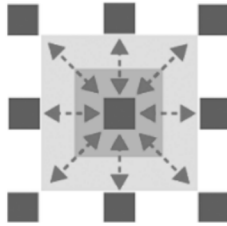# On Demand Government

On Demand Government

Continuing the e-government Journey

Todd Ramsey
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IBM

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On Demand Government: *Continuing the e-government Journey*
Todd Ramsey

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Preface

Much has been written about e-government and the opportunities it affords to improve access to government services, particularly in terms of providing alternatives to waiting in long lines in government offices. In fact, governments have made good progress in putting existing services online and creating portals that make it much easier to find Internet-enabled services. Yet, this progress just scratches the surface of what can and should be accomplished with e-government. Governments face ever-increasing challenges that will only worsen with time. Program costs rising faster than revenues, increasing security concerns, spiraling health care costs, and aging populations create a compelling case for governments to act with a sense of urgency. To address these challenges, governments must cast off the pattern of slow, incremental changes of the past and drive real transformation across the enterprise. Governments that do this effectively will be in a position to increase economic development and enhance the quality of life for citizens. This book is a how-to guide for government leaders who want to act decisively to integrate government operations and use government transformation as a catalyst to address challenges to their society.

The first chapter summarizes common challenges forcing governments to implement transformations. Chapter 2 describes the four waves that governments typically go through to reach the advanced implementation of e-government that we call *on demand* government. Chapter 3 defines six key steps that characterize successful plans for becoming an on demand government. Chapters 4 and 5 provide examples from the public and private sectors that illustrate the

benefits of transformation; the organizations at the heart of the case studies presented in these chapters serve as role models for governments planning to implement major changes. Chapters 6–12 delve into greater detail on topics of interest to most governments planning major transformations. The concluding chapter addresses concerns about the return and benefits from e-government initiatives.

This book represents the IBM government team's collective experience with e-government projects since 1996. Most of us were also actively involved in IBM's major transformation, which started in 1993 and is still evolving today. I want to especially acknowledge Janet Caldow and Brad Westpfahl, who made extensive revisions to the text. Mark Cleverley, Janet Caldow, Tracy Denny, Trevor Moore, and Brad Westpfahl authored chapters on critical elements of transformation projects. Curtis Clark, Mark Forman, Wayne Goeller, Matt Kantor, Andy Kendzie, Nigel Knight, Bob Reeve, Jeff Rhoda, Bart Steukers, and Bart Windal also contributed their insights, graphics, and content suggestions. Special thanks go to my wife, Pam, and my three children, Jennifer, David, and Michael, for their love, patience, and support.

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Challenges Facing
Modern Governments

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Governments today are at a major crossroads. The world is changing rapidly and the information age has made it increasingly difficult for governments to control and regulate the activity within their borders. Mounting challenges force governments to significantly change the manner in which they operate. In today's environment, in which the traditional approach of lengthy study preceding incremental changes is too slow to address many of these challenges, nimble governments can significantly improve their standings in the world order. While different governments around the world experience a variety of unique problems, the challenges form a consistent pattern.

Budget Pressures

Most governments face cyclical budgetary shortfalls caused by some combination of insufficient tax revenues and increased demand for services. Governments typically spend any surpluses on new programs rather than fixing existing ones. Funding for new programs is usually based on an optimistic economic outlook that puts pressure on future budgets when economic growth falls short of forecasts. When budget shortfalls occur, politicians are reluctant to cut programs and often use across-the-board spending reductions to reduce costs. After several iterations of this "spend, promise, and cut" cycle, programs become inefficient and ineffective. There is little linkage between what is spent on programs and desired outcomes. Because program changes are made in a piecemeal fashion, support systems and application programs are not well integrated or adaptable to the changing needs of customers.

Growing deficits are nearing crisis proportions in some countries. Many governments face a potent combination of increasing service costs and rising demand for those services. Aging populations add a huge burden to pension, health care, and other support systems. These issues, coupled with economic downturns that reduce revenue streams, cause government budgets to be stretched too thin. Whereas economic fortunes rise and fall over time, the long-term projection is modest growth in the global economy; thus governments are not likely to have tax windfalls to fix problems. Since fiscal problems can quickly spiral out of control, governments need to urgently address these issues within current funding constraints.

Collaboration

Most governments find it very apparent that they can no longer operate with islands of information. Even political leaders with little familiarity with information systems recognize that agencies or departments too often act as individual silos of authority in an era in which it is increasingly necessary to integrate information and streamline services across government.

Separate silos of information mean management and policy decisions are often based on incomplete or even erroneous data. Citizens navigate a bewildering maze of agencies and departments to find information or submit applications. Even government Web sites meant to simplify access are often confusing and difficult to use because they force the user to understand the roles of the various government departments.

When government agencies fail to collaborate properly, the problems often become very public. For example, there are well-documented cases in which child care agencies had identified problems within individual families — problems that required custodial intervention for the safety of the children — but where no coordinated response took place. Poor communication makes it difficult for emergency response teams to manage an incident. Much of the criticism directed at U.S. intelligence agencies after the attacks of September 11 dealt with the inability to correlate information known by several different agencies.

To effectively deliver mandated services, agencies *must* collaborate and coordinate efforts much more effectively.

Safety and Security

No problem illustrates the need to collaborate more than today's safety and security concerns. Terrorism increases the need for governments to share information across departments and among separate government entities. The

Internet, which dramatically improves access to information, also creates exposures that enable hackers to affect the operation of systems and gain unauthorized access to information.

Securing information systems and preventing unwanted access are high priorities for governments. Providing adequate security at this level is more difficult because many islands of automation exist in most governments. Vulnerability increases if security is not paramount to the architecture and design of the overall system. Although most organizations focus on outside threats, 70 percent of the companies responding to a recent security survey reported instances in which internal employees tried to access unauthorized information. Plenty of security tools are available in the marketplace, but they must be applied systematically for maximum protection. Unfortunately, many government agencies have neither the ability nor the capacity to adequately catalog and categorize information resources at their disposal, much less share that information with other agencies. Moreover, some governments instinctively respond to security threats by hardening the silos of information, thereby creating obstructions to legitimate sharing and collaboration.

Providing safety and security for citizens is a much broader and more complex issue. It requires increased cooperation and collaboration among many different organizations. Not only does existing data need to be shared, but new data may need to be collected for use by other agencies. While emergency-response and intelligence-gathering organizations do work together more today, better safety and security requires significantly more integration and process reengineering.

Privacy

Protecting privacy means governments must manage both who accesses data and how the data is used. Adequate security is a prerequisite to implementing a privacy policy; that is, privacy of information cannot be guaranteed unless there is sufficient security to protect data from unwanted access — externally and internally.

Managing privacy and security creates a dilemma for government. Sharing information to provide a safer homeland could violate the data-privacy rules demanded by citizens. Fortunately, considerable effort in recent years has developed techniques to mine important information from data without compromising the identity of the individuals involved. Adding privacy controls after an application has been deployed is extremely difficult. Both privacy and security are most effective when concurrently designed into the basic architecture of systems.

Human Resources and Changing Demographics

Due to the post–World War II baby boom, many countries see a significant portion of their populations moving into what would normally be considered a retirement stage. This creates a double challenge for government. Not only does an aging population increase demand for support services, but it also affects the potential retirement of a large portion of the government workforce. For example, some western nations estimate that 50 to 70 percent of the government's information technology (IT) workforce will be eligible for retirement in the next three years. The skills that these potential retirees possess are, in many cases, complex and highly evolved. They represent both the cumulative knowledge of the governmental policies and procedures that run IT organizations within governments *and* the understanding of how embedded information systems within these governments function. Governments often have difficulty attracting young skills into their workforce, so this loss of skill and institutional knowledge could be very serious indeed.

Changing demographics place added stress on support programs designed to improve quality of life. Increased life expectancy and declining birth rates have increased the average age of citizens in most developed nations. This puts pressure on health care systems and programs that support the aging. Many nations are also dealing with an influx of immigrants who often require more educational and other support programs. Pension plans are becoming insolvent because the increase in new workers is not enough to support the increase in those receiving pensions. Without major changes, governments will see costs for these programs spiral out of control and become unaffordable.

Taken together, these issues actually represent a unique opportunity. Government leaders recognize that changing the way government operates necessitates changing the skills and knowledge base of the workforce. To implement changes, workers need to be retrained and equipped with the tools to operate new processes and support customers more effectively and efficiently. Retirement is a natural way to reduce the workforce. If plans to change the skill and knowledge base of the remaining workforce are implemented now, governments can deliver on the promise to provide better services at lower cost.

Expectations

Citizens, businesses, and employees all understand how commercial enterprises constantly improve services and offerings, and they demand similar services and support from government. Although governments have made progress the past few years, they lag the private sector in delivering innovations and service improvements. This makes government customers even more

impatient in dealing with multiple agencies and slow bureaucratic processes when they want to get something done quickly.

For citizens, government bureaucracy means inconvenience and wasted time. For businesses that interact frequently with government to report wages, pay taxes, and comply with a wide range of regulations and other reporting requirements, bureaucracy means real added cost. Studies in Denmark and the United States confirm that government overhead is a significant burden for small businesses. A reduction in this cost could go directly to profit that can be used to create jobs, pursue new markets, or make pricing more competitive. No wonder business is often the strongest and most effective advocate for government to streamline operations.

Economic Development

The state of the economy is frequently the central issue debated in elections. Traditional approaches of tariffs to protect local businesses and tax incentives to attract new businesses become less effective in a global economy in which information flows freely across borders and value-added services form an increasing part of economic activity. Governments will have less power to regulate or control economic activity. Economic growth may well be determined by how well the government facilitates business participation in the world economy and promotes the development of the skills and capabilities that businesses will need to compete globally. This dramatically increases the stakes associated with the pace of government transformation. Early adopters will likely see economic growth at the expense of those who move more slowly.

Environment

Environmental issues constitute a major global challenge. Economic growth cannot be maintained long term if the environment that provides much of the world's basic resources is not preserved and maintained. Governments have a key role to play in setting policy and ensuring that there is global cooperation in addressing environmental issues.

Inclusion

Finally, there is the burgeoning problem of inclusion. As new technologies are implemented to make governments more cost efficient and responsive, governments face an escalating challenge to make those services accessible to all citizens. This issue is often referred to as the "digital divide." It's a challenge that governments must address: making certain that the population is not divided

into two unequal groups — those who have easy access to government services and those who do not. And, in most cases, this issue requires governments to deliver a full range of services to impoverished inner cities and to the most remote areas of their country or jurisdiction.

Inclusion has many ramifications. Often it's framed purely as an economic or consumer problem — keeping computer equipment and software down to a reasonable cost. But it's also a deeply rooted educational problem in most countries: exposure to electronic government services is sometimes limited more by undeveloped skills than by underdeveloped access to the equipment itself.

Key Imperatives

IBM recognized these common global government challenges as early as 1994, when the Institute for Electronic Government (IEG) was launched. Since its briefing center opened in downtown Washington D.C., more than 30,000 customers, analysts, and individuals from organizations interested in helping modernize government have visited the institute to collaborate on ideas and share experiences. IBM's global government team has also visited over 50 countries to explore firsthand how governments implement change. Closer to home, IBM has found that many of the lessons learned in the corporation's mid-1990s transformation to an on demand company apply to government as well. IBM employs more than 300,000 people worldwide, organized by product and geography. The scope of IBM's culture change and its own painful integration of entrenched organizational silos parallel the scale of change that most large governments face.

As with IBM's transformation, challenges facing governments call for comprehensive and transcending change. There are no easy solutions. Global economic growth is expected to be moderate at best, so no windfall of new tax revenues is likely to fund increasing costs. These issues cannot be addressed with new programs. The longer governments delay action, the worse the problems become. Any objective assessment of the issues will conclude that governments must act, and act quickly, if they want to maintain economic growth and the quality of life that citizens expect. Three clear imperatives for governments emerge from the analysis of these challenges:
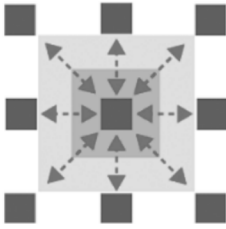
1. *Transform processes and integrate operations across the whole of government.* Putting services online is a step in the right direction, but it is not the solution to major problems. As long as governments continue to operate as a collection of independent silos, they are limited in what they can do to address major challenges. Solutions must be constructed by taking a customer or stakeholder view of what is

needed and then transforming relevant government processes and integrating the information required to support the desired solution.

2. *Implement changes within very tight financial constraints.* With budgets already under severe pressure, governments have limited resources to invest in transforming operations, even if successful implementation ultimately produces good returns. Governments need to find ways to save money and reinvest part of the savings into new programs to transform operations. Corporate transformations that produce significant savings *and* more effective ways to do business provide a useful model for governments.

3. *Enable government employees as a critical part of implementing successful changes.* No organization can successfully implement change without equipping its workforce with the skills and tools to operate in the new environment. Because governments generally have less flexibility to change their workforces, this imperative is even more crucial for government transformations than for those in the private sector.

Most people recognize the need for government to transform, but it is not always easy for government leaders to understand how to effect change. Implementing a transformation is difficult. No one likes to put an organization through major change unless it is really necessary. Some prefer to maintain the status quo or defer action as long as possible, but that is not an option — governments are at that crossroads *today*. The world of commerce is changing to become more responsive and adaptable. Public expectations, management science, applications software, and technology evolve primarily in response to the operational needs of the private sector. For government to regulate and facilitate trade, travel, defense, health, and education, then it too must understand and embrace operational changes in the private sector or run the risk of becoming an economic burden or, at worst, just plain irrelevant. Governments that act with a sense of urgency and accept the challenge to implement major changes will be able to attract, retain, and grow the skilled workforces that will truly compete in the global economy. Governments that postpone these changes will find that their economic strength and attractiveness will erode.

2

The Journey to On Demand Government

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The term *e-government* is now widely used to describe the way governments of the future should operate. In its simplest terms, e-government is the application of Internet technologies to change the way government operates and provides services. Following best practices of private companies, governments can take advantage of new technologies to improve efficiency and effectiveness and, more importantly, to transform the way they operate and deliver services. By the late 1990s, government leaders embraced this idea and encouraged the use of the Internet to improve access to government services. Internet access was just one of many channels used to deliver services. While the goal may be to make the Internet the primary service channel, governments still need to support mail, telephone, and face-to-face transactions for the foreseeable future. Virtually every major nation published a vision of how it would operate in the new e-world. Many set ambitious goals to rapidly become e-governments. The goal of these visions was not just to create a new Internet channel but to integrate processes and significantly transform operations.

To claim success in becoming an e-government, many jurisdictions defined e-government as simply putting services online. Surveys that measure progress by the number of services available online reinforce this less-than-functional definition of e-government. Unfortunately, this perception of progress actually slows momentum to implement difficult changes and reduces the return from e-government implementations. To understand what is genuinely needed to realize the promise of e-government, it is helpful to view the e-government journey in four distinct waves as shown in Figure 2.1.
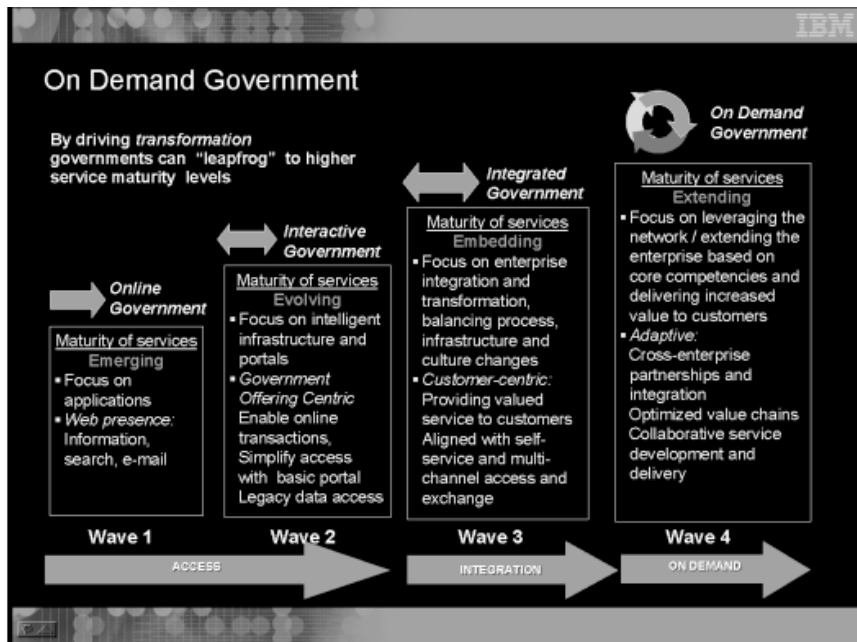
Figure 2.1: Four waves of transformation to on demand government.

Wave 1: Online Government

The first wave is characterized by putting information and services online. Providing forms and listing services online are relatively simple tasks that can be done by individual departments without much interaction from other departments. Making services and information available 24 hours a day, 7 days a week, is generally considered a big step forward — particularly if the alternative entails waiting in long lines at inconvenient times and locations to access the service. Governments often receive good publicity when services are first put online because citizens find this new channel much easier to use. Online services reduce government costs because fewer resources are needed to provide direct support to customers. As demand for services grows, online systems can handle increased demand and reduce the need to add more support resources. Most governments have implemented many wave 1 applications.

Wave 2: Interactive Government

In wave 2, governments organize information and services for better access by citizens and businesses. As individual agencies move services online, a confusing array of Web sites results, making it difficult for anyone to find the right

location for a particular function. The logical solution is to create an index that helps customers navigate to the correct site. The popular name for this solution is a *portal*. Portals range from simple pointers to other Web sites to a much more sophisticated site that makes it easier for customers to accomplish their objectives.

Although most governments have created some form of portal, many portals are not optimized for ease of use. Studies have shown that as many as 50 percent of active users of a Web site will quit before continuing to the next click of the mouse. Therefore, it is important to design a site so customers complete some desired action within two to three clicks. It is not uncommon for a government portal to start with a very colorful welcome page, followed by a page listing functions or other sites, followed by several pages of information, leading eventually to a form that must be printed and faxed. All of this takes 6-8 clicks and is likely to discourage all but the most determined customer from using the site again.

The central government of Canada has done an excellent job of addressing this problem through extensive use of customer focus groups to make the portal much more user friendly. The sessions helped Canada to not only refine the look and feel of its site but also to use terminology that makes sense to customers. By grouping functions and employing more user-friendly terminology, a portal enables customers to accomplish their objective in just a few clicks.

Wave 2 improves the ability of citizens and businesses to interact with government. Rather than just obtaining or exchanging information, as occurs in basic wave 1 applications, users complete multistep transactions in wave 2. In Figure 2.1, these first two waves are characterized as the *access* phase of the e-government journey because little or no process transformation occurs. Governments are simply doing what they always did while adding a more convenient way to access services. Most governments around the world today are still building some part of an intelligent infrastructure that improves access. They've made basic information processes available and are now organizing those processes to increase navigational ease.

Wave 3: Integrated Government

Wave 3 represents the internal integration in government. The focus shifts from putting agency programs and information online to integrating processes to provide the service that customers need. The term customers includes citizens, businesses, employees, other governments, and other stakeholders that interact with a specific government entity. In this wave, projects become customer-centric, starting with the desired objective, experience, or support

requirements for a specific customer and integrating processes to deliver that outcome.

Internal integration often occurs among groups or clusters of departments with common needs or customers. Tax, social services, and defense organizations across the world have successfully implemented enterprisewide integration projects. Cross-government efforts are under way in the United States, Canada, Singapore, and several Nordic countries. Most projects start with integration of internal support functions — information technology (IT) systems, finance, human resources, and procurement. Later projects transform mission-critical systems and processes — end-to-end case management, or end-to-end tax preparation — that directly support the customer. These projects illustrate that lessons learned in private sector transformations can be successfully applied in government. Culture change is critical to success in wave 3; employees must understand new expectations and acquire the skills and tools to be successful in the new operating environment.

Unlike moving information and simple transaction services online, internal integration requires major change. Agencies and departments are normally put in place to regulate or control some function or provide a very specific service. Operating rules are often defined in published policies or enacted into legislation. Changes to procedures or processes can pose risks because they may violate laws or established policies, even if the changes solve customers' problems quickly and more efficiently. To make progress in this wave, senior leaders must take an active role in driving change and setting new expectations. Individuals and organizations resist change unless they understand why it is necessary and believe senior leaders are united in their commitment to implement new processes and attitudes. While wave 3 is much more difficult to implement than the earlier waves, it offers significant returns. Successfully integrating government functions and processes can help create jobs, improve social service outcomes, and make employees more productive.

Much of IBM's work in e-government today attempts to bridge silos, understand government cultures, and build mechanisms that remove barriers between and among agencies so government can function as a cohesive and coordinated unit. Again, the savings realized during this transformation are real, and the efficiencies achieved in the delivery of services are significant.

Wave 3 efforts focus on creating efficient internal processes that significantly reduce operational costs and facilitate meeting a higher volume of services as demand increases. Customers see a less fragmented government, and employees are in a much better position to collaborate. This sounds like a nice end

point, and yet government can significantly extend the impact of its transformation by bringing partners and suppliers into the mix.

