March 2006

MANAGEMENT BRIEF

COST/BENEFIT CASE FOR IBM SYSTEM p5 FOR SAP SOFTWARE DEPLOYMENTS

Compared with Windows Servers

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

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

ERP RELOADED 2

Changes 2
Complexity 2
SAP Software Environment 2
Platform Differentiators 3
Criticality 5
Availability Drivers 5
Platform Differentiators 6

COST PICTURE 7

Basis of Calculations 7
Cost Comparisons 8
Server Costs 8
Costs of Downtime 9

DETAILED DATA 10

Cost Calculations 10
Server Costs 10
Costs of Downtime 10
SAP Software Abbreviations 12

List of Figures

1. SAP Enterprise Software Environment 3
2. IBM System p5 Capability Levels 4
3. Profiles Summary 1 7
4. Profiles Summary 2 8
5. Average Three-year Server Costs for Windows Server and IBM System p5 Scenarios (System p5 Scenarios include Oracle Databases) 9
6. Average Three-year Server Costs for Windows Server and IBM System p5 Scenarios (System p5 Scenarios include DB2 Databases) 9
7. Average Costs of Downtime for Windows Server and IBM System p5 Scenarios 9
8. Three-year Server Costs Detail 11
9. Three-year Costs of Downtime Detail 11
10. SAP Software Abbreviations 12

EXECUTIVE SUMMARY

What business challenges face SAP users? Answers to this question will vary between companies and industries. Most users, however, would cite such issues as integrating systems and processes, responding more rapidly to changing business conditions, increasing operational efficiencies, and improving the effectiveness of informational and collaborative processes.

Decisions must also be made about the IT infrastructures that will support SAP software. How should these be addressed? Experience has shown that certain basic principles apply. The role of the server, storage and software platforms that make up the IT infrastructure is to facilitate, in the most effective manner possible, realization of the business value of SAP applications.

If savings can be realized in platform costs without diminishing SAP business value, these should clearly be pursued. However, organizations should first be sure that they understand both the technical challenges and overall cost implications of creating an effective SAP hardware and software infrastructure.

One common misconception is that use of "commodity" server platforms and software can dramatically reduce infrastructure costs. This perception may be correct for certain types of basic application. However, the economics of supporting complex, business-critical, enterprise-wide systems – and the challenges of maintaining efficient, continuous operations for these – are significantly different.

This report deals with these issues. Specifically, it compares the cost implications of two approaches – (1) use of Intel processor-based servers with Microsoft Windows and SQL Server databases, and (2) use of IBM System p5 servers with AIX 5L and Oracle and DB2 databases – for SAP software deployments in companies with from U.S. $500 million to $5 billion in revenues.

Comparisons are based on six composite profiles of manufacturing, energy and distribution companies in this size range. For each profile, scenarios built around Intel processor-based and IBM System p5 servers were developed, and two sets of costs were calculated. Results may be summarized as follows:

1. ***Server costs***. Three-year server costs for System p5 scenarios employing Oracle databases range from 14.2 percent to 32.2 percent less, and average 24.9 percent less than those for equivalent Windows server scenarios. For System p5 scenarios employing DB2 databases, the comparable numbers are 18.0 percent to 37.9 percent, and 31.1 percent respectively.

   Server costs include hardware acquisition and maintenance; initial license, update subscription and support fees for systems and database software; personnel costs for system administration functions; and facilities costs for data center occupancy, power and cooling.

2. ***Costs of downtime***. Because of higher levels of availability enabled by System p5 environments, there are also significant differences in costs of downtime – meaning costs incurred by organizations due to disruptions affecting critical business processes.

   Three-year costs of downtime for System p5 scenarios range from 59.0 percent to 71.1 percent less, and average 65.8 percent less than those for equivalent Windows server scenarios. Costs of downtime represent lost gross profit, based on industry- and organization-specific values for outage effects. The basis of these calculations is detailed later in this report.

The value of an enterprise resource planning (ERP) system is delivered by application solutions. Unnecessary complexity and cost at the server infrastructure level can all too easily divert resources from the high value-added processes of application delivery and business enablement into the minutiae of managing and maintaining underlying platforms. The challenges of deploying a latest-generation ERP system are considerable. There is no reason to make them more difficult than they need to be.

