardware or software enhancement in isolation, we recommend a more holistic approach, because of the synergistic benefits of the combined advances in all the above.

This argues for brisker adoption across the board and for Platform Readiness again becoming the default approach...

This argues for brisker adoption across the board and for Platform Readiness again becoming the default approach (*as it was for most mainframe users up to the late 1980s, but when the pace of advance was much slower*), justified by the overarching business value the whole mainframe environment now provides.

5. Mainframe Software Stack Advances Build Business Value

Software Stack Key to Mainframe Strength

Below we summarize our full White Paper's assessments of the latest advances in the core mainframe software environments, comprising the z/OS operating system bedrock and the six primary middleware pillars. Covered are:

- **z/OS Operating System.**
- **DB2 UDB for z/OS – Information Management.**
- **IMS – Information Management.**
- **CICS Transaction Server – Transaction Management.**
- **WebSphere Application Server for z/OS.**
- **WebSphere MQ for z/OS Applications Integration.**
- **Tivoli NetView for z/OS Network Management.**

Major new releases of all these important software engines are already available, or scheduled for 2005 delivery, that combine to provide considerable advances in the business value they can deliver for mainframe users, especially when used with advanced zSeries server and TotalStorage enterprise storage systems hardware. We summarize these below, based on the more extensive analysis in our full-length White Paper.

5A. z/OS Operating System – z/OS Releases 1.6 and 1.7

z/OS, the native operating system for zSeries mainframes, is a secure, scalable, high-performance enterprise operating system on which to build and deploy Internet and Java-enabled applications, providing a comprehensive and diverse application execution environment. z/OS is designed to deliver the highest QoS for enterprise transactions and data, and to extend these qualities to new applications using the latest software technologies. z/OS also delivers On Demand benefits, including autonomic capability, integration, virtualization, and openness.

Substantial z/OS advances have already been delivered in the current z/OS 1.6 release, and more are scheduled for the next 1.7 release in September 2005. Together, these considerably extend the On Demand operating environment of zSeries, and relieve many constraint areas. Full exploitation of 64-bit virtual addressing, support for the zAAP Java offload processor that brings large cost savings on Java workload processing, and extensions to enterprise workload management are notable advances. This brisk pace of advance, with just one year between releases, also indicates the robust health of the platform and shows many deliverables from the sustained operating systems investments being made. In our assessment, this picture argues a good case for z/OS users to upgrade to these newest OS levels sooner.

5B. Information Management Business Value with DB2 Version 8

DB2 for z/OS is IBM's flagship relational database management system, and serves as the hub of a comprehensive information management environment for the mainframe. DB2 manages a high proportion of the world's largest databases on the zSeries platform, and is equally suited to supporting large online transaction processing/database applications, major enterprise applications packages (*such as SAP and Siebel*) and handling business intelligence and data warehousing applications.

DB2 UDB for z/OS Version 8 makes a compelling and persuasive case for itself. Long in the making, this was the most important upgrade in DB2's history, has now been generally available for one year, customer/adopter feedback has been uniformly positive, and release stability and robustness is strong. The business value of the advances offered, with the superior support offered for On Demand applications that must run 24x7, argues for early migration. The performance enhancements drive down the total ownership cost for DB2 applications, making each transaction cheaper to execute and allowing a given server to handle greater workloads.

Another advantage of DB2 UDB for z/OS Version 8 is that a large number of the earlier barriers and system limitations within the product have been greatly extended or removed, enabling larger applications. Two examples illustrate this: table name sizes have increased from eighteen to 128 characters; and the number of database partitions in a database has increased from 254 to 4,096. By removing barriers that prevent non-DB2 applications from being easily ported to DB2 on the zSeries platform, Version 8 also opens the way for compelling cost cases to be built around server consolidation and new "to the mainframe" migration projects.

In addition, the increased automation and intelligence built into the product and the supporting DB2 tools significantly increases productivity, allowing skilled DB2 administrators and developers to spend less time on routine tasks and devote their efforts to adding value with better-written, more efficient applications that can save money.