Wave 4: On Demand Government

The fourth wave represents a new, more expansive view of e-government. An *on demand government* is one whose business processes are integrated end-to-end across the enterprise and with key partners, suppliers, and customers, thus enabling the government to respond with flexibility and speed to any customer demand, opportunity, or external threat. What makes the on demand era different from those that preceded it is the fact that it presents not just the opportunity to get better but also the opportunity to create a major step-function improvement — to break through barriers once thought insurmountable. When customer needs are fully understood, the required services are almost always a combination of what government and nongovernment entities provide. On demand governments focus on what they uniquely need to do and rely on partners and suppliers to provide complementary services. This notion of an extended enterprise, which includes the use of partners and suppliers to deliver better service and to respond quickly to changing environments, can contribute to significant increases in customer productivity and effectiveness.

On demand systems are already everywhere, but many people do not recognize them yet. Consider the capability of OnStar® to call your vehicle and dispatch police if the system detects an air bag deployment. Such end-to-end integration leverages and exploits today's technologies. E-government visions need to embrace the power of end-to-end integration in an extended enterprise — from external entities such as citizens and business constituents, through the heart of internal operations, and extending all the way out to external suppliers. That's on demand government. This conceptualization is integral to redefining the vision of e-government.

The on demand era concentrates on increasing end-to-end productivity. For example, government plays a vital role in many complex processes such as public safety, exports, imports, health care, education, and housing. When the government enterprise extends basic operating processes to include suppliers and customers, the respective suppliers and customers begin to change they way they operate too. This chain of events results in a vastly improved, seamless process with significant cost savings and promotes major improvements in business efficiency.

Take an extended-enterprise view of health care. If various health care agencies, private suppliers, and customers interact in an integrated end-to-end process, tremendous savings and better outcomes are achieved. The requirements

to fill out medical forms, qualify customers, establish medical procedures, track and audit supplier reimbursement, process claims, and detect fraud are greatly streamlined. This, in turn, reduces massive overhead costs and enables citizens to receive better care at a lower cost. By lowering the overall cost of health care — minimizing the number of steps through which health care services are delivered — the extended-enterprise approach also enhances the patient's access to health care services. As a result, savings can fund improved quality of service or the extension of more services to a greater proportion of the population. Finally, lowered costs for businesses and health insurance providers are returned to the bottom line of those corporations. The focus has shifted to optimizing how health care services are delivered.

Since the late 1980s, business-process reengineering has had a predominantly internal focus, usually on one process within one organizational unit. That's no longer the case. Today, the highest transformation priorities are typically horizontal, cross-boundary processes — efforts at integrating across government agencies, across jurisdictions, or across the public and private sectors. These cross-boundary processes can either be contained within the government enterprise or extend beyond the government enterprise to other governments or to suppliers in the private sector. Fortunately, a convergence of forces is enabling the "perfect storm" in which new business models and new technologies intersect to unleash new cross-boundary capabilities. Leading-edge governments are beginning to perceive themselves in terms of modular business components (groups of people, processes, and technologies) where processes can link across boundaries to connect either internal or external components as needed — on demand. So, how is that possible?

For these new modular business models to work, the IT infrastructure must also be modular. Many elements of cross-boundary processes are still enmeshed in organizational silos with their own IT applications and infrastructures. These IT infrastructures were built to support the automation of individual standalone processes within an organizational unit — not across organizational units. Creating an integrated horizontal or cross-government process entails thinking about the IT agenda in new ways. It requires a highly modular environment in which applications and infrastructure can be easily defined and manipulated. The use of open standards makes it possible to integrate processes that were not originally designed to work together. With open standards, there is no need to re-create applications every time some piece of hardware or software changes. Advances in IT can now support a modular IT infrastructure built to correspond with new, modular business designs. New IT capabilities include tools to integrate existing assets and open standards that support loosely coupled services across boundaries and allow integration with outsourced

components. The overall IT simplification results in a consolidated, logical view of resources.

Many private sector companies have already squeezed out almost all of the cost and time they're going to find using business-process reengineering. A few governments have begun to reach that plateau too. However, the on demand era, with its "componentized" view of the business and IT infrastructures, is a genuine opportunity to leapfrog incremental changes — to integrate disparate, standalone operations and optimize them as a whole so they work better together and deliver additional value. Together, a modular approach to cross-boundary processes coupled with a modular IT infrastructure creates a powerful foundation for change.

Not every government will take the same path. Some will choose to start with a business design and focus on their highest-priority transformation component. Others will opt to simplify their infrastructures to reduce costs, increase flexibility, or eliminate redundancy and excess capacity. Regardless of which steps a government chooses to begin with, the important thing is to start. The next chapter offers a variety of ways to begin the transformation to an on demand world.

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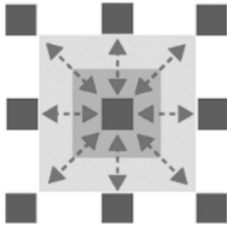
Six Steps to On Demand Government

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Pursuing on demand mode of operating is a journey, in both the private sector and the government. Understanding of the on demand concept and its power to transform an organization may come to senior leadership in a flash of insight. However, converting that insight into appropriate action generally requires the orchestration of seemingly unrelated, even obscure, disciplines and patterns over time — connecting the dots, if you will.

For the sake of simplicity and communication, the approach presented here consists of six steps (shown in Figure 3.1). In reality, the application of this approach is far from linear. Government organizations and their leaders will find that these steps apply whether their organization is looking to progress from one wave to the next or move rapidly through all four waves to become an on demand government. Although it requires more creativity and effort to plan a path through all four waves, the acceleration of progress may be justified based on the benefits of becoming an on demand government.

These steps focus heavily on the coordinated management of three dimensions of change that have generally been thought of as independent or, at best, loosely related: organizational culture, business processes, and information technology infrastructure. Perhaps more than any other characteristic, the organizations realizing new levels of value from technology investments have in common leaders who recognize the need to address and coordinate these three facets of transformation. These areas are so critical that each is covered individually in steps 2 through 4 of this six-step model, and the process of bringing them together is the subject of step 5.
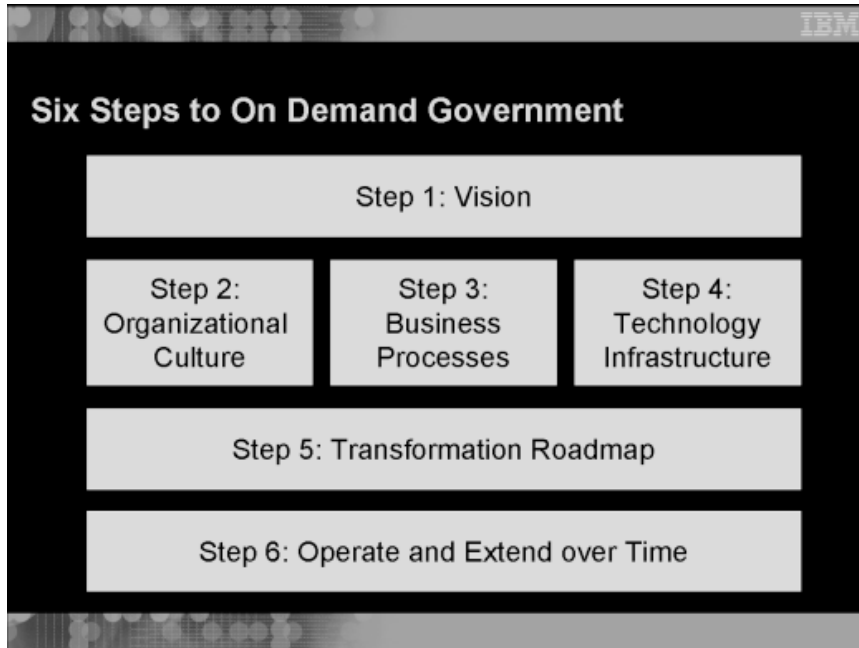
Figure 3.1: The path to on demand government, comprising six integral steps.

The essential value of the six steps is that they provide a deliberate approach to integrating information and technology into the business of government agencies. Earlier stages of e-government deployment were frequently characterized by ad hoc efforts. In some cases, these efforts were sparked by the application of newly available technology; in other cases, they were a response to a business need. Whether the technology enabled business-process changes or the business needs drove a technology search, this approach worked well enough as individual departments created their first Web sites and even as agencies created portals and moved processes online. Many governments, like their business counterparts, have reached a point at which information technology serves less as a productivity aid and more as a strategic tool for organizational success. As this trend progresses, the realization of acceptable returns on e-government investments will require senior leaders to balance technology investment, business needs, and organizational culture.

Step 1: Vision

The process of guiding a government organization through the four waves described in Chapter 2 is not simple. All human institutions assume the organizational equivalents of velocity and direction, which gather momentum just as

they would for physical objects. Larger institutions develop greater momentum and require greater amounts of force to alter their course. Regardless of the size of the organization, greater amounts of change also require the application of more energy to achieve a new course. Government leaders who see the need for change must overcome the inertia of their organizations to achieve the change they desire.

Vision is the guiding light to energize an organization and set it on a path. Recommitment to a clear and widely adopted vision can speed an organization along its current evolutionary course. Creation and communication of a *new* vision is essential to set out in a new direction. Vision is *the* essential tool to captivate the hearts and minds of the people within and outside an organization whose support is needed to accomplish change. People affected by change need to understand why they are being asked to do things differently, how they will provide value in the new organization, and what it will take to be successful in the future. In a government organization, a compelling vision inspires the workforce, taxpayers, legislators, and other stakeholders to embrace the changes required to improve the value of services the agency delivers.

Focus on Critical Customers

Government organizations have devoted much effort to developing vision and mission statements. Much of this work, sadly, has ended up relevant to the organization but less relevant to those whom the organization serves. Many vision statements are so vague or so broad that they don't highlight new directions and cannot be translated into specific actions. Frequently, organizations describe their vision in terms of current challenges and how to overcome them. All too often, visions focus inward and describe problems that seem insurmountable without offering a rationale or justification for trying to surmount them. To be efficacious in encouraging and justifying a transformation, a vision statement should have as its focal point the organization's customers. A vision statement that most effectively inspires an organization to change is one that describes the value the organization can create for its customers.

Creating a compelling vision is about describing an ideal. Moving toward an ideal state stretches thinking about what can be done, creates a context and reason for addressing constraints, and helps identify the tasks and projects required to reach that ideal. Although it may be a new concept for some government organizations, describing the recipients or beneficiaries of government service as *customers* can be transforming in itself. These customers may be individual citizens, business constituents, other government organizations, or even government employees. The proper definition of customer groups will vary from agency to agency. Whatever the choice, the first customers to address in a

vision statement should be the agency's most important customers. Adopting a customer viewpoint shifts the focus of the vision — and the planning it precipitates — away from the government and its procedures and toward the people who receive government services and the value they derive from those services. This technique, referred to as *outside-in thinking,* opens our imaginations to finding innovative ways of doing business rather than focusing on current challenges and incremental approaches to overcome them.

In one of the lasting lessons from the IBM transformation to an on demand environment, we realized we had become too inside-out focused — designing products and offerings because we could or because they were consistent with our organizational beliefs rather than beginning with what our customers needed or wanted. Government's role in society, especially the need for transparency and accountability, makes it even easier for government agencies to focus on *how* they do what they do rather than *why* they do it. This leads quickly to internally focused thinking. The realities of operating in a competitive business marketplace communicate the need for change more rapidly to business leaders than to their government counterparts. Agency history, culture, and even legislation may define what to do and how to do it. Attempts to improve sometimes stall and fail because they run counter to rules and the way people define their roles. Focusing on customer outcomes can be liberating from many of the internal roadblocks because work is defined backward from the customer experience. The promise of an improved customer experience can redefine the processes, skills, and support systems needed to achieve it.

Rethink the Mission and Value Proposition

Any organization's *value proposition* is the description of the benefits that its customers should expect to receive from their interaction with the organization. Government organizations traditionally describe themselves based on *what* they deliver and the *rules* by which they deliver service rather than describing the ways they optimize the value their customers receive. An on demand government culture that focuses on customer needs and the approaches used to create value for customers may redefine many long-held beliefs about what an organization can and cannot do. Many government leaders find that the strongest vision statements are those that describe an enhanced value proposition for critical customers while clarifying the value to other stakeholders — especially taxpayers.

To understand the power of this approach, let's consider the relationship between a government tax agency and the small business constituents it deals with. Traditionally, these small business entrepreneurs would not describe themselves as customers of the tax agency, nor would the tax agency describe the businesses as customers. An entrepreneur's objective is to build a

successful business. The administrative task of dealing with government agencies is often viewed as a distraction from that objective. Typically, a government focuses on ensuring that entrepreneurs "follow the rules." Using outside-in thinking, a government tax agency may realize that its success in generating revenues for government operations is connected to the entrepreneur's success in growing a profitable business. Any time that entrepreneurs spend on understanding and interpreting the tax code or processing government forms is time that they are not spending on important tasks of business growth and job creation. Redefining the value proposition of the tax agency to "help create successful businesses by reducing the time business owners spend calculating and settling their tax liabilities" changes the entire approach to serving this critical customer segment. This shift has obvious appeal to the entrepreneur, but it also benefits the taxpayer since a stronger business community creates more jobs and raises the standard of living.

The shift from a process focus to a customer-value focus can and must be accomplished without compromise to the government agency's statutory and regulatory roles. The benefits of this shift in thinking and action can be felt by the entrepreneur, the government employees, and the government agencies that count on tax revenues to deliver vital services. This tax agency example can be replayed for other tax customers or for other agencies and their respective customers.

One strategy to turn this ideal vision into reality is to expand the interpretation of customer to include the partners and suppliers that serve them. We think of the customer's partners and suppliers as their *extended enterprise*. Government agencies may be able to realize visions like the one above by helping the entrepreneur's partners to provide information in ways that make tax calculation and filing simpler. Taking an extended-enterprise view of the customer's value chain increases the opportunity to find innovative ways to improve value. The extended-enterprise view increases both the quantity and quality of services and should provide flexibility to adapt services over time to meet customers' changing needs.

Drive Change around the Customer Experience

By focusing on delivering improvements to customer value, government organizations and their leaders gain both direction and motivation to undertake transformation. The acid test of a customer-oriented vision is whether the customers themselves agree that their relationship with the government agency would improve if the vision were to become reality. The easiest way to assess customer opinion is to ask individual customers or organizations that represent groups of customers. Better yet, a government agency may wish to involve

customers in defining the value proposition and creating the vision statements to make sure the results are accurate and meaningful.

The customer-centric "imagine this" scenarios that follow are examples of visions that focus attention on the customer experience. Imagination spurs creativity and prevents current problems from limiting progress. The desired customer

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IMAGINE THIS…

Consider the following scenarios that governments have already implemented. The phrase *Imagine This* is used here to expand thinking, break down silos of information, connect processes, and work with partners and suppliers to establish an integrated set of services that better serves the needs of the customer.

» *Imagine* an environment in which a case worker and a citizen meet and quickly validate all of the support programs for which that citizen's family is eligible, tailor a plan to get the family back on its feet, choose local suppliers that best meet the need, and generate an electronic voucher guaranteeing payment.

» *Imagine* an entrepreneur who wants to start a new business. In a single online session, she can review every regulation affecting the business, provide only the necessary information to receive government permits, and receive a list of organizations that provide assistance with launching a business. Once the business is registered, the government proactively sends relevant information and limits requests for new information.

» *Imagine* an environment in which a government "advisor" (a person or a Web site) quickly asks a citizen or a businessperson the exact information needed to complete a transaction. The advisor then processes the information through government departments in multiple jurisdictions to approve the transaction.

» *Imagine* an environment where authorizations to support disaster victims are approved in one session and service delivery begins the next day.

» *Imagine* a citizen receiving a form that includes of all his tax from municipal, regional, and national governments precalculated and consolidated onto a single page with a check box to accept or reject the calculations as they are listed.

» *Imagine* many emergency response teams rushing to a major disaster scene. The activities of the responding units are coordinated in real time and critical information — including maps and real-time incident status — is provided to all participants using secure, wireless communications.

» *Imagine* a military logistics officer who can quickly adjust the entire supply chain to respond to changes in battle plans. Everyone from suppliers to transporters to maintenance depots to field commanders is connected so that new plans are coordinated and confirmed nearly in real time.

experience should be the guiding objective in determining how to modify the business model and in selecting the areas in greatest need of transformation.

Step 2: Organizational Culture

An essential dimension of successful transformation is the creation of an atmosphere that supports progress toward defined goals. When an agency's vision provides a new sense of direction, cultural issues will determine whether the vision is embraced and acted upon or rejected by the organization. The management of culture in a large organization encompasses many factors, including identification and engagement of stakeholders, communication with individuals whose roles and relationships with the organization will change, and the establishment of a leadership structure that can identify and respond to unanticipated issues. The identification, prioritization, and orchestration of steps to turn vision into action are clearly the domain of the most senior leader or group of leaders advocating change. These steps are reinforced through management techniques and governance activities that engage every organizational unit that will be touched by the transformation. This enables leaders to share their perspective with every individual whose relationship with the agency will change over time.

The cornerstone principle for managing the culture of transformation is a focus on people. The information technology community often refers to people within the organization as *users*. Lines of business tend to see them as *assets*, or tools within the production process. These views will be difficult to change across an entire agency in the time span of one transformation project. In the scope of the governance plan and particularly in the management of culture, the senior leadership role is centered on understanding people as… well, *people*. In this context, people can be employees of the organization, customers, participants in the extended enterprise, or any other stakeholders. For better or worse, there is no shortage of people and people-oriented issues in the area of government transformation.

The most common response that requires senior leadership attention takes the following form:

The declaration of a new direction means change is coming.
♦ Change means people must leave their comfort zones.
  ♦ This displacement leads to uncertainty.
    ♦ Uncertainty leads to speculation.
      ♦ Speculation leads to fear.
        ♦ Fear leads to resistance.

Successful leaders in transformation efforts find every opportunity to refocus this thinking, break the negative thought chain, remove the uncertainty, and channel energy into success.

The Role of Executive Leadership

Although many people in the organization will participate in each element of the transformation, the most senior leader must ultimately drive the process from the definition of vision through to the end and must demonstrate a firm commitment to implementing change. Transformation projects led by middle managers rarely succeed, even in the most collegial of enterprises. Change is threatening when people do not understand what it will mean to them personally or how the organization will deal with setbacks or unintended negative consequences encountered on the way to achieving the vision. A good vision explains why change is necessary and where the organization is going, but it must be backed up by leadership that illustrates at every opportunity the meaning of the vision and the organization's determination to achieve it.

The most powerful tool that senior leaders use in performing this role is the delivery of clear, consistent, confident communication. Keeping people informed about where they are and where they are headed is critical to achieving results in an on demand transformation. The natural human tendency to resist change gets reinforced when the workforce sees senior managers failing to model the new behaviors or presenting conflicting views about the organization's direction. Consistent communications keep the organization well informed of progress and reinforce senior management's commitment to implementing change. Surprisingly, the most effective communication is not necessarily voluminous or detailed. Simple messages repeated often and reinforced repeatedly in action can have the greatest effective. It is important to acknowledge issues that must be addressed and provide formal feedback channels that promote buy-in and participation. If the transformation extends to other enterprises — government or nongovernment — the senior leaders of all participating organizations must speak with one voice and demonstrate commitment to the integrated plan.

People may resist change, but they often also give practical feedback about whether and how a particular change will work. Just as a vision may be enhanced through the engagement of customers, cultural issues within a transformation project may be identified and understood through the engagement of people within the organization. One effective device for gaining feedback is the survey. A survey instrument works well in identifying the degree to which people may embrace or resist the new vision. It can also provide senior leaders with perspective on the obstacles to progress. Knowing the barriers to and enablers of constructive change will help in further communication — messages

that accentuate the positive aspects while reducing the perceived barriers usually deliver good results.

Strong support from advocates outside the organization can significantly increase success rates for transformation projects. Support from legislative bodies such as Parliament or Congress is particularly important. Perhaps unknowingly, legislatures create laws and funding directives that reinforce independent silos and discourage cross-government integration. Educating legislators about their critical roles in supporting transformation is critical. Customers are also valuable advocates for change. By articulating the value of transformation, they rally public support and increase the urgency to implement change. When government employees hear their customers and lawmakers encourage change, they may be more inclined to support the difficult actions necessary to achieve that change.

A single, strong leader may be able to establish and implement the governance plan for the smallest transformation projects. Yet, given the size of government organizations, the vast majority of transformation projects require the collaborative leadership of many senior executives. This collaborative aspect introduces some challenges for which there are proven, practical solutions. It is crucial that the leadership team has a common understanding of the project plan, goals, and approaches that will achieve the results described in the vision. A structured, facilitated kickoff event or planning session may be a way to unite the leadership team at the start of the project. Regular, action-oriented meetings of the leadership team to assess progress, address obstacles, and align communication are critical to success. As with other aspects of the governance plan, these meetings need to include representation from all affected organization units within the government and need to explore the cultural, process, and technology issues associated with the transformation.

Establish the Governance Model

The ongoing management of cultural issues within a transformation project requires a plan and a process, which together can be thought of as the governance model. Governance is particularly important in government, where organizational roles and processes are often dictated by laws and regulations and where the needs of various stakeholders don't always align toward a common goal. The governance model starts with the senior leadership team that must approve, direct, review, and visibly support transformation activities. It is extremely important for all units that will experience change to be engaged in the definition and planning efforts so that all affected departments have a voice in the plan. Senior leaders must ensure that every affected organization within their agency is invited and remains active in the governance plan. Failure to

include key parts of the organization allows cultural issues and inertia to dominate over vision, and progress inevitably stalls. Yet, too much attention to preserving existing cultural norms and respecting everyone's opinion may sidetrack overall progress. What's needed is a mechanism that achieves balance without obstructing the process and that makes changes where needed to improve customer value on the journey toward the organization's vision of on demand government.