ERP RELOADED

Changes

The ERP world is changing. The 1990s focus on structured systems and transactional efficiencies has given way to approaches that address a broader range of business performance variables. Issues such as organizational flexibility, cross-functional collaboration, and more effective use of information are now at the forefront of the ERP agenda as vital new enablers of competitive advantage.

Organizations worldwide are also beginning to move beyond conservative business strategies to target growth. These changes coincide with fundamental shifts in the underlying technologies and architectures that support corporate systems. If opportunities are properly recognized and exploited, the impact may be transformative. If they are not, the result may impair organizational adaptability during a period of critical business transition.

The ERP systems that are put in place during the next few years will, in no small measure, determine how well the new business challenges of the 21st century are met. The server infrastructures that support these systems will, in turn, materially contribute to – or undermine – their effectiveness. Decisions made now will affect organizations for a long time to come.

Selection of server platforms is thus not a trivial exercise. Attention must be paid not only to conventional criteria of cost and performance, but also to the extent to which platforms can assist in addressing two broader challenges: (1) controlling complexity and (2) realizing continuity for business-critical SAP software systems.

Complexity

SAP Software Environment

Five years ago, an SAP enterprise software environment was typically dominated by the core ERP components of SAP R/3. Now, however, these components are increasingly complemented by applications that deal with analytical and intranet processes, as well as customer relationship management (CRM), product lifecycle management (PLM), supply chain management (SCM), supplier relationship management (SRM) and a wide range of other high value-added functions.

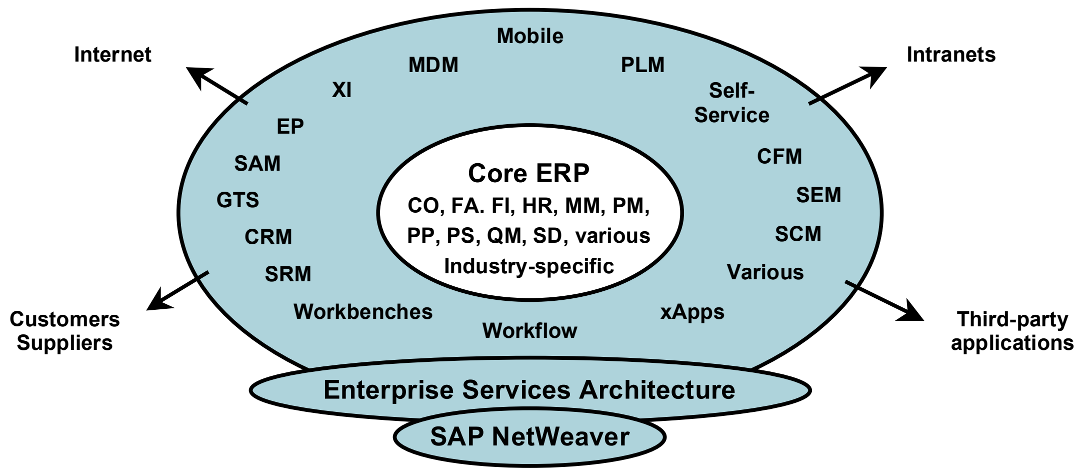
As a result, application structures and workloads have become more diverse than those in conventional ERP systems. They have also become more closely interdependent. Process interoperability and data transparency must be maintained across overall software structures that are both more complex, and require higher levels of real-time interaction than many organizations have dealt with previously.

The new SAP enterprise software environment, moreover, incorporates a range of technologies built around such components as the SAP NetWeaver platform and enterprise service-oriented architecture (ESA). These enable greater flexibility than earlier SAP R/3 structures, and are more closely aligned with Internet and intranet standards.

They are also, however, potentially less stable and – because they are more open to the rest of the IT world – more vulnerable than was the case for SAP R/3. Core technologies will also evolve more rapidly, and integration and management challenges will be more demanding.

Figure 1 illustrates this environment. A list of application abbreviations employed in this and other figures may be found in the Detailed Data section of this report.

Figure 1
SAP Enterprise Software Environment



SAP software architecture is built around multiple logical server tiers. If individual modules and functions are deployed on separate physical servers, the level of technical complexity to be dealt with will tend to increase. The effect will be magnified if this is the case not only for production systems, but also for development, test, quality assurance, staging and other non-production instances.

