IBM On Demand Operating Environment
Executive Brief
April 2005

Realizing the potential of government transformation.

How widespread modernization and innovation in public administration can become reality

Contents

The changing nature of government

During the last century, governments have been organized vertically, in separate organizations with their own responsibilities, resources, regulations and processes. Within government agencies, the adoption and deployment of information technology (IT) has followed a similar pattern. While IT has delivered significant value by automating processes and enhancing all aspects of information management, its effectiveness has often been limited by this high degree of fragmentation and resulting inefficiency. This has made it difficult for governments to deliver valuable services to constituents while controlling costs—a challenge that will only intensify over time.

Governments, like businesses, must meet the rising expectations of constituents, serving them as customers—just as private companies already do—by transforming the way they run their business. They must use IT more effectively to create a better user experience. Transforming governmental organizational processes requires a shift in the way governments manage constituents' requests. They must move from vertical and separate service delivery by each internal organization, to seamless horizontal integration, cooperation and interoperability. This requires a transformation of their IT infrastructures.

Governments also face other difficult challenges, including:

- *Budget pressures due to rising costs and resistance to tax increases*
- *Security issues, with new funding required to meet increased concerns*
- *Services provision to an aging population with dramatic increases in pension and healthcare costs*

The potential of e-government

"E- government enables the public sector to maintain and strengthen good governance in the knowledge society. This means:

(1) A public sector that is open and transparent: a government that is understandable and accountable to the citizens, open to democratic involvement and scrutiny.

(2) A public sector that is at the service of all. A user-centered public sector will be inclusive; that is, it will exclude no one from its services and respect everyone as individuals by providing personalized services.

(3) A productive public sector that delivers maximum value for taxpayers' money. It implies that less time is wasted standing in queues; errors are drastically reduced; more time is available for professional face-to-face service; and the jobs of civil servants can become more rewarding."[2]

- *Economic development will require government support and action for economic competitiveness and to enable any given country to respond rapidly to the changing global marketplace*
- *Resource and knowledge management issues resulting from expected attrition of aging government employees*

These priorities are rapidly evolving as new and unexpected situations emerge.

Government organizations must be prepared to reengineer their processes to adapt to the demands of an unpredictable environment. For example, financial plans, once updated annually, now often must be revisited quarterly, even monthly. Staffing structures must be designed around the needs of constituents, as well as around those who serve them. And more efficient use of available technology will play an increasingly important role, as governments strive to improve service delivery. As a result, the e-government paradigm has been created, based on these new service models and new technologies. E-government refers to the provision of online public services for citizens, including registration for government services such as healthcare, education and employment benefits. For businesses, e-government can take the form of online alerts for public procurements or funding opportunities, as well as information on legislation. E-government is widely viewed as an extraordinary opportunity for administrations to reduce costs, speed procedures and increase their efficiency and responsiveness.

In 2000, the European Union (EU) established the Lisbon Strategy. The strategy is a ten-year plan to drive economic, social and environmental renewal to make the EU the world's most dynamic and competitive economy. The agenda includes the implementation of an EU e-government strategy as a key enabler.[1]

On demand government

An organization whose business processes—integrated end to end across the organization and with key partners, suppliers and customers—can respond with flexibility and speed to any constituent demand, market opportunity or external threat. An on demand organization has four key attributes: it is responsive, variable, focused and resilient.

Vertical organization, horizontal operation

Although many governments have successfully used technology to improve flexibility and efficiency, few have realized the ultimate goal of e-government: to radically transform the way governments serve their constituents. In the future, governments will increasingly need to operate horizontally, while continuing to be organized vertically. This evolution is made possible by the introduction of new technologies, architectures, standard interfaces and applications that support the integration of processes—not just within, but across, organizational silos. Integration at this level can help eliminate redundancies and inefficiencies, while dramatically improving service levels and satisfaction. The purpose of this paper is to describe how innovations in IT can help turn this vision into a reality.

On demand government

In 2003, IBM described the era we're in as the on demand world. Characterized by rapidly changing demographic, political and economic realities, the on demand world demands agility and efficiency from governments. Organizations that can adapt rapidly to changing demographic, political and economic realities can stay focused on their missions, be resilient in the face of mounting, multidirectional pressure and maintain efficient operations throughout their organizations over time—to become on demand organizations.

