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**Operating Environment essentials
for an on demand breakthrough.**



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Introduction

Finally, the siege may be over. After two long years of substantial declines in the capital markets and recession in the general economy, indicators are improving. While sentiment is mixed on how strong the recovery might be, the pundits are forecasting increased IT spending.

According to *BusinessWeek online*, "Economy.com in West Chester, Pennsylvania forecasts a 16% increase in IT equipment and software spending, to \$532 billion next year. If that materializes, 2004 would top the previous peak in 2000, when Corporate America spent \$468 billion on tech gear and services. By contrast, a Morgan Stanley survey of 225 chief information officers (CIOs) from among the nation's top 1,000 companies projects a more subdued 5% hike in corporate IT budgets for 2004, vs. what's expected to be a slight uptick in 2003 over 2002's decline."¹

Whether 2004 IT spending exceeds that of 2000 or just continues to steadily increase over 2002, the upturn is refreshing for anyone in a technology-related position. But the news actually gets better. During late 2003, IBM completed a study with chief executive officers (CEOs) from around the world. What they told us is very interesting:

- *Growth is back on the CEO agenda.*
 - *Eight in ten view growth as a key focus area.*
- *Clients are concerned that their companies are not agile enough.*
 - *Eight in ten rate "rapid response" as a high or very high priority.*
- *Clients view product and service innovation as a top priority.*
 - *Nearly two-thirds view product/service improvement as one of the greatest opportunities for revenue growth.*
- *Clients seek company-wide transformation with a short time horizon.*
 - *More than nine in ten believe they need to achieve their transformation goals in less than five years; nearly half think they need to do so in less than two years.*



Growth, rapid response, product and service innovation, transformation initiatives—those are priorities that excite technologists. But even as the business world's focus slowly returns to growth, IBM's research around the globe shows that companies are opting for a highly pragmatic approach to all their investments. There is an acute awareness of the need to deliver tangible progress and quantifiable results. Healthy skepticism. Will initiatives that attack new markets or change key processes or implement new technologies really work? Will they make a measurable difference? With the limited number of resources available and the plethora of possible projects—why this one? Why now?

Providing the information technology environment necessary to support the emerging focus on the priorities noted above will be challenging in today's highly pragmatic and results-oriented environment. And that, in a nutshell, is the focus of this paper.

A little over a year ago, IBM described the era we're entering as "the on demand world." We said that the companies best equipped to compete in that world are on demand businesses—that is, enterprises "whose business processes—integrated end-to-end across the company and with key partners, suppliers and customers—can respond with flexibility and speed to any customer demand, market opportunity or external threat."



Throughout 2003, as industry analysts and competitors began to describe these same marketplace phenomena using slightly different words, IBM was already hard at work. Side by side with industry-leading clients, we helped them navigate the issues related to winning customer loyalty in times of ever-rising expectations. Increasing organizational flexibility in the face of volatile demand shifts. Streamlining and integrating processes and increasing employee productivity by getting more out of their existing investments in information technology.

Much of our work was focused on defining and then delivering the infrastructure an organization needs to support its on demand initiatives. We call such an infrastructure an on demand Operating Environment. This paper provides an in-depth look at what we've learned about shaping an on demand Operating Environment, answering three primary questions: How can I enable business flexibility in my infrastructure? How do I simplify the way to manage that infrastructure? And how can I get started through incremental projects that take advantage of my existing IT assets?

This paper has six major sections. The first section discusses what's fundamentally different about the on demand era we've just entered—and what IBM has learned about creating an on demand business. The second section describes how the underlying technology infrastructure is tightly woven with new business model designs. The third section discusses entry points for on demand—specifically, how you can get started and find incremental projects to meet your priorities and resources. The fourth section describes the characteristics of this technology infrastructure in terms of the capabilities of an on demand Operating Environment. The fifth section discusses what makes this possible—a service-oriented architecture and the impact this architecture has on software development. Finally, section six answers the question, “how can I get started today?”

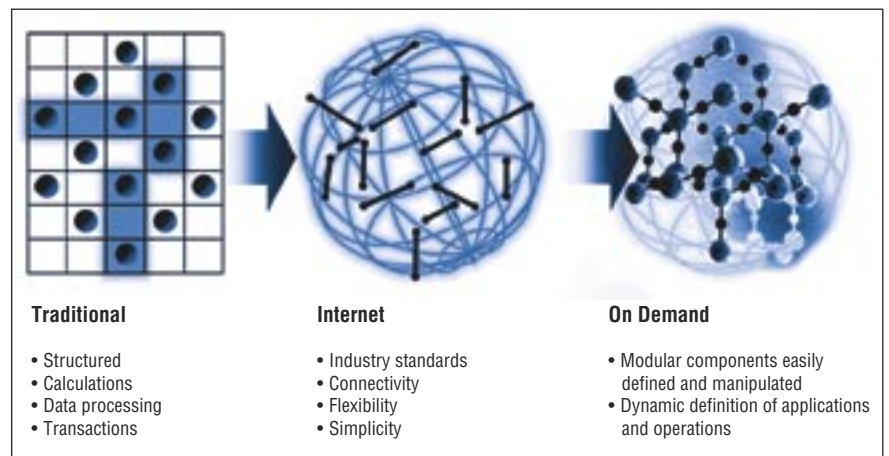


Getting to on demand

On demand is not about technology for the sake of technology—it’s about enabling new ways of doing business. It’s about helping an organization reach new levels of innovation while continuing to deliver the improvements in productivity necessary to improve the bottom line. Yet the underlying technology makes an on demand business fundamentally different.