Proliferation of servers escalates hardware, maintenance, software, facilities and – because more individuals are required for system administration and related tasks – personnel costs. System integration tasks may also become more challenging, and maintenance of service quality levels – including such variables as availability, recoverability and security – becomes more problematic.

Platform Differentiators

Differences between architectures and technology bases of System p5 and Windows server platforms contribute to cost disparities. If Windows servers are employed, the number of physical platforms will tend to be larger because it will be necessary to dedicate these to different instances and functions.

In comparison, the System p5 platform offers high levels of performance and scalability for SAP workloads; i.e., fewer servers may be required to execute the same workloads. It also supports use of logical partitions (LPARs) and micro-partitions. The combined impact of these, and of system and workload management facilities built into the AIX 5L Version 5.3 operating system enable multiple instances to run on a single physical server in a highly efficient manner.

These capabilities enable more efficient overall use of capacity than if multiple, dedicated servers are employed. This is the case for production and non-production instances. Additional savings may be realized by System p5 virtual disk, virtual I/O and virtual local area network (LAN) technologies.

These differences are reflected in smaller numbers of physical servers and full time equivalent (FTE) personnel for System p5 relative to Windows server scenarios for the composite profiles.

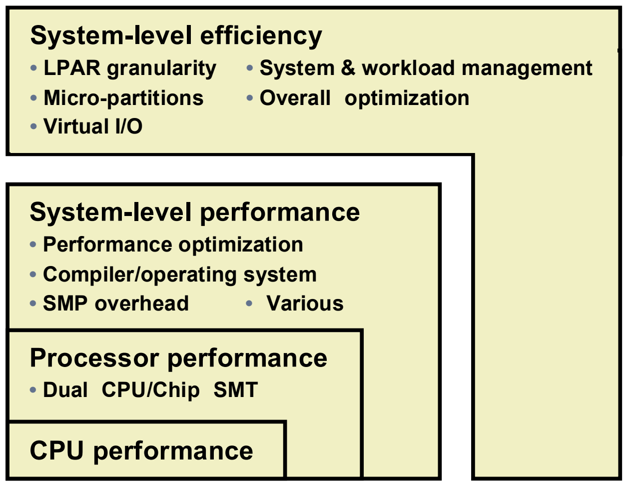
System p5 server consolidation strengths are particularly significant for database serving functions, which tend to represent greater management and availability challenges than application and Web serving. A significant reduction in technical complexity and associated costs thus occurs.

An additional point should be noted: the strengths of the System p5 platform are a function not only of individual factors, but also of the manner in which these are integrated and optimized within the overall system environment.

The System p5 platform, for example, benefits from high levels of CPU performance, as well as effective compiler- and operating system-level performance acceleration, including chip simultaneous multi-threading; low levels of symmetric multiprocessing (SMP) overhead; and other variables.

These are complemented, as figure 2 illustrates, by a further level of capability, including multiple forms of virtualization and embedded management facilities. These are closely integrated into System p5 hardware and AIX 5L software, and enable exceptionally efficient use of system resources.

Figure 2
IBM System p5 Capability Levels



Micro-Partitioning technology, for example, enables highly flexible, dynamic allocation of system resources to meet changing workload requirements, and is employed by numerous SAP software users to improve load balancing. Overall capacity utilization is materially improved.

The importance of System p5 system and workload management capability should be highlighted. The levels of capacity utilization that may be achieved by any server depend heavily on mechanisms that monitor and control workload execution processes. This is particularly the case when virtualization technologies are employed.

Criticality

Availability Drivers

Because ERP systems automate core business operations, they are inevitably vulnerable to disruption. The impact of even short outages may ripple across the entire supply chain, potentially affecting not only internal processes, but also customers and suppliers. Bottlenecks may be created whose effects continue to be felt long after service has been restored.

More than a decade of experience has shown that the bottom-line effects may be substantial. A wide range of supply chain cost components – order processing, inventory, logistics and others – may be affected. Late delivery fees may be incurred. Customers may be lost.

These effects are magnified when systems are standardized and tightly integrated across the entire organization. They are magnified further when companies maintain low levels of inventory, employ just-in-time (JIT) techniques, or have adopted real-time business models.

The ability to maintain high levels of availability for conventional ERP processes is clearly critical. But as other types of application come to play a larger role in business performance, it also becomes vital to minimize downtime for these.

