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- ### IBM's Dynamic Infrastructure – Removing the Barriers between Business and IT
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Introduction

During the past year, "change" has emerged as a profound metaphor capturing trends in politics, the economy and other facets of daily life, including business. That change is inevitable is common wisdom. But effectively managed change is anything but common, a critical point when organizations require beneficial changes to survive and thrive. In fact, an inability or unwillingness to embrace positive change often determines and defines business failure.

This issue is particularly important in relation to companies' use of information technologies (IT). In too many cases, business technologies are organically deployed, without apparent rhyme, reason or attention to long term strategic requirements. On the upside, organizations today have access to innovative IT solutions of unprecedented power. On the downside, operating, managing and maintaining such infrastructures can become a massively complex, massively expensive undertaking.

In a sense, this model of what might be called "chaotically distributed computing" is a logical destination of the business IT revolution that began a generation ago. Despite that, it is critically important for companies to ensure that their business and technological assets are managed intelligently and effectively. Why? Because digital and physical infrastructure assets are literally colliding, with computational power inhabiting objects we would never recognize as computers. Indeed, nearly anything – any person, object, process or service can be digitally aware, enhanced and connected.

Most importantly, by harnessing the power of this increasingly digitized world, organizations can work more closely with their customers and partners, significantly improve operating efficiencies and vastly shrink decision windows to gain competitive advantage. These benefits become clear in IBM's vision of a "smarter planet" as described by company CEO Sam Palmisano where "every human being, company, organization, city, nation, natural system and man-made system is becoming instrumented, interconnected and intelligent."

The shift toward systemic global intelligence affords businesses great opportunities and equally great challenges. To succeed in an increasingly intelligent world, companies need infrastructures that provide the means to commonly aggregate, manage, secure and gain the full advantages from their IT and business assets. Working closely with its customers has allowed IBM to discern their elemental requirements, and helping them cost-effectively achieve their operational and technological goals is the point of the company's Dynamic Infrastructure initiative.

The Evolution of a "Smarter Planet"

In a November 2008 speech before the Council on Foreign Relations, Palmisano outlined the emergence of a smarter planet and the need for correspondingly dynamic business and IT infrastructures. According to Palmisano, three evolving technology and user trends serve as the basis of the smarter planet:

1. **Instrumented** – We have the ability to support, sense and measure digital interactions of every sort: Half of all sensors used in transportation, facilities and production equipment are "smart" devices that are able to collect and transmit information relevant to business operations. Estimates suggest that there will be 30 billion embedded radio frequency identification (RFID) tags by 2010.
2. **Interconnected** – People, systems, and objects can communicate and interact in entirely new ways: There were some 4 billion mobile phone subscribers globally at the end of 2008, and by 2011 a third of the world's population will be using the Internet.
3. **Intelligent** – We can respond to changes quickly, accurately, and securely and increasingly predict and prepare for future events: Estimates suggest that an astounding 15 petabytes of new data are generated globally every day, roughly 8 times the volume of information contained in all U.S. libraries.

Everything has a price, so what are the real world consequences of doing business on a smarter planet? That Information and information-generating resources are exploding to a degree which threatens the ability of organizations to keep up, let alone enjoy the full value of these developments. The seriousness of this was clear in IBM's latest (2008) CEO study, where 83% of participating executives indicated that they anticipate turbulent changes requiring bold moves in the coming months. But while this recognition seems sensible to anyone who keeps an eye on the news, the study revealed a troubling gap: Only 61% of participating executives felt their companies will be able to manage those changes effectively.

There are numerous issues underlying their concerns. Some relate to the mundane activities people and companies deal with day after day. But others represent fundamental shifts in the way people do business. At the same time insecurities are increasing, markets and opportunities are expanding across the globe. These are often supported by the emergence of increasingly powerful mobile technologies that allow business to take place, quite literally, anywhere and anytime. In addition, growing collaboration between companies and their employees, partners and customers is stretching the bounds of the traditional workplace and shrinking or flattening historic business barriers.

What sorts of new challenges are organizations facing? From a purely practical standpoint, continuing economic uncertainty means that business budgets of literally every kind are flat or contracting. As a result, "working smarter/not harder" and "doing more with less" are object survival strategies, not simplistic management bromides. Though some organizations have stabilized or bolstered revenues by extending their efforts into new markets, pursuing open exchanges with new customers and partners results in greater security and reliability requirements for digital and physical resources. Given the ever-higher service expectations of tech-savvy consumers and employees, these are critical issues to address for companies that plan to establish and maintain competitive leadership.

