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ALIGNING PLATFORM AND SERVICE MANAGEMENT WITH IBM SYSTEMS DIRECTOR AND TIVOLI SOLUTIONS

Infrastructure Economics

What is the business case for enterprise infrastructure management? Most organizations adopt segmented approaches. For example, investments are justified by the benefits of improved storage or network management, or more effective data center operations, or better security or business continuity arrangements. Initiatives typically focus on specific functions or platforms and tend to be incremental.

Strategies based on incremental approaches assume, however, that existing infrastructures are largely efficient. This may appear to be the case. The situation does not deteriorate seriously from year to year.

This view, however, may be based on a fundamental misperception. In many organizations, infrastructure inefficiencies have been building up for decades. Because the process has been gradual, it has often not been visible in annual planning and budgeting cycles. High levels of infrastructure spending have become regarded as “normal.”

During 2008, almost 63 percent of IT expenditure by the average Fortune 1000 corporation will be on infrastructure resources such as servers, storage, middleware, and networks. If, however, infrastructure efficiency can be materially improved, there is an opportunity for major changes in overall IT cost structures and effectiveness.

In the average Fortune 1000 corporation, an effective enterprise management strategy employing such components as IBM Systems Director 6.1 and IBM Tivoli offerings could potentially reduce infrastructure costs by around 15 percent through improved capacity utilization, reduced administrative costs, and other effects. This would represent a more than nine percent reduction in overall IT expenditure.

This report is about this opportunity. Specifically, it looks at the role that IBM Systems Director 6.1 and Tivoli offerings may play in achieving such gains. Combined, these represent a unified solution set capable of managing the full range of IBM as well as non-IBM infrastructure resources in a manner that both increases efficiency and improves the alignment of IT resources with business goals and priorities.

The Black Hole

IBM Systems Director 6.1 deals with the management of distributed servers – which means that it deals with what is, for any organization attempting to implement effective enterprise management, one of the IT universe’s largest “black holes.”

Distributed servers represent the greatest source of infrastructure inefficiency. They are also, in terms of operating status, configurations, utilization levels, energy consumption, and other variables, the most poorly tracked of infrastructure resources. Without corrective action, this situation will deteriorate further.

Organizations must deal with two trends – one long-established, and one emerging. These are:

1. ***Physical server proliferation.*** The effects of this trend have been widely documented. Among x86 server bases, capacity utilization is the lowest, and downtime the highest of any major IT resource. Overall capacity utilization is typically in the 5 percent to 25 percent range, and most industry estimates put the norm at around 15 percent.

Numbers of administrators are higher – by wide margins – than for other server platforms, or for storage systems and networks. In most organizations, use of Windows and Linux management tools is at best uneven, and inefficient manual practices are widespread. The result is a level of inefficiency that would not be tolerated in any other area of the business.

For users concerned about rising data center energy consumption, it should also be noted that x86 servers typically account for 50 to 60 percent of overall energy consumption by IT equipment.

As the energy used by data center power, cooling, and air conditioning systems is generally proportional to that of IT equipment, this means that in practice x86 servers are the largest driver of overall energy consumption by IT organizations. Even small reductions in x86 server power usage will have positive “ripple effects” across the entire data center infrastructure.

Although these effects are most visible for x86 server bases, efficiency levels and cost structures are often similar in organizations that have deployed large numbers of small UNIX servers.

2. ***Virtual server proliferation.*** Growing adoption of VMware, along with Xen and Microsoft virtualization enablers, has begun to slow growth in x86 physical server bases.

The benefits of server virtualization in enabling consolidation and improving the speed and flexibility of server provisioning became apparent at an early stage. As organizations have moved beyond pilot projects to larger-scale deployments, however, they have discovered that virtualization creates new management challenges.

One common experience in deploying VMware ESX, for example, has been that an entire new layer of software architecture is created. Organizations must deal with new structures such as VMware resource pools and clusters, as well as with physical servers and operating systems.

This more complex environment makes even basic discovery more difficult. Monitoring of virtual servers poses challenges that are significantly different to those of the physical server world. Change and configuration management tools and processes must deal with virtual images that can be easily created, altered, and moved between platforms.

Virtualized environments, moreover, create new forms of availability and security exposure. Management of shared storage resources, along with software updates, backup and recovery, and other tasks may also become more exacting.