With its heavy exploitation of, and tight integration with, the latest zSeries hardware, operating system releases and other key middleware products such as WebSphere, which produce synergistic additional benefit when used together, DB2 UDB Version 8 illustrates and delivers the fullest value of Platform Readiness.

5C. Business Value from High Transaction Volume Information Management with IMS Transaction and Database Servers Version 9

IMS (*Information Management System*) is zSeries' long-standing (*36-years*) and respected high-performance, high-volume database and transaction server, used for the most demanding and highest volume OLTP applications. IMS Version 9, the latest major release, which became generally available on 10.29.2004, was developed to deliver the highest QoS for enterprise transactions and data, and to extend these qualities to new composite applications under a SOA using the latest software technologies. IMS Version 9 extends this heritage with much-improved interoperability, increased flexibility, and support for new and emerging technologies, as well as availability, performance and manageability improvements.

Java has become central for new enterprise applications, and so IMS Version 9 and the IMS Connector for Java offer enhanced Java support for the latest in standards and ease-of-use. They allow customers to take advantage of the latest tooling, as well as providing enhanced performance for this environment. As increasing numbers of IMS customer extend and modernize their existing software assets in new, On Demand business solutions, these advances provide IMS support for the vital applications, information and operational integration needed. They help provide a seamless end-to-end capability for IMS application use and data access, enabling applications to talk to others in new ways that are essential to support changing core business processes.

The enhanced development tools support offered also makes this extension and reuse of core IMS application assets faster and easier, improving developer productivity and project time-to-business value. With IMS Version 9, almost any other IT environment, Linux included, can access and integrate with IMS assets.

It also offers many improvements that also make IMS itself easier to install, easier to use and manage, extended environment management commands and tools improve resource utilization and performance, as well as increase operations productivity.

IMS Version 9 can also be used with IBM WebSphere Application Server (*discussed later in this Section*) and the WebSphere Studio tools to rapidly transform static Web sites into sources of dynamic Web content. This can help users improve their marketing effectiveness and customer service. In particular, Version 9 also allows customers to transform IMS transactions into Web Services that can be reused in composite applications for SOAs, enabling quick response to new customer requirements, business opportunities and competitive threats.

In our assessment, these advances present a convincing business case for IMS users to migrate up to IMS Version 9 as part of their Platform Readiness strategy to fully exploit their zSeries platform.

5D. Enhanced Business Value from Popular Transaction Environment with CICS Transaction Server Version 3.1

CICS Transaction Server is one of the world's most widely-used and longest-established middleware software products, and provides a robust and versatile transaction processing environment for over 10,000 of the world's larger businesses. CICS is nearly ubiquitous in being installed and used at almost every mainframe site, and has been evolving and serving this base for 35 years. CICS Transaction Server Version 3.1, which became generally available in March 2005, advances CICS to the heart of the New World of composite applications linked by Web Services standards under SOAs. It therefore enables active participation, reuse and extension of the massive inventory of CICS transaction applications in new On Demand solutions, not only as a service provider as previously, but now also as a service requester.

CICS Transaction Server Version 3.1 provides a further substantial advance in enabling CICS customers to extend their existing, proven, core CICS applications to new audiences and opportunities. It provides both enhanced functions for traditional programming-style applications, and new functionality using now strong support for industry-standard Web Services that enable CICS to play fully in composite applications under SOAs, both as a service provider and as a service requester.

CICS provides a range of access options to support modern connectivity architectures, such as Web Services and J2EE™ standards-based and other standard transport mechanisms. With the right external connectors and internal adapters, customers can maximize the reuse of mission-critical CICS assets. By enabling customers to re-energize and transform these existing applications, customers can reduce the costs, risks and time-to-market of delivering new applications to address and satisfy On Demand requirements.