The growth of information, the audiences for information and the value of information define the opportunities and challenges of IBM's smarter planet vision. The question, then, is how we can best gain the full benefits of that evolving global intelligence. Traditional IT and business management solutions are simply not smart enough, secure enough or scalable enough to keep up with the demands of rapidly growing information resources and next generation operational requirements. To fully enjoy these developments, organizations must start thinking differently, and effectively develop, deploy and manage more dy-

namic infrastructure that can address today's challenges while seizing the evolving opportunities of a smarter planet.

Why Do Organizations Need Dynamic Infrastructures?

What are the qualities of a dynamic infrastructure? In essence, the concept reflects the degree to which digital information informs and enriches both business and IT processes. But commonly and fully leveraging business critical information across organizations is no easy task and will not occur as a natural matter of course. As a result, companies need dynamic infrastructures to:

- **Break down the barriers between IT and business assets** – In most companies, "smart" IT assets are typically managed and maintained separately from physical infrastructure assets such as facilities, production equipment and transportation. This can obviously result in unintended inefficiencies, such as wasting time and money on duplicated efforts, unnecessary management layers and expenses. But a profound shift is underway where computational power via smart sensors is being embedded into assets that would usually not be recognized as computers.

For example, many utility companies are replacing traditional electricity and gas meters that are read manually with smart meters that can be centrally monitored and managed in near real time. By closely monitoring, tracking and communicating with infrastructure assets, companies can improve performance and cost efficiencies, and even create or discover opportunities for new higher value services. As IT and physical infrastructure assets become ever more connected and interdependent, dynamic infrastructure solutions provide the key to effectively managing them without draining company resources.

- **Ensure cost and energy efficiencies** – The dramatic rise in energy prices during the first half of 2008 demonstrated just how delicate, unpredictable and even manic commodity prices can be, and also highlighted the economic and environmental benefits of virtualizing, consolidating and optimizing IT assets. Though energy costs have retreated, continuing economic uncertainty continues to punctuate the value of highly virtualized IT infrastructures. More importantly, though these technologies provide companies the means to literally do more with less they also enable breakthrough productivity gains and proactive energy stewardship.

We also believe that organizations which hope to maximize cost and energy reductions are best served by embracing standardization of IT assets and processes. These include common, replicable software stacks, operational policies and service management methodologies which can notably reduce operating expenses related to labor and downtime – by far and away the fastest growing pieces of most IT budgets. In addition, the improved efficiencies and economies of scale provided by standardized assets and processes can also play a significant role in hastening and enhancing the delivery of cloud-based services and solutions.

- **Achieve security, compliance and resiliency via business-driven risk management** – Embracing open, collaborative business models provides numerous potential benefits and opportunities, from developing product and service offerings to exploring new markets. But it also heightens the need to ensure the security and resiliency of critical assets. This is particularly the case for outward facing processes, such as supply chains and customer re-

lationship management (CRM), where the danger of outages or security breaches is particularly profound.

In addition, stringent compliance and regulatory oversight of unstructured data including email can create additional risk management challenges. Should a company facing litigation fail to produce subpoenaed files due to lax security processes, it runs the risk of judicial reprimand, public embarrassment and further legal exposure. By comparison, ensuring a holistic, business-driven approach to managing risk via dynamic infrastructure solutions can help companies improve business resiliency and seamlessly meet critical security and compliance goals.

- **Improve service management and service orientation** – The concept of service orientation – leveraging IT assets and business processes into integrated, interoperable services – is becoming common currency in businesses of every sort. But no single strategy fits every organization's requirements. Some are best served by traditional point-to-point interactions, such as electronic data interchanges (EDI) while others thrive with more flexible couplings of services based on underlying technologies and data assets.

While a Service Oriented Architecture (SOA) is not necessary to pursue this strategy, companies employing SOA recognize the benefits of these various methodologies. Whatever approach organizations choose, critical assets should be engaged in service delivery to ensure support for business processes and return on IT investments. To that end, dynamic infrastructures can provide the highly integrated, highly effective operational capabilities that help to gain the full value of service-oriented assets.

- **Best engage traditional and emerging IT service offerings** – Even as the barriers between businesses and their partners and customers recede, so are those between companies and service professionals. This includes traditional enterprise IT services, such as management of on-premises datacenters and infrastructure offerings hosted off-site. But we believe that emerging cloud computing technologies, which allow companies to seamlessly access and leverage computing assets when and as they are required, qualify as an ideal platform for both accessing and delivering the next generation of highly flexible, scalable and reliable business services.