Governance does not mean decisions should be made by committee or that consensus is required for every detail. The achievement of significant change in reasonable periods of time frequently requires the powerful voice of a strong leader. Good governance does mean the leadership team should document issues and clearly identify required policy or procedural changes needed to address problems or accommodate the new processes. An objective of the governance approach is to provide representation of all stakeholders at the table where transformation is being guided. Without it, senior leaders quickly become deaf to issues that might derail the overall effort and plans overcome by the underlying culture of the organization. A proper governance model requires widespread, active participation and provides a feedback mechanism to redirect complaints into positive efforts and find solutions to achieve the vision.

Step 3: The Business Model

Since an organization's value proposition is delivered by its business processes, value enhancement depends on the deconstruction of existing business activities and their reconstruction in an improved way. This step assumes a position between organizational culture and technology infrastructure for good reason. Step 2's review of an organization's readiness for transformation and development of a governance plan create valuable input for redefining business processes. Similarly, choices to be made concerning technology infrastructure must follow the business-model step because they require a definition of the business processes they are to support.

Define and Build Business-Process Capabilities

Early process-reengineering efforts of the 1980s and 1990s generally focused internally on one process at a time within the boundaries of an organizational unit. It placed greater emphasis on improving existing processes than on rethinking groups of processes. On demand transformations encompass multiple business activities and may cross enterprise boundaries to optimize the end-to-end value chain. Transformation efforts routinely encompass customer transactions, internal financial-support services, engagement of outside suppliers, and so on. On demand transformation looks at these business activities

and processes as parts of a whole and determines the best way to integrate them into an optimized value chain. On demand transformation is challenging; but with proven methodologies and some expert help, it is not as daunting as you may think.

To operate in a customer-centric environment, the workforce must consistently focus on delivering value to the customer. Stu Leonard's, a grocery store in New England, made this commitment clear to everyone through a sign carved in a boulder at the store entrance. "Our Policy — Rule 1: The customer is always right! Rule 2: If the customer is ever wrong, reread Rule 1." Organizations, whether government or commercial, cannot be responsive to customer needs if the priority is on internal measurements, rules, and procedures. Customer satisfaction must be measured and used as a primary criterion for evaluating performance. Good systems include tools to help identify illegal and fraudulent activity. The challenge is to successfully segment customers into those with good intentions and those with bad intentions that must be recognized and handled appropriately.

Many techniques have been used to guide this process. They range from the business process reengineering techniques that surfaced in the 1980s and 1990s to emergent approaches such as component business modeling (see sidebar in step 6). Most of these techniques can be applied to an individual agency or department or to multiple agencies and departments, up to and including the whole of government. There are several aspects that any government should include in this process, regardless of which techniques the organization chooses to employ.

- Establish a manageable scope supported by the seniormost executive sponsor. Taking on fewer projects initially will increase the amount of leadership time and attention that each project receives and will increase the likelihood of success.

- Take a broad view of the customer and his or her environment. If the vision for delivering an enhanced value proposition for customers included identification of their extended enterprise, now is the time to consider how those partners can be engaged in delivering customer value. Many government organizations today are finding that their customers' partners and suppliers may be effective allies to deliver improved government value. To use the tax example introduced earlier, the entrepreneur may receive financial information from banks, tax assistance and advice from accountants, and accounting software from independent software vendors. Any or all of these may be appropriate points of engagement and service delivery by the tax organization

looking to enhance its value to entrepreneurs, an important customer group. These opportunities are overlooked if the extended enterprise is not defined and engaged.

- Explore the possibility that any given process — and the people and information to support it — may be duplicated within a government agency or across agencies with similar missions. As citizens, we experience the symptoms of this when interacting with multiple government agencies, each of which requests the same information about us. Where this duplication exists, there is opportunity to improve customer value generation, reduce government expense, and reduce errors simply by combining processes. Notwithstanding the political challenges of turning two government functions into one, the reduction of duplication is generally an easier step than process transformation.

The various approaches for planning business-process transformation are distinguished by the technique they use to define, group, and categorize business functions and processes. Some begin with a definition of the processes that exist today and attempt to refurbish them. These approaches may be thought of as process evolution. Others, which espouse a "clean slate" philosophy, begin with the selection of critical customers and fashion an ideal approach to serve them. Each approach is suited to a particular environment, and the right choice is the one that works for a given government at a given time.

Whatever the method, these analytical approaches eventually produce a list of candidate processes or projects that a government organization can consider for investment. So, how does an organization choose? Although no formula provides a universal answer, some questions applied to each candidate process or project can lead to revealing answers. When considered collectively, these answers can help to differentiate the areas that represent the best investment potential from those with less impact on the value delivered to customers. Here are three broad areas to consider for each project or process:

- *Strategic implications:* How closely linked to the organization are the project and the process it represents? Is it a process that repeats across government, or one for which this agency alone has the mission and competence? Does it define the agency and its measure of success? In a tax agency, risk management (compliance activities) would almost certainly fall into the strategic category. Taxpayer (customer) account management, while clearly important, is relatively neutral. Procurement processes, however, are basic activities and likely a support service for a tax agency.

- *Financial impact:* How many resources are required to create, maintain, and support the enhancement project? These costs can include outright expenditures or the use of resources such as labor and facilities that might otherwise be applied in other ways. We tend to see projects differentiate themselves based on their consumption of capital or expense. Naturally, the most attractive projects require little capital and produce savings rather than consume resources.

- *Transformation value:* To what degree (high, medium, or low) will a particular project deliver recognizable improvement in the value delivered to the critical customer group?

> ### Core or Non-core?
>
> A critical step in the development and implementation of a new business model is the classification of components into one of two types:
>
> **Core components** are critical to the delivery of the new value proposition. They are recognizable because their output connects directly with customers or controls other components that do.
>
> **Non-core components** are typically outside the direct value chain. They include support services that are vital to running the organization but may not directly deliver customer value.
>
> The identification of a component as core or non-core will influence its priority as a candidate for enhancement and investment as part of the value chain. Some non-core components may stand out as candidates for shared services with other government agencies.

The comparison of candidate projects using these assessment categories will favor concentration on those projects that are strategically important, consume few resources, and would be perceived as value enhancements by the customers being served.

What then of the projects that don't rise to the surface of this list? The easiest answer is to postpone less critical projects until the critical projects are complete. A more recent approach applies to those projects that are not strategic but that are attractive based on their financial and transformation characteristics. In some circles, the preferred terms for strategic and nonstrategic are *core* and *non-core*. Core processes are critical to the successful delivery of the desired service or outcome; they demand attention when performance falls below established standards. Non-core processes include basic support activities. Both core and non-core components should be analyzed to determine the best provider. Which ones should be performed by the government? Which ones could be better performed by a particular agency or partner? Non-core components are candidates for shared services with other government organizations. In some cases a government department

may provide this service to the entire organization. Some of these components can be outsourced to a private provider.

In step 1 and again in step 3, we mention the importance of including the *customer's* extended-enterprise partners within the vision. Those organizations offer opportunities to reach the vision effectively and efficiently. But they are only half of the extended-enterprise story. Government organizations, too, have partners and suppliers that are part of the *government extended enterprise*. These entities can be engaged in the transformation of government processes. In many cases, these entities are already under contract to government agencies as suppliers or service providers. Especially for non-core processes, it may be easier and more cost efficient to expand the responsibilities of existing contractors to perform work or handle peak load requirements identified in the transformation roadmap.

Establish New or Adapt Existing Partnership Models

Process transformation frequently requires business activities to be integrated between a government agency and one or more partners. Business functions may be provided by variety of government and nongovernment partners and used interchangeably. Collaboration across the extended enterprise is instrumental to success. The vision identifies common objectives for all partners. Partnership models define roles, establish collaborative governance systems, and align incentives to focus all partners on the common objectives. Existing contractual relationships evolve to reflect the new operating model.

Transformed processes and integrated infrastructures make it possible to share appropriate information across the extended enterprise, creating a knowledge-based organization. The government workforce and appropriate extended-enterprise partners should be able to quickly access and assimilate necessary information to respond to a customer need on a real-time basis. Policy and management decisions are based on facts, not impressions and intuition. Employees become empowered because they can get the information to help solve customer problems on the first call rather than force the customer to go through multiple conversations about the same issue.

Step 4: Technology Infrastructure

The third of the three focus areas to be addressed, the information technology (IT) infrastructure, assumes its place here after the discussion of step 3 because it must support the work done in the business-process step. Logically, then, it should follow that step; but as a practical matter, the two will interact significantly. It is likely that work will commence on infrastructure before changes to

the business process are fully documented and that consideration of the technology options may actually feed back into the business-process work.

The process of designing an IT infrastructure has many similarities to designing a home or office building. More precisely, designing and building an IT infrastructure is much like remodeling and expanding a home or office building because few organizations are building an IT infrastructure from scratch and few have the luxury of moving out of their existing infrastructure and into a new one. Using the remodeling analogy, the considerations surrounding IT infrastructure management involve overall design issues that determine suitability for a purpose, compatibility with what is already in place, and choices of components and materials to deliver new capabilities.

The capabilities that must be considered in the technology infrastructure cover a wide spectrum and are certainly not limited to "hard" infrastructure items like PCs, servers, and storage devices. Those infrastructure items are increasingly among the last to be addressed and are the easiest to change over time. The items that should be considered earliest in the process of designing technology infrastructure are those that have the longest-lasting impact and are the most difficult to change. These frequently include the selection of standards that will guide the evolution of IT, the choice of major software components that support those standards, and the identification of application software systems that are consistent with the IT plan and that support the new business models.

Define and Build IT Capabilities

One of the guiding tools of transformation that is gaining popularity across governments is the use of an *enterprise architecture* (EA). In *A Practical Guide to Federal Enterprise Architecture*, the U.S. Federal CIO Council defines EA as

> *"a strategic information asset base, which defines the business mission, the information necessary to perform the mission, the technologies necessary to perform the mission, and the transitional processes for implementing new technologies in response to the changing mission needs."*

In essence, EA represents an integrated strategic view of the enterprise both across and within functional areas.

The primary purpose of an EA is to guide an organization's multiple business processes and their associated solutions or systems toward common goals. This tool is crucial for keeping projects on track and even more important in ensuring that today's projects are positioned for smooth growth and extension over

time. An effective EA defines which IT solutions are permissible within the organization and how categories of IT solutions, such as self-service or application integration, must be implemented. These solutions are implemented by using defined standards for various elements of transformation, including business architecture, information architecture, application architecture, technology architecture, and security architecture.

Enhanced business capabilities must be supported by IT capabilities that connect people and provide information needed by the business process. Enterprise architecture defines the standards governing how information is managed and exchanged across departments within an agency, between agencies in a government, and even across enterprises. In this context, *IT capability* includes hardware platforms, operating systems, software, data, and networks required to support the components of the overall business model. The EA provides the framework for selecting specific products and building a capability that can adapt to changing requirements over time.

Several common themes recur in EAs adopted by governments and commercial organizations around the world. While some themes are technical and others are process related, they all ultimately serve one of two purposes: to innovate business processes so they can deliver new value or to make better use of resources and enhance productivity. The measure of success for the architecture, for its components, and ultimately for the services that use it is the delivery of value to the customers who are the focus of the vision discussed in step 2. An *integrated* architecture is essential to support the business model. The on demand operating environment must integrate new systems with legacy systems within government, and it must extend to include customers, partners, and suppliers who are part of the overall value chain.

New IT capabilities must embrace open standards. That is, the systems must use recognized industry standards rather than single-vendor proprietary "standards." The use of industry standards allows governments to maximize their selection of products and offerings that will work together. It also increases the opportunity to implement new functions without disrupting existing operations. Open standards offer ease of evolution and the ability to react quickly when the need arises — for example, when emergencies require two or more government agencies to link their people and data, or when the implementation of legislative requirements leads to the merging or cleaving of existing organizations.

The creation of a transformation roadmap is the essential step that connects the actions of the organization into a cohesive plan. The unique characteristic of an on demand transformation roadmap is the extent to which it integrates

actions leading to process change, actions leading to the evolution of technology infrastructure, and attention to the human issues of change through a focus on organizational culture. The senior leaders of the agency must see that the benefits of transformation that were described in the vision are delivered through the roadmap. The governance approach and the engagement of people both inside and outside the organization can accomplish that.

Step 5: Transformation Roadmap

The most inspiring vision and the best plans for culture, process, and technology generate no value until they are translated into action. Once an agency has described its destination, attention shifts to developing a roadmap for getting there. The challenge at this stage is to transform underperforming business activities and knit them together into an end-to-end, on demand environment that is supported by appropriate technology and people who can make the organization work. The transformation roadmap is a plan that delivers enhanced value for customers, employees, and taxpayers at reasonable cost and with manageable risk.

The tool that aligns the three aspects of transformation discussed in steps 2 through 4 is the governance plan developed by the senior leadership team. Effective management of the transformation roadmap requires active, visible, high-level sponsorship. This is the top-down element of the on demand transformation. The sponsor may be a senior-level politician, a political appointee, or a career civil servant. If the initial sponsor is unlikely to be present throughout the full transformation, it is important to establish a clear succession plan to reinforce that the change program has ongoing support. Otherwise the transformation may stall or may not survive a leadership change.

The building blocks of the transformation roadmap are the individual projects that move an organization toward its vision. Each project would likely have its own steering committee. The governance model will expand to accommodate the voices of individual steering committees and will help to align the work of individual project teams. Projects may address business-process changes, technology changes, or both in concert; but whatever their content, they will need to remain focused on supporting the vision and addressing the cultural issues associated with the people who will be affected by the change.

It is helpful to think of the roadmap as an actual document that can be used to chart the steps represented by each project. This is shown conceptually in Figure 3.2. We think of business processes evolving through several phases of maturity, from independent to integrated, and have depicted this progress on the vertical axis. IT infrastructure, too, progresses from tools that support a

specific process to those that act as a resource supporting the many processes of an entire agency and that gracefully evolve over time. This evolution is shown on the horizontal axis. The individual projects leading to an on demand government enterprise will move an organization in a stair-step progression from wherever they are starting toward the upper right. The key variable that determines how quickly an organization can progress toward its goal is the management of culture.

Fortunately, many proven tools (described below) are being used by senior leaders across government to efficiently achieve the results they seek. These techniques focus on projecting the commitment and intent through successive layers of management so that the top-down intent becomes appropriate, coordinated bottom-up implementation.
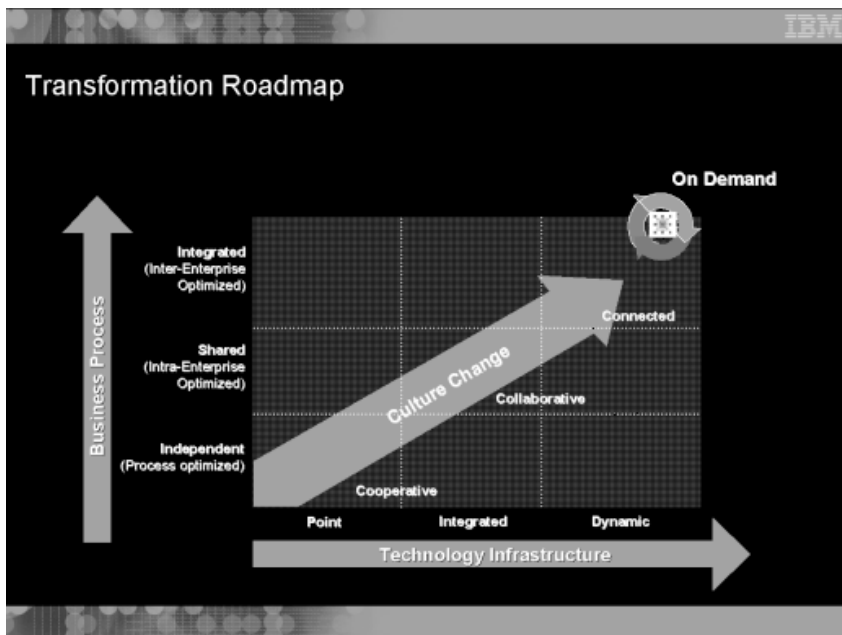
Figure 3.2: Conceptual representation of the six steps to transformation.

New values and expectations must be reflected in all human resource (HR) policies and processes that govern incentives, promotions, pay, employee development, recruiting, and performance measurement. Training, promotions, reward systems, and management development need modification to align with new organizational goals and desired behaviors. Effective HR systems generally combine "carrots" (incentives) and "sticks" (mandatory requirements) to move the

workforce to a higher level of performance that supports the new organizational goals. Changing the HR system, particularly the learning system, is the most visible way to do this. Recognition is a key tool that the senior leader can manage personally. There are few techniques as powerful or as infectious as public recognition delivered personally by the senior leader for people who have demonstrated the right behavior and made big personal strides — even if they are small steps in the overall project.

HR actions can also help allay fears related to uncertainty. Line management and the HR organization can anticipate and address typical questions before they become barriers to progress. People frequently want to know: Will I be valued in the new organization? What will I be asked to do? How will I develop the skills to perform tasks in a new way? Will I be successful when I am given new performance expectations? Descriptions of new behaviors and expectations should specify plans to develop new tools and train the workforce to perform more fulfilling jobs in the future. Many organizations have tremendous success with internal Web sites that become the hub for corporate communications, collaboration, and e-learning. Deployment of these capabilities may be the most productive first project in a transformation where the leadership anticipates significant culture change.

The use of a Web portal to facilitate communication from senior leaders to customers, employees, and partners is a proven, effective technique. The concept of a communication portal can be extended to include other services that support project success. The scope of many projects requires people to locate and collaborate with people from other organizations or departments. In fact, this is frequently an essential step to break down the silo structures that impede progress. These actions can be facilitated by tools available on employees' desktops or through the portal. Collaborative work implies sharing of information, and yet an old adage queries, "If information is power, then why would I ever share it?" Effective collaboration tools, reinforced by recognition and reward, can help people to become less protective of jobs, organizations, and the status quo and start being collaborative with other agencies, customers, and partners.

Traditional training programs from IT and from lines of business generally center on how-to activities. In the move toward an on demand mode of operation, an organization needs to lift training out of its automation focus and develop it into learning how to look different and to be different. In short, the organization needs to help people transform, thus changing the culture that determines the organization's values and governs how people interact and respond to customers.

In the third step, which focused on definition of a new business model, the analysis of business processes and their attractiveness for transformation should have uncovered four to six areas that are prime candidates for immediate attention within the roadmap. The development of a transformation roadmap focuses on how to migrate these activities, including the people, processes, organizations, and information that comprise them, to deliver greater customer value. Reengineering these components is a prerequisite to constructing the new value proposition and moving toward the vision of enhanced customer value. Beyond these activities to receive top focus are likely the processes that are candidates for consolidation into common support services with other government agencies.

Much of the roadmap focuses on the managing of transitions. No organization has the luxury of being able to shut down existing services while it builds new capabilities for the future. This is true of both the business processes and the IT infrastructure that supports them. Here again, the analogy of renovating a home or office can be applied to transformation projects in government. During a building renovation we may wonder how the organization will receive mail while the mail room is being relocated or where employees will eat while the kitchen is torn up. In a transformation project we may encounter similar questions — for example, how to handle new applications for benefits while the case management process is being migrated and the organization is being retrained. None of these issues is easy, but history and personal experience tell us each can be solved.

One of the first questions in building the roadmap is cost, which is usually immediately followed by the question of how the organization will pay for the transformation project. The answers to those questions lead many successful transformations to start by creating shared services for common support functions. Centralizing and reengineering back-office functions reduces support costs and provides savings that can be reinvested in other transformation efforts. Frequently, the first candidate to transform into a shared service is IT operations. Centralization and consolidation of IT can reduce costs and accelerate implementation of integrated infrastructures based on open standards. This enables collaboration and information sharing across the enterprise. The savings realized may equal the cost of the consolidation effort in less than 12 months. Procurement, HR, and finance are also good candidates for shared services. Consolidating payroll, employee benefits, and other HR support programs generates significant savings; and the use of employee portals accelerates the development of new skills and enhances timely communication across the enterprise. A 2004 European Commission survey titled "Reorganizing of Government Back Offices for Better Electronic Public Services — European Good Practices" recommends downsizing administrations (the back office) and

upsizing services. The report refers to research in Denmark that found that technology generates 20 percent of the savings from reorganization. Eighty percent of savings originate from the redesign of processes!

Central funding of a substantial part of this investment increases organizational willingness to collaborate on new projects. Mechanisms that enable departments to retain part of the savings also encourage innovation. Savings can be reinvested in future transformation projects by replenishing a central fund. Typically, government initiatives to generate new sources of revenue from Web advertising and user fees do not produce enough funding for transformations. Likewise, initiatives to attract private funding in exchange for future benefits or transaction revenues generally fail. Private investments build new capabilities, but savings and benefits depend on government agencies' actions that are outside the control of private investors. Political pressures, public concerns, and other unanticipated factors often limit governments' willingness to act. Private funding works with toll roads and parking tickets because private firms can take action to generate return on investments; but when all or part of the control of actions remains with government, the results rarely meet expectations.