The release is supported by essential tools that now enables CICS users to transform business-critical legacy processes into reusable, shareable business components, integrate traditional zSeries CICS applications with new Java and .NET applications, whilst making full use of existing CICS skills at increased levels of developer productivity.

Whilst providing these new technologies and improved capabilities, the approach is evolutionary and minimizes customer risks in adoption, whilst exploiting and updating their substantial existing CICS skills base, and can thus be easily and safely deployed by CICS users in a smooth, incremental, manner.

With today's business focus now back on revenue growth whilst maintaining the bottom line, IT departments must do more with less, and engineer much greater flexibility and responsiveness into their infrastructure. CICS Transaction Server Version 3.1 provides a vehicle for realizing these goals. It can undoubtedly create substantial new business value by leveraging customers' large existing investments in CICS applications, help deliver new solutions that generate new sources of revenue, extend competitive advantage, improve customer service and time-to-market, and increase overall profitability.

5E. Network Management Business Value with Tivoli NetView for z/OS Version 5.2

In the On Demand environment, the enterprise network and its connections to the Internet play an ever more important role in enabling and supporting the integration of people, processes and information. Today, TCP/IP is the near-universal open enterprise network standard, mirroring its central role as the Internet standard on the external Web. Monitoring and managing the enterprise TCP/IP network, which is often centered on zSeries mainframes, has therefore assumed new levels of importance and criticality in maintaining high availability and responsiveness throughout the enterprise communications network infrastructure. For many years, NetView has been the industry-standard network management tool on the mainframe and now the zSeries. It offers network and systems management through graphical display and automation.

IBM Tivoli NetView provides the enterprise-class TCP/IP network management service layer required to monitor and run national or global enterprise networks from the rock-solid zSeries host platform. Tivoli NetView for z/OS Version 5.2 provides a solid and substantial advance in a number of important areas, which keep this faithful workhorse up to the newest standards. It improves its integration and interoperability with other essential enterprise management and problem tracking tools, as well as extending core network management function and capacity. Improved ease-of-use and consistency of user interface with other Tivoli family products helps improve productivity and reduce systems management effort when staff switch between these products from day-to-day.

IBM officials claim migration to NetView 5.2 is considerably easier than for earlier releases, which makes the above benefits relatively easier to obtain. These important and worthwhile advances show NetView moving forward to meet the increasing challenges of large-scale TCP/IP Network management in the new mainframe world of On Demand.

5F. Enterprise Modernisation Business Value with WebSphere Application Server for z/OS Version 6.0

WebSphere Application Server (WAS) for z/OS is the full-function, industrial-strength, J2EE™ application server optimized for, and fully exploiting all the unique QoS of, the zSeries mainframe under z/OS. WAS for z/OS Version 6.0 is also the heart of the WebSphere software platform for business integration on z/OS. The WebSphere Application Server family is the global market share leader in the J2EE™ application server marketplace. WAS for z/OS Version 6.0, which became generally available in March 2005, shares a largely common code base, and the same functionality, behavior and interfaces as the distributed versions. However, it uses a unique internal architecture to fully exploit zSeries capability to give the highest scalability, extreme reliability, and the closest integration with zSeries services and applications.

WAS for z/OS Version 6 is another significant step that enables the integration and reuse of the wealth of mainframe software assets in new, Web-based, On Demand solutions.

Combining the latest core J2EE™ application server capabilities and standards support as on distributed versions, WAS for z/OS Version 6 adds deeply embedded exploitation of, and optimization for, the zSeries environment, the most scalable, reliable, available, automated and manageable commercial computing environment available. WAS for z/OS Version 6 is another significant step that enables the integration and reuse of the wealth of mainframe software assets in new, Web-based, On Demand solutions.

Business executives who need to deliver better customer service, and increase their ability to quickly adapt to changing business priorities should consider the product. WAS for z/OS Version 6.0 provides a dynamically scalable IT environment capable of handling variable transaction volumes, provides increased IT application responsiveness and performance, along with near-continuous availability, to meet the most challenging business demands.

