ITG Executive Summary

February 2011

VALUE PROPOSITION FOR IBM POWER SYSTEMS SERVERS AND IBM I: MINIMIZING COSTS AND RISKS FOR MIDSIZE BUSINESSES

Challenges

The challenges faced by midsize businesses remain daunting. Weak markets, competitive pressures, cost reduction mandates, and demands for greater operating efficiency and productivity are the norm in most industries. In many, globalization continues.

Information technology has become central to meeting these challenges. Even relatively small organizations now have enterprise resource planning (ERP), customer relationship management (CRM), business intelligence (BI), e-commerce and other state-of-the-art systems. The number of "must have" solutions continues to expand.

The good news is that a plethora of new capabilities has become available to midsize businesses. The bad news is that new technologies can significantly increase the complexities with which organizations must deal. Solution value may be degraded, IT costs may escalate and risks of business disruption may increase. Current economic conditions do not argue in favor of such strategies.

Excessive complexity has undermined the IT strategies of many large organizations. In a midsize business with more limited resources and technical skills, the impact may be a great deal more serious.

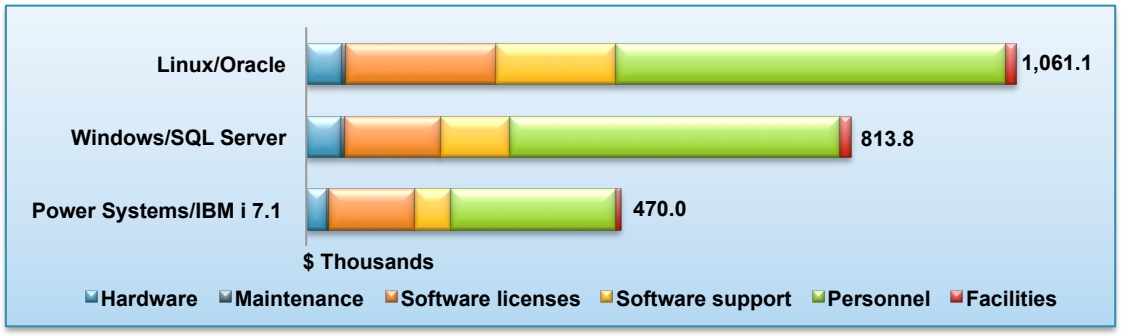
How can this be avoided? One option is to employ IBM i 7.1 on latest-generation POWER7 based systems. These offer industry-leading integration and optimization across all components of hardware and software stacks. More than any other platform available today, they offer midsize users the benefits of advanced technology while minimizing costs, complexities and risks.

Costs

The cost advantages of POWER7 based systems and IBM i 7.1 may be illustrated by comparing costs for server infrastructures in four midsize businesses with $200 million to $1.3 billion in sales, and 500 to 4,500 employees.

Overall three-year costs for use of POWER7 based systems and IBM i 7.1 average 42 percent less than for x86 servers with Microsoft Windows Server and SQL Server, and 56 percent less than for x86 servers with Linux and Oracle databases. Figure 1 summarizes these results.

Figure 1
Overall Three-year Costs by Platform: Averages for All Installations

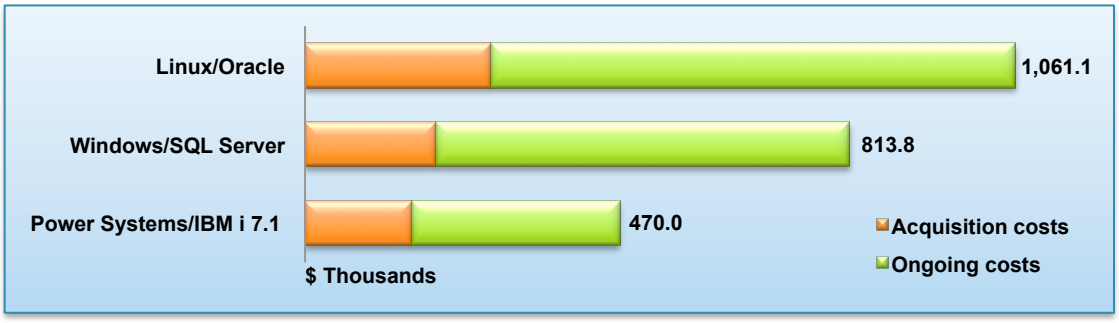


Three-year costs include hardware acquisition and maintenance; license and support costs for operating systems, databases and other systems software; personnel costs for system and database administration; and facilities (primarily energy) costs.