This is, for example, the case in the following areas:

- ***Customer-facing systems***. Experience has shown that outages affecting a CRM system – or any other customer-facing system – can have negative effects. Inability to place orders, or verify inventory availability or order status online may result in lost sales.

  There may also be broader, longer-term damage to customer relationships. A customer who experiences an outage – either directly (e.g., because an Internet or telephone self-service system is down) or indirectly (e.g., because critical systems are not available to sales personnel, call center operators and others) – will inevitably be dissatisfied.

  Customer dissatisfaction translates into customer loss. Even where defections cannot be tied to any specific negative experience, service quality shortfalls contribute to overall levels of satisfaction or dissatisfaction, which in turn affect attrition rates.

- ***Supplier-facing systems***. For a growing number of companies in a wide range of industries, procurement occurs 365 days per year, around-the-clock. JIT practices have shortened order-processing cycles, and globalization of supplier bases means that partners may be distributed across a wide range of time zones.

  Procurement processes are, moreover, increasingly moving to the Internet – which is, almost by definition, a 24/365 medium. Maintenance of near-100 percent availability for supplier-facing systems operating via the Internet has become a critical requirement for many businesses.

- ***Informational systems***. Across the SAP world, there has been a progressive shift toward treatment of information as a time-sensitive business resource. Business damage may be caused not only by failing to deliver a part to a manufacturing line, or a finished product to a customer on time, but also by delays in delivering the right information to the right person.

  It thus becomes necessary to maintain high levels of availability not only for core ERP systems, but also for planning and forecasting, operational query, messaging, business intelligence and other professional applications. These become as sensitive to disruption as operational systems.

In these and other cases, it becomes increasingly difficult to distinguish between those SAP applications that are "business-critical" – in the sense that they require high levels of availability – and those for which lower levels are acceptable.

Interdependency of SAP software components tends to reinforce the need to maintain near-continuous uptime for the entire application portfolio, and for the data management and communications mechanisms that underpin it. An outage at any point within the SAP software environment may impact other applications and the business processes they enable.

Platform Differentiators

The maintenance of high levels of availability requires the avoidance, or at least the minimization of the duration and impact of two types of outage:

1. ***Unplanned outages***. Potential causes of these include hardware and software problems, power failures, data center or network disruptions, security violations, virus damage, operator error, natural or man-made disasters, and a variety of other factors.
2. ***Planned outages***. Potential causes include hardware and software configuration changes, software updates (e.g., version upgrades and patches), database reorganization, scheduled maintenance and data backups.

All platforms are potentially susceptible to both types of outage. However, the degree of exposure may vary widely depending on hardware and software components, application and workload characteristics, and other factors.

The System p5 benefits from a number of capabilities that facilitate high levels of availability. These include embedded reliability, availability and serviceability (RAS) features. Extensive redundancy, along with monitoring, diagnostic, and fault isolation and resolution facilities, are built into most major hardware and systems software components. The IBM High Availability Cluster Multiprocessing (HACMP) solution also provides highly effective failover clustering.

LPARs further contribute to reduction of planned outages. Batch workloads, for example, may be executed concurrently with online processing when spare capacity is available, rather than executed offline. Software may be copied to and modified in LPARs without disrupting operations.

Intel processor-based servers are often equipped with functionally similar features. Again, however, capability is determined not only by individual features, but also by the extent to which these are integrated and optimized within overall system architecture. Availability is a pervasive System p5 design parameter across hardware as well as systems software components, with the result that "the whole is more than the sum of the parts."

The issue of availability overlaps with that of complexity. A complex system is typically more vulnerable to disruption than a simple one, because there are more potential points of failure. Backup, recovery and security processes also become more challenging when they must be managed across numerous physically separate servers.

The high levels of server consolidation enabled by the System p5 platform, as well as the role of such capabilities as virtual disk, I/O and LANs in reducing numbers of hardware components, represent potentially significant availability advantages compared to Windows servers.

COST PICTURE

Basis of Calculations

The cost comparisons presented in this report are based on the six composite profile installations summarized in figures 3 and 4.

