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## **VALUE PROPOSITION FOR IBM POWER SYSTEMS SERVERS AND i: MINIMIZING COSTS AND RISKS FOR MIDSIZE BUSINESSES**

### **Challenges**

What challenges face today's midsize businesses? Competition. Market shifts. Pressures to increase efficiency and productivity. In many industries, globalization. In most, economic conditions have affected bottom lines.

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 systems and other state-of-the-art systems. The number of "must have" solutions continues to expand.

Even five years ago, clear distinctions could be made between the systems of large organizations and the more basic systems employed by midsize businesses. However, this picture is changing. Midsize IT environments are becoming as sophisticated and diverse as those of Fortune 500 corporations.

The good news is that a growing array of critical solutions and technologies has become available to midsize businesses. The bad news is that, all too easily, these can create complexities that degrade solution value, distract business and IT professionals, escalate costs and disrupt business operations.

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 – or continue to employ – IBM Power Systems and the IBM i 6.1 operating system. More than any other platform available today, these offer midsize users the benefits of advanced technology while minimizing costs, complexities and risks.

### **Costs**

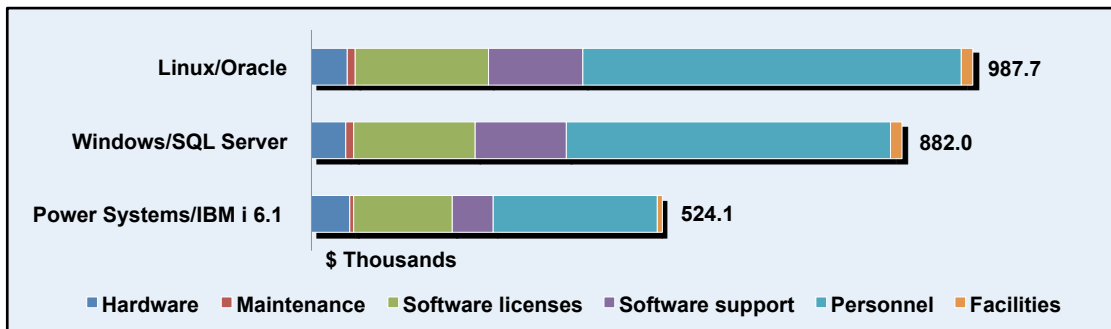
#### **Cost Advantages**

The cost advantages of Power Systems and IBM i 6.1 may be illustrated by comparing three-year IT costs for four midsize businesses with from \$400 million to \$1.2 billion in sales and from 500 to 4,500 employees.

Costs for use of Power Systems and IBM i 6.1 average 41 percent less than for "commodity" x86 servers and Microsoft Windows, and 47 percent less than for x86 servers and Linux operating systems. Figure 1 summarizes these results.

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

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



Comparisons are between IBM Power 520 and 550 systems equipped with IBM i 6.1 and PowerVM virtualization firmware; and Dell PowerEdge Intel Xeon-based servers with Windows Server 2008 and SQL Server 2008, and Linux and Oracle Database 11g. Where appropriate, VMware ESX virtualization tools are employed.

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

### **Cost Factors**

Lower costs for use Power Systems and IBM i 6.1 are due to multiple factors. Personnel costs are – by wide margins – less than for Windows and Linux/Oracle servers, reflecting higher levels of IBM i 6.1 integration and automation.

Software license and support costs are also less for Power Systems and IBM i 6.1. Although x86 server software may be inexpensive for basic capabilities on single platforms, 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 such functions as system management, security and failover 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.

Personnel and software costs are increased for Windows and Linux/Oracle solutions by server proliferation. Multi-tier architectures, as well as the limitations of x86 server virtualization tools, mean that more physical servers are required than is the case for Power Systems. More servers and instances must be managed, and more software copies must be licensed and supported.

### **Complexities**

#### **Complexity Impact**

Complexity has a major impact on IT costs and effectiveness. Complex environments generate higher management overhead, because administrators must deal with more tasks and functions. The effects are multiplied when systems are poorly integrated and characterized by use of 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.

There is a risk that IT agendas will become dominated by the minutiae of managing and maintaining systems, to the extent that focus on meeting business objectives is diluted. An organization preoccupied with the basic tasks of making systems work properly will devote less attention to business needs.

### **Capability Differences**

From this perspective, there are striking disparities between IBM i 6.1 and Windows and Linux environments. IBM i 6.1 is the only major operating system designed and enhanced – for more than 20 years – specifically for use by small and midsize businesses. A central design goal has been to minimize the complexity with which users as well as IT staff must deal.