Comparisons are between latest-generation versions of all platforms. These include IBM Power 720, 730 and 740 systems with IBM i 7.1 and PowerVM virtualization; and x86 servers based on Intel 7500 and 5600 series (Nehalem EX) processors with Windows Server 2008 and SQL Server 2008, or Linux and Oracle Database 11g. VMware ESX 4 virtualization is employed with Windows and Linux servers.

Costs for use of POWER7 based systems and IBM i 7.1 are lower across the board. For example, initial acquisition costs for hardware and software licenses average 18 percent less than for x86 servers with Microsoft Windows Server and SQL Server, and 43 percent less than for x86 servers with Linux and Oracle databases. Figure 2 summarizes these results.

Figure 2
Three-year Acquisition and Ongoing Costs by Platform: Averages for All Installations



Personnel costs for use of POWER7 based systems and IBM i 7.1 are significantly less than for Windows and Linux/Oracle servers, reflecting higher levels of IBM i 7.1 integration and automation. Numbers of full time equivalent (FTE) administrators average 55 percent less than for Windows Server 2008 and SQL Server 2008, and 60 percent less than for Linux and Oracle.

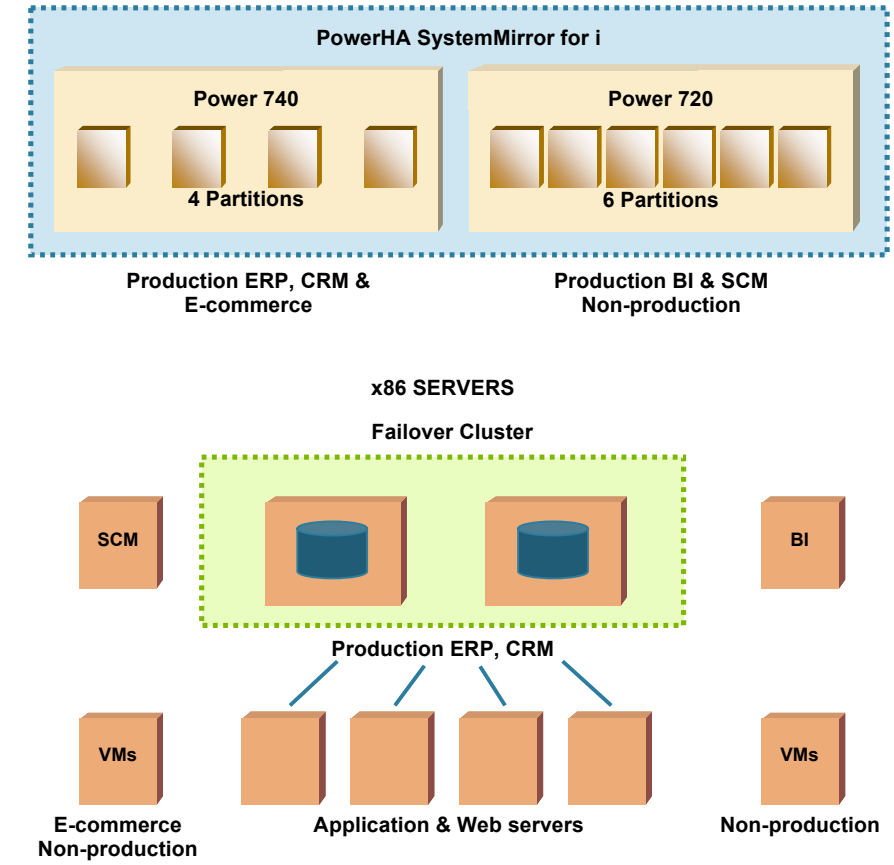
Hardware and maintenance costs are also less. Individual x86 machines are less expensive than POWER7 based systems. However, multiplication of servers to handle database, application and Web serving, and to support test and development as well as production instances drives up overall costs.

Although VMware is employed to help reduce numbers of x86 servers, its effects are limited. Reflecting overall industry experience, VMware hosts test, development and comparatively light-duty production instances. It is not a realistic candidate to host major business systems.

Power logical partitions (LPARs) and micro-partitions are fully capable of handling major production systems. Higher performance – POWER7 based systems outperform Nehalem EX-based equivalents by wide margins – as well as "hard" partitioning and real-time workload management mean that the level of concentration achieved with POWER7 based systems and IBM i 7.1 is significantly greater.

Figure 3 illustrates this effect for one of the four midsize businesses used as the basis of cost calculations in this report.

Figure 3
POWER7 Based Systems and x86 Server Configurations: Example



In this case, 10 separate Windows servers are required to handle the same applications, workloads and instances that run on two partitioned POWER7 based systems. Failover clusters are employed for POWER7 based systems and for x86 database servers.