That shift represents the rise of decentralized, business outcome-based solutions which blend both traditional on-site and alternative off-site IT assets. Though the location of such assets may be amorphous to end-users, managing efficiently them remains a crucial task. Fortunately, dynamic infrastructure strategies and solutions are designed to help companies easily engage and fully enjoy the benefits of cloud computing, whether resources reside within an on-site datacenter or in off-site hosted services facilities.

Why IBM's Dynamic Infrastructure?
During this time of unprecedented challenges and changes, organizations need to pursue and achieve four goals:

1. **To reduce costs and expenses amid economic uncertainty** – And do so while still supporting critical operational processes, meeting the myriad needs of customers and partners, and fully leveraging existing and emerging IT solutions

2. **To align company business and technology assets to improve service** – In order to respond quickly and effectively to market changes, and to help companies differentiate their offerings by delivering higher service levels

3. **To manage existing and emerging risks and threats** – The world can be a dangerous place, particularly as a company expands its spheres of influence – and exposure – with "smart" and mobile devices, external networks and highly collaborative business processes

4. **To achieve these goals quickly and with agility** – Now, more than ever, time is money. But most companies are racing on tracks where rewards and punishments are determined as much by agility as by speed

To those ends, we believe that IBM's Dynamic Infrastructure initiative is based on tested established proof points and delivers the business and technology goods that companies require. The power of IBM's offerings rests on a firm, multi-point foundation. First, one should consider the company's vast experience in developing and delivering such solutions. IBM has collaborated with thousands of customer organizations, helping them to achieve critical IT and business goals.

But the value of these relationships does not simply flow one way. The lessons the company learned in these engagements inspired many of the best practices and innovations underlying IBM's Dynamic Infrastructure, including its flexible, powerful cloud computing offerings. In essence, businesses are not simply the recipients of these solutions – their experiences literally helped to shape and bring IBM's Dynamic Infrastructure into being.

In addition, IBM's clear technology leadership sets the Dynamic Infrastructure table. The company's product portfolio contains the industry's broadest and deepest range of IT solutions, guaranteeing that customers will not be squeezed into the "one size fits all" solutions favored by some other vendors. Along with its own server, storage and middleware/software offerings, IBM also closely collaborates with thousands of technology and business partners, helping to ensure that customers' needs, whatever they may be, are fulfilled.

While the company is able to leverage huge advantages from its research and development efforts, it is also an established leader in open standards efforts of every kind. By pursuing this path, IBM has helped customers and partners reap the substantial benefits of standardized computing and avoid the difficult, expensive pitfalls of being locked into proprietary systems and solutions.

Ever-expanding IT interdependencies help support the benefits of the smarter planet but they are also driving increasing complexity, making it difficult for companies to fully manage and maintain their own infrastructures. Along with impressive business computing products and tools, IBM's Global Business Services and Technology Services groups can develop and deploy end-to-end solutions that dynamically meet customers' critical, discreet operational requirements.

Finally, IBM's Dynamic Infrastructure initiative comes, in part, from the company's own successful transformation into a globally-integrated enterprise. These efforts include pursuing a datacenter consolidation strategy leveraging all of its platforms, which is expected to use 80% less energy and 85% less floor space while doubling compute capacity by 2010. The company is also effectively leveraging cloud computing for real time integration of infor-

mation and business services, and to support the efforts of 3,000+ researchers. These increased efficiencies have provided profound savings for IBM, delivering a cumulative benefit yield of $4.1 billion over the past five years.

Final Thoughts

That change is inevitable is common wisdom, but effectively managed change is anything but common. Despite that, it remains critical for companies to ensure that business and technological assets are managed intelligently and effectively, a point clear in IBM's vision for a smarter planet. To succeed, companies need dynamic infrastructures that provide the means to commonly manage increasingly instrumented, intelligent and interconnected technology and business assets.

IBM's Dynamic Infrastructure strategy provides organizations the tools they need meet a wide range of existing and emerging operational challenges. In addition, it is designed to help companies quickly and agilely reach critical goals, including reducing costs, improving services, and effectively managing risk. IBM's thousands of customer engagements resulted in proof points and best practices that helped to shape and inform the Dynamic Infrastructure initiative.

In addition, IBM's technology leadership sets the table for fulfilling the vision of a dynamic infrastructure. The company's dedication to open standards and the industry's broadest, deepest portfolio of hardware, software and services make IBM an ideal source for flexible, enhanced end-to-end solutions ranging from traditional datacenters to next generation cloud computing environments. Overall, we believe that organizations contemplating or planning improvements to their IT and business infrastructures would be well-advised to consider IBM's Dynamic Infrastructure offerings.

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