Step 6: Operate and Adapt over Time

Government processes have traditionally operated within the separate silos of defined departments, offices, and bureaus. A traditional hierarchical decision-making process is sufficient to sense and respond to change in this environment since changes are contained within a silo and the only external actions concern the interchange of information between silos. As integrated processes involve multiple organizations, a more collaborative decision-making process is needed because the likelihood is greater that a process change in one department will trigger the need for change in others. Participants must think beyond the borders of their specific responsibility to make sure that real value is delivered to the customer. Collaborative organizations share information, consult experts in other areas, and include others in important decisions.

Operating the New Model

The introduction of the first transformed components and business activities marks a pivotal transition period. Success gives the organization confidence to proceed with the ongoing transformation. Existing problems may actually be magnified at this point, and implementation challenges are sure to emerge. This gives skeptics a chance to undermine the change. Careful attention to the rollout plans for new functions can dramatically increase the chance for success. Although schedules cannot be delayed indefinitely, it is important to carry out training and other preparations well, even if it means pushing back the

implementation dates. Pilot implementations with a small subset of intended users provide opportunities to identify and correct problems before large rollout plans begin.

The governance model and senior leadership requirements defined in earlier steps do not diminish in importance when the project is implemented. Leaders need to be very visible during this period — encouraging, listening, and taking appropriate action on issues as they are identified. Customers play a prominent role in this transition by providing feedback and describing the positive impact of changes. Communication is especially vital during the initial stages of implementation and remains important as the implementation moves forward. Senior leaders must act as one voice to candidly report progress, celebrate small successes, and demonstrate a willingness to listen and take action when necessary to correct problems.

Once the initial high-priority changes are successfully implemented, the focus shifts to other business activities targeted for change. The organization should be more accepting of changes after initial successes. However, each new transformation step requires the same careful attention to the human aspects of change to keep the positive momentum building. Although planning and design of multiple projects can occur simultaneously, the implementation of new activities should be scheduled so that leaders can track progress and react quickly to any unexpected problems or issues.

Systematically Track and Measure Business Value

You get what you measure. Every business activity needs measurements to track performance and validate the business value delivered to customers. Available benchmarks from similar business activities in government and the private sector help establish both relevant measurements and realistic objectives. Publishing the performance results periodically and using the defined metrics for new business activities will communicate progress and reinforce the commitment to deliver value. To that end, balanced scorecards that consolidate measurements in a single report or *dashboard* are an effective way to communicate status and progress to all stakeholders. Good measurements identify problems early, validate that the expected value is being achieved, and provide data to demonstrate the return on investment.

Performance metrics for business activities must define desired outcomes and focus the organization on producing expected results. Typical metrics include input and output volumes for the major segments of the new processes, cycle times for key processes within the business activity, customer satisfaction, service quality, and efficiency. Responsiveness may be measured with service-level agreements that define how functions will deliver value to other functions of

the organization or to customers and extended-enterprise partners. As change is implemented, metrics provide a yardstick to ensure transformation initiatives achieve desired results. Without a robust set of performance metrics, leaders are often unable to attribute savings to performance improvements and momentum is lost.

At each step, measurements help determine whether the transformation initiative is working, call attention to any adjustments that are needed, and, most importantly, demonstrate results and justify future investments as savings are realized.

Extend the Business Model

Implementing and operating the new model are only the beginning of an ongoing transformation. No environment is static. Even if plans are implemented perfectly, a high probability exists that critical customer needs or some other part of the environment will change significantly before the transformation is complete. This is certainly no reason to slow down or stop transformation activity. Ideally, this inevitability should be recognized in vision statements and communications about the future; ignoring the need for change won't improve anything. The best approach for addressing change allows the model to adapt over time in a way that expands functions and minimizes disruptions.

Good business models include feedback mechanisms that monitor progress and capture ideas for improving outcomes. Without proactive management, good ideas never get implemented. Continued use of a strong governance system will actively solicit feedback to improve operations from customers and partners and monitor the marketplace to recognize new trends and developments of impact to the services being delivered. If monitoring the marketplace is not a core competency of the organization, consider adding a partner or contracting for a service that can provide input on trends and directions. The stimulus for change may be obvious — for example, a new legislative mandate or a national crisis — but proactive management systems are always looking for ways to improve outcomes and the value of services delivered.

Enhance the Process and Technology Infrastructure

The organization's perception of core and non-core processes and the availability of new options to acquire service and support may change the choices for how to achieve results. Increasingly, governments are using an approach called business transformation outsourcing (BTO) for non-core business activities that need significant transformation. This has been done successfully in the past for collection of parking ticket fines, toll road payments, and other revenues. To take advantage of competencies that have been developed in the private sector,

governments are considering BTO for broader functions in HR, finance, and procurement. BTO, essentially an extension of the shared-services approach to nongovernment service providers, can often be implemented more quickly and efficiently than an in-house transformation.

The rapid pace of technological change makes IT a good candidate for consolidation and centralized management. Industry standards and well-designed EAs define the interfaces between components and their IT support systems. Consolidation reduces complexity and makes it easier to implement consistent security across the enterprise. Technology enhancement and user support structures are easier to implement and manage in a centralized environment. Moving IT management to a centralized agency or commercial company can save costs and provide better access to skills needed to implement new technologies.

A well-designed EA provides flexibility to deploy alternative computing approaches in support of evolving business models. The combination of architecture and implementation may be judged on its ability to extend the value of an organization's past system investments, meet its current needs, and provide flexibility to address as yet undiscovered challenges. Many government agencies have an increased appreciation of the value that can be realized through rapid connection of information that they and their partners already possess. In the areas of defense, intelligence and law enforcement, the advantages are most visible to the public; but system compatibility is no less critical to mission success in agencies that specialize in social services, tax, and other areas. This is the type of challenge that an agency-appropriate EA can position government organizations to overcome.

Among the new techniques that will likely find their place in the architectures of government agencies in the coming years are grid computing and Web services. Grid computing allows systems and the storage that attaches to them to be interconnected into a network that allows them to function as if they were one large computer. This has obvious value in improving the utilization and efficiency of the IT hardware, but its full value is much greater than that. The fact that many computers can be connected using available networking connections allows their information to be combined rapidly when government needs require it. The physical connections and operating environment created by grid computing can be extended by the software tools that implement Web services. Such tools greatly enhance the ability for software systems to locate one another within a network and to share the data that they manage in ways that make sense. It should come as no surprise that these capabilities are implemented through the use of open standards. This connection between

architecture, standards, the computing environment, and an organization's ability to address emerging needs will grow clearer and tighter in the coming years.

Less dramatic examples of the value of flexibility will appear also. A flexible architecture will allow non-core functions to be outsourced to organizations that provide a broader array of services and expertise to improve productivity, support structures, and efficiency. Many organizations are beginning to offer utility-like computing capability so that multiple enterprises can share applications. Within government, there is likely to be an increase in the use of shared services where one government entity with an area of expertise offers its services to others. This utility model may work like a wall outlet for electricity in that a customer plugs into the computing network and only pays for what is used. This technique is well suited to services such as e-learning, management of benefit programs, or high-performance computing.

Monitor Organization Attitude and Adjust Culture

Changes in culture need to keep pace with a changing environment. New values must be constantly reinforced because skeptics will continually look for signs of inconsistency in leadership behavior and in the way values are incorporated into HR systems. Once the transformation begins to show results, enthusiasm builds quickly, particularly if new ideas are welcomed and implemented when they improve operations. The best approach to building positive momentum is to treat employees like customers, measuring satisfaction and monitoring buy-in to new values and changes in operations.

The more the enterprise integrates with other organizations, the more important the governance system becomes. All participants must have confidence that they have a voice in decisions and that final recommendations are based on objective assessments, not on political favors — a particular challenge in government, where political forces are strong. Strong customer advocates, effective decision-support systems, and sound metrics that measure outcomes are essential to objective decisions.

On the Horizon: Component Business Modeling

The challenges associated with selection and deployment of traditional business-process redesign tools have surfaced as an impediment to progress in reengineering efforts. A new approach suited to the current environment is needed. One such approach, component business modeling or CBM, is previewed in the sidebar that follows.

Catalyst: A Methodology for Component Business Modeling

Over the past year, IBM Business Consulting Services and IBM Research and Development collaborated to develop Catalyst, an innovative analytical technique used to model and view an enterprise in terms of business components and the services each component uses or provides. Components are the basic building blocks of an enterprise. The enterprise could be defined as the entire government, only one part (an agency or department), or some combination of agencies and departments. There is a saying that you can move boxes around in an organizational chart, but it leaves untouched the underlying networks of people and processes. Getting to the basic building blocks, or components, is essential to efforts to create on demand government.

Catalyst is not a process modeling technique, nor is it a view of organizational units. It is a component, or modular, view of government, which is different from a process view, although the two complement each other. A process is basically a set of sequential business activities (step 1, step 2, … step n) that create some business value. The component view identifies the resources needed to support processes that can be invoked in whatever order needed. The primary purpose of a process view is to analyze a specific process in terms of where steps might be improved, automated, or eliminated to reduce the cost or time involved or to improve performance. The primary purpose of a component view is to assess the efficiency and effectiveness of resources (people, IT, etc.) supporting desired processes. Techniques to analyze processes are well developed; they have been in wide use for at least 15 years. Analysis through business modeling — that is, business components — is more recent. The business-model view looks at existing components and organizes them differently (eliminates duplication, ensures that they are aligned most effectively) and exposes activities through "services." In other words, you can reorganize an entire enterprise around a component structure and still have the same types of process flows — the components (group of people, IT, etc.) replace the "steps" in a process. Potentially, the result is greater flexibility and optimization.

By viewing the enterprise as a collection of components from multiple perspectives, you can identify and prioritize transformation initiatives, determine where to invest more resources, or determine where you can free up resources by opting for an outsourced solution that integrates well with both the process and the technology. When an enterprise is broken down into components (typically 50 to 60) across competencies and accountability levels (strategy, tactics, and execution), the result is enlightening. You may find 5 to 10 versions of the same component! By viewing each component as a standalone service, you begin to see new possibilities — outsource it, use it as a Web service, make it a utility, develop it as a shared service across the enterprise. This modular view is essential to becoming an on demand enterprise — where components can be swapped in and out, switched around and recombined, at will.

The first step in using the CBM is to identify business competencies and all the business components that are involved in each competency. Components have discrete boundaries defined by the services they offer or use, and they include people and technologies. Components may represent only one step in a larger process involving other components, or they may represent a standalone process. Components may or may not correspond to a single organizational unit.

The next step highlights which components are core, or critical to the successful delivery of a desired service, and which ones are non-core, representing basic support activities. This classification helps in deciding which components have the greatest impact, and in what way, on the on demand environment.

Next comes an analysis of costs associated with each component. The result is a categorization of components with high capital costs, with high operational costs, and with both. The final step is to evaluate the components from several perspectives — core/non-core, cost, capital — to identify and prioritize transformation candidates.

Some components could be outsourced to private providers. Many non-core components may require highly developed competencies and could be delivered more effectively by other organizations. Commodity-type components — for example, credit approvals — could be provided on a transaction basis. Such an approach allows governments to build alliances with networks of providers that have world-class capabilities.

In some cases, a particular component may be assignable to other components, offering an opportunity to improve efficiency and lower costs. For example, most enterprises require a customer database to support a variety of components. Part of the data may reside within multiple components of the enterprise, thus creating duplicate or inconsistent data. Analysis may reveal that a customer database could serve as a single resource needed by multiple components. Common rules for updating and accessing data would be defined to support all the components that need information from the database.

The component(s) selected as critical to an on demand environment may involve only part of an overall process that touches multiple components (a classic cross-government process). The power of the modular approach is that each component in a process can be designed to operate regardless of the provider. In other words, if each component (people, IT) is designed with this concept in mind, then all the process pieces can snap into place seamlessly. This holds true even if a component is outsourced. Of course, open standards are essential.

In today's pragmatic environment, few organizations are prepared to undergo the entire on demand transformation in one fell swoop. Most companies and governments prefer an incremental approach, starting from various possible points. Thus, the decision to focus on key components is an effective way to begin.

The connections between technology and mission performance are becoming stronger in private sector organizations and in government. This interrelatedness is driving the emergence of new techniques in computing, business organization, and leadership techniques. Although governments have been perceived as late adopters of some earlier phases of computing, strong evidence suggests that they will be near the forefront in adopting techniques such as Web services and grid computing. Underlying this shift is the recognition that governments, as the center of many cross-industry processes, are points of national and community value creation. Governments that understand where they want to be positioned on the four waves described in Chapter 2 can use the six steps described here to minimize the risk and shorten the time it takes to reach their goals. Of course, both the business needs and the available technologies will change, making this effort more of a journey of discovery than a trip to a known destination.

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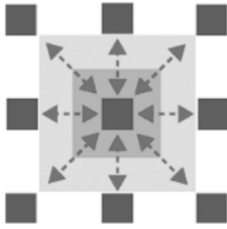
Case Studies in Governance and Cross-Organizational Change Management

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Global Government Industry

In the preceding chapters, it became clear that transformation to an on de-mand government requires (1) a determined program, spearheaded by lead-ers at the highest levels, and (2) a focus on delivering to customers a set of integrated services. The services benefit customers and governments most when integrated so as to optimize the competencies of government and its com-plementary partners and suppliers. Chapter 3 in particular described how transformations involve changes in three areas — process, culture, and infra-structure. The question addressed here is how to implement these changes in a way that produces the desired outcome.

Many governments find progress on e-government slowed by ineffective gover-nance models and a lack of processes that drive cross-government integration. While many may agree on the need for combining and streamlining processes, most existing systems and processes reinforce independent hierarchies that prefer to operate as separate silos. Every government responsibility, from en-abling legislation to reporting and reviewing requirements and even to the bud-geting process, reinforces an independent operating environment. Breaking down walls and integrating processes across government entities requires changes to almost all the traditional ways of managing government agencies.

Two examples illustrate how to implement new systems of governance and change management in a decentralized environment. The first case, although not a government example, is a study of the successful transformation efforts of IBM, a large, complex, decentralized organization that approaches the size and

scale of a large government. IBM started its transformation with over 400,000 employees distributed across very decentralized organizations, called countries and product divisions, that operated in much the same way as many government departments do today. Many, if not most, of the lessons learned in this successful transformation can be directly implemented in government. The second case involves the U.S. federal government. Though still in the initial stages of transformation, the case provides good examples of techniques and processes that can be used to drive cross-organizational integration.

Case Study: IBM Corporation

In the late 1980s and early 1990s, IBM struggled to adapt to a changing marketplace. The longtime industry leader suddenly began reporting losses, and the stock price plummeted to less than 25 percent of its peak value. Although the need for change was obvious, there was no consensus on what to do or how to do it. Over 400,000 employees expected that hard work would be rewarded with lifetime employment, as had been case through IBM's history. IBM operated in over 120 countries with unique cultures and produced over 30,000 products through laboratories and development organizations that operated independently.

The popular opinion among financial analysts and management experts at the time was that IBM should be broken into manageable pieces that could compete independently in the marketplace. Following this advice, John Akers, the chairman and CEO, encouraged leaders of his major organizations to create transformation plans to make business units more responsive to their customers. Although significant changes were made, the overall performance of IBM did not improve significantly. In 1993, Lou Gerstner was named chairman and CEO and was given the mandate to remake IBM into a successful enterprise. You can read Gerstner's firsthand account of how he led the successful IBM transformation in his book, *Who Says Elephants Can't Dance?* IDC has also written an in-depth case study on the transformation called *Business Transformation Through End-to-End Integration* (August 2002; reprints available through IBM). Several important lessons learned from the IBM transformation reinforce and illustrate the six-step process described in Chapter 3.

Create the Vision

Before joining IBM, Gerstner was an IBM customer at both American Express and RJR Nabisco. He underscored this experience by telling audiences that a customer was now running IBM. One of his highest priorities after becoming CEO was to talk with customers and a wide range of IBM employees to get their views of what IBM should do to reinvent itself. These discussions and

other analyses led him to the conclusion that the right approach was to integrate IBM into a global company that provides fully integrated solutions, not piecemeal parts, to customers. Although he did not call this the company's vision at the time, it became the theme that connected with employees and customers. He later coined the term e-business to describe the way IBM wanted to operate as a company. This became the mantra that energized the company and drove the successful transformation of IBM. It was simple, clear, and, most importantly, reflected what the market was telling us was needed. Of course there were many strategies and plans behind this simple message, but no one was confused about where IBM was going and why we needed to get there quickly.

Leadership and Governance

Establishing a vision to integrate IBM globally was an important first step, but deciding how to achieve the vision was a huge challenge. There was no precedent for transformation in a company as large and diverse as IBM. Virtually every country and product development site had its own systems and culture. Although everyone was an IBMer, most employees had a greater affinity to their individual units than to IBM as a whole. Several factors were important in changing this perspective.

1. Gerstner established a senior leadership team to drive and manage the transformation. They met regularly to discuss plans for transformation projects and acted as an integrated team to address issues and communicate progress.

2. Gerstner's memos to the entire workforce, many of which are included in his book, clearly communicated expectations and progress. The senior leadership team spoke with one consistent voice in both what they said and what they did.

3. The senior leadership team led the governance system. They approved the overall plan to ensure alignment of investments and strategy, reviewed specific projects, and monitored overall progress on a biweekly basis. This team selected the key processes to be transformed and implemented across the entire corporation. A senior leadership team member was assigned responsibility for leading the effort to change key processes.

4. Business executives with deep experience in specific functions were assigned to lead cross-organization process transformation teams, reporting to the responsible senior leadership team member.

5. Organizations affected by the targeted processes had representatives on the transformation teams. Feedback mechanisms were created to allow units to raise issues with both the transformation teams and the senior leadership team, if required.

6. The transformation projects were coordinated by the IBM CIO to ensure that a consistent change process was followed, information system requirements were well understood, and an integrated architecture could be implemented across IBM.

Shared Services — A Key Enabler to Enterprise Integration

Functions such as finance, procurement, IT, and legal were organized into shared services units to support all of IBM. Instead of reporting directly to individual units, everyone who provided a particular function reported to central management responsible for that function. As the leader of a large unit, I was initially very uncomfortable with this decision because traditional IBM systems did not support the unique reporting and certification requirements in my U.S. federal marketplace — requirements that carried stiff penalties for improper compliance. In retrospect, the shared services approach was the only viable way to accomplish our goal of integrating IBM. Having the people who understood my marketplace as active participants in designing the transformed processes gave me more, not less, input into the process. These central teams became the common infrastructure to make it possible to collaborate with IBMers across the entire world who had similar customer requirements. This enabled us to share skills and experiences that would help us serve our customers better. Ultimately, the savings from this centralized approach made us much more cost competitive in the marketplace.

The Transformation Roadmap

We took a modular approach at both the corporate and process levels to design and optimize the new processes. The corporate model shown in Figure 4.1 identifies key processes transformed and implemented globally.

Transformation teams then broke each process into detailed components, looking for innovative ways to improve efficiency and produce more effective outcomes. In most cases, customers, suppliers, partners, employees, and other stakeholders participated in the analysis, design, and assessment phases of this work. Using the modular approach, teams evaluated each component in the new model to determine the best partner or supplier to perform the function. Much of the information technology (IT) function is now outsourced to an IBM services unit that provides this capability to customers. In the redesigned procurement process, IBM selected a set of strategic suppliers globally that are

now included at the very beginning of a product's design phase. This approach of incorporating supplier expertise directly into IBM product plans is much more efficient than having IBM designers give specifications to a supplier for a component that may have to be uniquely designed and manufactured.

IBM Transformation

Stakeholders

Integrated Product Development

Integrated Supply Chain

Procurement | Production | Fulfillment

Customer Relationship Management

Suppliers | Customers

Human Resources | Finance

Employees
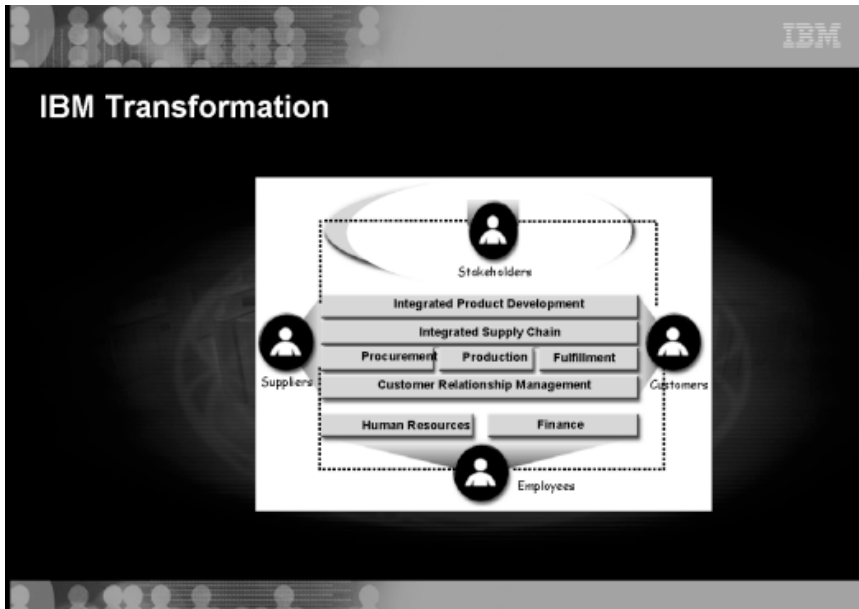
Figure 4.1: IBM's corporate model for transforming key processes.