When you have business processes that have been integrated end-to-end—across your company and with key partners, suppliers and customers—you have the ability to respond to any customer demand, market opportunity or external threat. Yet, there’s a lot of work to be done. Today’s infrastructure is complex. It’s rigid. And because much of it was based on proprietary hardware and software—delivered well before industry standards were established—it’s difficult to make all the pieces work together. And it’s even more challenging to make them deliver the flexibility necessary to support today’s dynamic business environment.

Emerging On Demand Computing Model





That has to change. And that need for change is forcing the emergence of a new computing model. This new, on demand model blends the robust nature of the traditional IT computing model with the industry-standards-based computing model that enabled the Internet and the Web. And yet it transcends both models, in a number of ways.

The traditional IT model has focused on calculations, data processing, transactions and other highly structured tasks. It served us well for those rigid applications and will continue to do so over time. But it breaks down when you try to extend it into applications or processes that aren't so highly structured, such as long-term enterprise resource planning projects.

The Internet computing model had a different design point. It gave us simple mechanisms, based on industry standards, to link together many components, which you can use to perform relatively simple functions like browsing and searching for information and sending and reading e-mail. The Internet computing model enabled a handful of new business models. But more important, it revolutionized the way that existing things were done—communications between companies, marketing, sales and customer support. And with that revolution came the recognition that computing technology is exponentially more powerful when it's based on industry standards. That meant the industry would need additional standards and mechanisms to handle more sophisticated applications.

The on demand Operating Environment, as a computing model, builds on both models, leveraging industry standards to redefine how existing systems and technologies interact. This enables the creation of a highly modular environment, where application and infrastructure components can be more easily defined and managed. All enabling a more flexible and real-time implementation of business policies than was possible with more structured computing models.



On demand insights

As we've worked with companies around the world, we've gathered three key insights that are helping us and our customers move from the theory of becoming an on demand business to the reality of actually operating as an on demand business. From the what and why to the *how* of on demand.

The first major insight? The need for flexibility and innovation is forcing organizations to become more componentized—that is, to break down the overall business into the pieces (or components) that make it up. This allows you to stop looking at your business through lenses like organization, geography and product or customer segment, and to begin to look at it through the lens of discrete functions and processes (i.e., what is actually being done) instead.

Second, applications are evolving on a similar path, becoming increasingly modular. So instead of focusing on big monolithic applications made up of millions of lines of code, organizations are beginning to think about discrete modular elements of application functionality that can more easily be modified as the needs of the business change.

And our third insight has to do with the infrastructure that's required. In the on demand world, the need to support componentized business models and modular applications requires an operating environment that can speed the integration process and simplify the overall complexity and reduce the unnecessary consumption of resources.



Tightening the linkage between technology and the business

While technology has always played an important role in enabling a business to deliver its products and services, in the on demand world, the dynamics of the relationship will change. The linkage will get tighter. It will be harder to distinguish between the business and the technology that enables it. However, the most significant change we see is this—business and technology evolving in lockstep. Business designs will change incrementally and rapidly—and the infrastructure must be designed and deployed to do the same.

Component-based business models

Ever since we started talking about the on demand era, many have struggled to describe what's really different between it and the eras that preceded it: Six Sigma Quality, Zero Defects and Business-Process Reengineering—eras in which technology was applied to improve an existing business model. We believe that the major difference is that in the on demand era, an organization has the ability to take an existing process and make it better; it also has an opportunity to create a major step-function improvement—to breakthrough. Getting better is about applying technology to do what you've historically done more efficiently. Breakthrough comes when new business designs are coupled with the technology that makes them happen.

During 2003, IBM invested a tremendous amount in developing a methodology to speed the creation of these new business designs. We started with a concept that's been around the technology world for a long time: components. In this case, component-based business models. While the concept has been around for a long time, we focused on taking the component notion from generic to industry-specific and from conceptual to highly practical and operational. This effort included creating methodology around linking a business component (and all of its parts—including people, strategy and operations) through to the technology (applications and infrastructure) that will enable it.



We started by creating component business models for six industries (six more will be completed in 1Q04, and the remaining six will be done in early 2Q04). These models are designed to simplify the way a business looks at itself by identifying the unique and standalone set of business building blocks (components) it's made up of, enabling a more effective coupling between changes in business operations and the underlying technology infrastructure. This strengthens your ability to connect change and investments with the business outcomes and the returns you anticipate.

But in the process of creating this component-based approach to fusing business transformation to infrastructure optimization, we were reminded that there's a big gap between understanding what needs to be done and actually getting it done. A part of that gap has to do with business processes and creating horizontally integrated processes that are built not just to withstand change but to actually enable and support it.