5G. Application Integration Business Value with WebSphere MQ Version 6

Business and application integration is a central enabler of the new On Demand world we have discussed above. In this environment, integrating and connecting applications securely, reliably and manageably over network connections is a universal requirement. With so much of the world's largest and most demanding transactional applications and data sources residing on zSeries mainframes, software to loosely couple and transfer data and messages between the different environments and platforms, to and from the mainframe, is crucial. The prime technology that accomplishes this goal is Message-Oriented Middleware (MOM), and in this category, IBM's WebSphere MQ has, for over ten years, been the unambiguous world market-leading software product. WebSphere MQ ensures reliable delivery of messages, including XML documents and SOAP messages, connects applications and Web Services, spans environments such as J2EE™ and Microsoft .NET, and bridges over 40 platforms. Now, WebSphere MQ for z/OS Version 6, to become generally available in April 2005, extends this record with other significant advances.

Underpinning and enabling the whole notion of SOAs is the logical concept of an ESB, which is the underlying communications infrastructure needed to support loosely-coupled application integration that connects different types of software running on different types of platforms into new e-business application solutions. This ESB must provide message communication and event services based on open-industry standards that enables all of these disparate software components to communicate with each other through the ESB in a standardized manner through well-defined standard interfaces. So message and event broking services, secure message transmission, QoS, and applications integration management services must be provided by the ESB. Publish-and-subscribe, and assured message delivery are base services, as are sophisticated event handling and brokering to trigger business activities in defined circumstances.

WebSphere MQ is the leading product that provides the services of an ESB, although its history long predates the concept.

WebSphere MQ for z/OS therefore plays a central role because of the scale, importance and depth of software and data assets held on mainframe platforms. Version 6 substantially extends and strengthens this key engine that is central to the whole application integration and industry-wide migration to SOA-based, composite applications that reuse existing software assets combined with new components written in modern languages like Java connected through Web Services standards.

WebSphere MQ for z/OS Version 6 is a substantial and significant advance in this central, and already widely-used foundation of enterprise application integration and communications infrastructure.

WebSphere MQ is also a central component of IBM's overall WebSphere Business Integration suite. WebSphere MQ for z/OS Version 6 is a substantial and significant advance in this central, and already widely-used foundation of enterprise application integration and communications infrastructure. In our view, for the large proportion of zSeries users migrating towards the SOA approach, upgrading to this next level of WebSphere MQ for z/OS should be an early priority.

Our Analysis

These wide-ranging and impressive software developments on the zSeries operating system and primary middleware software pillars were strategically aimed at extending the mainframe platform's already considerable leadership as the premier enterprise hub platform for On Demand. The new releases, available now or later in 2005, have been coordinated, focused and targeted at substantially extending the integration, support for SOAs and Web Services and J2EE™, and at enhancing the manageability, performance and security of all the platform's main pillars. They also aim to fully exploit and complement the considerable and impressive recent hardware advances in the z/Architecture mainframe servers, including, for example, the important new zAAP Java offload processor option. Whilst many leading-edge mainframe users have recognized the considerable business values of these mainframe hardware and software advances, and have adopted the new systems and software relatively quickly and consistently, others have been more cautious and slow. The latter have often advanced on a more piecemeal or case-by-case basis, and are therefore some way behind being current with these latest advances in mainframe hardware and software. History habits, the constraints on spending of the 2000-2003 downturn, and the effort and cost of upgrading are all factors in this.

The specific business value enhancements that each of these latest primary software pillar releases offer are important, but the synergistic benefits of faster, multiple adoption are still more compelling. We consider that Platform Readiness is therefore a real case of "two plus two equals five", where these substantial incremental advances in hardware, operating system, database, application server, integration and network management software interplay and multiply the individual benefits from each.