Transformation leaders and project teams were identified early to analyze corporate processes. However, the most senior leadership team started with human resources and finance. Analyzing these areas, along with rationalizing the IT infrastructure, produced near-term cost savings that were reinvested in other transformation projects and provided the foundation for managing people and business in a more effective manner. This focus on a few processes also enabled the senior leadership team to produce early successes and increase confidence that other transformations could be successfully implemented. In fact, the confidence and momentum gained from these early projects allowed IBM to more quickly adapt to incorporate new capabilities as opportunities arose (such as the use of the Internet to connect with customers and suppliers).

Measuring Results

Performance metrics were established for each process transformation. Baselines and objectives were set and measured using a variety of metrics, including reductions in centers, cost savings, cycle-time reductions, error reduction, and

utilization of the new processes. The lists in Figure 4.2 summarize some of the results and metrics used for IBM processes that are similar to those used in government. Tracking and publishing these results clearly demonstrated the value of transformation projects and increased buy-in across the corporation. Establishing metrics facilitated benchmarking with other organizations to establish best-of-breed performance standards.

Benefits of Transformation

Infrastructure and Governance
•CIOs: from 128 to 1
•Data centers: from 155 to 10
•Networks: from 31 to 1
•Applications: from 16,000 to 4,926

Human Resources
•HR operations centers: from 38 to 1
•HR data centers: from 21 to 1
•Key applications: from 168 to 71

Supply Chain Improvements in 2003
•$7B+ in cost reductions
•Reduced sales force time spent on supply chain by 20%
•Inventory levels reach 30-year low
•$700M in cost reductions in IBM Global Services

On Demand Workplace
•$2B in annual cost savings
•Almost 50% of training delivered over the Web
•69% of managers see time savings from manager portal

Figure 4.2: Some measurable benefits of IBM's transformed processes.

Reinvesting IT Savings

Savings from consolidating the IT infrastructure funded significant parts of the initial transformation activity. Consolidating data centers and networks produced savings in the first year. A portion of those savings were reinvested to support transformation of the cross-IBM projects. Help-desk costs dropped dramatically when the corporation standardized its employees' workstations globally to just four configurations, thus simplifying challenges to provide security, update software, and resolve software problems. Over a 10-year period, overall IT costs dropped 31 percent despite the major investments required to handle increased volume, new software and other functionality, and more responsive service levels. In any given year, almost half the savings were reinvested in some part of the transformation. Savings were accelerated by the outsourcing of IT operations to IBM Global Services, but it is important to note that the

outsourcing occurred only after the IT requirements to support the transformation had been well defined.

Managing Culture Change

IBM's employee Web site was an important tool in sustaining the organization during the most difficult years of the transformation. It facilitated the change from a culture dependent upon immediate managers to a high-performance culture in which individuals are empowered to take responsibility for business and personal growth. The Web site promotes collaboration and timely communication across the corporation and is the primary instrument for increasing personal productivity and reducing reliance on costly, labor-intensive support structures. Even today the site is updated constantly to increase functionality. The Web site is used for performance management, accessing and changing benefits, expense accounting, procurement, skill assessment, career planning, e-learning, and e-meetings. It also provides information retrieval and a contact directory for all employees. Over 95 percent of IBM employees sign onto the site every day. It is our most effective medium for corporate communications and reporting on important marketplace developments. The Web site not only increases workforce productivity but also is a key investment to develop new skills and build collaborative networks. IBM's on demand workplace is described in Chapter 9.

Extending the Model

The IBM transformation is an ongoing process. All of the original processes were modified or even transformed several times to improve performance and incorporate new functions. Cross-organizational investment teams still consider new investment proposals, allocate funding, and monitor progress at critical milestones. Most processes use commercial off-the-shelf software to facilitate upgrades and the addition of new functions. Once the key process transformations were under way, the senior leadership shifted its focus to broader value-chain optimization. Instead of taking an isolated view of the customer for an individual process, the corporation began to look across lines of business and the collection of processes to determine the best way to optimize end-to-end integration. Use of a common infrastructure with a consistent architecture for all the corporate processes made this integration and optimization possible.

Sam Palmisano, a key member of the senior leadership team that led and managed the transformation, is now CEO of IBM. He is leading IBM aggressively into the on demand wave of transformation. Areas of major focus include making the supply chain even more responsive to the marketplace and creating an

on demand workplace for employees. IBM now outsources some manufacturing operations and brings new partners into the supply chain. Partner offerings with lower transaction costs and more functionality enhance and often replace functions traditionally performed internally. For example, employee investment portfolios are now managed through a partner that offers new capabilities. All business activities are being analyzed to determine innovative ways to use partners, technology, and new approaches to improve efficiency and effectiveness.

Applying Lessons Learned to Government

Most of the IBM lessons learned apply directly to government transformations. Corporate processes, especially shared support services, are good models and benchmark candidates. The transformation methodologies, IT architectures, and approaches to reinvest savings apply to any organization. Transformation is still hard, but good examples and role models — especially in large, complex organizations — do help.

Resilience and determination are crucial to success. IBM encountered many unexpected challenges and marketplace changes during its transformation; in fact, many of the transformation projects had to be stopped and redone because they did not deliver the projected business results or could not adapt to a changing environment. Others required major modifications once they were implemented.

Strong feedback systems and a willingness to understand and address problems will reassure users that corrections will be made quickly. Organizational resolve starts at the top and builds with every success. These experiences should give governments the confidence to implement successful transformations.

Case Study: Cross-Government Integration in the U.S. Federal Government

One of the best examples of the six-step model in action is the e-government initiative in the U.S. federal government. This effort was led initially by Mark Forman, the first U.S. administrator for e-government and IT. As a consulting principal at IBM, Forman participated in developing the approach and methodologies described in this book. Before joining IBM, he had extensive experience in both the executive and legislative branches of government. Forman's government experience gave him a good understanding of the importance of the budget process in driving behavior. In his position as e-government and IT administrator, Forman is not considered a separate government CIO who

would presumably report to the president; instead, he reports to the director of the Office of Management and Budget — effectively the COO of government. Rather than managing the technical teams, Forman creates an IT governance process to drive improved results using the budget process that approved expenditures.

Cross-government integration and transformation became a priority for the U.S. federal government as a result of President Bush's management agenda, summarized here.

- Strategic Management of Human Capital
    - Adopt IT to capture employees' knowledge and skills
    - Acquire and develop talent and leadership

- Competitive Sourcing
    - Improve procedures to evaluate public and private sources
    - Better publicize activities subject to competition

- Improved Financial Performance
    - Baseline erroneous payments and establish goals for reduction
    - Ensure that financial systems produce accurate and timely information

- Expanded Electronic Government
    - Simplify and unify around citizen needs
    - Support projects that operate across agency boundaries
    - Maximize interoperability and minimize redundancy

- Budget and Performance Integration
    - Use performance information to make budget decisions
    - Link performance and cost in a performance budget

The president's endorsement and proactive support elevated the importance of these priorities. Senior-level business leaders, not just CIOs, became accountable for delivering results and driving the necessary transformations within and across agencies and departments.

The e-government initiative began with a review of planned and ongoing projects across federal agencies and departments. The review, called Quicksilver, produced several important pieces of output. The first, a matrix (a portion of which is shown in Figure 4.3), summarizes the type of projects by agency.

Figure 4.3: Matrix showing areas of duplicated function for potential consolidation.

The matrix clearly illustrates the opportunity to save money and improve results by consolidating similar projects across agency boundaries. From the entire matrix, the e-government team identified 100 projects as good candidates for cross-government integration. The Quicksilver review also enabled the team to refine the e-government vision as follows.

The Vision: an order-of-magnitude improvement in the federal government's value proposition to the citizen, with decisions made in minutes or hours, not weeks or months.

E-Government Definition: the use of digital technologies to transform government operations in order to improve effectiveness, efficiency, and service delivery.

The Principles:

- Citizen-centered, results-oriented, market-based
- Integral component of President's Management Agenda
- Simplify and unify

Notice the focus on transformation, customers, results, and market-based measures. The mantra, "simplify and unify," drives process transformations. Individual project teams created specific visions to conform to these principles. An

important element of success was that the Quicksilver team comprised se-
nior-government career employees from a broad set of disciplines who had ac-
complished at least one major management reform.

To drive the transformation and cross-government integration, the e-govern-
ment team turned to the President's Management Council (PMC). The PMC is
an organization made up of deputy secretaries, the No. 2 political officials who
function as COOs in departments and major agencies. This group selected the
25 projects listed in Figure 4.4 as the focus for cross-government integration.
These projects straddle four major customer sets — citizens, businesses, em-
ployees (internal effectiveness and efficiency), and other governments. A PMC
member and his or her respective CIO became advocates for each of the 25 pro-
jects. Agencies participating in a specific project were called partners, and the
agency with the most program exposure, talent, or resources assumed the role
of managing partner. The PMC reviewed progress quarterly and reported re-
sults to the president and his cabinet.

Figure 4.4: Projects selected for cross-government integration.

To increase focus on the President's Management Agenda (PMA), a scorecard
was developed to assess individual agencies on both the overall status and the
implementation progress of projects supporting the five PMA priorities.

Assessments were presented in red (unsatisfactory), yellow (mixed results), and green (success). A sample of the scorecard is shown in Figure 4.5.
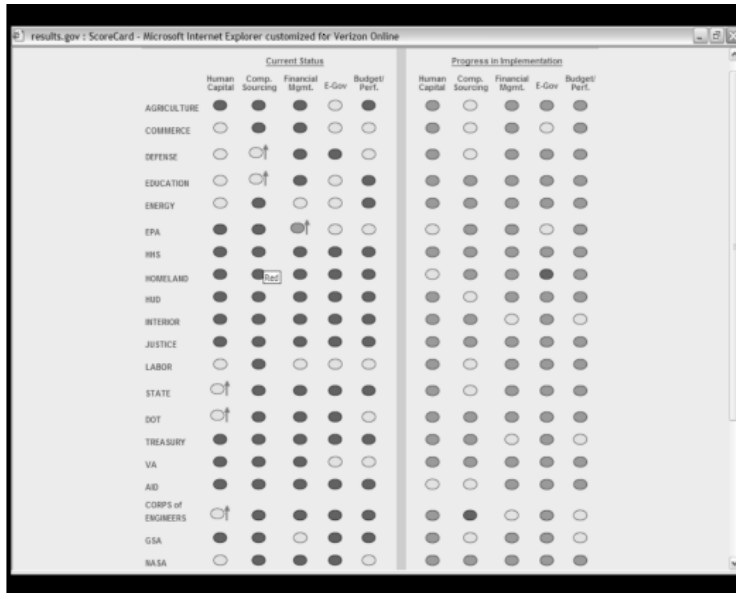
Figure 4.5: Scorecard showing agencies' progress in the five areas of PMA priority.

The current version of the scorecard can be accessed either through the main U.S. federal government Web site at *www.firstgov.gov* or more directly through the results Web site, *www.results.gov*. The results.gov site was developed by the assistant to the president and director of White House personnel as a tool to keep the president and his cabinet informed about progress on the PMA. Publishing these scorecards also allows citizens and other interested groups to track quarterly progress.

Updates on the results and accomplishments of the 25 projects are also published on the referenced Web sites. The Web site structure features integrated cross-government views of all offerings for specific customer segments (e.g., *www.seniors.gov*, *www.students.gov*) and high-interest areas (e.g., *www.recreation.gov*, *www.grants.gov*). Significant milestones from the first 18 months include the following:

1. Firstgov.gov — This main Web site averages almost six million visitors a month and was voted as one the 50 Most Incredibly Useful Web Sites by Yahoo.

2. Grants.gov — Applications for more than $360 billion in federal grants from 26 agencies can now be accessed from one site (*www.grants.gov*). Over 3,000 training courses are available to federal employees, and 60,000 employees have taken courses.

3. Disasterhelp.gov — Over 10,000 registered users from 46 states and 4 countries used the site for 34 incidents and 61 disaster-preparedness exercises.

4. Regulations.gov — The site is a one-stop portal for citizens and businesses to search, view, and comment on proposed federal regulations from over 100 agencies. It is projected to generate $94 million in savings in three years by consolidating formerly independent systems.

5. E-Vital — This site, which provides online verification of birth and death records, will save $52 million a year in processing costs, erroneous payments, and fraud.

To support cross-government integrations, a Federal Enterprise Architecture project was initiated through the CIO Council. (The CIO Council includes all the CIOs across the government agencies and departments.) Figure 4.6 depicts the five layers of this architecture.
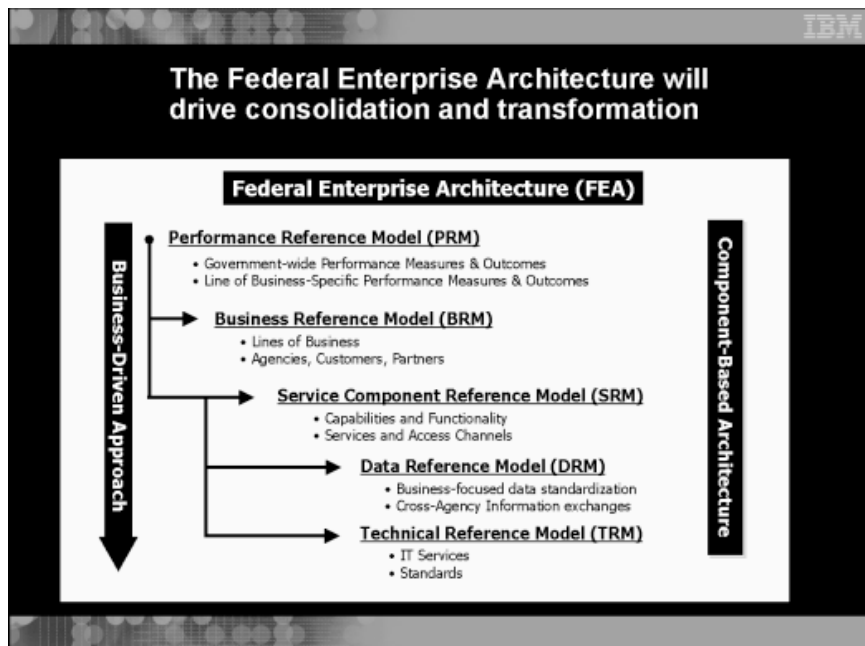
Figure 4.6: Five levels of the Federal Enterprise Architecture.

More details on this architecture are available at www.feapmo.gov. What is important to this discussion is the recognition that government outcomes and business activities can be broken into components, many of which will be common across organizational boundaries. This architecture links business goals to the IT infrastructure used to implement new projects. A component approach increases opportunities to leverage IT spending and transformation projects across traditional agency silos. The use of architectures based on a common framework facilitates future infrastructure and process integration across agency programs.

The direct reporting link to the Office of Management and Budget allowed the e-government team to specify a new business-case methodology that was integrated with the annual budget process. Budgets would not be approved unless improvements to business outcomes were defined and an analysis was conducted to determine what other agencies could use a similar process. The advantage to cross-government projects was that funding from multiple agencies could be used to accelerate implementation, increase function, and reduce the overall cost to government.

Lessons Learned

Several important lessons learned by the U.S. federal government reinforce the six-step model described in previous chapters.

1. Clear Vision. The PMA provided clear direction and priorities, and the Quicksilver projects provided the data to make a compelling case for cross-government integration.

2. Proactive Senior Leadership. President Bush made the priorities public and reviewed progress regularly. Senior business leaders from federal agencies and departments became the owners of specific projects.

3. Strong Budget Linkage. The tie to the budget process changed the perspective from independent projects to cross-government integration focused on business outcomes.

4. Performance Metrics. The scorecard raised the visibility of the projects and public accountability for driving progress.

5. Consistent Communication. The federal Web sites became an important tool to change culture, both by recognizing the progress of early adapters and providing a public scorecard on progress.

6. Component Approach. The Federal Enterprise Architecture demon-strates the value of identifying components which are common across the enterprise.

Ongoing Challenges

The e-government initiative is still in the start-up phase and has encountered expected challenges.

1. A transformation project requires net new funding to pay for the initial analysis and development work while the old system still op-erates. Savings materialize only after the new process is imple-mented. The lack of funding to pay for upfront work slows progress considerably as agencies opt to put their scarce funds into areas that will produce near-term results rather than long-term benefits. The Office of Management and Budget was able to make some prog-ress in this area by using a provision in a piece of legislation, called the Clinger–Cohen Act, that enabled funding to be redirected or canceled when agencies did not participate fully in cross-government initiatives.

2. Though the executive branch advocates cross-government projects, Congress approves appropriations at an agency and department level. In some cases, legislation prevents sharing of funds on a cross-government project. Without strong congressional support, cross-government integration is a secondary priority within agen-cies.

3. Without ongoing top-down support, cross-government projects lose momentum quickly. Changes in leadership, emergency funding re-quests, and other unexpected events divert funding and focus to a point at which progress stops.

4. Since agencies have been asked to fund initiatives out of savings, most are looking at models where the private sector provides a ca-pability up front and receives payments as transactions occur. These models, while good in concept, are often difficult to imple-ment successfully. Without process transformation up front, these transaction models are either automating the old system (paving cow paths) or trying to implement new private sector–developed systems that are unlikely to be compatible with existing govern-ment systems. Without transformation, which requires time and funding, governments cannot take advantage of the new systems. Additionally, governments historically have trouble issuing man-

dates or taking other actions to get transaction levels high enough to cover contractor costs. Agencies do not want to pay migration costs or, in some cases, higher fees, even if the functionality is greater.

None of these problems are insurmountable. A potential solution is to choose one or two key areas for cross-government integration and then focus everyone on providing the funding and sustained leadership to successfully implement the programs. In spite of the challenges encountered, the U.S. federal government continues to make progress in its transformation, building a framework that others can use as a model.
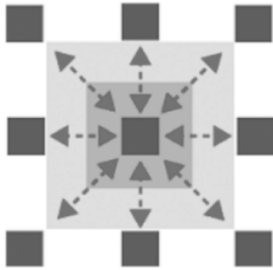
Learning by Example

Todd Ramsey
General Manager
Global Government Industry

It's one thing to develop a theory on how the journey to becoming an on de-mand government should unfold, and it's quite another to point to practical real-world initiatives in which the journey is taking place. Consequently, this chapter explores specific, real-world examples in which governments are taking steps to be more responsive, more variable in their cost structure, and more focused and resilient. These initiatives provide excellent examples of governments providing better service, thus increasing the efficiency and effectiveness of their operations and becoming easier to do business with.

Case Study: New York State Governor's Office of Regulatory Reform

Around the world today, governments are facing a growing dilemma: in some countries as much as 70 percent of a nation's employment base comes directly from small business enterprises. Consequently, for many governments, there's a natural incentive to stimulate this kind of job growth, to expand the opportunities for new enterprises, to assist the development of new entrepreneurs, and to increasingly expand the number of new jobs that can increase the economic well-being of the populace.

Yet, the barriers to starting a new business are often seen by entrepreneurs as a matrix of conflicting governmental requirements, forms, and regulations. Each regulation, license, form, or registration procedure may be perceived as yet one more obstacle to starting a new business, expanding an existing business, or maximizing the efficiency of just doing business.

Under the leadership of Gov. George Pataki, the State of New York began an innovative program to address this dilemma. The Governor's Office of Regulatory Reform (GORR) spearheaded this initiative to make it easier to do business in New York from both a process and regulatory perspectives.

The GORR Web portal shown in Figure 5.1 now consolidates the information requirements of 36 separate agencies into a single interactive decision-tree portal. At the time of the program's implementation, the state estimated that the government managed more than 1,100 different permits from these 36 state agencies. The goal of the system was to streamline the bureaucracy, shorten the application process, and allow applicants to track the status of applications they had submitted.
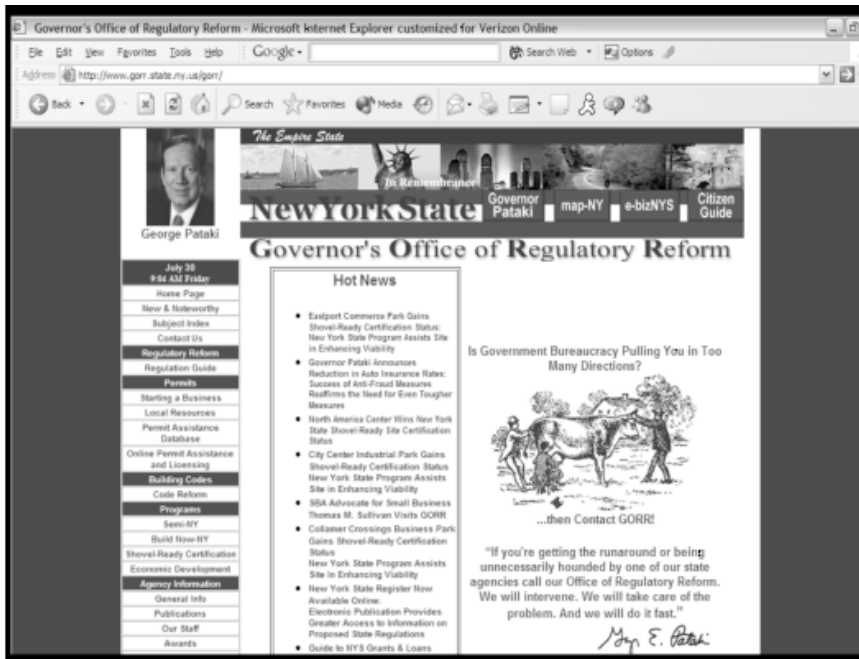
Figure 5.1: The New York State GORR Web portal at www.gorr.ny.state.us.

