On demand infrastructure

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.

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When business processes have been integrated end-to-end, across a company and with its key partners, suppliers and customers, it has 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 and rigid. Because much of it is based on proprietary hardware and software, delivered well before industry standards were established, it's difficult to make all the pieces work together. It's even more challenging to make them deliver the flexibility necessary to support today's dynamic business environment.

The 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. It transcends both models, in a number of ways.

The traditional IT model focused on calculations, data processing, transactions and other highly structured tasks. It served businesses well for those rigid applications and will continue to do so over time. But it breaks down when trying 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 can be used 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, especially in the areas of communications between companies, marketing, sales and customer support.

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 the traditional and Internet computing 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.

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 to get started depends on the organization's priorities and resources.

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 environment, increasing overall flexibility and resilience, while reducing the resources that their

current approach requires.

1.2 Infrastructure to support an on demand business

Over the last several years, most enterprises have concentrated on making individual business processes more efficient. This work has typically been done within application or line of business silos. As we look forward, continued improvement in business performance will require a horizontal view, looking across the business and even across the ecosystem of suppliers, partners and customers.

To create applications and support business processes across lines of business or organizations will require the ability to use and integrate existing applications and processes. This ability provides flexibility to allow the business to easily adapt and assemble new applications to support new business requirements. 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, applications don't need to be recreated every time some piece of hardware or software changes or rewritten to support changes in the dependent processes.

Aside from the business flexibility that comes from the ability to integrate people, processes and information across the business, the IT infrastructure must also be made simpler and more manageable. This includes support for virtualizing the resources required and automating the management and operations of the IT environment.

The characteristics that enable an on demand Operating environment are the capabilities that enable business flexibility and simplification of the underlying technology infrastructure.

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 the organization to become more flexible and responsive to the dynamics of its markets, customers and competitors is critical. It becomes increasingly so as the value net is extended to more tightly integrate partners, suppliers and customers into the business processes.

The second focus is IT simplification, the creation of an infrastructure that's easier to provision, deploy and manage. This is accomplished through the creation of a single, consolidated, logical view of, and access to, all 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. Eliminating the practice of over-provisioning by moving to an infrastructure that accommodates dynamic resource provisioning can reduce an organization's capital investments significantly.

In order for more flexibility and componentization to be achieved, the 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 the entire organization.

1.3 Capabilities

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

Each of the capabilities for an on demand Operating Environment, acts as a facilitating element to enable the deployment of an underlying infrastructure. An infrastructure that drives business flexibility and IT simplification.

Integration capabilities enable the connection of people, processes and information in a way that allows businesses to become more flexible to the dynamics of the markets, customer and competitors around them. To maximize

the ability to integrate within and beyond the enterprise, there are six key capabilities required. These will typically be implemented over time according to the needs of the individual business:

_ *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* enables 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* 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 the 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, an enterprise will:

_ have a single, consolidated view of, and easy access to, all available resources in the network, regardless of location.

_ efficiently access and manage those resources to reduce operations and systems management costs while maintaining needed capacity.

_ respond dynamically to the application needs of its users.

_ gather and access information across the organization quickly to gain competitive advantage.

Automation enables an IT infrastructure to manage many day-to-day tasks itself. With a self-managing infrastructure, efficiency is increased and resource allocation simplified. 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 ensures IT resources remain aligned with business goals.

To achieve this simplified and optimized management of the infrastructure, the following capabilities are required. Again, these will typically be achieved overtime as the business requires.

_ *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 the 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 to visualize the 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).

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.

1.4 On demand Operating Environment architecture

The following figure represents the on demand Operating Environment architecture.

Figure 1-1 Operating Environment architecture

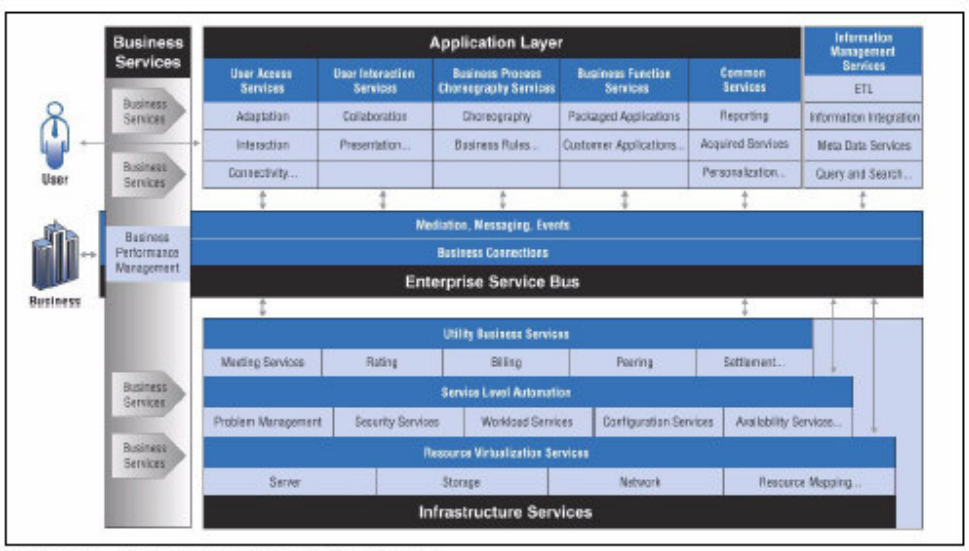

Figure 1-1 Operating Environment architecture

The on demand computing model applies at various levels in the IT stack. At the system level, the components are system objects

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. 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.

The on demand Operating Environment is based upon the concepts of a Service Oriented Architecture (SOA). A Service Oriented Architecture views every application or resource as a service implementing a specific, identifiable set of (business) functions. Services communicate with each other by exchanging structured information - messages or documents (sometimes called business objects). Their capabilities are defined by interfaces declaring messages they can produce or consume, policy annotations declaring quality of service required or provided and choreography annotations declaring behavioral constraints that must be respected in service interactions. The actual implementation is hidden from the requester of a service, thus Service Oriented Architectures are a convenient way to achieve application integration by allowing new and existing applications to be quickly combined into new contexts. Existing applications are 'adapted' to service declarations. The interaction of services can be direct, or can be mediated through an intelligent infrastructure, which we will call an 'Enterprise Service Bus' (ESB).

Service Oriented Architectures require standards for the definition of services

and their capabilities and interactions. The adoption of this architectural approach has been greatly facilitated by the growing acceptance of XML used to provide a standard representation of structured information and of 'Web Services' standards (often called WS-* standards). The conceptual model of a Service Oriented Architecture applies to the virtualization of both business functions and physical infrastructure. It spans the construction of applications as well as their deployment and management. A client (user or business) only sees a collection of business services, and is interested in their quality of service, but is shielded from the details of application assembly and service delivery through the on demand Operating Environment.

1.5 Summary

In this chapter we have introduced the on demand Operating Environment and briefly described its key capabilities, characteristics and architecture. An on demand Operating Environment is not a specific product or suite of products and it is not something that will be created or deployed overnight. Enterprises will

evolve to the Operating Environment by deploying various capabilities based on the specific needs of their business.

An on demand Operating Environment provides businesses with flexibility through enabling integration between people, processes and information and a manageable infrastructure through automation and virtualization.