From a server management perspective, these are unwelcome developments. Organizations must increasingly deal with mixed physical and virtual server environments. Challenges are compounded by the fact that virtual server bases are growing rapidly.

To put this in perspective, by the end of 2008, a typical U.S. Fortune 1000 corporation will have slightly more than 4,200 physical x86 servers. If current trends continue, by the end of 2013, the same organization will contain more than 6,000 physical x86 servers – growth in physical bases is expected to continue, albeit at a slower rate – and between 5,000 and 10,000 virtual x86 servers.

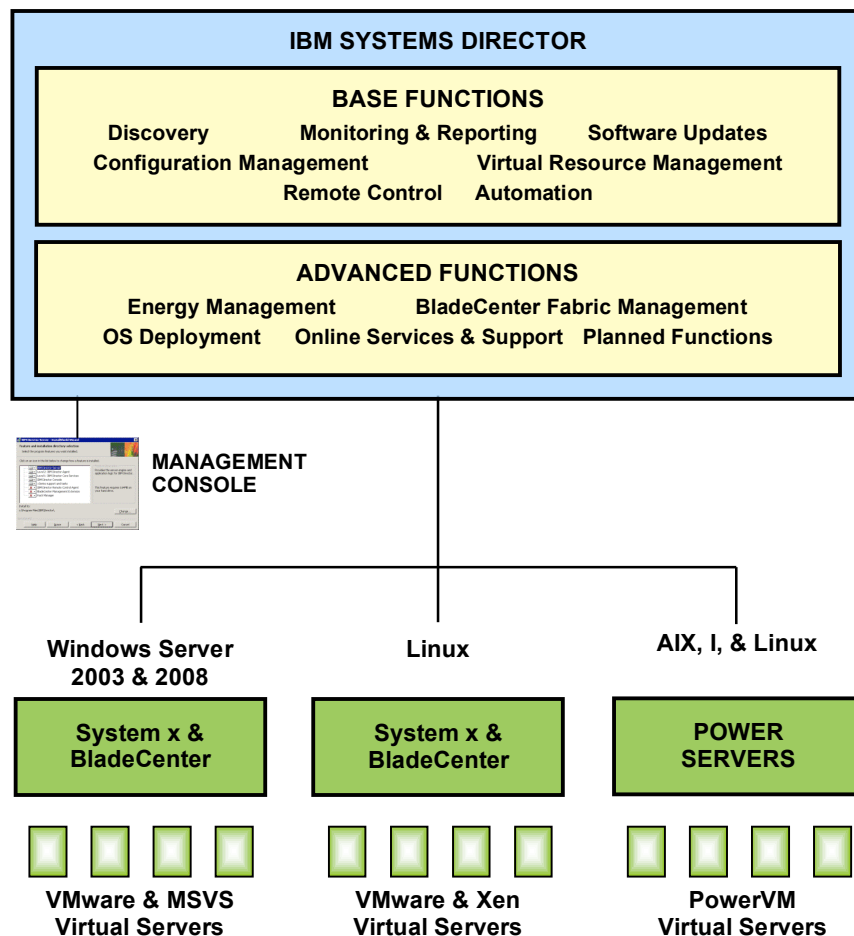
How will such environments be managed? For IBM server users, the product set built around Systems Director 6.1 offers the obvious solution.

Systems Director 6.1 provides a core set of functions, including discovery, monitoring and reporting, configuration and software update management, remote control, and automation. A compatible set of IBM offerings integrate advanced functions such as energy management, operating system deployment, management of BladeCenter fabrics, and online service and support.

These functions are supported transparently for Windows and Linux operating systems, along with VMware, Microsoft Virtual Server (MSVS), and Xen virtual resources on the principal IBM x86 physical server platforms – IBM System x and IBM BladeCenter. Support also extends to IBM AIX, IBM i, and Linux operating systems and PowerVM virtual resources on the company’s Power servers.

These capabilities enable unified management of physical and virtual resources on all platforms through a common management console and browser-based administrator interface. The resulting environment is illustrated in figure 1.