IBM i 6.1 is built around a unique object-based kernel, and incorporates features such as single level storage that are not found in any other operating system. These contribute directly to high levels of system stability, administrator productivity and security.

A wide range of components are integrated. These include core operating system functions; the DB2 for i relational database management system; an integrated file system; Web application and Web services servers; and tools handling more than 300 system, storage, backup and recovery, communications, security, operations and other management tasks.

In Windows and Linux server environments, a variety of tools, often from multiple vendors, must be separately purchased, installed, configured and supported to provide comparable functionality.

IBM i 6.1 also features industry-leading automation capabilities – including extensive use of IBM autonomic (i.e., artificial intelligence) technologies – and common, streamlined administrator interfaces.

PowerVM partitioning granularity, and the closely integrated system and workload management capabilities of Power Systems and IBM i 6.1, enable significantly higher levels of concentration.

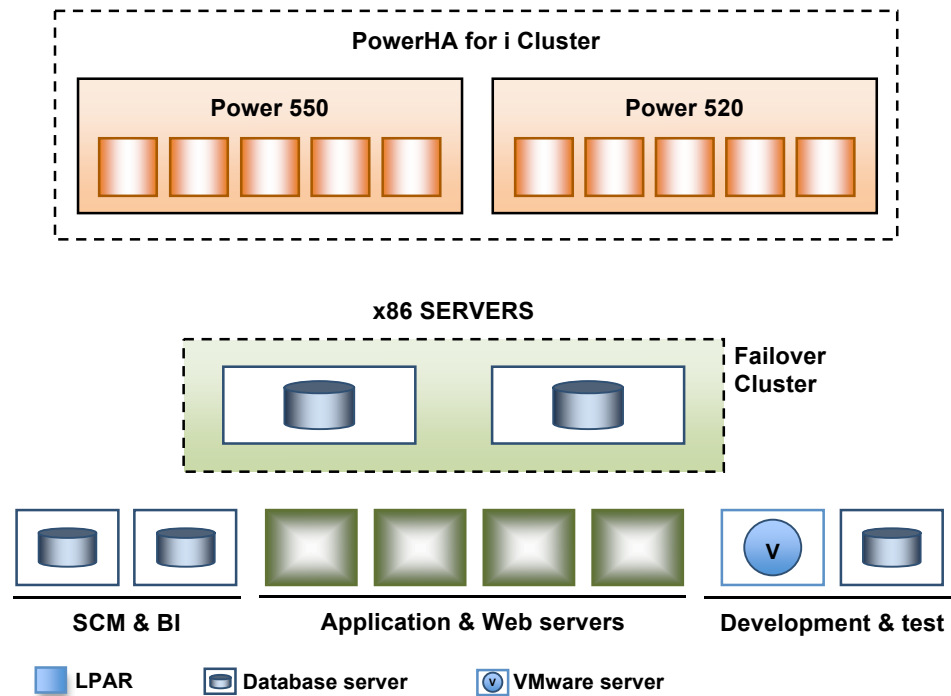
In one of the installation profiles in this report, for example, two clustered Power Systems employ firmware-based logical partitions (LPARs) to host production as well as development and test instances of all of the company's major systems. It requires 10 separate Windows servers to handle the same instances. Figure 2 illustrates these configurations.

Fewer physical servers means reduced administration complexity and lower energy costs. A further benefit of Power Systems capabilities is that workloads may be more evenly balanced across processor, memory and I/O resources than is the case for x86 servers. Significantly higher levels of overall capacity utilization may be realized.

Partitioning is also supported by x86 virtualization tools such as VMware, Microsoft Hyper-V and Xen. However, these employ software rather than firmware-based partitioning techniques, and system and workload management features are less closely integrated. Unacceptable levels of performance degradation may occur, and guested workloads may interfere with each other.

As a result, vendors of popular ERP and other core business systems often discourage, or do not support use of x86 virtualization for major production systems. x86 virtualization tools are more often employed for development and test instances, and for comparatively light-duty production applications.

Figure 2  
**Power Systems and x86 Server Configurations: Installation Example**



## Risks

### *Exposure Trends*

Power Systems and IBM i 6.1 may also play a significant role in reducing risks. This is particularly the case in such areas as availability, and security and malicious code (“malware”) resistance, where a number of industry trends – which are discussed in more detail later in this report – 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 24x7 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 expand. 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.

Midsize businesses are also vulnerable to – and less well protected than their larger counterparts against – the actions of individual hackers, disgruntled employees and others who may hold grudges against them.