As the world's economies slowly return to growth, governments must invest carefully as they begin the on demand transformation. In fact, on a day-to-day level, their need to emphasize the bottom line looks a lot like the challenges that businesses face. To maximize the value of their investments, governments must analyze their IT investments, asking key questions of each project:

- *How does this investment help us adopt new priorities in a rapidly changing environment?*
- *How does it help us cut costs?*
- *How do we know if this project will make a measurable difference?*

Governments must also look at their overall strategies, repeating the above questions, as well as asking:

- *How can we best foster real-time integration and interaction among and within tiers of government?*
- *How can we redesign our administration and infrastructure functions and use our resources more efficiently?*

An *on demand government* approach provides a means to address the above issues and concerns. It is based on the premise that environments with rapid, unpredictable change and turbulence require higher levels of flexibility, responsiveness and resilience than stable environments. To operate in such environments, current operational models need to be changed, and the relationship between business and technology also has to change. Governments must transform both their organizational processes and their underlying IT infrastructures. Creating an infrastructure that serves and is justified by organizational goals at every level is an evolutionary process and cannot be done overnight.

The first priority in the on demand transformation is to build an IT infrastructure that can support both continued organizational evolution and the day-to-day requirements of on demand government. This is what IBM calls an *On Demand Operating Environment,* enabling business flexibility, simplified IT management and appropriate resiliency.

The On Demand Operating Environment represents a fundamental transformation from vertical to horizontal integration. Instead of separate, fragmented IT infrastructures, you see a component-based infrastructure that works across departments and divisions, relying on a simplified operating environment that reduces IT maintenance, controls costs and increases productivity and organizational agility.

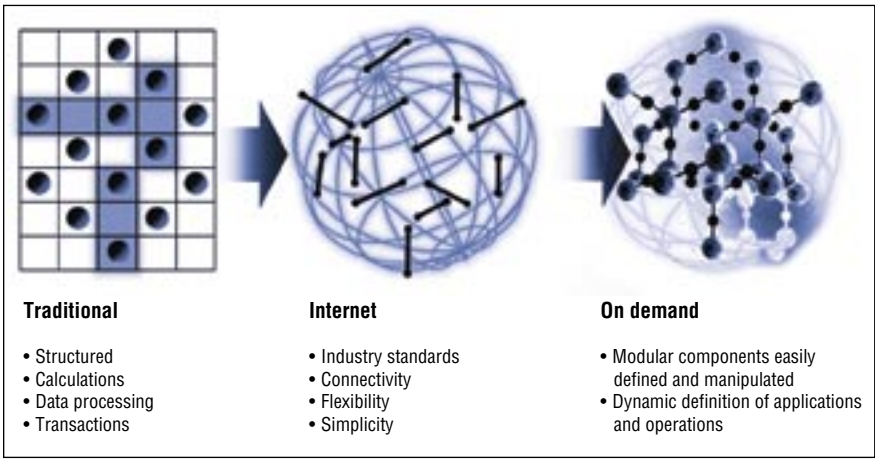
When applications and systems are reduced to their component tasks, they can easily be assembled and reassembled to meet organizational needs. These components are analyzed to design a roadmap that helps an organization begin to convert to an On Demand Operating Environment. The map outlines the incremental steps to add on demand capabilities while taking full advantage of existing IT assets. The On Demand Operating Environment must adapt to ever-changing requirements and to the evolution of economies, laws and regulations—including security threats, and increasing demands from citizens, businesses and suppliers. Because it's built incrementally, an On Demand Operating Environment can enable governments to continually improve operating efficiencies by allowing them to incorporate the latest technological advances as needed. It can also help deliver a faster return on investment by reducing IT maintenance time and costs—ultimately resulting in a lower total cost of IT system ownership for government organizations. And a more efficient infrastructure can mean increased employee productivity—further defraying costs.

It is important to understand that an On Demand Operating Environment is not, in itself, a product, platform or architecture. Instead, it defines a combination of integration and infrastructure management capabilities that can be used in an incremental and modular fashion to make the on demand transformation. The journey, discussed in more detail in the "Becoming an on demand organization" section of this paper, begins with taking stock of your current systems, processes and level of integration.

The integration and infrastructure management capabilities of an On Demand Operating Environment rely on a wide set of IT concepts and technologies, which are discussed in the section below.

The United Kingdom has been undergoing an organizational transformation toward on demand government by continuously focusing on improving processes while reducing costs, and by freeing up back-office resources that can be reinvested in the front office.