Figure 1
Systems Director 6.1 Environment



Systems Director 6.1 also allows for integration of two other sets of resources under a common management umbrella: (1) z/VM Linux guests hosted on IBM System z mainframes; and (2) distributed disk storage, including the company’s DS3000, DS4000, and DS6000 disk systems, RAID controllers, the SAN Volume Controller (SVC) virtualization solution, and IBM and third-party SAN devices.

Enterprise Integration

For more than a decade, there has been a growing recognition that all components of organizational IT environments have grown more complex and interdependent. It has become clear that full range of IT resources must be managed more effectively at the enterprise level.

Solutions designed to meet these challenges have been available for more than a decade from vendors such as BMC Software (Patrol), Computer Associates (Unicenter), Hewlett-Packard (OpenView), and IBM (Tivoli). Their implementation, however, has been an uneven process.

To some extent, this has been because enterprise management solutions are themselves often technically complex. Deployment challenges have been magnified by the diversity of applications, platforms, and technologies in enterprise IT environments, and by the rate of change in these.

A more important factor, however, has been that most IT organizations are not structured to deal with management challenges at the enterprise level. Deployments tend to focus on specific disciplines – e.g., data center operations, network management, storage management, security management, and financial management – and specific sets of IT resources.

There has been some convergence around processes that set and administer service level agreements (SLAs). Typically, however, silo-based IT structures have resulted in silo-based management systems.

There are, nevertheless, some indications that this situation is beginning to change. Three key change agents have entered the picture:

1. **Server virtualization.** In most organizations, the depth and effectiveness of management systems varies widely between platforms. Mainframe management tools and processes have typically been in place for decades, and high-end UNIX server and storage environments now generally equal these in sophistication and effectiveness.

Apart from a minority of platforms supporting business-critical systems, however, management of x86 and small UNIX server bases is a great deal less advanced. Concentration of servers in data center racks has done little to address fundamental inefficiencies.

This situation might continue indefinitely were it not for the growth of server virtualization. Rapid adoption of VMware and other tools represents a powerful change agent. Organizations are faced with the need to create management infrastructures at an early stage, before large-scale proliferation occurs.

Although VMware and others offer management tools for virtualized environments, these often lack scale and functionality, and they do not address the broader challenges of managing mixed physical and virtual resources. Reliance upon them could create “islands” of control that would make it more, rather than less difficult to integrate management systems and processes across large organization x86 server bases.

Systems Director 6.1 offers the means of putting in place an effective management infrastructure for x86 as well as other IBM servers that can handle the growth of virtualization in a non-disruptive and cost-effective manner. Potential problems can be averted at an early stage.

There is also an opportunity to break the longstanding industry impasse between enterprise and server management tools.