6. Platform Readiness – Call for Action?

We recommend enterprise IT users take the following steps along this journey for best results:

- Rationalize Mainframe Software Portfolio to Slim, Modernize.
- Update, Upgrade to Current zSeries Hardware/ Software, and Automate.
- Enhance/Extend Mainframe Legacy Applications for Fast ROI.
- Simplify to 2-tier Infrastructure on zSeries.
- Review Mainframe Chargeback Models.

Each of these steps, discussed in detail in our full White Paper, offer substantial incremental business and economic benefits towards fully enabling and unleashing the full potential of the zSeries mainframe for On Demand, but requires Platform Readiness for fullest benefit.

Re-examine Platform Readiness Inhibitors

About one quarter of the approximately 11,000 total mainframe users are today already actively and enthusiastically embracing and benefiting from Platform Readiness strategies, by deploying most or all of the newest zSeries hardware, operating system and middleware software releases relatively quickly and systematically as these become available. These users are already convinced of the mainframe business values discussed and identified in Section 3, and need little further encouragement to follow this path actively and briskly.

Another larger group of mainframe users, probably around half of the user population, are also positive and committed to the platform, but have usually been slower, more cautious, and more partial in their rate of adoption of zSeries advances. This group has typically made piecemeal and less systematic upgrades and enhancements to the platform, where they can see individual business justification for each item in isolation.

For this latter group, and the remainder of the mainframe installed base, what are the inhibitors and roadblocks that are holding them back from taking full advantage of these compelling Platform Readiness benefits? From our discussions and work with many enterprise IT users and mainframe customers, we have identified eight principal inhibitors:

- Incomplete Appreciation of Platform Readiness Benefits.
- Update/Upgrade Deferral Habits.
- Downturn Cost Savings Hangover.
- Distributed Computing Bigotry.
- Silo Thinking/Organization: Missing Holistic Benefits.
- Migration Time, Effort, and Cost Fears.
- Diffused IT Governance Making Coordinated Planning Difficult.
- Dis-functional Mainframe Chargeback Schemes Mislead.

Each of these inhibitors are discussed in detail in our full White Paper. Enterprise C-level executives and CIOs should ask themselves how many of these inhibitors are still influencing or constraining their own organizations, and whether the original motivations behind each of them are still applicable today. In many cases, they will find few rational grounds for still allowing these inhibitors to constrain their plans.

Important Mainframe Platform Readiness Drivers

In our assessment, four specific drivers argue particularly for the adoption of mainframe Platform Readiness strategies, and for moving up faster to full currency with the latest hardware and software releases. Some have been mentioned earlier in this White Paper. We highlight them here as amongst the most important changes and developments to have occurred, which greatly encourage and enable wider use of, and growth in workloads on, the mainframe platform, and for using its latest technologies to the full. These are:

- **2-tier Architecture Benefits:** Complex three-tier or multi-tier distributed IT Infrastructure became commonplace from the mid-1990s. These environments have been repeatedly found to lead intrinsically to a profusion of servers, complex networking and infrastructure, high support costs, and poor overall reliability and QoS. They are also hard to manage, and even more difficult to troubleshoot for performance or failure issues.

With the transformation of the mainframe with strong new workload capability, resource virtualization, support for the latest software standards, and hugely superior economics, the need for such multi-tier environments has been drastically reduced.

Many customers have now found it more cost-effective, manageable and reliable to collapse their enterprise applications infrastructure back down to two tiers, with much more of their total workload on the mainframe.

Many customers have now found it more cost-effective, manageable and reliable to collapse their enterprise applications infrastructure back down to two tiers, with much more of their total workload on the mainframe. Three of the main variations of this are shown in Figure 5. Many have moved front-tier edge-of-network and Web serving workloads, traditionally run on commodity scale-out servers, to Linux virtual servers on the mainframe. More frequently, the heavier-duty, middle-tier application serving workloads often run on UNIX or Intel SMP servers have been migrated. For heavy back-end database serving, the mainframe has always remained pre-eminent. Some customers have successfully combined all three workload types on their mainframe. Performance is usually considerably better, reliability far higher, hardware resource utilization much higher, and TCU significantly lower. In addition, the QoS delivered is higher and can be assured, and many fewer staff are needed to support and operate the platform.