Enabling horizontal business process organization

Virtually everyone we talk to is interested in finding innovative ways to differentiate their businesses while continuing their focus on increasing productivity. Yet, we believe that most organizations are going to need to take a different approach than they have in the past. Historically, organizations have focused on the automation and optimization of single, standalone process. Think for a minute about the functional automation that's gone on around your sales organization. If you're like many companies, you've spent a lot of money on sales force automation and customer relationship management software—and that's true whether you built your own or chose packaged software from one of the industry leaders.



But the automation process didn't stop there. You've enabled your sales force to work around the clock—to access their applications any time, from anywhere—from a growing number of devices. And the infrastructure that was necessary is astounding. Servers, storage, communications infrastructure, security—and once you had it for your direct sales channel, you had to replicate most of it for your partners.

As we all know, the sales organization doesn't operate in a vacuum. It's part of an ecosystem that includes marketing—and a whole array of Web-based marketing and sales initiatives. No doubt the individual disciplines within the ecosystem have undergone similar optimization and automation initiatives.

Marketing has invested in Web-based programs to help generate leads, enable customers to access information and educate themselves. And most companies didn't stop there; they invested in loyalty programs designed to simplify transacting business with key customers. There's a whole burgeoning set of applications and corresponding infrastructure to support commerce, lead tracking, digital asset management and personalization. And many benefits have been achieved.

For organizations that have invested enormous energy and resources to optimize the discrete functions of sales and marketing, there's probably little to be gained from focusing on either process discretely. The real gains to be made are in the gaps between the disciplines—that is, in the interactions between organizations. Integrated processes, backed by information-rich records about every prospect and customer that are used by both marketing and sales can make the joint discipline far better. The opportunity for breakthrough will come when it's possible for customers to identify themselves—to tell you what they need and how soon they need it. It comes when your marketing infrastructure can support processes that proactively nurture each customer and that provide him or her with the right information at the right time—all while recording every tactic for future analysis and optimization.



To create that kind of integrated horizontal process, you're going to need discrete bits of process and application functionality that exist within the confines of marketing, sales and the Web. And the desire to achieve breakthrough in your marketing and sales processes (or any other horizontal process, for that matter) is going to force you to think about your IT agenda in new ways. And rethink the way you've historically approached your infrastructure.

The infrastructure required to support an on demand business

To support horizontal processes, you have to increase your focus on overall flexibility. If there was ever an argument for using industry standards, that's it. Being able to quickly and seamlessly integrate processes that weren't built to work together from a variety of vendors. With industry standards, you don't have to re-create applications every time some piece of hardware or software changes or rewrite the application to support changes in the dependent processes.

But you'll need more than flexibility; you'll also need a simpler, more manageable IT environment. A year ago, we said that IT systems need to be more self-managing and take advantage of the capacity that's out there. Since then, we've launched a symphony of solutions that allow businesses to orchestrate and provision internal capacity in a heterogeneous environment to do exactly this. And that's just the start.



Operating Environment: the gateway to on demand

We recognize that this isn't a one-size-fits-all solution or methodology. Organizations have different priorities, different personalities. An on demand approach reflects that. With many different entry points, where you start depends on your organization's priorities and your resources. Business design projects. Technology projects. Projects that leverage flexible financing and delivery options.

In today's pragmatic environment, there are only a handful of organizations prepared to tackle all of the facets of creating an on demand business. Most companies opt to start more slowly. They focus on one key process and transform it. Or they start by taking steps to simplify their operating environments—increasing overall flexibility and resilience, while reducing the resources that their current approach requires. Experience has shown that regardless of where you start, it's actually possible to reduce the costs associated with the way you're approaching things today—so you can free your resources to help you continue to fund your on demand journey.



On demand Operating Environment entry points

For more than a year now, we've been working with customers of all sizes, in all industries, to help them begin the transformation of their operating environments. Let's take a closer look at how some of those companies are getting started—with specific projects that act as entry points to establishing on demand Operating Environments:

- **Schneider Logistics** is a well-known trucking firm and a major carrier for Wal-Mart and General Motors. The company had to comply with new regulatory requirements that permitted a maximum of eight hours on-road time per day, per driver. Schneider now needs to track and bill for the amount of time needed to unload a vehicle at its delivery destination, as soon as the charges are accrued. An entire fleet of trucks must be monitored in real time to properly bill customers in a timely manner.
- **Whirlpool** is a global consumer appliance white goods manufacturer. The company sought to integrate a variety of messaging formats, including instant messaging, voicemail and e-mail, into a unified message center so that formats could be converted as recipient needs dictated. The objective? To incorporate the new messaging center into an employee personal-knowledge portal.
- **Honda Motors of Alabama** is the newest U.S. plant in the Honda production system. Having invested in production planning and reporting systems managed by the IT staff, Honda partnered with the IBM jStart team to Web-enable employee access to this system. Access by a variety of work groups and departments allows content to be configured in a self-service, on demand manner—and removes it as a gating step in the process.



Creating an on demand Operating Environment

An on demand Operating Environment is not a single product. Not a brand. Not a platform, or even an architecture. An on demand Operating Environment is an approach designed to enable the business flexibility and IT simplification that your organization needs to become an on demand business.

Working side by side with leading customers, we've learned a lot about what it takes to create the kind of infrastructure that truly enables—rather than inhibits—an on demand business. We know an on demand Operating Environment must leverage existing assets. No one is interested in starting from scratch. Instead, you need a disciplined approach to evolving what you have into what you need.