The resulting Web portal consolidated the process by employing an interactive interview during which the applicant can — in a single sitting and location — answer all pertinent questions required to start an application process. Each question asked by the portal software is aimed at understanding the applicant's specific needs. Each question answered by the applicant leads the software down a decision tree to further map the steps and requirements needed by the

state to process all the required forms. Information is entered once for all potential permits, no matter how many agencies are involved.

Once those items of information have been provided, the system automatically forwards the completed information to the appropriate agency or, in some cases, multiple agencies. The applicant is provided with a tracking number by which he or she may monitor the status of any of the applications submitted to any of the government agencies.

Because all information is gathered at a single point of entry and forwarded to the appropriate agencies to be processed, no further interaction is required of applicants unless an individual agency needs to contact them for clarification. In effect, entrepreneurs are not required to figure out the matrix of government; their applications' status is immediately accessible, and progress can be tracked and monitored throughout all the regulatory processes involved within the bureaucracy.

How successful was this innovative approach? GORR's Online Permitting and Application Process has led to a doubling of the requests for permit assistance. The State of New York estimates that this has led to the creation of 4,500 jobs. In addition, the state credits the new process with an unanticipated benefit: a dramatic 90 percent reduction in the training time for new customer service representatives who work with businesses. A new call center rep sat with an experienced rep for up to six months learning the former processes. With the intelligence built into the new system, training time has been cut to approximately two weeks.

This is a great example of how the transformation of government can have a dramatic and positive impact upon the economy as a whole. Among the key elements to note are the facts that this system —

- was mandated by the governor,
- simplified the search of more than 1,100 permits across 36 agencies,
- reduced employee training time by 90 percent, and
- created 4,500 new private-sector jobs.

Case Study: Manitoba's Child Care Online

Within many governments and municipalities, coordinating a social service response or delivering entitlements to a citizen is often a complex process requiring a thorough knowledge not only of the services and functions of interagency caseworkers within government but also of the growing array of nongovernmental services offered in the private sector. The Canadian province of

Manitoba created a one-stop Child Care Online site as a part of its broader Better Systems Initiative (BSI) to help resolve the difficult problems of delivering service to its citizenry.

Manitoba's Child Care Branch is responsible for overseeing the operation of child care in the province for children aged 12 weeks to 12 years old. This includes —

- licensing and monitoring child care centers and family child care homes;

- providing grants and program assistance to eligible child care settings;

- working to place children with special needs into child care settings;

- classifying all early childhood educators who work in licensed child care facilities and assigning a child care coordinator and subsidy advisor to work with each licensed facility; and

- providing subsidies for child care fees to licensed facilities for families who qualify.

As in many parts of the world, child care has a "supply chain" of those requiring care, the government's regulation and management, funding sources of subsidies, and the actual providers. The providers are often nongovernment organizations (NGOs) — day centers or private, licensed home facilities. Helping those most in need to efficiently navigate this supply chain and ensure that they receive the proper benefits was a major goal of the province. The processes in place were mostly paper-based, manual, and unable to support a true citizen-centered approach to social services; it was not unusual to encounter four-week turnaround for subsidy applications.

The new process includes a Web portal (shown in Figure 5.2) that allows parents to obtain an estimate of the subsidy for which they are eligible based on income and residence in the province. In addition, they can apply online for the actual subsidy without having to report to the government office. With Manitoba covering an area roughly twice the size of Germany, this convenience is both timesaving and much more practical for the citizens. Possibly most convenient and valuable is the ability to search for actual providers based on specific needs such as location, days available, age requirements, and setting (e.g., school, center, or family setting). Once presented with choices that fit their children's requirements, citizens are able to view specific provider capabilities such as language spoken, number of children present, slots available, accessibility capabilities, transportation options, school districts, and program highlights. Address and contact information is available, and citizens can view the provider's child day care license online.
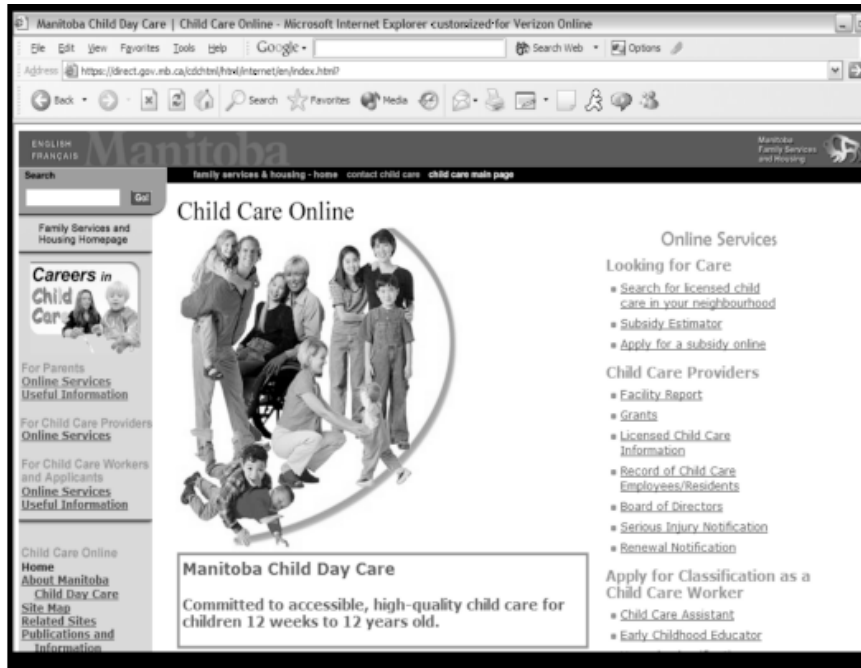
Figure 5.2: The Child Care Online site of the province of Manitoba.

The site also gives providers the capability apply for licenses and report activity such as attendance records that impact billing. The online attendance recording allows for payment processing to be done in two business days, rather than in two weeks under the former process.

As part of Manitoba's BSI, the child care project is one of a series of independent development projects under a single framework sharing a common goal of improving service delivery to Manitobans. The strategy is to use a multichannel approach through the use of common infrastructure and architecture. The BSI vision of an integrated citizen-centered delivery system is well under way. The Human Services Guide provides access to all online citizen services from a common Web portal.

Case Study: UK's Knowledge Network

The UK government has developed one of the most modern and advanced governmental knowledge systems in existence. Known as the Knowledge Network, it currently serves over 54,000 civil servants in 22 departments. Prior to developing this cross-government solution for sharing information, each department had its own methods of record keeping and no central repository of information.

In helping to make "joined-up government" a reality, the Knowledge Network enables government workers access to cross-department information to assist with inquiries, policy setting, and briefing documents, just to name a few uses. The wealth of information available has transformed the way in which government officials work together. It has become instrumental in providing supporting facts, statistics, background information, cross-department policies, frequently asked questions, key speeches, Parliamentary questions, daily breakdown of departmental activity, and much more. Ultimately, it has improved the government's ability to gain timely, accurate, and consistent analysis and answers.

Rather than focusing on rewriting legacy applications and systems, the government created a data warehouse from which it could identify the common elements within each department's system, extract the data into a separate repository, and consolidate the information into a system that could be analyzed electronically to act as the basis for ongoing policy decisions. This system was originally designed as a closed and private system for use solely by the prime minister, his cabinet, and their staff. However, as the repository's worth was proven, the prime minister began to extend access to the data to a larger number of ministers.

The Knowledge Network serves as an excellent example of how separate silos of authority can be brought together to create a more unified virtual structure for the purposes of creating change within the government itself. Such cooperation is extremely important if government is to streamline its response and formulate common processes by which real and worthwhile collaboration can begin.

The important benefits of the UK Knowledge Network include —

- instant internal communication of departments with one another,
- increased ability for joined-up policymaking,
- increased dissemination of government policy information to the public,
- increased access to information by staff,
- improved coordination of different communications channels, and
- enhanced ability to respond to rapid-fire changes in policy in a united fashion.

Case Study: Capital Wireless Integrated Network

The Capital Wireless Integrated Network (CapWIN) is a partnership between the states of Maryland and Virginia and the District of Columbia to develop an integrated transportation and public-safety wireless information network. It is

the first voice and data network in the United States to integrate public safety and transportation agency efforts across multiple states.

The impetus for the system arose when various response teams from several neighboring jurisdictions were summoned to an emergency that crossed state and local government borders. The confusion of coordinating the efforts of emergency teams using various proprietary response systems caused regional planners to recognize the need for a better means of coordinating services. Clearly, it was necessary to have a cohesive means of responding to emergency situations in a collaborative and comprehensive manner. The plan was to devise a solution that would allow disparate mobile data platforms to communicate with one another and to develop an enhanced set of incident management tools that could be shared by multiple disciplines. The resulting concept implemented the architecture in Figure 5.3.
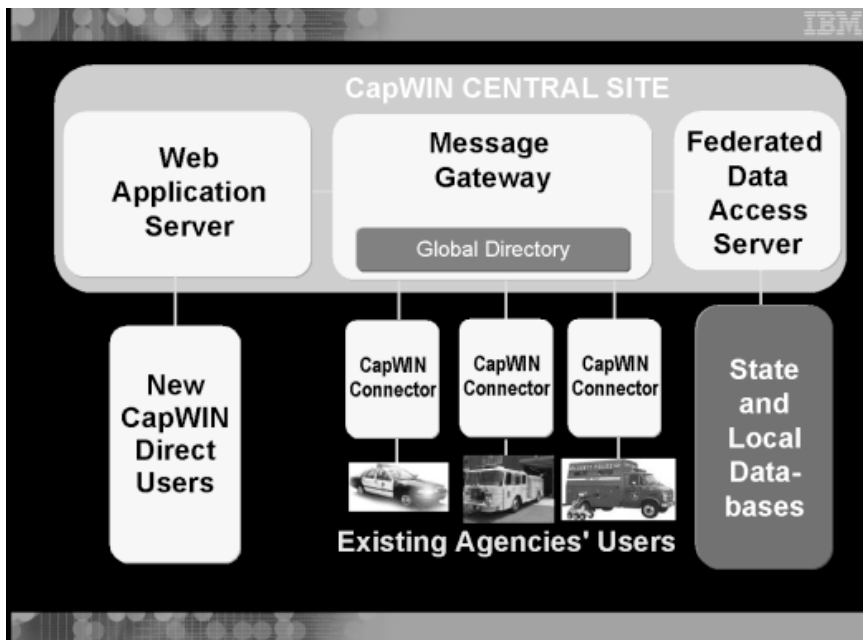
Figure 5.3: The CapWIN architecture.

As important as the technical solution is proving to be, the governance model to allow numerous autonomous government jurisdictions to make decisions, prioritize requirements and funding, and ensure interoperability is just as much a prerequisite for success. The Center for Advanced Transportation Technology

at the University of Maryland administers the contract, and George Mason University has been commissioned to create governance recommendations. It is critical that the participating governments and federal organizations be comfortable that their issues and requirements are being addressed.

CapWIN provides the Washington metropolitan region with a powerful means by which multiple government response teams can collaborate to respond to and work an emergency. It allows for information sharing across different government organizations and across governments. The chief design point for CapWIN does not involve replacing the many systems in use by the numerous organizations cooperating on the new system. Rather, the solution is designed to allow interoperability of the current systems using laptops, personal digital assistants, and other standard devices through the use of an open architecture. The project is viewed nationally as an example for other initiatives and potential networks.

Case Study: Electronic Tender Handling, Information, and Communications System (ETHICS), A Solution for SKI of Denmark

The Copenhagen-based company National Procurement Ltd. (SKI) brings together public purchasers and suppliers by negotiating large frame contracts for their customers — including approximately 8,200 institutions, ministries, and public agencies across Denmark. SKI coordinates procurements, performs tenders, and negotiates the framework for contracts on behalf of all Danish public agencies. The company is a strong partner to public agencies and to suppliers. With this partnership and expertise in mind, SKI began looking for a better way of working. One example that spurred action was a PC procurement that resulted in 36 vendors submitting a combined 30,000 pages for evaluation. It became clear that the company needed a way to improve the efficiency and effectiveness of the process. An important aspect of public sector procurement is transparency in the process, which became a key requirement of any new solution that SKI would consider.

SKI decided to create an automated system that would reuse contractual terms and questionnaires and ensure an open, transparent evaluation process. It needed a comprehensive e-procurement system that would ease the burden of managing public tenders while maintaining the high levels of security, confidentiality, and contractual fairness required by European Union (EU) guidelines.

Figure 5.4 shows the solution adopted by SKI. The Electronic Tender Handling, Information, and Communications System (ETHICS) is an open, secure, Web-based procurement system enabling agencies to plan, execute, and

evaluate public tenders in compliance with EU-defined guidelines. It covers all aspects of operating a public tender organization, including the annual planning cycle and tender selection and timing. It also covers all external tender announcement procedures; daily management and communication with bidders; online, secure tendering using digital signatures; and transparent decision making based on a unique questionnaire design tool.
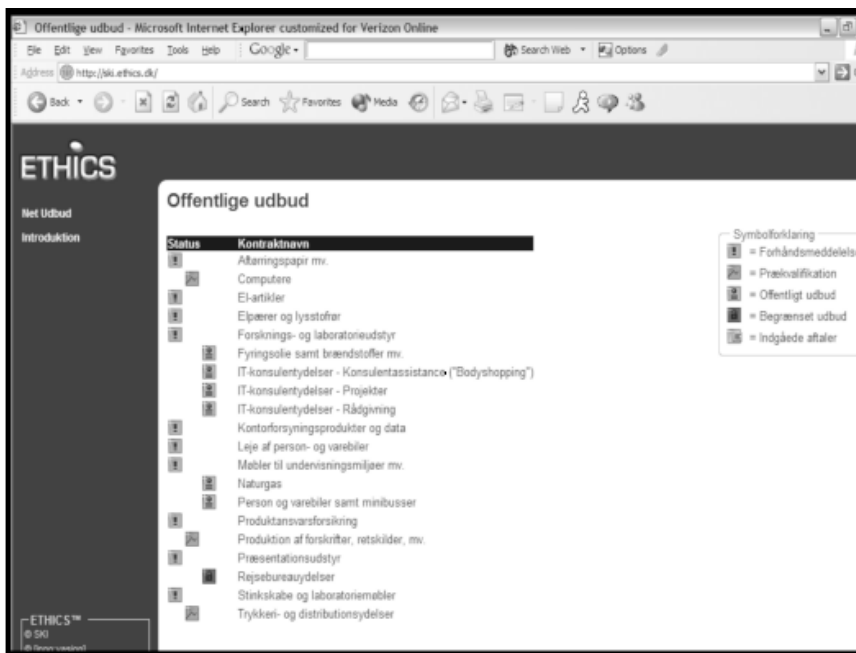
Figure 5.4: SKI's ETHICS external Web site showing tender status.

SKI has realized numerous benefits from ETHICS. Productivity has more than doubled as SKI has managed over twice the number of frame contracts with the same employee head count. Preserving and reusing organizational know-how has also been a key advantage as 50 percent of SKI's staff has turned over in the past four years without disruptions or delays. In that same time frame, the company had no complaints or legal issues with vendors. The lack of legal issues not only serves as a measurement of quality; it also means that SKI can avoid the significant cost and schedule challenges associated with the legal process. SKI has seen significant interest in its EU-compliant procurement system from numerous other countries.

Case Study: Ichikawa City, Japan

Municipalities worldwide are leveraging the Web to help create communities of interest among their citizens. In addition to the capability to transact their business with government, citizens are able to link with people with similar interests through the government portal. It is helping promote Web skills among new users, drawing citizens to the government portal as a new way to conduct their business with government, and providing a social network for citizens with similar interests.

Ichikawa City in Japan is located in the western portion of the Chiba prefecture, approximately 40 minutes from Tokyo by train. The population is a mixture of senior citizens and of younger professionals who commute to Tokyo. Government leaders designed the portal capabilities around four main components: the Life Network, the Forum, the Administrator of Needs, and the 360+5 System (see Figure 5.5).

Figure 5.5: The Ichikawa City portal.

The Life Network comprises three key areas: a one-stop service that provides copies of official certificates, a nonstop service for information, and a system that provides a Web presence for communities of interest. Citizens can use keyboard access or contact staff via PC-based cameras and microphones to have

the staff member assist them with the process. The nonstop service provides citizen information services concerning health, taxes, lifestyle, prenatal care, children, education, disability, and elder care. Information is provided as text, video, or audio, and the nonstop service portion of the city's Web site has an area containing frequently asked questions. It also provides links to city services such as gas, electricity, phone, water, postal service, cable television, and the police. The communities-
of-interest aspect of the Life Network provides a means for citizens to collaborate online with others that share their unique interests — anytime, anywhere. This password-protected portion of the site helps to generate an increased feeling of community and fosters sharing and learning within Ichikawa City.

The Forum is a means for city officials to pose both policy and informal questions directly to citizens. Citizens are able to provide and exchange opinions freely among each other and with city officials.

The Administrator of Needs function allows citizens to register opinions, complaints, and requirements with city staff. Responses are delivered in the mode requested by the citizen: by mail, e-mail, or phone call. The mayor has the capability to see the progress of responses to citizens' requests.

The 360+5 System provides access to applications and information services that cross administrative boundaries, and it gives citizens a virtual view of government. Capabilities include reservations for public establishments, volunteer activities, welfare, government, children and living, and an integrated geographic information system. Kiosks are located in Lawson convenience stores through Ichikawa City for easy access.

Ichikawa City continues to leverage its e-government capabilities to make it easy to live and work in the city and to foster a greater sense of community among its residents.

... **And Many More**

These examples are a very small subset of the many global e-government efforts to provide better service, improve the effectiveness and efficiency of government, and make it easier to do business. One of the most powerful advantages that each of these examples has created is the change in culture within each governmental entity: previous islands of automation and information are coordinated to free human resources to constructively tackle the challenges that were identified.

These extraordinary systems teach us by example and enhance our understanding of what lies ahead for e-government. While these systems have a power that is inspiring in scope and sophistication, they are mere stepping stones to the environments of the future, where on demand computing will transform how our governments will interact with citizens and constituents to solve the pressing challenges that await.

6

Future Infrastructure

Mark Cleverley
Public Sector
Sales and Consulting

I skate to where the puck is going to be. — Wayne Gretzky

On the ice Wayne Gretzky was arguably the greatest hockey player ever at anticipating and responding to change in the game. His epithet summarizes what we all — whether in the public or private sector — must strive to improve. It describes neatly the capability that our future technology infrastructure must help us achieve. We call that capability *on demand operations*.

The phrase *on demand* describes an extended enterprise that can respond to change quickly and effectively — an enterprise whose business processes, integrated end-to-end across its internal organization and with key partners, suppliers, and customers, can respond with flexibility and speed to any demand, opportunity, or threat.

But to do this, the enterprise must have a highly flexible technology infrastructure in which components all work together: an on demand operating environment. This is an end-to-end enabling technology infrastructure that can allow an enterprise to execute technology operations directly aligned with its business needs, thus enabling an enterprise to be more responsive, focus on core mission and competencies, benefit from variable cost structures, and be resilient to external threats. In this way, the operating environment allows the enterprise to use more of its resources on efforts that pertain to its mission rather than on the management of technology.

To that end, the most important thing that your future infrastructure will deliver is a technology environment

1. that supports the business needs of your enterprise,

2. through which change can be embraced faster and at less expense, and

3. in which ongoing operating costs can be lowered.

This environment is realized by reducing your incremental cost of change through a component-based, service-oriented architecture that implements open standards and provides a consistent global view of resources of all kinds. In the rest of this chapter, we begin to look at some suggestions for moving toward the future infrastructure.

How Future Infrastructure Will Be Different

Technology infrastructure will evolve for two main reasons — first, the new business environment that is upon us, and second, the emerging computing paradigm driven by technology development.

The New Business Environment

We won't rerun here the arguments about the public sector's transformation imperatives. We should more or less agree about the benefits of technology-enabled transformation in the public sector. We might also agree on the pressures that drive the need to transform — and the pace of change is a critical component of all of them. Today and tomorrow, the horizons are closer, the cycles are faster, and the expectations of constituents are framed by the leading private sector organizations and how they use their world-class technology infrastructures.

These elements of the future environment drive the need for the on demand enterprise, which, for the public sector, describes the kind of school system, hospital system, municipality, or agency we aspire to be. Leaders of these enterprises — and the constituents they serve — instinctively know what that means.

The New Computing Paradigm

When we talk about infrastructure, we're not just talking about servers, software, networks, clients, and so on. Those are important; but more importantly, with infrastructure, we're talking about a whole new paradigm, a new computing model. There is a major shift under way in how computing is built, bought, and used. What are the important elements of this?

- Computing workloads are shifting from the desktop client, or from the client/server model, to various kinds of servers that specialize in different tasks.

- Stored data used to be attached to a specific server for a specific application. Now, it's increasingly available to any application that needs it and has authority to use it.

- New entry points to the infrastructure will proliferate into the trillions as new client devices introduce new ways for people and things to interact and work.

- The "always-on" availability promised by new networking technologies and 24/7 operation increases the demand for reliability and security.

- The data generated by all these new transactions and interactions needs to be able to move seamlessly throughout the infrastructure. Hardware, software, and even enterprises themselves must be interoperable.

These elements have contributed to the next phase or chapter of computing, which we call e-business on demand. More than just a shift in emphasis or an increase in volume, e-business on demand is a whole new landscape. We're already seeing some changes wrought by this new landscape in terms of how programs are written, how hardware is configured, and how enterprises operate.