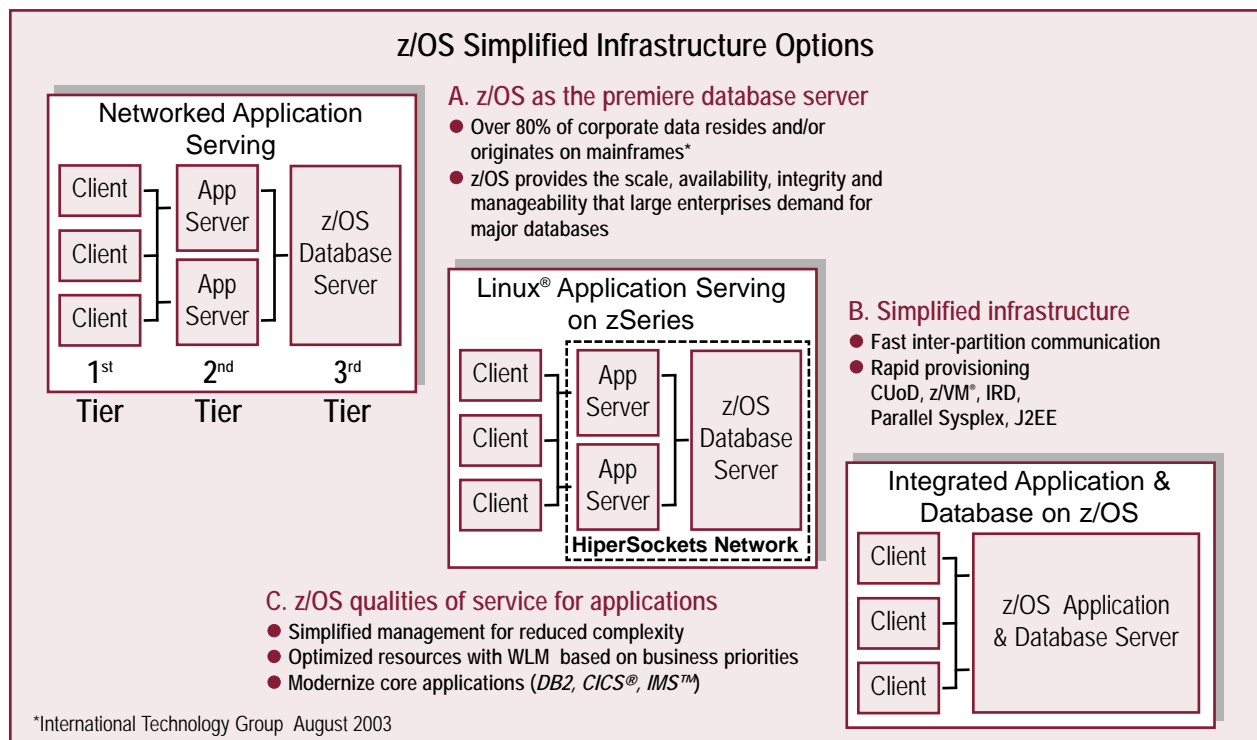
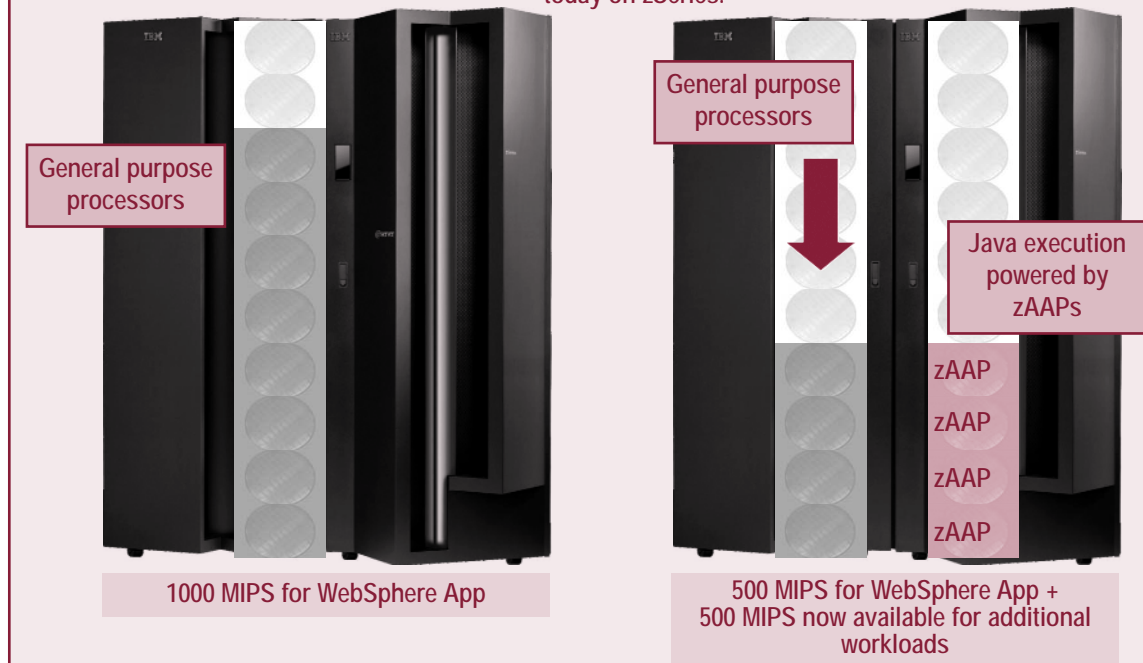