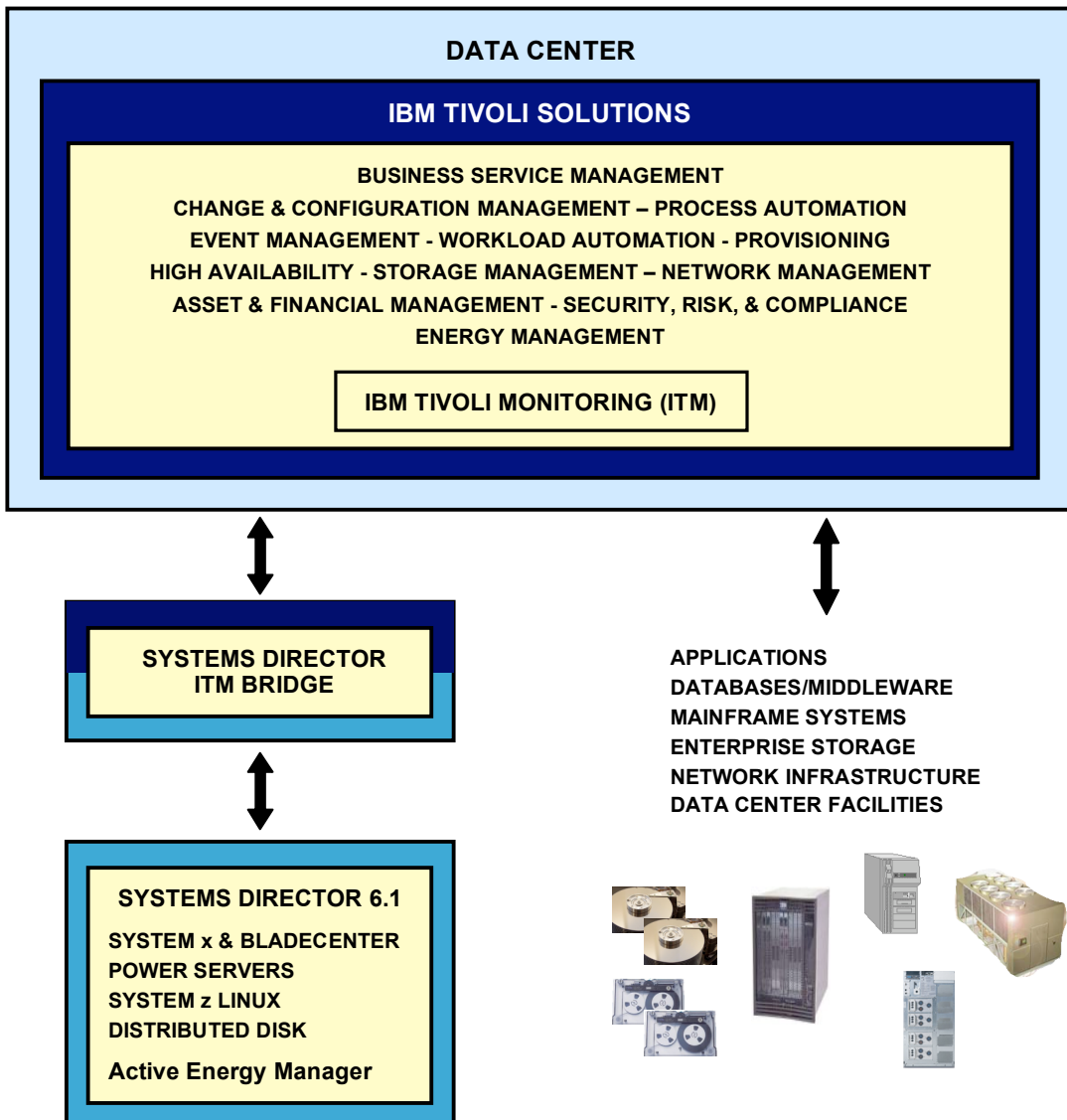
In the past, organizations have been faced with a choice of two very different sets of tools. Enterprise management suites have offered high-level functionality, but their complexity and cost has prevented widespread adoption to manage small server bases.

At the other end of the spectrum, bundled management packages, such as Dell OpenManage, Hewlett-Packard Insight Control Environment (ICE), and IBM Director, offered lower-cost but more basic options for x86 server bases. Interfaces between these and enterprise management solutions were – and, in most cases, still are – limited to simple forms of data exchange.

With Systems Director 6.1, however, IBM has begun to realize a more substantive integration of these types of solution. Systems Director 6.1 addresses the server level at comparatively low cost (basic functions are bundled free of charge with IBM servers, and advanced function modules are inexpensive), while sharing common agents and management processes with Tivoli solutions.

This approach, which is illustrated in figure 2, integrates server and enterprise management levels more effectively than any competitive solution.

Figure 2
Integration of Systems Director 6.1 and IBM Tivoli Solutions



The key link between these levels is through a bridge between Systems Director 6.1 and IBM Tivoli Monitoring (ITM) that allows the latter to collect and aggregate a broad range of server hardware metrics. These may then be integrated with operating system, middleware, application, and network metrics with other data to provide a unified view of infrastructure resources.

Monitoring, along with event management, performance and capacity management, reporting and other tasks, may then be undertaken in a coordinated manner across all resources. This yields significant efficiency improvements, and materially reduces the time and difficulty required to identify, diagnose, and resolve problems.

Data collected from Systems Director 6.1 may also be consolidated and combined with other metrics in the Tivoli Data Warehouse for analytical and planning purposes.

- 2. *Energy management.*** Data center energy consumption has engaged the attention of the highest levels of business management. Pressures to demonstrate quantifiable gains in energy conservation and environmental responsibility have reinforced economic considerations to make this an important new change agent.

Organizations cannot effectively reduce data center energy usage unless they address the single largest consumer – their small server bases. One implication is that energy conservation may play a major role in driving broader deployments of server management tools.