Figure 1: The emerging on demand computing model



The On Demand Operating Environment—key concepts

The On Demand Operating Environment is based on several key concepts that underpin its effectiveness at reducing costs, optimizing processes and efficiencies, and providing flexibility.

Open standards

Open-standards-based services, such as Web services, are self-contained, modular applications that are able to work together without relying on custom-coded connections, because the components share a common protocol—in other words, they can communicate with each other no matter what programming language they're written in. Open standards enable easy communication and integration across and within all government organizations and with the

The value of Linux technology—Regione Lazio, Italy

As part of a national campaign in Italy to increase government efficiency and improve responsiveness, Lazio's regional government wanted to upgrade its existing Web presence. Government leaders wanted to be able to not only deliver information, but also provide interactive applications for citizens and businesses, while connecting the regional government to all its municipalities.

Budget constraints, as always, were a factor. And central government guidelines insisted on interoperability with various existing IT infrastructures, which meant adhering to technology standards and selecting open-source software whenever possible.

IBM helped design and build Regione Lazio's new portal, and developed a plan for migrating its existing technology to an open-source Linux platform that would meet central government guidelines. IBM provided capacity planning and hardware design services to identify necessary upgrades to the existing mainframe, to support both the portal and the region's legacy applications. IBM then implemented the changes, reconfiguring the server for the Linux operating system.

"Over time, the regional government has accumulated multiple platforms, but we don't want to manage so many dedicated servers anymore," says Vincenzo Bianchini, general manager of Laziomatica, the IT service arm of Regione Lazio. "We want to run all our core applications on one scalable server that's easy to manage and lowers our total cost of ownership."

outside world, including constituents. Governments need considerable flexibility in the way that they configure their information systems. Those systems must seamlessly communicate with other systems, be easily reconfigured and be flexible enough to source technology from a variety of vendors and leverage innovative emerging technology. Open standards enable this flexibility.

In another sense, governments must also be open to their citizens, providing greater access to e-government applications and enhanced responsiveness when citizens and businesses need to interact with government. In this case, open implies that public administrations allow access to government applications on a choice of platforms and with a variety of technologies, so as not to impose a single platform or vendor's offering on the general public.

By establishing nonproprietary, common standards, through which applications, data and operating systems can interoperate, technologies such as the Linux® operating system can help smooth data integration, offer deployment flexibility and provide greater application choice. Open-standards technologies can enable consolidation of information from different platforms and applications across governmental organizations. Linux technology's open-source platform fosters integration by running on almost all available hardware. Because its acquisition costs are intrinsically low, Linux technology can help drive the standardization of even the lower levels of the IT infrastructure. The end result is a higher level of flexibility and responsiveness. Open standards are increasingly popular within public administrations. In most EU countries, government recommendations are pushing toward the adoption of open standards and Linux technology.

Integration

Key to the flexibility and adaptability of the On Demand Operating Environment, the capacity for horizontal integration is a defining characteristic. A fully integrated organization responds dynamically to internal and external requirements and is connected both across departments and with other governments, suppliers and constituents. Among other things, integration provides the ability to model graphically the organization's component tasks; reuse and combine existing applications in new ways; provide access to key data throughout the organization; and collaborate with other employees in real time.

The On Demand Operating Environment is ideally built on a layered, modular architecture known as a service-oriented architecture (SOA). An SOA views applications and processes as services, each with an interface defined according to industry standards. These standards-based interfaces allow for the exchange of structured information among different components of the On Demand Operating Environment, regardless of their original technologies and platforms. They also allow applications and processes to be disassembled and regrouped as necessary to meet the demands of a changing external environment.

Using an SOA, governments can incrementally deploy common services, such as constituent identification, across agencies. Even when agencies develop unique services, a service-oriented approach can integrate them across the organization. For example, SOAs could support more effective collaboration between the agencies involved in national security, providing means of communication between defense, police, health and other agencies.

Infrastructure management

Infrastructure management refers to the range of capabilities required to support the operating environment, while it, in turn, supports government on demand. Infrastructure services help ensure the availability of the overall system while managing security needs. They also choreograph and orchestrate organizational processes, optimizing the systems for productivity and resource management. Infrastructure management relies on two key processes for simplifying IT—automation and virtualization.