The design of an on demand Operating Environment must also match the design of the business itself. For increasing flexibility and componentization to be achieved in your business design, the infrastructure must evolve from silos of complex, over-provisioned, proprietary hardware and software to a standards-based infrastructure in which capacity can be optimized across your entire organization.

The characteristics

What are the characteristics of an on demand Operating Environment that gives companies, large and small, across a variety of industries, the opportunity to become an on demand business? Simply put, they are the capabilities that enable business flexibility and simplification of the underlying technology infrastructure. Let's explore this further.

The first focus is to increase business flexibility through capabilities designed to speed integration initiatives. The ability to connect people, processes and information in a way that allows your organization to become more flexible and responsive to the dynamics of your markets, customers and competitors is critical. And it becomes increasingly so as you extend your value net to more tightly integrate partners, suppliers and customers into your processes.



Take **Acuity Insurance**, a small insurance company. The company foresaw an opportunity to increase revenue and agent productivity by making it faster and easier for its agents to access information. By responding to agents with real-time business processes, Acuity could help agents gain efficiencies and productivity, while increasing its own market leadership and company marketshare. Acuity created direct company-to-company communication processes—connecting agents' own management systems to its core insurance transactions by developing an adaptable, open infrastructure using industry standards. This resulted in US\$200 million increase in premium revenue over a two-year period; 15 percent higher profitability than the national average for property-casualty insurance companies; and a 40 percent increase in average premium revenue per agency in the most recent fiscal year.

The second focus is IT simplification, the creation of an infrastructure that's easier to provision, deploy and manage. How? Through the creation of a single, consolidated, logical view of and access to all the available resources in a network. Many organizations have become comfortable with the practice of over-provisioning, buying excess capacity so they can handle the occasional spikes that almost every system experiences. Interviews and surveys with more than 20,000 clients tell us that simply eliminating the practice of over-provisioning by moving to an infrastructure that accommodates dynamic resource provisioning can reduce an organization's capital investments by anywhere from 15 to 35 percent.

Take the **U.S. Tennis Association (USTA)**, the non-profit governing body for tennis in the United States, which relies on the US Open tournament to generate significant revenue. The organization wanted to both protect and monetize its intellectual property—such as scores and images—which decline in value if not used in real time. The USTA needed to serve and satisfy its key constituencies, including the players, umpires and the media, with timely information. Yet, with only two weeks per year to generate the bulk of its annual revenue, the USTA needed to provide a truly differentiated experience to online fans and to effectively communicate match-related information to a global audience—quickly and accurately.



IBM was able to orchestrate the operation of the US Open IT infrastructure to help fans get a courtside seat through the Internet. IBM orchestration solutions helped prioritize which IT resources should be doing what, based on predefined business rules—leveraging existing resources—with the ability to bring new resources online almost as fast as an overhand serve.

The result for the USTA? IBM implemented a Web infrastructure to support the needs of the USTA—scalable to 50 times greater during the US Open than during the rest of the year. On demand access to server resources when they're most needed—during the US Open event—with the flexibility to pay for only what the USTA uses. And an orchestration solution that helps the USTA take advantage of business opportunities and increase revenue—giving it competitive advantage. All this, and Web traffic on usopen.org increased 18 percent.

The ultimate insight is this: In order for more flexibility and componentization to be achieved in your business design, your infrastructure must evolve from silos of complex, over-provisioned, proprietary hardware and software to an industry-standards-based infrastructure, where capacity can be optimized across your entire organization.

The capabilities

On demand Operating Environment capabilities enable business flexibility and IIT simplification. There are two entry points: integration and infrastructure management. The objective? To evolve to an industry-standards-based, integrated, automated and virtualized IT environment.

But what exactly is a capability? Merriam-Webster defines it as “the facility or potential for an indicated use or deployment.” Each of the capabilities for an on demand Operating Environment, therefore, acts as a facilitating element to enable the deployment of an underlying infrastructure. An infrastructure that drives business flexibility and IT simplification. At IBM, these capabilities are delivered by middleware, hardware and services, integrated seamlessly for this purpose. Next, let's explore the necessary capabilities that enable an on demand Operating Environment.



Integration capabilities let you connect people, processes and information in a way that allows you to become more flexible to the dynamics of the markets, customer and competitors around them. To maximize your ability to integrate within and beyond your enterprise, there are six key capabilities you'll want to add over time:

- **Business modeling** enables the graphical depiction and simulation of a business process, including task descriptions, resources required and decision points.
- **Process transformation** enables existing applications and information to be reused in new ways.
- **Application and information integration** enable multiple information sources and business applications to be combined.
- **Access** extends data and information to new classes of devices and methods of interaction regardless of connection type.
- **Collaboration** allows users to interact in a personalized way with dynamic information, applications, processes and people.
- **Business process management** allows you to model, deploy and analyze processes with the goal of managing the end-to-end business process.

Infrastructure management capabilities extend access to and create a consolidated, logical view of resources across a network. This dramatically simplifies the operating environment, increasing flexibility and delivering broad-based cost savings. Fundamental to this simplification are the concepts of automation and virtualization.