Multiplication of x86 servers inflates software license and support costs. Another factor should also be taken into account. Although basic x86 server software may be inexpensive, costs escalate when high-end versions of operating systems (e.g., Windows Server Enterprise Edition) and databases (e.g., SQL Server Enterprise Edition, Oracle Enterprise Edition) are required.

Costs escalate further when allowance is made for additional tools for functions such as system management, security and clustering; for Client Access Licenses (CALs) required for Windows servers; and for support costs – Microsoft, for example, charges 25 percent of license fees per year for Software Assurance coverage, while Oracle charges 22 percent per year for its database products.

Details of installations, along with methodology and assumptions employed, and cost breakdowns may be found in the Detailed Data section of this report.

Complexities

Complexity has a major impact on IT costs and effectiveness. Complex environments generate higher personnel overhead, because more tasks and functions must be dealt with. The effects are multiplied when systems are poorly integrated, or are administered using comparatively inefficient manual practices.

Complexity affects the productivity not only of system and database administrators and operations staff, but also of application developers. Applications overlaid on complex system environments typically require more changes, more often. If insufficient resources are available, enhancements may lag, and flexibility to meet changing business needs may be impaired.

More than any other platform in existence today, POWER7 based systems and IBM i 7.1 are designed to minimize complexities. IBM i 7.1 is the latest version of an IBM system environment that has been employed, in some cases for more than 20 years, by small and midsize businesses worldwide. It has been progressively upgraded and enhanced to deliver stability, manageability and reliability.

Two key characteristics are particularly significant:

1. ***Integration***. Core operating system features – including a unique object-based kernel and single-level storage – are tightly integrated with the DB2 for i relational database; an integrated file system; Web application and services servers; and more than 300 management tools.

   These in turn are closely coupled with underlying Power hardware structures and PowerVM virtualization, and share common, high-productivity administrator interfaces.

   Components are not simply bundled. They are engineered to interact with each other in a simple and efficient manner, and extensive testing is carried out to ensure that they do so. This testing extends not only across IBM hardware and software, but also across key independent software vendor (ISV) solutions.

   The implications are important. Integration does not simply increase administrator productivity. It also affects performance – efficient software structures generate lower system overhead – and quality of service. Tightly integrated, tested systems are less likely to experience outages. There are fewer potential points of failure.

   Equivalent functionality in Windows, Linux and UNIX server environments typically requires that users acquire, install, configure and administer multiple software products from different vendors. This increases deployment complexity, and creates integration and administration challenges that are greater than those faced by users of POWER7 based systems and IBM i 7.1.

   In addition to increasing FTE staffing, poorly integrated environments are more likely to degrade performance, and maintenance of availability, security and other quality of service variables becomes a great deal more problematic.

2. ***Automation***. Power systems and IBM i 7.1 are also characterized by industry-leading automation, including use of advanced artificial intelligence technologies and new POWER7 performance optimization features. Although the most visible effect of automation is that it reduces FTE staffing, other benefits are also realized.

   A system that can determine workload requirements and reallocate system resources in a matter of milliseconds, for example, will use capacity more efficiently than one that is dependent on administrator or operator intervention. POWER7 based systems provide this capability.

   Automation also reduces the potential for human errors leading to performance bottlenecks, outages, data loss or corruption, and other negative effects.

Another unique feature of the POWER7 based systems and IBM i 7.1 deserves mention. The kernel-embedded Technology Independent Machine Interface (TIMI) means that system technologies may be updated without changes to applications software. At a time of economic pressures, the ability to avoid repeated application upgrades delivers obvious bottom-line advantages.

Risks

Exposure

POWER7 based systems and IBM i 7.1 may play a significant role in reducing risks. This is particularly the case in such areas as availability, security and protection against malicious code (malware), where industry trends are combining to increase the exposure of midsize businesses.

In manufacturing, distribution, retail and other businesses that operate supply chains, greater process integration, and moves toward lean inventories and just-in-time operations have increased vulnerability to outages. In these and other industries, there has also been growing awareness of the bottom-line impact of outages affecting customer-facing systems.

The potential impact of outages has been further magnified by shifts to 24/7 business operations. Globalization, mounting competitive pressures in many industries and the growth of Internet commerce have contributed to this trend. Even if a business does not function around the clock, key systems must.

At the same time, security and malware threats continue to increase. There has been a marked shift in targets. As the defenses of larger organizations have improved, perpetrators have focused more on midsize businesses with fewer security personnel and more limited resources.

Capability Differences

In comparing POWER7 based systems and IBM i 7.1 with Windows and Linux server environments, the following should be highlighted:

- ***Availability***. The availability strengths of Power systems and IBM i have been clearly demonstrated. Industry surveys, as well as user experiences, have consistently shown higher levels of availability than for any other platform employed by midsize businesses.