Figure 5: z/OS Simplified Infrastructure Options

zAAP Concept Overview: A Simplified Example

Consider a new WebSphere transactional application that requires 1000 MIPS today on zSeries.



In this example, zAAP can reduce the standard CP capacity requirement for the WebSphere application to approximately 500 MIPS or up to a 50% reduction.

Figure 6: zAAP Concept Overview: A Simplified Example

- **zAAP Transforms Mainframe J2EE™ Workload Economics:** J2EE™ is now the predominant open industry standard for enterprise server-side applications, and, as can be seen in Section 5, the mainframe software environment now provides rich, mature and complete support for J2EE™ applications throughout the stack. Programming models with a high level of abstraction, such as J2EE™, provide high productivity, functionality and portability, but do use more computing resources in execution (*typically 2.5 times that of a comparable 3GL program*). With zSeries mainframe hardware resources relatively expensive per unit of capacity, this effect inhibited some customers from hosting all their larger J2EE™ applications on the mainframe.

Specifically, the real inhibitor was that adding hardware capacity on a mainframe (*for J2EE™*), in the past, drove up software license costs, rather than just the hardware capacity cost itself. The introduction of the zAAP dedicated Java offload processor for zSeries has been a breakthrough solution to this issue.

The fixed-cost zAAP processors cost much less than standard mainframe processors and do not trigger any increased software charges. On average around 50% of a WebSphere workload can be offloaded to the zAAP, halving the standard capacity needed, as can be seen in the Figure 6 example. This makes for dramatic cost reductions in supporting large J2EE™ workloads on the mainframe, and, with their other advantages, is spurring a faster growth in this type of deployment.