Virtualization is the ability to separate the direct dependency of an application to a physical resource. Through virtualization, you'll get a single, consolidated view of—and easy access to—all available network resources in your network, regardless of location. So you can efficiently access and manage those resources to reduce operations and systems management costs while maintaining needed capacity. Respond dynamically to the application needs of your users. And gather information across your organization quickly to gain competitive advantage.



Automation enables your IT infrastructure to manage many day-to-day tasks itself. With a self-managing infrastructure, you can increase efficiencies and simplify resource allocation. A fully automated IT infrastructure can sense changing conditions—like surges in demand or isolated application errors—and can spot trends that could lead to costly system downtime. The infrastructure then automatically responds by taking corrective actions that ensure your IT resources remain aligned with your business goals.

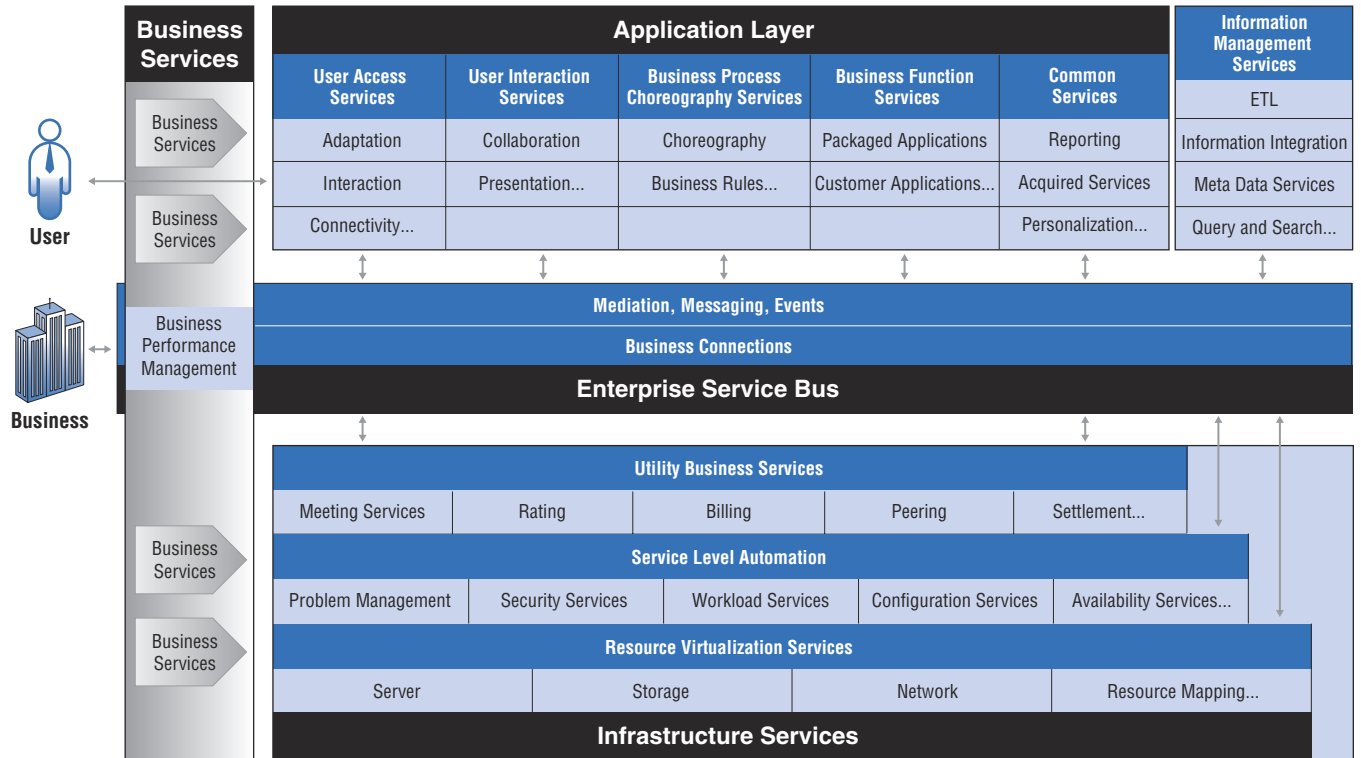
To achieve this simplified and optimized management of your infrastructure, you'll need to implement seven unique capabilities over time:

- **Availability** helps ensure the health and appropriate functioning of IT environments.
- **Security** helps ensure that information assets, confidentiality and data integrity are protected.
- **Optimization** helps make the most productive utilization of your IT infrastructure.
- **Provisioning** makes the right resources available to the right processes and people at the right time.
- **Policy-based orchestration** senses, triggers and responds according to business goals.
- **Business service management** helps you visualize your IT environment in business terms and manage service levels to business objectives.
- **Resource virtualization** provides a single, consolidated, logical view of and easy access to all available resources in a network (including servers, storage and distributed systems, etc.).

Although we discuss the capabilities through the two entry points of integration and infrastructure management, in reality, each are tightly linked. Security, for example, permeates IBM solutions, providing a critical, pervasive functionality across the on demand Operating Environment.