Automation provides real-time management of increasingly complex IT environments. By helping to ensure that IT resources are used in the most efficient way and that problems are anticipated and resolved before reaching a crisis point, automation does more than just free up time for system administrators and programmers. Routine tasks run automatically according to organizational policies and rules, including rules that specify what to do in the event of problems or conflicts. This rules-based behavior helps ensure that IT environments are aligned to the real priorities of government—reducing IT overhead, improving availability, security and resiliency, and increasing the efficiency of legacy systems.

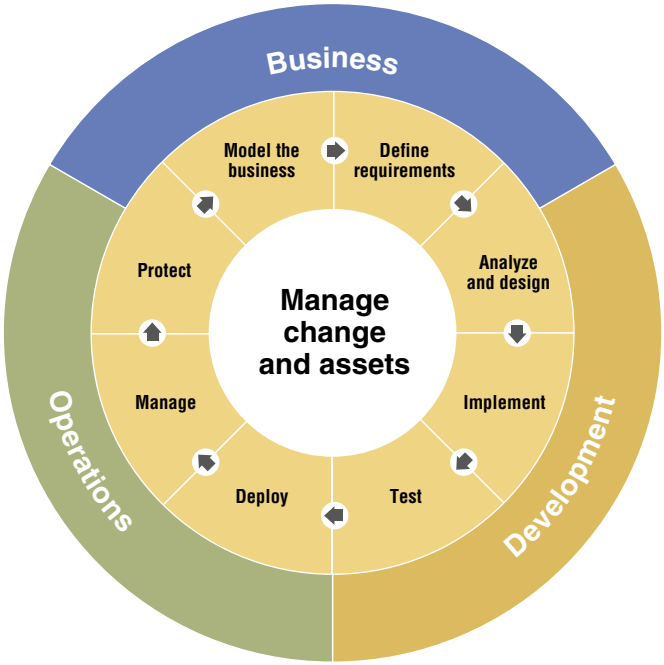
Virtualization enables a consolidated view of computing power, storage capacity and other resources, while automating the management of these resources based on organizational goals. Making possible basic systems management of multiple disparate systems, it allows for the real-time, dynamic deployment and optimization of these IT resources. Finally, it relies on a solid open-standards-based approach with a single dashboard that can be used to manage all systems. In sum, virtualization allows organizations to:

- *Aggregate and view data from a variety of sources*
- *Share departmental workloads across a single server*

- *Deliver service-level agreements, even during periods of high demand, production and testing*
- *Respond quickly to user application needs.*

Again, the overall result is that organizations can reduce operations and systems management costs while maintaining high availability.

Figure 2: The business-driven development cycle



Business-driven development

The term *business-driven development* reflects the shift in thinking at the root of the worldwide movement to on demand operations—all horizontal business and organizational processes must be framed and designed against the organization's overall goals and priorities. In the on demand era, even software development must be seen as a horizontal business process.

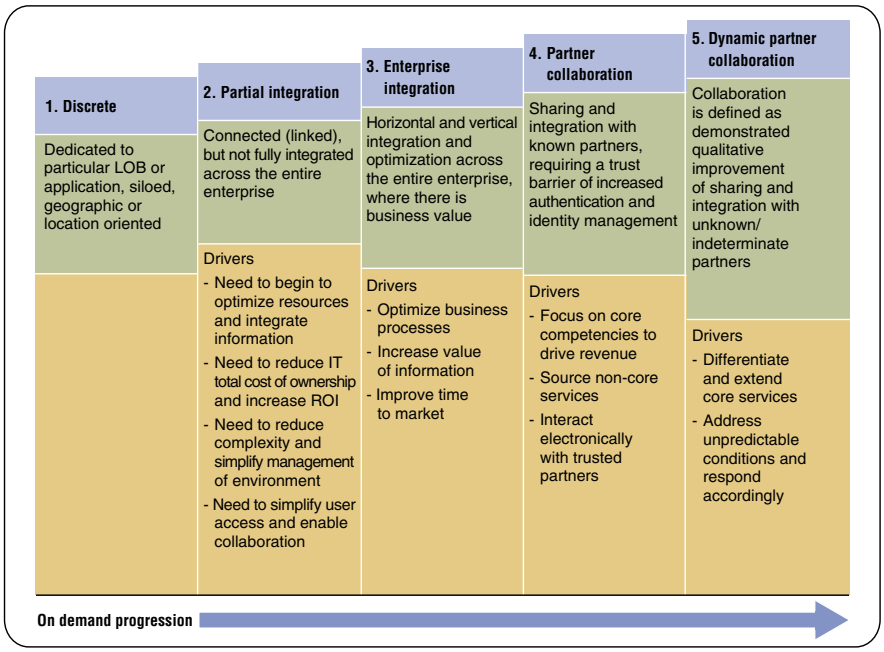
The business-driven development process has three phases. In the discovery phase, you model your organization's processes and goals, identify reusable assets and provide IT and development teams with an organizational perspective that dramatically clarifies requirements for new applications and services. The model-driven development phase accelerates and simplifies the process of transforming, integrating and building software assets within service- and component-based architectures, while allowing IT architects and developers to collaborate effectively. In the deployment phase, fully tested, tuned and well-designed components, services and applications are deployed to your operating environment in a consistent and repeatable fashion—so they are easier to monitor and manage over their entire lifecycles.