Figure 3
Profiles Summary 1

Company	Oil & Gas	Chemicals	Wholesale Distribution
Profile	$5 billion revenues 5,000 employees Oil & gas production & marketing	$2 billion revenues 2,500 employees Specialty chemicals	$1.5 billion revenues 3,000 employees Medical products distribution
Applications	IS-Oil, BI, CO, CRM, EP, FI, HR, MM, PLM, PM, QM, SD, SEM, SRM	BI, CO, CRM, EP, FI, GTS, HR, PLM, PM, PP, PS, SD	BI, CO, CRM, EP, FI, MM, WM, SD, SRM, TR
Number of Users	2,000	1,500	1,000
WINDOWS SERVER SCENARIOS			
Servers	2 x Xeon 4 x 3.0 GHz (dual core)* 8 x Xeon 4 x 3.33 GHz 9 x Xeon 2 x 3.6 GHz Total: 19	2 x Xeon 4 x 3.0 GHz (dual core)* 7 x Xeon 4 x 3.33 GHz 6 x Xeon 2 x 3.6 GHz Total: 15	2 x Xeon 4 x 3.33 GHz* 5 x Xeon 4 x 3.33 GHz 7 x Xeon 2 x 3.6 GHz Total: 14
Personnel	1.75 FTEs	1.5 FTEs	1.5 FTEs
IBM SYSTEM p5 SCENARIOS			
Servers	2 x 510Q 4 x 1.5 GHz – 2 LPARs* 1 x 510Q 4 x 1.5 GHz – 2 LPARs + 3 micro-partitions 3 x 510 2 x 1.9 GHz 1 x 505 2 x 1.65 GHz – 2 LPARs 1 x 505 2 x 1.5 GHz – 2 micro-partitions 2 x 505 2 x 1.5 GHz Total: 10	2 x 510Q 4 x 1.5 GHz – 2 LPARs* 1 x 510Q x 4 x 1.5 GHz – 2 LPARs + 2 micro-partitions 1 x 510Q x 4 x 1.5 GHz – 3 micro-partitions 1 x 505 2 x 1.65 GHz – 2 micro-partitions 3 x 505 2 x 1.5 GHz Total: 8	2 x 510Q 4 x 1.5 GHz – 2 LPARs* 1 x 510Q 4 x 1.5 GHz – 3 micro-partitions 1 x 505 2 x 1.65 GHz – 2 micro-partitions 5 x 505 2 x 1.5 GHz Total: 9
Personnel	1.0 FTE	1.0 FTE	1.0 FTE

*Clustered configuration

Profiles and scenarios were developed using data on SAP applications, instances and workloads, server configurations, service levels, staffing and other variables supplied by 21 companies in the same industries and approximate size ranges, with generally similar business profiles.

A best practices approach drawing upon the experiences of multiple users was employed. In one case, for example, the experiences of one company with SAP ERP deployment on Windows servers were combined with those of another with SAP SRM applications on the same platform.

In another case, the experiences of one company with deployment of ERP and CRM production instances on a single System p5 server were combined with those of another that had adopted this approach to consolidate multiple development, test, quality assurance and sandbox instances.

All scenarios include non-production instances as well as production systems. Clustered failover configurations are employed for servers requiring high levels of availability and recoverability.

Figure 4
Profiles Summary 2

Company	High Technology	Industrial Machinery	Life Sciences
Profile	$1 billion revenues 5,000 employees Electronic components	$700 million revenues 2,500 employees Industrial tools & equipment	$500 million revenues 600 employees Pharmaceuticals
Applications	BI, CO, EP, FI, HR, PLM, PM, PP, SD, SRM	BI, CO, CRM, EP, FI, HR, MM, PLM, PM, PP, QM, SD	BI, CO, EP, FI, FI, HR, MM, PP, SCM, SD
Number of Users	600	500	400
WINDOWS SERVER SCENARIOS			
Servers	2 x Xeon 4 x 3.33 GHz* 3 x Xeon 4 x 3.33 GHz 8 x Xeon 2 x 3.6 GHz 4 x Xeon 2 x 3.4 GHz Total: 17	2 x Xeon 4 x 3.0 GHz (dual core)* 1 x Xeon 4 x 3.0 GHz (dual core) 1 x Xeon 4 x 3.33 GHz 3 x Xeon 2 x 3.6 GHz 1 x Xeon 2 x 3.4 GHz Total: 8	2 x Xeon 4 x 3.33 GHz* 1 x Xeon 4 x 3.33 GHz 4 x Xeon 2 x 3.6 GHz Total: 7
Personnel	1.5 FTEs	1.0 FTE	1.0 FTE
IBM SYSTEM p5 SCENARIOS			
Servers	2 x 510Q 4 x 1.5 GHz – 2 LPARs* 1 x 510Q 4 x 1.5 GHz – 2 LPARs + 2 micro-partitions 1 x 505 2 x 1.65 GHz – 2 micro-partitions 5 x 505 2 x 1.5 GHz Total: 9	2 x 510Q 4 x 1.5 GHz – 2 LPARs* 1 x 510Q 4 x 1.5 GHz – 2 LPARs 1 x 505 2 x 1.65 GHz – 3 micro-partitions Total: 4	2 x 510 2 x 1.9 GHz* 1 x 510 2 x 1.9 GHz – 2 LPARs 1 x 510 2 x 1.9 GHz – 2 LPARs + 2 micro-partitions 1 x 505 2 x 1.65 GHz Total: 5
Personnel	1.0 FTE	0.5 FTE	0.75 FTE