The On Demand Operating Environment Architecture



The on demand computing model applies at various levels in the IT stack. At the system level, the components are system objects (e.g., computing capacity, storage, files). At the application level, components are dynamically integrated application modules that constitute sophisticated, yet much more flexible applications. At the business level, the components are business objects, defined for particular vertical industries or more generally, as they apply horizontally across industries. And because the on demand computing model is based on industry standards, it can be used to define the business, applications and systems at various levels: within a department, across an entire enterprise or throughout an industry ecosystem. It enables true end-to-end business process integration.



In a successful SOA environment:

- *Business rationale—not technical features—is the key factor in determining IT investments. Every technology choice is backed by a business objective.*
- *IT decision makers find a pragmatic balance between technical rigor and time-to-market.*
- *Ongoing flexibility and agility are valued more highly than one-time efficiency gains.*
- *Investments made in a diversified portfolio of applications—not a single packaged application or a technology platform—reduce risk.*
- *Business processes federated across business units, trusted partners and valued customers reduce costs and increase visibility into performance—while creating new, and perhaps unexpected, opportunities to capture value.*

But is it real?

Over the years, there's been much discussion about taking a more componentized approach to software and infrastructure development. While most organizations have made progress, it hasn't come without challenges. What's changed to make a componentized infrastructure viable today? First, industry standards with which to create services and have them communicate have evolved and been agreed on by major vendors. In conjunction with broad industry support, we're now tackling business-level interoperability, as opposed to simple connectivity. Second, the infrastructure to support self-defined, loosely coupled services has emerged. And finally, tools to incorporate existing assets are now available.

Service-oriented architecture

As a result of the maturation of these standards, the on demand computing model can enable a modular approach to infrastructure, including software design, development and execution. The industry term for this approach is service-oriented architecture (SOA). In an SOA environment, every application and resource is treated as a service. These services have interfaces that are defined according to industry standards, enabling them to exchange structured information and providing the flexibility to treat applications and their underlying infrastructure—as well as business processes—as components that can be mixed and matched at will.



The Guardian Life Insurance Company of America

In a fiercely competitive industry and in the midst of an economic downturn, The Guardian Life Insurance Company of America (Guardian), the fourth-largest mutual insurance company in the United States, wins business by making it easy for its business partners—independent agencies and agents—to sell its insurance policies and financial services to individuals and customers. Although annual revenues grew in 2002 by 3.5 percent, the growth was not enough to offset costs and the company posted a US\$283 million loss.

Guardian realized that it had many silos of information managed by different business units, and this was undermining its ability to run its business profitably. Choosing to focus first on its sales channels because its agents represent a primary source of revenue, the company found that its business processes and systems were actually hindering its business partners. Agents simply did not have the time or resources to search multiple databases for cross-sell and up-sell information, successful sales strategies and customer information records. And independent agencies could not easily access comprehensive sales compensation program information to help with recruiting and retaining key sales staff. To drive more revenue more efficiently, Guardian needed to integrate its business processes and the information infrastructure that supported them.

A cornerstone of the company's solution was a redesign of its underlying enterprise technology infrastructure. Guardian developed a service-oriented architecture that integrates with legacy systems and uses industry standards to ensure flexibility for future development. Using this service-oriented architecture, Guardian also created two critical applications to help its agents: a Web-based unified client view tool that shows agents all the products that individual customers have purchased from the company; and a Web-based tool that shows agents what the future value of the business they are doing with Guardian will be—a very effective tool in retaining a good sales force.

Now, many of Guardian's agents do business with the company because of its agent-oriented technology, rather than in spite of it, as was common in the past. And while becoming more responsive to its business partners, the new architecture has allowed Guardian to drive down costs: IT expenses alone have dropped 30 percent over the last two and a half years. In the future, Guardian will continue to use this industry-standards-based architecture to develop new applications and services that cut across its information silos, making it possible for its partners and employees to work more efficiently and effectively.



Impact on software development

We've established the requirements of an on demand Operating Environment and have discussed the need for—and benefit of—integrating and automating horizontal business processes. As you think about this, remember that these horizontal business processes are unique to each business. Integrating and automating these processes can't be done by purchasing packaged applications—it's a custom effort for each company. Because this is unique, it's a key to achieving strategic, competitive advantage. And organizations that can achieve this horizontal integration distinguish themselves from companies locked into vertical, siloed business processes.

Software development plays a critical role in bringing this to fruition by leveraging all forms of applications. That includes leveraging the value of your existing legacy systems; customizing and deploying commercially available packaged applications; and building new, custom software and applications. Only by harnessing all available software assets can you integrate and automate your business processes.

To accomplish this, you must be prepared to build new applications, modernize existing applications, extend packaged and existing applications, integrate new, existing and packaged applications and finally, deploy new, existing and packaged applications.

This requires software development teams to embrace three software development imperatives:

- *Develop iteratively by adopting a proven, results-oriented process that delivers increasingly improved software system iterations.*
- *Focus on architecture by basing software design on reusable components and service-oriented models.*
- *Manage change and assets by protecting and tracking changes to all assets involved in the software development lifecycle.*



How to get started with on demand today

Getting to on demand is an evolutionary initiative that occurs over time. Start where your business needs demand. And where immediate ROI can be seen. Align IT with business objectives and know that, over time, the investments made in an industry-standards-based IT infrastructure will support your evolution at the pace your business requirements demand.