The conceptual basis for on demand infrastructures is reflected in the technologies that enable an On Demand Operating Environment.

How to get there—the phases of on demand adoption

As this paper emphasizes, becoming an on demand organization is an incremental or evolutionary process, building on existing assets and systems, converting them to open standards and adding new applications and systems as defined by organizational needs and timelines. IBM has identified five phases of progression toward operating on demand, but the final destination for your organization depends on your needs and priorities. For some organizations, the third or fourth phase may represent their targeted level of on demand functioning.

Figure 3: The on demand adoption maturity model



The value of simplification and sharing: the Municipality of Haarlem, Netherlands

As Haarlem grew, so did the number of its government departments and their locations, each managing an isolated IT system. The cost of maintaining these geographically disparate environments was a significant drain on public funds. Additionally, Haarlem wanted to implement a single portal interface to provide both internal users and private citizens with access to vital data and applications.

IBM helped Haarlem implement a consolidation effort within the government's IT infrastructure that would reduce costs, meet challenging e-government targets and leverage existing investments in IT resources—while providing an integrated portal to service both internal and external users.

Phase one—simplify

Many governments today find themselves in the very early stages of on demand adoption—characterized by discrete, separate infrastructures integrated vertically rather than horizontally. Most IT solutions and applications have been developed within individual departments or agencies on a project-by-project basis. Often, departments will run a different server for each application with a different proprietary operating system, raising both costs and quality-of-service issues. To address this, the simplification phase works to:

- *Standardize processes by reducing the number of ways to manage and serve IT elements, such as workstations, servers and networks*
- *Consolidate infrastructures by reducing the number of instances of the same element, such as through server consolidation.*

Phase two—partial integration

In the second phase, organizations further reduce costs and improve efficiency by more effectively using and sharing IT resources. Here, infrastructure management services are mapped and put in place, including:

- *A workflow automation initiative*
- *A service-oriented architecture strategy*
- *An on demand integration management plan*
- *A shared directory initiative*
- *A single-sign-on initiative*
- *An IT service management initiative*
- *An organization-wide storage virtualization and consolidation plan.*

The projects necessary for realizing these plans and initiatives are grouped together and mapped against an overall timeline for the on demand journey.

Phase three—automating and virtualizing the infrastructure

Once you have implemented the infrastructure services that best align your IT environment with your organizational priorities and goals, it is time to focus on fully automating and virtualizing your infrastructure. During the third phase, you create a uniform interface that allows infrastructure services to communicate with one another and manage resources such as networks, servers and storage on the virtual, rather than physical, plane. The interface provisions and schedules the virtual pool of resources through automated processes that require minimal human involvement. It can include:

- *An enterprise service bus (ESB) to manage the interactions among application and infrastructure services*
- *A legacy systems transformation initiative.*

Phase four—operating as an on demand organization

In a fully on demand organization, all IT infrastructure elements are dynamically managed in accordance with the service- and business-level objectives outlined during phase three. In phase four, there is a move to a higher level of collaborative capability, while implementing a utility computing infrastructure. Now, standardized processes and infrastructure management are delivered as a high-performance

service with measurable results and a usage-based pricing model. This fosters more efficient resource use while providing the means for more effective partnering arrangements, both within the organization and with other governments. Initiatives at this level include:

- *Partner integration services*
- *On demand partner information management infrastructures.*

Phase five—dynamic partnerships

At this phase, the most sophisticated level in the on demand hierarchy, organizations embrace the concept of virtual government, in which one government may partner with other governments or business partners to respond more rapidly to changing environments and constituent needs. For example, agencies could establish a reciprocal relationship by making their resources available to one another in a security-rich, real-time environment. Initiatives at this level can include:

- *Dynamic partner integration*
- *Disaster recovery strategy that considers unknown external resources.*

Becoming an on demand organization—how IBM can help

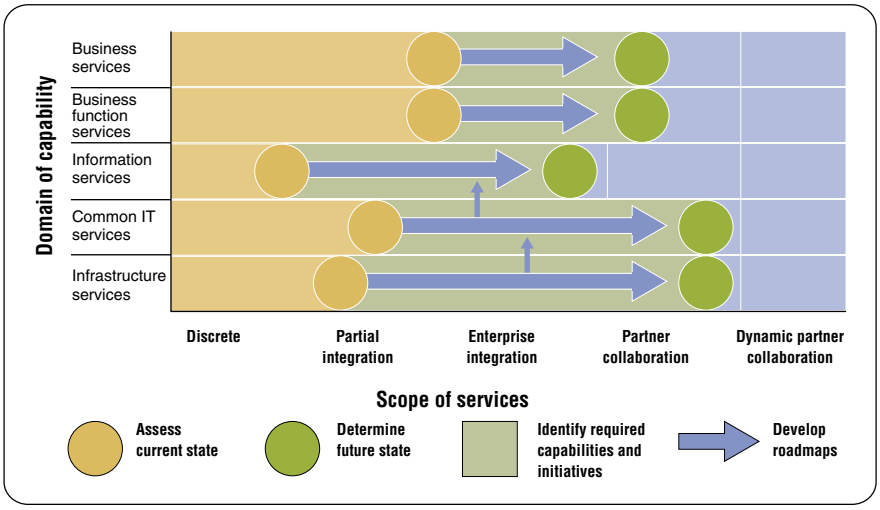
To ensure that the evolution to an on demand government remains cost-effective and does not disrupt the day-to-day processes of government during the multiyear transformation journey, IBM developed the IBM Component Infrastructure Roadmap. The roadmap helps governments take full advantage of their previous investments, while managing change and helping to foster the necessary cultural shift within the organization. It is a maturity-driven model that helps create a technically focused transformation roadmap for clients,

by first determining the client's current state and then articulating its desired state in the on demand maturity model. The roadmap considers all facets of the On Demand Operating Environment and recommends the implementation of capabilities and technologies that are appropriate for a specific client.

Generally speaking, there are three main areas that organizations must assess to plan for the transformation to an On Demand Operating Environment:

- *Build a componentized business model of the organization, breaking each task down into the people, processes and technologies required to complete it. Each component can then stand on its own and can be pulled into a variety of business processes and tasks, on a "plug-and-play" basis. Complementary business components are linked into sets; together, these sets offer a full representation of all the processes and tasks necessary for the organization to operate effectively. The IBM Component Business Model™ method may be applied here.*
- *Review the government's current application portfolio to assess its fit with the new business model and to pinpoint necessary changes.*
- *Review the existing IT infrastructures to assess how well they support the new business model and the application portfolio; to assess the level of integration across the organization; and to determine the next steps in creating an On Demand Operating Environment.*

Figure 4: The IBM Component Infrastructure Roadmap



IBM can help you make these assessments, using the IBM Component Infrastructure Roadmap to construct a comprehensive, individually tailored guide for the transformation process. Customized during an intensive, focused workshop process that includes key personnel involved with your organizational change, the roadmap is organized into four steps:

1. *Set the vision and establish on demand readiness. Define organizational goals and priorities. Readiness assessments can cover several organizational domains:*
   - *Overall IT infrastructure, including application readiness*
   - *Autonomic computing and grid computing capabilities and potentials*

–Utility management capabilities and potentials
–Linux capabilities and potential
–Total cost of ownership assessment and quality-of-service analysis

2. *Create a roadmap. Identify key projects necessary to get you to your goal. Group them into initiatives. Analyze their dependencies and frame them against a realistic, multiyear timeline—so you know what you have to get done and when.*
3. *Make sure all systems are go. Revisit your existing infrastructure and make the necessary changes to support the process of the on demand transformation.*
4. *Manage change for continuous improvement. Reiterate the on demand journey, repeating this phased approach, to incorporate changes and sustain breakthrough improvements.*

The On Demand Operating Environment can enable effective e-government by helping to meet the mandates for e-government, reducing IT complexity and increasing the ability to respond flexibly to changing environments and constituent needs. IBM Infrastructure Solutions for On Demand Government can help address the specific challenges of the on demand transformation.