Precursors to the Paradigm

To underscore these changes, let's recap a little evolutionary history of computing paradigms. Before we reached the Internet and e-business, computing evolved through three major phases that warrant brief discussion.

Phase 1: The Mainframe Model. In the mainframe or host computing model, everything was centralized: the processing, the data, and the applications. Not coincidentally, the design and manufacturing of the hardware and software, as well as the services offered in information technology, were mostly all centralized as well. This model had administrative, back-office productivity as its focus.

Phase 2: The PC Model. The personal computer model emerged in the 1980s, with the advent of the PC. Processing, applications, and data could be distributed across oceans of small computers dedicated to individual users. Manufacturers of parts such as microprocessors, operating systems, and hard disk drives thrived because everything worked together in so-called open architectures. In fact, these architectures were proprietary to specific companies and therefore not easily interoperable. But the issues

that surfaced in this phase began to show exactly what the IT industry needed: common standards.

Phase 3: The Client/Server Model. Infrastructures became ever more granular and distributed (incoherently, to some extent). Then centralization reasserted itself somewhat in the 1990s in the form of the client/server model. On paper, the idea was to get those millions of PCs — the clients — working in concert with all the world's servers. Unfortunately, this admirable effort couldn't get very far without common standards.

Then something really big came along: the Internet. It seems simple now, but suddenly you could send electronic mail not just to colleagues down the hall but to customers and vendors at other companies. Information that once had to be printed could now be accessed by anyone, anywhere, at any time, via the World Wide Web. The IT and communications industries began to converge on protocols and standards. This laid the groundwork for even broader collaboration on a much richer array of standards.

Some remarkable technology was developed during this time, and new pathways were established between and among enterprises. This model is here to stay. The 'Net offers amazing possibilities, but it also requires significant business and technology decisions. Most immediately, it requires decisions about infrastructure, as the new computing model unfolds exponentially.

Today's Landscape

It's projected that in the next few years we will see 10 times more people connected, 100 times more network bandwidth, 1,000 times more devices, and a million times more data: more information will be created in the next three years than in the whole of human history. Wireless Web devices are beginning to outnumber PCs. Embedded chips are creating a world in which there are more things online than people. And it's not just volume that characterizes change; the pace of change feels like a runaway train. At the same time, technology skills are getting more difficult to find and retain — some estimate shortfalls of several million people worldwide.

With all this, there must be real benefits and return on investment in technology deployment. That's the job of the future infrastructure.

Elements of the New Infrastructure

The new technology infrastructure includes a number of elements that will surely continue to evolve in support of the on demand business environment.

Among the elements that currently dominate the new infrastructure are servers, storage devices, clients, operating systems, middleware, and superstructure, each of which is described briefly here.

Servers

Today, infrastructure starts with servers. Whereas server-buying decisions in the past have been based largely on cost, size, or speed, the deciding factor nowadays is becoming the task you want the server to perform.

Three main classes of servers (shown in Figure 6.1) handle those tasks.

- *Data and transaction servers* are the computing engines that can't go down, the ones that manage complex, data-intensive transactions with extreme requirements for data and transaction integrity.

- *Web servers* handle user-generated transactions that are comparatively simple but high in volume. These servers provide moderate data and transaction integrity, and they are often used to serve Web site content to potentially millions of users at a time.

- *Edge servers* sit out in the network to handle repetitive, high-volume tasks such as caching, data transcoding, or security functions so that the other servers don't have to.
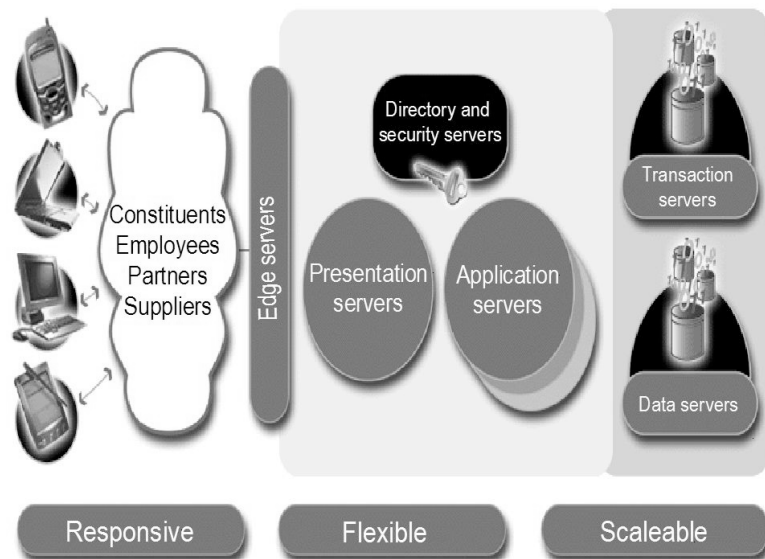
Figure 6.1: Elements of the new technology infrastructure.

Storage

Storage is the second critical set of building blocks. Attached storage, in which one processor draws data from one attached storage device, is being supplanted more and more by network storage, in which any storage device on a network can serve up files and data to any user. There are two kinds of network storage:

- *Network-attached storage* is based on a self-contained, intelligent device that attaches directly to a network, not to a server. It can be added quickly and simplifies storage management by separating it from network and application servers.

- *A storage area network* is a high-speed, high-bandwidth network of storage devices strung together to allow all systems to get at any data in the enterprise at any time, regardless of vendor technology.

Clients

These server and storage technologies are becoming more scalable and robust — and that's good because, at the other end, there's an onslaught of clients approaching. If the Internet continues to grow as expected, we will soon be living in a world with a trillion online devices, hooked up to each other and to the servers via networks, both wired and wireless.

Judging from earlier technology phases, we ought to expect that all these servers, storage, networks, and clients will create an enormous problem of communication — except this time, with a little luck and a little sense, they won't.

Operating Systems

At the heart of future infrastructure strategy lies the necessity for open standards. Client devices must be able to talk to each other and to the servers and the stored data behind them. That's why every component of IBM's portfolio is designed with integration and open standards at its core.

IBM extends the idea of open standards even further, evident in the company's commitment to help further open source operating systems such as Linux. Linux software utilizes open standards and is available for free to application programmers. IBM has dedicated significant resources to enable every IBM hardware and software product for this new direction in operating systems.

Middleware

If the real value of technology-enabled transformation comes from integrating entire business processes, then interoperability and flexibility are essential. Here, the key is open standards–based middleware. This layer enables many different applications and systems to communicate, both within an enterprise and up, down, and across its value chain. Middleware is the collection of software products made up of databases, messaging, groupware, transactions, and systems management. Together, they allow applications to run on operating systems and to share data with other applications.

In the open standards–based world of the Internet, middleware is where developers write programs. Middleware speeds new application deployment much faster than the traditional methods, which required porting code to another system, then another, and then another.

Superstructure: Extended-Enterprise Applications

Above this future infrastructure, the applications that deliver value will continue to be built. Increasingly, they will be built collaboratively across enterprises and their customers, constituents, and stakeholders, with integration and interoperability designed in. They may also be built from components — often pre-existing applications exposed as services on some infrastructure somewhere, with linked service levels — so you will decide which components, from where, to bring together in a particular form to get your job done. Reduced duplication, reduced redundancy, and increased speed to deployment will all be enabled by open standards implemented on the kind of infrastructure described in this chapter.

What Elements Must You Get Right Over Time?

Nobody has the future infrastructure completely implemented today; nor is complete implementation expected, because the infrastructure of the future is in fact a moving target. But at any given point, we can describe the infrastructure elements that we think are necessary to deliver the capabilities we want.

Figure 6.2 presents a description used at IBM. Don't worry too much about the detail. If you can put your infrastructure and superstructure together in a way that resembles this, then you are probably ahead of most of your peers.
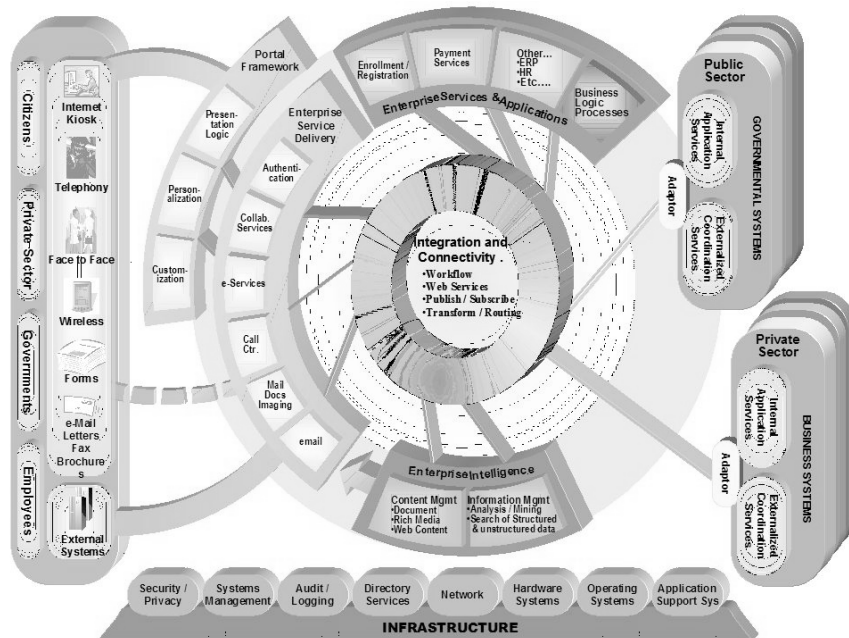
Figure 6.2: Recommended infrastructure and superstructure for delivering capabilities in the future.

The Next Evolution

Once you have capable applications on reliable middleware on interoperable servers, storage networks, and clients across the enterprise (regardless of how you define *enterprise*) — that's when you can really transform. With all the tools in place, you can tackle the really hard parts of transformation, which are mostly about culture and change.

We have reached an exciting and important point at which vendors of technology are agreeing (for once!) on enough things so that soon enterprises will be able to build their infrastructures with any vendor. You'll be part of this new world too, on one condition: you must embrace (not just adopt but actually grab hold of and *hug*) true open standards as they are developed and agreed upon by the independent bodies that steward them.

In this way we hope that, this time around, we will build the interoperable world. For the public sector, this might mean that if you build the right infrastructure and standards (regardless of whom you build your systems with), you will be able to integrate with other enterprises on a local, regional, and national scale, as shown in Figure 6.3.
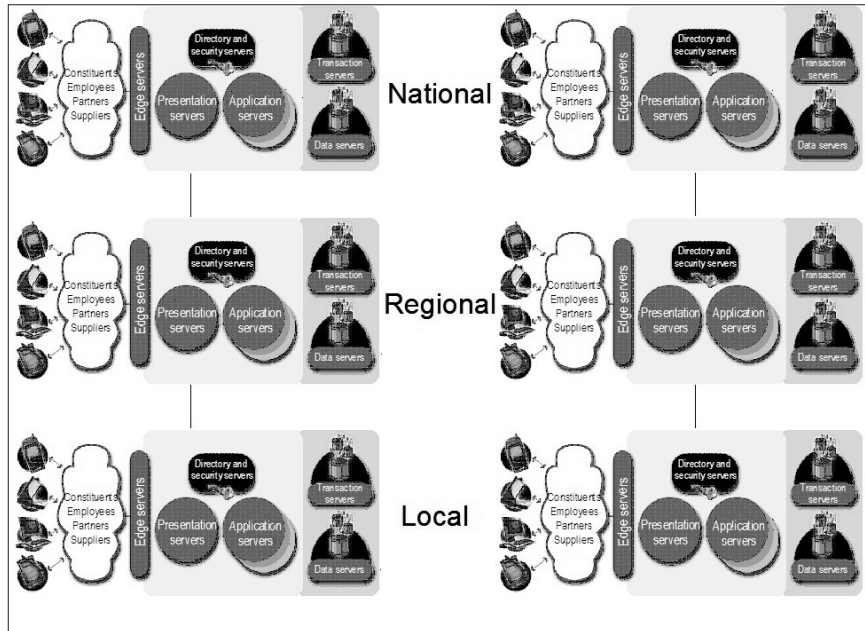
Figure 6.3: New technology infrastructure pervading local, regional, and national governments.

Moving into the On Demand Era

Making progress doesn't mean that you need to throw everything away and start over. You should be able to (and IBM will help you to) leverage your existing investment in hardware, software, and skills. Sure, some things will need to be let go, over time; but it is encouraging to see just how much of a typical IT infrastructure can be used in some form to help to build the new infrastructure.

Yet, when it comes to new investments, you should ruthlessly inspect every procurement or development to determine whether it furthers or hinders your broad infrastructure goals. If it doesn't further those goals, have a very good reason for making the investment. This means focusing intently on architecture and, at a high level, keeping your attention on the critical attributes that you want your infrastructure to exhibit.

Attributes of the Future Infrastructure

What elements must come together to allow us to cope with change? In IBM's view, you need to evolve your computing infrastructure over time to become increasingly integrated, open, virtualized, and autonomic:

INTEGRATED in its broadest sense — of facilitating the flow of information, application function, business process, and expertise — within and beyond the boundaries of your enterprise. These elements must be reachable, understandable, and usable by all authorized actors, whether human or program, internal or external.

To get to this state, never again let independent infrastructure elements (servers, operating systems, middleware, storage, or applications) grow ad hoc. Require new instances of these elements to explain precisely how they will interoperate securely with the existing infrastructure. You never know when you will need them to do so. You never know when someone else will need them to do so.

OPEN because there is no other realistic choice long term. You could — for a while — integrate elements if you use a single server, operating system, database, application environment, client, and so forth. As soon as you move beyond one, you need to use open standards. As soon as you need to interact effectively with someone or some system outside your control, you need open standards. That means embracing real open standards as they are developed and when they emerge from the vendor-neutral bodies that we charge with their stewardship.

Open standards bring other benefits besides integration — choice of vendors, availability of applications, speed of deployment, and breadth of skills in the marketplace, to name a few.

VIRTUALIZED because you already have more infrastructure resources than you think; you just can't get to them and apply them in the right way at the right time. This trend is toward a virtualized set of infrastructure components that insulate users and applications from the physical set of components. The goals are

(1) simplicity, because virtualization allows underlying infrastructure components to be more easily managed, reconfigured, upgraded, diagnosed, and repaired without disruption to users; and

(2) improved utilization, because virtualization also allows the computing infrastructure to pool disparate physical devices (servers, networks, storage, middleware, databases, and even clients such as the PC on your desk) and then to provide a unified view of resources.

Through this dynamic allocation of resources, an enterprise can accomplish more work through the infrastructure, with better, faster outcomes in many cases and with far less waste of resources.

AUTONOMIC because we must make things easier to manage. As things get more complex, they get tougher to manage. Complexity will begin to outstrip our ability to deal with it as usage of the world's dynamic infrastructure expands, as more data flows around more wireless or wired network connections and between more applications, with more stringent performance, availability, and security requirements. We need to take complexity out of the infrastructure as much as possible so enterprises can devote their money, brains, and time to dealing with complexity where it should be dealt with — in the vision, mission, and goals of the enterprise, and in the business processes with which we do our jobs.

We need an infrastructure that's smart enough to identify and solve its problems on its own. We need it to do so before we are aware of the problems — and maybe without bothering us at all.

Just as our bodies automatically regulate our breathing according to our activity, IBM is working hard on breakthrough technology called autonomic computing that allows computers to regulate themselves. That means building new, higher levels of intelligence into our servers so they can monitor, help, and heal themselves without human intervention. The charge for middleware is to become the autonomic nervous system of this new infrastructure. It's a task that cries for chip technology, to become the nerve endings, with integrated processing, memory, and communications functions on all those trillion devices and in the servers to which they're connected.

In the end, the infrastructure must manage itself to appropriate service levels, without conscious intervention. Systems will become able to configure, optimize, protect, diagnose, and heal themselves, thus reducing costs of systems management.

How Do You Know When You're Doing Well?

What should we be able to say about our infrastructure? How will we know when we're on the right path? If the statements that follow apply to your infrastructure, its operation, and the skills you deploy, then you are probably doing well.

Infrastructure responds to the needs of the extended enterprise. Future infrastructure must underpin the business needs of the enterprise; and you need to think afresh about what that enterprise is. It may be a value chain created between your operation and applications and information in other organizations. The business needs of all the participants may dictate the business needs of the enterprise.

Business leaders run the infrastructure. In charge of the infrastructure should be the business leaders of the enterprise — leaders who are not just able to understand technology and what it can and cannot do but who are also able to manage and control technology as a fundamental enabler of what the enterprise does.

Security, reliability, and availability are sine qua non. There will be no "degrees" to which these attributes are implemented. For future infrastructure they should become starting points, not goals. They will be designed in from the outset.

Nobody complains about data. Data, perhaps more than anything, is fundamental to a trustworthy infrastructure that can deliver value. Providing it where and when it is needed; keeping it safe, secure, and current; managing the processes that deal with it just as much as the systems it resides in — these are, again, disciplines inherent in the future infrastructure.

You are using your extended enterprise. When you need to link an internal application and data with an external one, three conditions coincide: (1) it is obvious how to do it; (2) it does not entail a customized one-time effort; and (3) the marginal cost of doing it is clearly outweighed by the benefit.

Measurement is a way of life. Metrics are the only way you can understand how to improve. The future infrastructure will be designed to gather the right metrics, match them to service-level agreement elements, and report so that the enterprise can allocate resources appropriately.

The customers you serve tell you you're good. Direct and indirect customers of your infrastructure feel that their needs are being addressed well and in a timely way. They bring their new applications to the infrastructure again and again. They recognize the benefits for the entire enterprise of sharing infrastructure (e.g., across different agencies of a state). They are happy to participate in this "give to get" approach.

Your infrastructure approaches best-of-breed cost-effectiveness. And you can prove it. This starts with a clear understanding of the costs. It continues with a

regular assessment of the cost of service compared to peers in and outside the public sector.

Provision of your infrastructure is pragmatism, not philosophy. If someone else's infrastructure provides what you need — if it addresses your requirements appropriately and with the right service levels — then your enterprise is open to acquiring capability in different ways: e-sourcing, application service provision, utility computing, software as a service, process outsourcing, and other models.

And, perhaps most telling of all these statements, you are no longer able to use technology as the reason for not *doing something.* At some point, we have all uttered remarks like "Our systems can't handle it" or "Our technology won't talk to their technology." But the world we're moving into, the infrastructures that we are building, will, over time, take away this excuse.

Recap — Key Principles

How unusual to read an IBM chapter on infrastructure without encountering any mention of products! Looking ahead, this might not be so unusual after all because, in the future, the product you choose will matter less and the way you use it will matter more.

Whatever product you choose —

- use it with open standards,

- base your systems and protocols on Internet structures,

- support multiple clients from the outset,

- use XML to describe data,

- use Web services to describe applications as services and to expose processes and get them to integrate,

- think of your extended enterprise and your value network rather than your department or agency,

- begin to virtualize your resources with the different capabilities coming to the marketplace, and

- bring in autonomic capabilities as they develop to reduce your exposure to complexity.

That's not to say that we don't think our infrastructure products are the best — of course we do. We also think our vision is the broadest and smartest and that our capability to execute that vision is the strongest.

We organize our entire set of infrastructure products and services around the characteristic attributes of the on demand era: being open, integrated, virtualized, and autonomic. You will continue to see developments along these lines in IBM brands such as eServer, TotalStorage, Infoprint, WebSphere, DB2, Lotus, Tivoli, Rational, and others. (Oh dear, we blew it! We mentioned products.)

We take such purposeful measures in order to position IBM as the best organization to help you to progress to your future infrastructure. But whether you work with IBM or not, we strongly counsel you to embrace the principles described here and to work with your selected vendors to make them real.

Open Source Software in Government

Brad Westpfahl
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Taken as a group, government institutions are sometimes caricatured as being more deliberative, more methodical, and less progressive than their commercial counterparts. We'll save our defense of government on that topic for another book, but in this discussion of open source software we will gladly offer some proof points to dispel the myths of government nonprogress. Open source is one of the hottest topics in information technology (IT) today, and government institutions of all sizes and in all regions of the world are demonstrating leadership in defining practices to put open source technology to productive use.

The term *open source software*, or simply OSS, actually represents several different concepts that we will separate and discuss. The appeal of this software development approach is attributable to the role OSS is playing in the delivery of stable, standardized, and affordable software capabilities. Government leaders see these attributes as useful capabilities in the encouragement of software development industries in their communities and as tools to extend the value of the budget they allocate to IT spending within their own organizations. In contrast to software developed using the more traditional commercial practices, OSS-developed modules have a much stronger connection to the needs of their user community because the users are encouraged to play a direct and active role in the software's evolution. OSS proponents claim, and many software buyers agree, that this characteristic is the strongest motive for the rapid adoption of OSS that has made this such an exciting topic.

This chapter addresses areas of interest to government leaders who are exploring their role in integrating open source software into their organizations and into the communities within their jurisdictions. The topics include a definition

of OSS and its various elements, discussion of the benefits and potential exposures, examples of its deployment within government, and recommended action steps for consideration by government leaders.

Open Source: What Is It? Where Does It Come From?

The phrase "open source software" has started to appear widely in the press, in government documents, and elsewhere. Anyone who has recently tuned in to the topic may conclude that OSS is a dramatic departure from some predecessor technology and that it just emerged from the global techno-ether that has produced a steady stream of innovations for decades. Actually, neither is true. Open source is a modest change from predecessor techniques and has been around since the early days of the IT industry. It isn't a stretch to say that the roots of OSS go back to the emergence of technology industries in the Industrial Revolution and perhaps even earlier.