*Clustered configuration

In the Windows server scenarios for the Oil and Gas, Chemicals and Industrial Machinery companies, "4 x Xeon 3.0 GHz (dual core)" configurations are servers with four dual core Xeon 3.0 GHz processors; i.e., eight cores each. All other Windows server configurations employ single core processors.

Where appropriate, multiple application and database instances are deployed on single Windows or System p5 servers. In System p5 scenarios, LPARs, micro-partitions, or both are employed.

Cost Comparisons

Server Costs

For each profile, server cost comparisons were developed for the configurations and staffing levels of Windows server and System p5 scenarios.

Calculations for System p5 scenarios include AIX 5L Version 5.3 and, where appropriate, HACMP facilities. Costs were calculated separately for use of Oracle 10g and IBM DB2 databases for all System p5 scenarios.

Windows server configurations include Windows Server 2003 Enterprise Edition and, where appropriate, clustering solutions, SQL Server 2005 Enterprise Edition databases, or both.

Average three-year server costs for both sets of scenarios for all six profiles are summarized in figures 5 and 6.

Figure 5

Average Three-year Server Costs for Windows Server and IBM System p5 Scenarios (System p5 Scenarios include Oracle Databases)

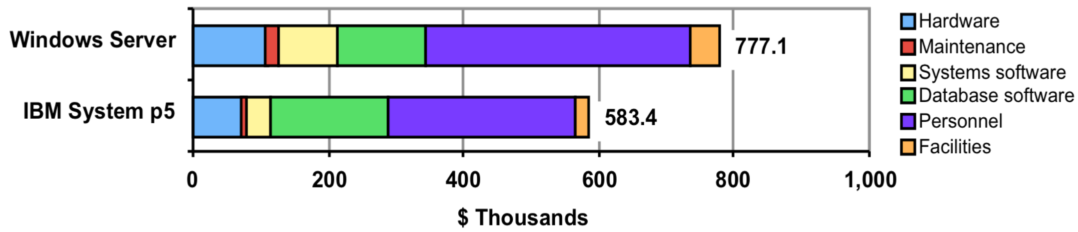
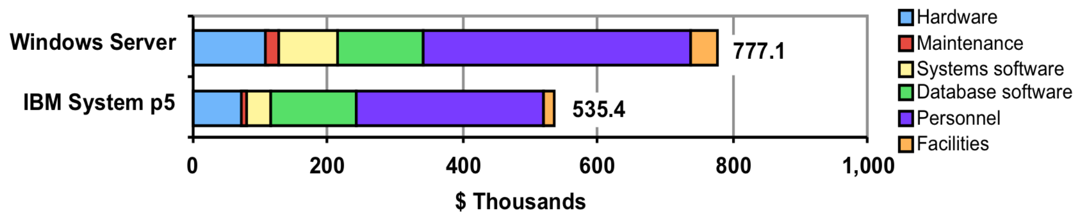


Figure 6

Average Three-year Server Costs for Windows Server and IBM System p5 Scenarios (System p5 Scenarios include DB2 Databases)



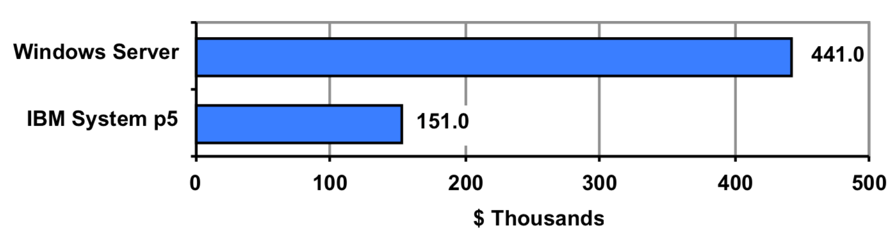
Server costs presented in this report are for the specific scenarios and profiles described in figures 3 and 4. Actual user costs may vary.