Optimizing IT assets

Getting the most value out of existing IT assets is key to any effective organizational transformation. But studies show that organizations use only 15 percent of their IT capacity. Designed to focus IT resources, reduce costs incurred by waste and improve productivity while reducing errors through automation, IBM Infrastructure Solutions for On Demand Government includes services,

hardware and software to help you make the most of your IT. IBM IT Optimization Services can provide a disciplined evaluation of your IT environment in relation to your overall organizational priorities, giving you a detailed business plan with precise actions that you can take to improve your IT utilization. Such offerings as the IBM Virtualization Engine™ suite and IBM TotalStorage® SAN Volume Controller systems provide points of entry for cost-reduction strategies by optimizing resources through virtualization and increasing storage infrastructure flexibility. Automation can help reduce the complexity of managing IT, making your staff more focused and effective. By automating manual provisioning and configuration procedures, IBM Tivoli® Provisioning Manager software, for example, helps increase employee productivity and server utilization.

Increasing organizational flexibility

Increased flexibility and responsiveness is one of the hallmarks of e-government. IBM Infrastructure Solutions for On Demand Government can help your organization increase flexibility, streamline business processes and integrate infrastructure elements. IBM WebSphere® Business Integration Server Foundation software, as an example, can help establish new processes, synchronize information and transform message formats en route between applications—all in the interest of increasing IT agility. By streamlining business processes, such as by implementing a service-oriented architecture as the foundation of your IT infrastructure, IBM solutions can help reduce the costs of adapting IT to changing business needs. IBM offerings can also boost responsiveness by integrating infrastructure components using such solutions as the IBM SAN File System and SAN Volume Controller, which provide centralized multivendor storage management, higher utilization and shared access.

Reducing risk through increased resilience and security

While the increased integration of today's infrastructures, applications, business processes and users does much to increase flexibility and reduce costs, it also poses a significant security risk. Whether the threat comes from viruses or from simple human error, your infrastructure needs to be resilient enough to recover from attacks and errors, and secure enough to block most of these threats in the first place. IBM Infrastructure Solutions for On Demand Government helps mitigate risk and foster resiliency by assessing security vulnerabilities, improving network access management and enhancing IT protection. IBM Security Health Check is an example of a tool that helps identify your security strengths and weaknesses. To help you actively monitor, correlate and automate responses to security incidents, IBM offers solutions such as the IBM Integrated Security Solution for Cisco Networks. IBM builds security performance into its celebrated hardware offerings, such as IBM ThinkPad® notebook computers and IBM @server® zSeries® servers.

Leveraging information from disparate sources

Chances are, your employees spend about one-third of their time searching for the data they need to do their jobs. In addition to the obvious impact on productivity, the diffuse nature of data in most organizations means that information can be inaccurate, or delayed beyond usefulness. IBM Infrastructure Solutions for On Demand Government are designed to work with your existing systems to integrate and improve access to mission-critical data. Solutions like IBM DB2® Information Integrator, IBM Workplace™ and IBM WebSphere Portal software

can help you boost collaboration and retrieve data dynamically—without changing your existing infrastructure. IBM middleware offerings, such as IBM Data Management Services, are designed to help you access, analyze and manage your data faster and more effectively. Intelligent algorithms, embedded in products like the IBM SAN File System and IBM @server servers, also help you improve your information handling.

Why IBM?

A pioneer in On Demand Business, IBM has been at the forefront of analyzing and defining the Internet-driven global shift in the marketplace. IBM is a recognized industry leader with comprehensive hardware, software and services solutions to meet diverse business and organizational needs. IBM continues to research, develop and support the adoption of open-standards technologies to support cost-effective business and organizational transformation and to facilitate horizontal integration.

Working with both businesses and governments, IBM has developed the most comprehensive array of transformation solutions available today. No other organization in the world can match the depth and breadth of IBM's expertise in both business and organizational processes, as well as in technology.

IBM offers a comprehensive range of architecture and implementation services to help you achieve your goals, no matter where you are on the road to becoming an on demand government.

For more information

To learn more about how IBM can help government organizations leverage on demand technologies, or to begin transforming the way you deliver government services, visit:

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[1] Commission of European Communities. "eEurope action plan." June 2000.

[2] Commission of the European Communities. "The Role of eGovernment for Europe's Future." Communication from the Commission to the Council, the European parliament, the European Economic and Social Committee and the Committee of the Regions. September 2003. p. 8.

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