Energy management, to a much greater extent than for any competitor, is a central component of IBM management solutions and strategy.

At the server level, an extensive set of energy monitoring, reporting, and control functions is built into IBM Active Energy Manager, which forms an integral part of the Systems Director 6.1 environment and supports all of the company's distributed server and storage platforms.

At the enterprise level, IBM Tivoli Monitoring can be extended through ITM for Energy Management to monitor energy consumption. ITM for Energy Management, which integrates Systems Director and Active Energy Manager, allows for collection and aggregation of data from servers as well as other infrastructure resources in the same manner as for other metrics.

Monitoring, collection and analysis of data, and management of energy-related processes may thus be integrated across a wide range of IBM as well as non-IBM platforms.

- 3. *Business alignment.*** There is growing interest in the subject of IT governance. This has been reflected in growing adoption of service management frameworks such as IT Infrastructure Library (ITIL) and Control Objectives for Information and Related Technology (COBIT), as well as in broader debates as to how IT may be better aligned with business goals and strategies.

The argument that there should be closer alignment has gained increasing traction among business executives, to the extent that it may also play a major role in encouraging adoption of more aggressive cross-functional approaches to enterprise management.

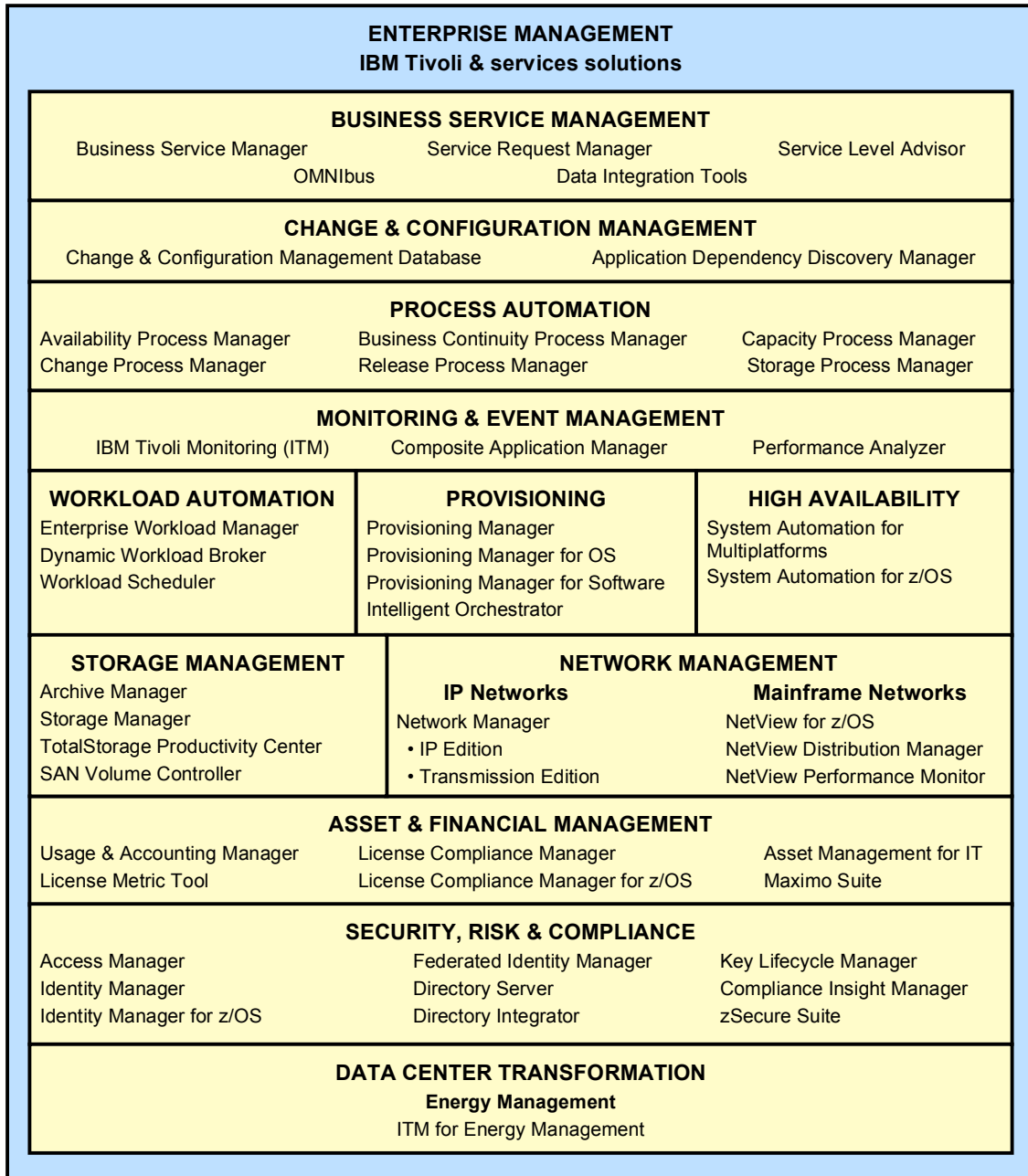
This argument is addressed in IBM Tivoli strategy. The entire portfolio of Tivoli solutions is aligned with and supports the delivery of IT service to meet business objectives.