## Capability Differences

The following should be highlighted:

- **Availability.** The availability strengths of Power Systems and IBM i 6.1 have been clearly demonstrated. Industry surveys, as well as user experiences, have consistently shown levels of availability that are significantly higher than that of any other platform employed by midsize businesses.

Systems routinely function on a 24x7 basis with little or no operator intervention. Unplanned outages are rare, and planned outages are shorter and less frequent than for Windows and Linux server environments.

High levels of availability reflect features built into the IBM i 6.1 kernel, and embedded into Power Systems hardware and firmware. The overall simplicity and integration of IBM i 6.1, along with industry-leading automation features, also assist in minimizing outages. There are fewer potential points of failure, and errors by IT staff or users are less likely.

Certain of the availability optimization features of Power Systems and IBM i 6.1 may be found in commodity x86 servers, and in Windows and Linux software. However, IBM implementations are more sophisticated.

For example, the microelectronics technology used to provide reliability, availability and serviceability (RAS) for Power 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.

Windows and Linux servers suffer a further disadvantage. A complex system is inherently less reliable. There are more potential causes of unplanned outages. Planned outages also tend to be longer and more frequent. This particularly the case if changes are often required, or if patches must be regularly applied. In Windows and Linux server environments, both typically occur.

- **Security and malware protection.** In this area, capability differences are not merely significant – they are dramatic. IBM i 6.1 is one of the most secure operating systems in existence. Security violations are rare, and malware incidents are virtually unknown.

The U.S. National Vulnerability Database, operated by the National Institute of Standards and Technology (NIST), for example, has recorded no vulnerabilities for IBM i 6.1 or its predecessors since collection of statistics began in 1992. There are no known native i viruses.

The strengths of IBM i 6.1 reflect its distinctive 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 functions for IP security, along with a built-in intrusion detection system, single sign-on and other features are overlaid on this structure. Administrators again benefit from levels of automation, including use of autonomic technologies.

In comparison, Windows is the operating system most frequently targeted – and penetrated – by hackers worldwide. There are 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 security and malware exposure between IBM i 6.1 and Linux variants.

It is possible to secure Windows and Linux environments, although the degree of protection will be less. However, the costs and difficulties of doing so may be significantly greater. For example, Microsoft issues Windows patches in monthly batches. The industry “rule of thumb” is that it takes at least two hours to apply a patch to each server.

Availability- and security-related tasks may occupy a great deal of Windows and Linux system administrator time. This contributes to higher IBM i 6.1 administrator productivity and lower personnel costs. Availability and security levels will also typically be lower – and risk exposure correspondingly higher – if commodity x86 servers and software are employed.

## Platform Options

Most Power Systems and IBM i 6.1 users also employ Windows and/or Linux servers. However, a distinction should be made between core business systems and the applications that it makes sense to run on x86 platforms. Core business systems are more sensitive to availability, house the most sensitive data within organizations, and disproportionately affect overall IT cost structures.

The role of these systems has expanded as organizations have deployed business intelligence, planning and other “informational” tools that draw upon the contents of core databases. If a core business system is down, or does not function effectively, a wide range of other activities may be impacted.

Deployment of Power Systems and IBM i 6.1, and Windows and Linux servers is thus not an “either/or” choice. Decisions should be based on the functional characteristics and business criticality of the systems that must be supported.

Power Systems offer options, which are discussed later in this report, to support IBM i 6.1 as well as other operating systems. For example, users may run IBM i 6.1, along with AIX (the IBM version of UNIX) and Linux in separate LPARs on the same server.

IBM BladeCenter systems may be configured with Power- and x86-based blade servers, supporting IBM i 6.1, AIX, Windows and/or Linux operating systems in a single physical frame.

IBM BladeCenter as well as IBM System x servers running Windows, VMware and x86 versions of Linux may be attached to Power Systems servers through iSCSI connections, and Power Systems storage resources and management services may be shared.

## Conclusions

Although Power and BladeCenter systems may be used to consolidate physical servers, the strengths of IBM i 6.1 for core business systems remain clearly differentiated.

IBM i 6.1 and its predecessors have been installed by hundreds of thousands of midsize businesses worldwide to run such systems, and new deployments continue. IBM i 6.1 is supported by more than 2,500 independent software vendors (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 most Windows and Linux equivalents.

There are thus strong arguments for new users to consider deployment of Power Systems and IBM i 6.1. For existing System i users, moving to Power Systems and IBM i 6.1 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 be 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](mailto:info-itg@pacbell.net).



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