While some of the capabilities that will ultimately be delivered are still in development, Schneider Logistics, Whirlpool and Honda, among others, provide proof that there's plenty of opportunity to get started today. The products are real. The expertise is available. And if your company is like most, there's plenty of opportunity.

We've included a table with very specific how-to, building-block steps in the Appendix (see page 26) that highlight where you can immediately extract value and benefit as you move forward toward implementation of an on demand Operating Environment. These steps are categorized into two areas: creating business flexibility through integration, and IT simplification through infrastructure management. As you can see from the list below, we're focused on helping you address the very concrete problems our customers tell us they're facing today:

Creating business flexibility through integration

- *Simplify building, developing and deploying on demand business applications*
- *Improve communication and collaboration within your business and beyond*
- *React quickly to changes in the marketplace by rapidly modifying business processes*
- *Instrument applications and analyze the events they generate to understand business process impacts*
- *Create links between new and existing applications*
- *React in real time to the most relevant information by ensuring a seamless flow of information*



Simplifying IT through infrastructure management

- *Secure access to and control of information, resources and applications*
- *Ensure scalable and consistent management and control of operations to support end-to-end business systems*
- *Avoid system failures and take automated action to resolve problems*
- *Protect systems from intrusions and threats by using monitor and alert systems that allow automated self-protection of your IT environment*
- *Provide monitor and alert systems to allow the establishment of business service level agreements (SLAs) and the automated detection and remediation of violations*
- *Reduce the time/cost to repurpose IT resources to meet business requirements and service levels by evolving to the dynamic assignment of resources to needs*
- *Provide the ability to map the IT resources used by various business processes and to monitor and control all tiers of an end-to-end solution*

Our goal is to provide you with an evolutionary path toward shaping your on demand Operating Environment. Providing services and products that can help you deliver business value today—while we continue to evolve and strengthen the capabilities for the longer term.

Are you ready?

Conversations about new business designs, component-based business modeling and horizontal business processes are beginning to take place now. And there will be a lot more of them over the next year. Why? We believe that new, more flexible business designs, backed by horizontal business processes, are the key to being competitive in the on demand world. But there's another thing driving these conversations—and that's the recognition that these changes can be made incrementally.

In today's pragmatic environment, few organizations are prepared to make a wholesale move to operating as an on demand business. Most companies opt to take a more incremental approach, choosing from multiple possible entry points. A company may choose to focus on one key process and transform it. Another company may decide to simplify its operating environment—increasing



overall flexibility and resilience while reducing the resources its current approach requires. Regardless of where you start, it's critical that you help your organization recognize that the transformation won't take place overnight. The value will be achieved incrementally.

As your organization makes the journey, technology will be driven deeper and deeper into the core of the business. The infrastructure, applications and business will share a common design point: componentization. Adoption of the on demand computing model will enable use of rich modular components, easily defined and deployed to enable dynamic definition of applications. And modularity—leading to flexibility and simplification—drives breakthroughs.

Integration and infrastructure management are the on demand Operating Environment capabilities that deliver business flexibility and IT simplification. These capabilities manifest themselves in real products and technologies today. All to enable you to get started on the journey toward on demand through incremental steps.

The potential benefits of the on demand model are astounding. But the path to get you there doesn't need to be overwhelming or risky. It's a matter of starting and continuing with incremental projects based on the needs of your business. Reinvesting cost savings from increased business and IT efficiencies. Leveraging existing assets and investments.

Given the volatile economic climate, the eventual recovery of the IT market will inevitably require a focus on investments proven to save or make money in the short term. But equally important will be investments that maximize flexibility. And that's the advantage of the on demand model. It makes technology an enabler of innovation and growth. It enables you to usher in a new generation of integrated business processes. And it provides an unprecedented level of flexibility—to change when you're ready and to grow the way you want to. To build and support the kind of applications you need. To access capacity and storage the way your business needs dictate. To create the on demand Operating Environment necessary to enable your company's transition to becoming an on demand business.



Creating Business Flexibility Through Integration²

Business how-to	Capabilities required	How to get started today using IBM products
Simplify designing, developing, testing and deploying on demand business applications	<ul style="list-style-type: none"> • Business modeling • Business process management 	<ul style="list-style-type: none"> • IBM WebSphere[®] Studio • IBM Rational Suite[®] • IBM WebSphere Business Integration • Modeler, Message Broker and Technology Adapters • IBM WebSphere Process Modeler and IBM WebSphere MQ Workflow • IBM WebSphere Application Server
Improve communication and collaboration between customers, partners and suppliers—within the enterprise and beyond	<ul style="list-style-type: none"> • Collaboration • Access 	<ul style="list-style-type: none"> • IBM WebSphere Portal • IBM Lotus Workplace • IBM WebSphere Studio, Integration Edition • IBM WebSphere Business Integration Connect and Adapters • IBM DB2[®] Information Integrator
React quickly to changes in the marketplace by rapidly and easily modifying business processes	<ul style="list-style-type: none"> • Business process management • Business modeling 	<ul style="list-style-type: none"> • IBM WebSphere Business Integration Modeler • IBM WebSphere Studio • IBM Rational[®] XDE™ • IBM WebSphere MQ Workflow • IBM WebSphere Interchange Server • IBM WebSphere Application Server • IBM DB2 Information Integrator
Instrument applications and analyze the events they generate to understand business process impacts	<ul style="list-style-type: none"> • Business process management 	<ul style="list-style-type: none"> • IBM WebSphere Business Integration Server, Monitor, Collaborations and Message Broker • IBM WebSphere MQ Workflow • IBM WebSphere InterChange Server
Provide seamless connectivity between new and existing applications, data and processes	<ul style="list-style-type: none"> • Application & information integration • Process transformation 	<ul style="list-style-type: none"> • IBM WebSphere Business Integration • e-business Adapters, Integration Connections, Collaborations and Adapter Development Tools • IBM DB2 Information Integrator • IBM WebSphere MQ • IBM WebSphere Portal • IBM Lotus[®] Workplace
React in real time to the most relevant information by ensuring a seamless flow of information	<ul style="list-style-type: none"> • Business process management • Application and information integration • Business modeling 	<ul style="list-style-type: none"> • IBM DB2 Information Integrator • IBM WebSphere MQ Workflow • IBM WebSphere Portal • IBM Lotus Workplace