  High levels of availability reflect features built into the IBM i 7.1 kernel, and embedded into Power hardware and microcode (firmware). The overall simplicity and integration of IBM i 7.1, and its automation features also assist in minimizing outages.

  Certain of the reliability, availability and serviceability (RAS) features of POWER7 based systems and IBM i 7.1 may be found in x86 servers, and in Windows and Linux software. However, IBM implementations are a great deal more sophisticated.

  For example, the microelectronics technology used in RAS features for POWER7 based systems is a great deal more advanced than in commodity platforms. Clustered failover solutions are more robust and have longer track records of stable and successful operation.

  POWER7 based systems and IBM i 7.1 also benefit from technologies transferred from mainframe systems, which deliver the highest availability levels of any major platform. According to IBM, the availability optimization features of POWER7 based systems were developed jointly by the company's Power and System z (mainframe) design teams.

- ***Security and malware protection***. In this area, differences between POWER7 based systems and IBM i 7.1, and Windows and Linux servers are not merely significant – they are dramatic. IBM i 7.1 is one of the most secure operating systems in existence. Security violations are rare, and malware incidents are virtually unknown. There are no known native IBM i viruses.

  These differences are reflected in data compiled by Secunia, one of the industry's leading authorities on security and malware exposure. Figure 4 summarizes vulnerability data for Windows Server 2008 and i5/OS version 6 (the immediate predecessor of IBM i 6.1 and i 7.1). Both were introduced in 2008.

Figure 4
Comparative Vulnerability Data: Windows Server 2008 and i5/OS 6.x

SEVERITY	WINDOWS SERVER 2008	i5/OS 6.x
Extremely critical	1	0
Highly critical	41	0
Moderately critical	28	3
Less critical	42	3
Not critical	4	0
TOTAL ADVISORIES	116	6
TOTAL VULNERABILITIES	207	8
UNPATCHED	6	0

The number of recorded vulnerabilities for Windows Server 2008 was more than 25 times greater than for i5/OS 6.x, and the number of advisories was more than 19 times greater (advisories may cover multiple vulnerabilities). Severity of incidents and the number of unpatched vulnerabilities were also significantly higher.

The strengths of IBM i 7.1 reflect its object-based structure. Objects are encapsulated in a manner that places strict controls on data as well as system code, making it extremely difficult for unauthorized instructions to execute. Additional capabilities for IP security and other functions are overlaid on this structure. Administrators again benefit from high levels of automation.

In comparison, Windows is the operating system most frequently targeted – and penetrated – by hackers worldwide. There are tens of millions of Windows malware variants. An unprotected Windows server exposed to the Internet will typically be infected in a matter of minutes. There are also wide differences in exposure between IBM i 7.1 and Linux distributions.

Business costs of outages, security violations and malware damage may be substantial. However, IT costs are also affected.

Availability- and security-related tasks typically occupy a great deal more of Windows and Linux system administrator time than is the case for POWER7 based systems and IBM i 7.1. At a time of budgetary constraints, it is difficult to see the business logic of "less for more."

Conclusions

Although Windows and Linux servers may play a valuable role for many applications, the strengths of POWER7 and IBM i 7.1 for core business systems remain clearly differentiated.

IBM i 7.1 and its predecessors have been installed by hundreds of thousands of midsize businesses worldwide to run such systems, and new deployments continue. IBM i 7.1 is supported by more than 2,500 ISVs – including most major vendors of ERP and industry-specific core business systems – along with systems integrators and professional services firms worldwide.

Reduction of complexity, in IBM's strategy for this platform, extends beyond system design to include Business Partner programs that assist this community in the delivery of solutions that are more integrated, and simpler to install and support than is the case for Windows and Linux equivalents.

There are thus strong arguments for new users to consider deployment of POWER7 based systems and IBM i 7.1. For existing System i users, moving to these is a comparatively simple exercise.

Changing operating systems and databases, however, is a longer and more expensive process. Even with outside assistance, organizations would incur significant risks of disruption not only while migration was occurring, but also during the longer period when new systems and skill sets were being shaken down. In a difficult economic climate, it would be foolhardy to incur such risks.

In migrating to Windows or Linux servers, organizations could also expect to expand IT staffs, experience lower levels of availability and face an immediate and dramatic escalation in security and malware exposure.

There may a business case for doing this. But if costs are not reduced, it is unclear what it might be.

Additional Information

This ITG Executive Summary is based upon results and methodology contained in a Management Brief released by the International Technology Group. For copies of this Management Brief, please email requests to info-itg@pacbell.net.

International Technology Group

4546 El Camino Real, Suite 230
Los Altos, California 94022-1069
Telephone: (650) 949-8410
Facsimile: (650) 949-8415
Email: info-itg@pacbell.net