Costs of Downtime

Costs of downtime were developed based on annual availability levels and corresponding business losses for all scenarios and profiles. Average three-year costs for all six profiles are summarized in figure 7.

Figure 7

Average Costs of Downtime for Windows Server and IBM System p5 Scenarios



Costs of downtime presented here are for the specific scenarios and profiles described in this report. Actual user costs may vary.

DETAILED DATA

Cost Calculations

Server Costs

Hardware acquisition, maintenance, and initial license, update subscription (where appropriate) and support costs for systems and database software were calculated based on discounted published vendor U.S. list prices current as of February 2006. It is assumed that SQL Server, Oracle and DB2 databases are acquired from SAP. Costs do not include SAP applications software, which in each profile would be the same for both scenarios.

Personnel costs were calculated using U.S. annual average salaries of $74,068 and $81,303 for Windows and AIX system administrators respectively. Salaries were increased by 29.2 percent to allow for bonuses, benefits, training and related items.

Facilities costs for servers were calculated using vendor specifications for electricity consumption and footprints for server configurations included in scenarios. Costs include data center occupancy – calculations were based on Electronic Industries Alliance (EIA) standard rack mount units and service clearances for these, plus allowance for inactive areas – and electricity consumption.

Facilities costs also include acquisition, maintenance, occupancy (including service clearances and inactive areas) for, and electricity consumption by power and cooling equipment. Configurations of this equipment are appropriate for overall electricity consumption and heat generation by server bases in scenarios. Cost calculations were based on U.S. specifications and discounted list prices for appropriate models from leading vendors.

Data center occupancy costs for servers as well as power and cooling equipment are based on a conservative assumption for annual average cost per square foot for existing facilities (i.e., costs do not include new facilities construction), while electricity costs for both are based on a conservative assumption for average price per kilowatt/hour. Both assumptions are for U.S. costs.

Detailed server costs are shown in figure 8.

Costs of Downtime

Costs of downtime calculations were based on the applications and availability levels shown in figure 9.

Availability percentages reflect hours of system-level outages (i.e., outages whose causes are specific to the hardware, systems software and database platforms employed) relative to annual hours of operation of companies, or business areas within companies, which are supported by applications on which calculations were based.

For each application and scenario, the frequency and duration of outages over a 365-day period was determined based on the experiences of companies that contributed data to profiles, and of other SAP user organizations. Industry- and company-specific values for the effects of supply chain disruption and other factors as appropriate were then applied to calculate costs caused by these outages.

Costs are measured in gross profit – meaning profit net of cost of goods sold (COGS), but before deduction of selling, general and administrative (SG&A) and other expenses – for three years, assuming levels of availability and financial variables remain consistent over this period.

Figure 8

Three-year Server Costs Detail

Company	Oil & Gas	Chemicals	Wholesale Distribution	High Technology	Industrial Machinery	Life Sciences
WINDOWS SERVER SCENARIOS ($000)						
Hardware	166.3	121.3	105.4	104.2	88.3	52.3
Maintenance	29.1	21.2	21.1	22.4	12.1	10.1
Systems software	139.7	138.5	98.4	80.5	42.7	30.9
Database software	213.9	164.7	150.8	110.0	82.8	45.4
Personnel	502.4	430.6	430.6	430.6	287.1	287.1
Facilities	60.3	49.5	41.4	44.0	27.5	19.2
TOTAL	**1,111.7**	**925.8**	**847.7**	**791.7**	**540.5**	**445.0**
IBM SYSTEM p5 SCENARIOS ($000)						
Hardware	93.6	84.6	80.3	83.6	51.0	39.6
Maintenance	9.1	7.3	6.6	7.8	4.5	5.4
Systems software	40.1	38.4	38.4	38.4	30.4	27.2
Oracle software	294.1	226.4	207.3	151.3	114.0	62.4
DB2 software	213.9	164.7	150.8	110.0	82.8	45.4
Personnel	315.1	315.1	315.1	315.1	157.6	236.3
Facilities	23.1	20.5	20.3	20.3	9.2	11.0
TOTAL with Oracle	**775.1**	**692.3**	**668.0**	**616.5**	**366.7**	**381.9**
TOTAL with DB2	**694.9**	**630.6**	**611.5**	**575.2**	**335.5**	**364.9**