Simplifying IT Through Infrastructure Management³

Business how-to	Capabilities required	How to get started today using IBM products
Secure access to and control of information, resources and applications	<ul style="list-style-type: none"> • Security • Availability 	<ul style="list-style-type: none"> • IBM Tivoli® Identity Management • IBM Tivoli Access Manager • IBM Tivoli Directory Server and Integrator • IBM Tivoli Storage Manager • Platform security (IBM RACF®, Kerberos)
Scalable and consistent management and control of operations to support end-to-end business systems	<ul style="list-style-type: none"> • Security • Provisioning • Orchestration • Business service management 	<ul style="list-style-type: none"> • IBM Tivoli Enterprise Console® • IBM Tivoli Risk Manager • IBM Tivoli Monitoring • IBM Tivoli Storage Management • IBM Integrated Solutions Console
Avoid system failures and take automated action to resolve problems	<ul style="list-style-type: none"> • Security • Provisioning • Availability 	<ul style="list-style-type: none"> • IBM Tivoli Monitoring • IBM Tivoli Autonomic Monitoring Engine • IBM Tivoli System Automation for Linux and OS/390® • IBM Tivoli Intelligent ThinkDynamic™ Orchestrator
Protect systems from intrusions and threats by using monitor and alert systems to enable automated self-protection of IT environment	<ul style="list-style-type: none"> • Security • Provisioning • Policy-based orchestration • Availability 	<ul style="list-style-type: none"> • IBM Tivoli Intrusion Manager • Web Intrusion Detection System • Network Intrusion Detection System • IBM DB2 Universal Database™ • IBM Tivoli Risk Manager • Platform Intrusion Detection Services
Provide monitor and alert systems that allow the establishment of business SLAs and automated detection and remediation of violations	<ul style="list-style-type: none"> • Provisioning • Optimization • Policy-based orchestration 	<ul style="list-style-type: none"> • IBM Tivoli Monitoring for Transaction Performance • IBM Tivoli Service Level Advisor • IBM Tivoli Business Systems Manager • IBM Tivoli Enterprise Console • IBM Tivoli Data Exchange • IBM Tivoli Intelligent ThinkDynamic Orchestrator
Reduce the time/cost to repurpose IT resources to meet business requirements and service levels by evolving to the dynamic assignment of resources to needs	<ul style="list-style-type: none"> • Provisioning • Policy-based orchestration 	<ul style="list-style-type: none"> • IBM Tivoli Provisioning Manager • IBM Tivoli Intelligent ThinkDynamic Orchestrator • IBM Tivoli Configuration Manager
Provide the ability to map the IT resources used by various business processes and to monitor and control all tiers of an end-to-end solution	<ul style="list-style-type: none"> • Business service management 	<ul style="list-style-type: none"> • IBM Tivoli Configuration Manager • IBM Tivoli License Manager • IBM Tivoli Monitoring for Transaction Performance
Consolidate and simplify infrastructure to improve performance, maintainability, availability, recoverability and scalability while positioning for future growth and immediate reduction in fixed costs	<ul style="list-style-type: none"> • Resource virtualization • Optimization • Availability 	<ul style="list-style-type: none"> • IBM TotalStorage® FASTT • IBM TotalStorage Enterprise Storage Server® • IBM TotalStorage Virtual Tape Server • IBM TotalStorage NAS 100 and 200 • IBM Ultrium Linear Tape Open • IBM @server zSeries®, iSeries™, pSeries®, xSeries® • IBM @server zSeries – zVM with Linux • IBM @server xSeries with VMWare
Optimize utilization and pool resources across a heterogeneous environment to maximize ROI	<ul style="list-style-type: none"> • Optimization • Provisioning • Policy-based orchestration • Virtualization 	<ul style="list-style-type: none"> • IBM TotalStorage Virtualization • IBM TotalStorage SAN Volume Controller • zSeries with Intelligent Resource Director and Workload Manager (WLM) across LPARs • IBM Grid Toolbox • IBM Grid Offering for Risk Management



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¹ Eric Wahlgren. "Is Tech Spending Ready to Rise Again?" *BusinessWeek Online*. December 23, 2003.

^{2,3} Charts contained in this appendix represent only a small sampling of IBM's product portfolio.