- **License Charge/Sub-capacity Licensing Cuts Software Costs:** Perhaps the largest inhibitor to the resurgence of the mainframe was the platform's traditional software licensing model. This generally linked software charges, whether IBM or third-party ISV, to the overall capacity of the mainframe installed, rather than to metrics based on the actual usage of the software. This obstacle was smashed three years ago, with the introduction of the Workload License Charge, subsequently refined and extended to most of the software portfolio. In this so-called sub-capacity software pricing, fees are linked to the actual capacity used by the software only within the LPAR where it runs, measured on a monthly basis. This dramatically changes the position, and ensures customers pay only for software licensed in this way for what they actually use.
- **Mainframe Software Tools Portfolio Strengths:** Five years ago, the software tools available to support the mainframe were a somewhat mixed bag. Third-party ISV products had always held a majority share of this software market, IBM's product portfolio was patchy, and many of the tools from both sources were old. Investment had been low because of the uncertain future of the platform in the late 1990s. Some ISVs had made matters worse by exploiting the old software price models to demand large upgrade fees whenever hardware changed. Many of the third-party products had also failed to stay current with new mainframe enhancements. In 2005, the picture is entirely different.

IBM has now built, refined, and continually enhanced a comprehensive, modern, attractive, well-integrated and entirely current portfolio of mainframe software tools covering nearly all requirements, and supporting all the main software subsystems on the platform. Attractively priced, supporting open standards, and including a lot of innovation, this portfolio has now become an asset and advantage for the platform, rather than the weakness it was in the past. This has given customers real choice, driven down prices, and forced third-party ISVs to raise their game. We examined this tools portfolio in considerable detail in our two earlier White Papers. We consider that the portfolio is now more complete, up to-date, and better integrated than that of UNIX platforms (*although many of the IBM products are available on both*), and ongoing investment and R&D is now starting to extend this strength towards a clear leadership position. Tools are extremely important to make a computing environment productive, manageable, and tuneable, and the mainframe today offers a good value proposition in this essential area.

Other Related Software Strategies Research

1. **“Maximizing Business Value With Resurgent zSeries Mainframes – Platform Readiness Key in 2005.”** Software Strategies White Paper, April 2005, 46 p.p., 27 charts and tables. (*Full-length White Paper of which this Executive Overview is a summary.*)
2. **“Enterprise Transformation, Modernization & Integration Top Priority Today – Resurgent zSeries Mainframe Stakes Powerful Claim for Expanded Role.”** Software Strategies White Paper, September 2004, 56 p.p., 20 charts and tables. (*Enterprise transformation, modernization and integration with resurgent zSeries. Software stack-centered, in-depth assessment of the mainframe as an enterprise platform as at Fall 2004.*)
3. **“New Power-driven, High-end and Modular Enterprise Storage Systems – Game-changing Server Technologies/Advances Supercharge IBM’s Storage Market Leadership Bid.”** Software Strategies White Paper, 2nd Edition, November 2004, 42 p.p., 21 charts and tables. (*In-depth technology assessment of IBM’s new DS6000 and DS8000 enterprise storage systems.*)
4. **“IBM WebSphere Business Integration Leads the Way with Fullest J2EE™ and Eclipse Support – Business Integration Software Swings to Open Standards.”** Software Strategies White Paper, 2nd Edition, September 2004, 24 p.p., 16 charts and tables. (*Comparative evaluation of WebSphere Business Integration Suite & open standards support.*)
5. **“zSeries Mainframe Resurgence Beyond Question – Software/Costs See Major Advances: IBM Tools Break USV Grip.”** Software Strategies White Paper, January 2004, 50 p.p., 18 charts and tables. (*zSeries resurgence and software stack assessment.*)

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This Executive Overview (*and the full-length White Paper from which it was drawn*) is researched and written by Ian Bramley, Managing Director of Software Strategies, and published in April 2005. The views expressed are those of Software Strategies, and are based on our proprietary research. Bramley founded Software Strategies in 1997, is an experienced enterprise infrastructure analyst, a keynote speaker at many industry events, and has published many reports and papers. Before this, he served as Director of Enterprise Platforms at Butler Group and was Founder/Chairman of the Enterprise NT Management Forum from 1998 to end-2000. Previously, he held a variety of executive positions with international software vendors over a 25-year industry career.

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