In the IBM approach, which is illustrated in figure 3, the highest level of the Tivoli solution portfolio consists of Business Service Management applications. These deal with definition and monitoring of service level agreements as well as with broader business-driven processes of IT goal-setting, performance measurement, and service strategy development.

Figure 3 shows only the principal Tivoli offerings. Overall, IBM markets more than 450 major Tivoli-branded products that cover a wide range of applications, management functions, and platforms. The Tivoli product line is discussed in more detail in the Management Solutions section of this report.

Although a number of other vendors offer enterprise management suites, none rivals the breadth or degree of integration of the Tivoli solution portfolio. Many of the components of this portfolio are recognized industry leaders in their respective management disciplines and areas of functionality.

Figure 3
IBM Tivoli Solution Portfolio



The Tivoli portfolio includes IBM internally developed applications, as well as “best of breed” solutions obtained through more than 40 acquisitions of and investments in leading-edge specialist suppliers.

IBM is believed to have spent more than \$3 billion on Tivoli-related acquisitions, and at least the same amount for internal development and integration; i.e., the Tivoli portfolio represents an overall investment of more than \$6 billion. No other enterprise management vendor has committed resources of this magnitude to the development of its solution portfolio.

Internally developed as well as externally-sourced applications implement a common data model, and have been equipped by IBM with industry-leading automation capabilities. The company has also engineered end-to-end process structures that allow for high levels of integration across conventional management “silos.” The whole is a great deal more than the sum of the parts.

Conclusions: Saving the Lobster

There is an old saying that a lobster can be boiled without realizing it. As the temperature increases only one degree at a time, the lobster does not realize what is occurring until it is too late. Arguably, something similar has occurred in the IT world.

The growth of infrastructure inefficiency has been a gradual process. As organizations moved away from traditional centralized computing models in the 1980s and 1990s, IT infrastructures became dominated by small servers. The impact of the Internet and intranets and the growing complexity of software architectures and applications in the late 1990s and 2000s reinforced this trend.

Server consolidation initiatives and more widespread use of management tools have led to some improvements. In most organizations, however, server bases remain fragmented, and their use is characterized by levels of inefficiency that would not be tolerated in other areas of the business.

VMware and other x86 server virtualization enablers offer the potential for further consolidation, but generate new manageability and service quality challenges. If their deployment is not accompanied by the creation of effective server management infrastructures, they may both replicate and exacerbate the problems caused by physical server proliferation.

This situation, however, does not have to be addressed in a reactive manner. Growth of server virtualization, as well as pressures for improved energy management and increased business alignment, may act as catalysts for more far-reaching changes.

The next major IT breakthrough may not be another “hot” new technology or a new type of “killer” application. It may instead be the creation of infrastructure efficiency in a manner that enables a significantly larger proportion of IT resources to be channeled into investments that contribute directly and materially to the realization of business value.

What might the effects be in any organization if infrastructure expenditure could be reduced by, say, 10 percent or even 25 percent, and if these funds became available for new, high-value application deployment projects? Major gains in business agility and competitiveness might be achieved.

The tools and technologies to realize such gains are becoming available. What is needed now is the ability to recognize and act upon the opportunities they represent.

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.



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