Figure 9

Three-year Costs of Downtime Detail

Company	Oil & Gas	Chemicals	Wholesale Distribution
WINDOWS SERVER SCENARIOS			
Average system availability	99.56%	99.63%	99.82%
Three-year costs ($000)	775.6	249.9	333.7
IBM SYSTEM p5 SCENARIOS			
Average system availability	99.85%	99.88%	99.93%
Three-year costs ($000)	314.2	80.2	118.6
Company	**High Technology**	**Industrial Machinery**	**Pharmaceuticals**
WINDOWS SERVER SCENARIOS			
Average system availability	99.74%	99.86%	99.67%
Three-year costs ($000)	854.6	109.0	323.4
IBM SYSTEM p5 SCENARIOS			
Average system availability	99.92%	99.94%	99.90%
Three-year costs ($000)	246.9	44.7	101.1

SAP Software Abbreviations

Abbreviations employed in this report are shown in figure 10.

Figure 10
SAP Software Abbreviations

Applications		Applications	
BI	SAP NetWeaver Business Intelligence	PLM	Product Lifecycle Management
CFM	Corporate Finance Management	PM	Plant Maintenance
CO	Controlling	PP	Production Planning
CRM	Customer Relationship Management	PS	Project System
EP	Enterprise Portal (SAP NetWeaver Portal)	QM	Quality Management
ESS	Employee Self Service	SAM	Service & Asset Management
FI	Financial Accounting (mySAP ERP Financials)	SCM	Supply Chain Management
GTS	Global Trade Services	SD	Sales & Distribution
HR	Human Resources (mySAP ERP Human Capital Management)	SEM	Strategic Enterprise Management
MDM	Master Data Management	SRM	Supplier Relationship Management
MM	Materials Management	TR	Treasury & Cash Management
		WM	Warehouse Management
		XI	Exchange Infrastructure (SAP NetWeaver Infrastructure)

ABOUT THE INTERNATIONAL TECHNOLOGY GROUP

ITG sharpens your awareness of what's happening and your competitive edge
. . . this could affect your future growth and profit prospects

The International Technology Group (ITG), established in 1983, is an independent research and management consulting firm specializing in information technology (IT) investment strategy, cost/ benefit metrics, infrastructure studies, deployment tactics, business alignment and financial analysis.

ITG was an early innovator and pioneer in developing total cost of ownership (TCO) and return on investment (ROI) processes and methodologies. In 2004, the firm received a Decade of Education Award from the Information Technology Financial Management Association (ITFMA), the leading professional association dedicated to education and advancement of financial management practices in end-user IT organizations.

The firm has undertaken more than 100 major consulting projects, released approximately 160 management reports and white papers, and delivered nearly 1,800 briefs and presentations to individual clients, user groups, industry conferences and seminars throughout the world.

Client services are designed to provide factual data and reliable documentation to assist in the decision-making process. Information provided establishes the basis for developing tactical and strategic plans. Important developments are analyzed and practical guidance is offered on the most effective ways to respond to changes that may impact or shape complex IT deployment agendas.

A broad range of services is offered, furnishing clients with the information necessary to complement their internal capabilities and resources. Customized client programs involve various combinations of the following deliverables:

Status Reports	In-depth studies of important issues
Management Briefs	Detailed analysis of significant developments
Management Briefings	Periodic interactive meetings with management
Executive Presentations	Scheduled strategic presentations for decision-makers
Email Communications	Timely replies to informational requests
Telephone Consultation	Immediate response to informational needs

Clients include a cross section of IT end users in the private and public sectors representing multinational corporations, industrial companies, financial institutions, service organizations, educational institutions, federal and state government agencies as well as IT system suppliers, software vendors and service firms. Federal government clients have included agencies within the Department of Defense (e.g. DISA), Department of Transportation (e.g. FAA) and Department of Treasury (e.g. US Mint).

International Technology Group

ITG

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