The principal distinguishing feature of OSS versus commercial software is that everyone — users, students, hackers, literally everyone — has access to the source code of the software. Source code, or simply *source*, consists of the actual instructions as written by the programmer who developed the software. Since human language is not usable by the computers that software is written to run on, this source code must always be converted to a form of software that is usable by computers. That form is referred to as *object*, *executable*, or *machine-readable* software. Most commercial software producers distribute their software products only in object form. This choice offers a strong degree of intellectual property protection because source code is easily copied and reused in other programs, whereas object code is extremely difficult to reverse-engineer and copy. Given the cost of developing modern software systems and the revenue to be realized through their sale, much is at stake in protecting intellectual property that results from privately funded development efforts.

The access to source code that is afforded to all in the open source environment is essential to the processes that evolve and improve the software. Users of the software are invited, and in some cases even required, to return corrections and enhancements that they make to the software to the software's originators. These enhancements are then available to be added to the software and redistributed to all users. Through this mechanism, the capabilities of the software are both maintained and enhanced by a group of its users for their own benefit and shared with all users. This process creates a unique group of software developers that is distinctly different from the development teams that produce commercial software for sale. The development teams that support any one open source program in this way can be large, diverse, and tied together by their mutual interest in the improvement of the software. These collaborators

Definitions

Several concepts frequently become tangled under the "open source" theme. Let us spend some time defining and untangling them:

Open computing — A general and inclusive term that is used to describe a philosophy of building IT systems. In hardware, open computing manifests itself in the standardization of plug and card interfaces; in software, through communication and programming interfaces. Open computing allows for considerable flexibility in modular integration of function and vendor independence.

Open standards — Interfaces or formats that are openly documented and have been accepted in the industry through either formal or de facto processes and that are freely available for adoption by the industry. In the context of this chapter, the term will be used to refer specifically to software interfaces. Examples that many people are familiar with include HTTP, HTML, WAP, TCP/IP, VoiceXML, XML, and SQL. They are typically built by software engineers from various IT or software companies who collaborate under the auspices of organizations such as W3C, OASIS, OMA, and IETF.

Proprietary — Developed and controlled by a given company and not made freely available for adoption by the industry. Commercial software often uses proprietary interfaces or formats. When an interface is proprietary, its owner controls it, including when and how the interface changes, who can adopt it, and how it is to be adopted.

Open source software — Software whose source code is published and made available to the public, enabling anyone to copy, modify, and redistribute the source code without paying royalties or fees. Open source code evolves through community cooperation. These communities are composed of individual programmers as well as very large companies. Some examples of open source initiatives are Linux, Eclipse, Apache, Mozilla, and various projects hosted on SourceForge.

Free software and software libre — Roughly equivalent to open source. The term *free* is meant to describe the fact that the process is open and accessible and anyone can contribute to it; the term is not meant to imply that there is no charge. Free software may be packaged with various features and services and distributed for a fee by a private company. The term *public domain software* is often erroneously used interchangeably with the terms *free software* and *open source software*. In fact, *public domain* is a legal term that refers to software whose copyright is not owned by anyone, either because the copyright has expired or because it was donated without restriction to the public. Unlike open source software, public domain software has no copyright restrictions at all. Any party may use or modify public domain software.

Commercial software — Software that is distributed under commercial license agreements, usually for a fee. The main difference between the commercial software license and the open source license is that the recipient does not normally receive the right to copy, modify, or redistribute the software without fees or royalty obligations. Many people use the term *proprietary software* synonymously with *commercial software*. Because of the potential confusion with the term *proprietary* in the context of standards and interfaces, and because commercial software may very well implement open, nonproprietary interfaces, this chapter will use the term *commercial software* to refer to non–open source software.

can form a large, worldwide community in the case of widely adopted OSS software such as Linux and Apache. Perhaps most remarkably, they work for free, because the originator of the software does not pay for the enhancements and improvements they make. In most cases, the software they produce is available in its complete source code form for free from the originator.

Much of the media's and the market's attention on open source software focuses on the contrast between the voluntary collaborations of programmers working for nothing more than an interest in improving software that is then distributed for free, and the teams of professional programmers developing software for sale. This contrast makes for exciting journalism and for good hyperbole between the rival camps. Separating the opinion from the fact leads to the conclusions that both development methods, open source and commercial, can produce quality software and that both can produce products that are lacking. IBM has made major commitments to both processes and sees that each has its strengths and each produces capabilities that meet specific buyers' needs.

The advantages of software that is produced and maintained through the open source process are most visible and attractive in those portions of the software industry in which many users share a common set of needs. This dynamic creates a critical mass of interest sufficient to attract the collaboration of software developers that is the hallmark of open source. While we do see small communities of developers using this method to evolve specialized tools for their unique needs, it is less commonly applied to the cutting edge of the mass-market segments of the industry. In those areas, privately funded software development laboratories excel and are likely to continue that leadership for the foreseeable future. The forces that create this split in the market are not unique to software. In the large, mainstream market in which OSS is strongest, user needs are well documented and well understood. The attractiveness of breakthrough innovation in software decreases as the user base grows and matures. In fact, significant enhancements even become a disruptive event, because the large community of users doesn't necessarily look forward to making frequent upgrades and paying additional license fees to stay current. Rather, the mass market in mature segments seeks stable, reliable software at affordable prices. The user-driven, collaborative nature of the OSS process is well suited to this task. The central element to that suitability is the fact that OSS tends to incorporate or even define open standards that are the key to durability.

Open Source and Open Standards

The concept of open source software can be traced to several motivations and practices, both from the IT industry and elsewhere. A software developer who wants to speed the adoption of a newly developed file format, message protocol,

or data-encryption technique may deliberately offer his or her intellectual property for free with liberal license provisions concerning reuse. This approach provides the common technology necessary for many software programs from various vendors to read and write the same files, interchange e-mail messages, and decrypt messages received from another computer. Software developers who use these modules don't have to write these capabilities from scratch. The true beneficiary, however, is the person who purchases and uses the commercial software product that incorporates the standards. The benefit arrives in the form of interoperation. This sharing of software modules is a rapid and effective way to allow the software you purchase to interoperate with that of others. Open standards are essential to interchange, compatibility, and durability of software because they enable users to communicate with one another and to use the same applications.

Because open source techniques have been used to disseminate software tools rapidly for reuse by many software developers, the OSS development method has become closely associated with the adoption and deployment of open standards. This is where OSS has connections to the earliest technology innovations in a wide range of industries. Most new technologies — including arms and armaments starting in the 18th century; transportation starting in the 19th century; and electricity, telecommunications, and broadcast media in the 20th century — emerged as end-to-end proprietary systems.

Consider electrification as an example: the Edison Company offered its earliest customers service from the generator to the appliance. Edison generated the current, hung wires from poles, wired the customer's building, and sold the appliances. This integration was essential to delivering value to the electricity consumer, because it ensured that all of the pieces of the system would work together. Other producers, including Westinghouse, developed competing end-to-end systems. Eventually, consumers realized that there were advantages to each system, and they wanted the best of all worlds. Consumers also wanted the flexibility and price advantage of mixing and matching components from more than one supplier. Over time, the consumers' interests prevailed, leading to the establishment of standards for voltage, receptacles, and other elements of the electrification scheme. These standards were not controlled by any commercial organization. Rather, the standards were openly documented and available for all manufacturers to use. Other industries have gone through this same process and produced standards covering items from military ammunition to railroad track gauges to motor vehicle fuels to telephone jacks to DVD encoding.

To understand open source software, it is essential to understand that the history of virtually every emergent technology began with the availability of integrated, proprietary systems of technology. These proprietary systems

eventually split into two elements: a set of foundation industries that are based on open standard technologies and that adopt a commodity characteristic, and a highly innovative and competitive set of industries that utilize those standardized technologies to deliver their own value to consumers. Perhaps most important, the needs, interests, and actions of consumers create the separation between these two types of industries within a given technology. Technology producers have often been dragged into the open standards environment by their customers or have perished because they refused to enter it.

Consumers are well served by having widely available, standardized products that allow flexibility and cost advantages. This phenomenon allows us to drive automobiles confidently virtually anywhere in the world knowing that suitable fuel will be available. It also allows us to carry a laptop computer halfway around the world without even calling ahead to inquire about the availability of suitable power. Of course, when electrification proliferated and became standardized, the world was a large enough place to allow individual country decisions on receptacle standards, so when we take our laptops from Los Angeles to London, we have to carry adapters to accommodate a near-standard, but we don't have to bring a 6,000-mile extension cord.

The software industry is going through the process of evolving from clusters of vertically integrated software families to open standards right now. The buying patterns of software consumers are shifting, which is driving suppliers to shift in response. The result is likely to be a set of open standards–based software tools that form the foundation of the software industry. These tools will be affordable, stable, and reliable — the software equivalent of standard voltage, standard motor fuels, or DVD encoding. They will offer software users the platform on which they will place a range of tools to meet their specific needs. These tools may be open source, developed in house, or acquired from private software-development organizations. The only unique aspect of the software industry, in contrast to the many technological industries that have preceded it, is that the open standards of the earlier industries were written in books for producers to read and comply with, whereas OSS can be both a written standard and a reusable product. Far from threatening the consumer, this characteristic is likely to accelerate the realization of benefits from open standards in the software, since it reduces the time and cost of adopting those standards.

Utilizing Open Source in Government

Governments around the world are enlisting the capabilities of open source for a variety of reasons. Three motivations stand out above the others:

- the acquisition of OSS for internal use,

- the encouragement of OSS-based industries as part of an economic development model, and

- the use of open source development methodologies and licensing tools for government-produced software.

Each of these topics has been the subject of specific focus by governments around the world. In each case, clear trends are emerging to point the way for governments that are considering action and that are looking for guidance.

Open Source Acquisition Policies

Many government leaders in IT and other functions are becoming aware of just how widely adopted OSS has become within their infrastructure and just how dependent they are on it. This phenomenon is not that surprising when one considers that the spread of open source began with software modules and elements that helped to promote interchange of data and functions across departments and across organizations. Two landmark pieces of work on this subject were published by the MITRE Corporation for the U.S. Department of Defense (DoD) in July 2001[1] and for the Defense Information Systems Agency (DISA) in October 2002.[2] The latter report says:

> *"The main conclusion of the analysis was that FOSS [Free and Open Source Software, the DISA report's term for OSS] software plays a more critical role in the DoD than has generally been recognized. FOSS applications are most important in four broad areas: infrastructure support, software development, security, and research. One unexpected result was the degree to which security depends on FOSS. Banning FOSS would remove certain types of infrastructure components (e.g., OpenBSD) that currently help support network security. It would also limit DoD access to—and overall expertise in—the use of powerful FOSS analysis and detection applications that hostile groups could use to help stage cyberattacks. Finally, it would remove the demonstrated ability of FOSS applications to be updated rapidly in response to new types of cyberattack. Taken together, these factors imply that banning FOSS would have immediate, broad, and strongly negative impacts on the ability of many sensitive and security-focused DoD groups to defend against cyberattacks."*

This assessment provided support for what many IT professionals were coming to understand: that OSS had already established itself as an essential tool for government computing. Similar reviews by nondefense organizations, though less dramatic, might have reached similar conclusions at about the same time. The DISA report also points the way toward the position that government

would adopt regarding the use of OSS in its organizations. As an essential element in many areas of computing, OSS had to be channeled and embraced in appropriate ways.

While the U.S. DoD was exploring its use of OSS and formulating a policy position, other governments around the world were doing the same. This began to produce a series of policy directives and statements from large and small government organizations in 2002. An early and noteworthy example is the UK Office of the e-Envoy's statement in July 2002.[3] Many others have followed; and, more recently, John Stenbit, the CIO of the U.S. DoD, released a memo to DoD staff.[4] The common direction being established by these many studies and policy documents is becoming clear. Here is a summary:

1. Software produced and distributed using open source methods can and does offer value in government operations.

2. There are acceptable license offerings that are compatible with government participation in the open source development process as a user of and contributor to OSS tools.

3. Regardless of whether a government elects to procure an open source or commercial piece of software for a particular purpose, there is strong reason to adopt software that embraces open standards because those standards increase value and reduce costs of operation over time.

4. The most important consideration in government software procurement is the value offered by a particular piece of software in response to a government need, not the process (open source versus commercial) by which that software was produced.

Open Source and Economic Development

Beyond the use of open source software within their own operations, many government officials have identified the open source trend as an opportunity to promote economic development. Two aspects to this exploration have surfaced around the world:

1. Encourage business organizations to adopt OSS as appropriate to enhance their effectiveness and competitiveness.

2. Create or expand business activity around emerging OSS offerings such as Linux and Apache.

In the first instance, government leadership in the definition of open source procurement and acquisition policies for itself is directly transferable to the

businesses within the communities covered by those governments. As governments set direction for their own adoption of open source tools, they can assist the businesses that produce jobs and tax revenues in their jurisdictions to follow their lead.

The second opportunity is familiar territory for any government that has an established economic development function. It is self-evident that if there is an emerging industry around OSS, many governments would want to capitalize on the trend as a means of job creation and expansion of the tax basis. Two challenging questions arise: What is the actual opportunity? How can a government encourage business formation around that opportunity?

Many government leaders have expressed their thoughts on this subject and have taken steps to realize the opportunity. Detractors of this strategy have pointed out that OSS is distributed for free and that there is little chance for any country or company to build an economic development strategy around a free product. They are missing the point. As described earlier in this chapter, the expansion of OSS is a phenomenon that covers only certain elements of software. Specifically, we see it as a popular option in mature market segments in which user requirements are well established. Even for those users, the fact that OSS offerings such as Linux are available at no charge does not mean that the typical user will acquire them directly from the originator. In fact, much of the "free" software being adopted by government and commercial businesses is actually being acquired for a fee from distributors. These businesses take the freely distributed software from the original source and package it with support, services, education, documentation, and other offerings for which they charge a fee. The business of packaging and distributing OSS is a clear opportunity for economic development in the near term. These companies and the jobs they create will largely be in computer-related services such as user support, training, software installation, and software maintenance. In many cases, these jobs will exist in geographic proximity to the users of the software; in other cases, a company can serve a worldwide market from a single point on the globe.

The other opportunity for business formation around OSS is in the development and sale of applications and tools that work with OSS offerings. To resume the example of open standards propagation in the electric industry, where open standards take root, new opportunities emerge in both the standardized and proprietary segments of the market. In the software world, the new opportunity is in the development of commercially licensed software that works with the open standard/open source base that is being established worldwide today.

Government action around these areas follows typical economic development doctrine. Early work is focusing on the selection of specific market opportunities to be targeted, the identification or recruitment of fledgling businesses that can be attracted to begin the creation of new industries, and the alignment of education and workforce development efforts that will help citizens develop the range of skills needed to staff and manage new businesses in the industry. Given the relative youth of OSS as a meaningful component of the overall software industry, it is too soon to identify the successful countries, regions, or cities in this race. Meaningful examples appear in China, India, and Singapore, to name three. A recent example of a comprehensive treatment of this subject can be found in a report prepared for the Government of Canada by the e-Cology Corporation.[5]

Government as an Open Source Developer

Whereas this chapter and much of the public attention to open source in government has focused on the prior two topics, there is another play for governments in the open source environment. Public sector entities, including governments and education institutions, have several unique characteristics when it comes to the business processes they use and the tools they deploy to implement those processes. Especially at the local government level, very large numbers of independent government bodies implement remarkably consistent business processes to perform their duties. Unlike businesses, which see other similar organizations as competitors, governments are frequently eager to share their best practices and ideas with one another. This combination of a large number of users and a high degree of consistency in user needs is the same set of circumstances that have propelled OSS success in the general market.

The European Commission has done a significant amount of work on the subject of open source development as a means to evolve applications for use by governments within its framework. This work can be found within the European Union's Interchange of Data between Administrations (IDA) project.[6] Among their work is a report titled "Pooling Open Source Software,"[7] which explores the use of standard open source development and licensing techniques within a collaboration of government organizations.

OSS and Government Looking Forward

OSS is a powerful trend that will reshape the IT industry. This is not surprising, given the history of technological industries and the many transformations that the IT sector has already gone through in its brief history. What is noteworthy is the leadership that governments around the world are providing in embracing and directing this trend. Their interests as major consumers of

software, as economic development leaders for their communities, and as organizations looking to deploy the best techniques to deliver value for their citizens all find connection to the open source phenomenon. The governments that have explored this opportunity have started to define approaches that turn the available technology into benefits. More work is ahead, but it is becoming evident that those who understand and embrace OSS in appropriate ways will find benefit for themselves and their communities.

Notes

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2. Terry Bollinger, "Use of Free and Open-Source Software (FOSS) in the U.S. Department of Defense" (MITRE Corporation, October 2002); available at *www.egovos.org/rawmedia_repository/588347ad_c97c_48b9_a63d_821cb0e8422d?/document.pdf*.

3. "Open Source Software Use within the UK Government" (Office of the e-Envoy, July 2002); available at *www.ogc.gov.uk/oss/OSS-policy.html*.

4. John Stenbit, memorandum of May 2003, posted at the George Washington University Center of Open Source and Government; available at *www.egovos.org/rawmedia_repository/822a91d2_fc51_4e6e_8120_1c2d4d88fa06?/document.pdf*.

5. "Open Source Business Opportunities for Canada's Information and Communications Technology Sector" (e-Cology Corporation, September 2003); available at *www.e-cology.ca/canfloss/report/CANfloss_Report.pdf*.

6. Available at *europa.eu.int/ISPO/ida/jsps/index.jsp*.

7. Available at e*uropa.eu.int/ISPO/ida/jsps/index.jsp?fuseAction=showDocument&parent=highlights&documentID=550*.

8

Safety and Security

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It is easy to imagine that the earliest human communities formed in prehistory were conceived in part for safety and security. That need for protection has not dissolved in the time since, but the human institutions used to deliver it have progressed through clans and tribes to fiefdoms and kingdoms and ultimately to the democratic government institutions whose functions include a wide range of safety and security activities.

Although the quest for safety and security has remained with us throughout human history, the nature of the threats we face and the assets we have to protect have evolved and expanded continuously. So have the expectations of citizens, who today look to government to help them protect their health, lives, and property. In most recent times, nations around the world have had to develop strategies to protect themselves from asymmetric attacks of terrorism against people and property and have had to incorporate the protection of information and information technology (IT) assets.

This chapter discusses the implications of today's safety and security needs for government. It focuses on the forces shaping government action and the responses emerging to appropriately address those issues.

Setting the Scope

It is impossible to browse a government budget, listen to a political address, or read a national newspaper without seeing evidence of government's commitment to improving security. In some areas of the world, the preferred term may be *safety and security* or *homeland security*. Regardless of the preferred term,

security in the context of government and IT has become a catchall for a large and growing set of issues.

A meaningful discussion of IT and government security must begin by untangling all related topics. The simplest process for this is to separate the issues into two groups:

1. Protection of information assets — the set of topics that address threats and responses to the information infrastructure, data, and assets that are used to run government and private sector institutions; and

2. Information technology to enhance personal and physical security — the set of tools and techniques that enable government to fulfill its mission in areas as diverse as strategic intelligence analysis and disaster scene response.

Each of these major divisions has many subelements. The later portions of this chapter will attempt to address some of those. First, we'll review the forces that shape government's assessment of the need for action in both areas.

Principles Shaping Government Actions

Our perspective on applying IT to security begins with an assessment of the forces that will shape a government's response to threats. Government leaders around the world recognize that the pursuit of security raises tough choices and even direct conflict between competing objectives. For example, measures that one citizen views as reasonable steps toward security may be viewed by another citizen as excessive government intrusion. Resolution of these conflicts will always be part of the challenge of government leadership, but we do see the emergence of certain decision elements that will shape government actions in the direction of security policy and investment.

Seven principles guide the choices that governments make in the pursuit of security and the application of IT to that pursuit. These may be used as a checklist to compare two or more options or to shape the pursuit of an identified security goal.

- *Provide the highest levels of security for people and property.* The pursuit of security is a never-ending activity, and no plan can offer 100 percent assurance of protection. Governments are forced to establish goals and set priorities — and by default to leave some areas exposed. The priority and degree of protection afforded citizens, public and private assets, and critical infrastructure will shift in response to emerging threats, public

debate on priorities, and the availability of practical solutions to detect and interdict various exposures.

- *Deliver enhanced levels of security as quickly as possible.* Many countries and their governments have experienced an awakening to the threats that face them. Some of these threats have been documented for years; others are newly discovered. Clearly, the sense of urgency to close new points of exposure is high. Common issues facing government leaders are the speed with which the identified areas of exposure can be closed and the degree to which various options will address the challenge. Frequently, this debate will present two alternatives: take steps to achieve modest security improvements quickly and delay reaching high levels of protection, or implement more significant improvements that phase in more slowly and leave more significant gaps in the interim. Much debate will surround this issue of less/sooner versus more/longer.

- *Address the most significant exposures first.* As threats are identified and assessed, they will likely be distinguished one from another by the magnitude of potential impact. Those that threaten the ongoing viability of a nation or an economy will receive top focus, whereas steps to address those that by their nature are limited or containable will likely wait. Because many of the threats being addressed today are manmade and asymmetric — for example, terrorism and malicious hacking — the determination of significance has to be made with consideration for the damage that a determined adversary could do. Taking the attacker's view can be a challenge for many government and business leaders, but it is an essential step toward accurate prioritization of threats.

- *Proceed with the minimum expenditure of resources.* In all aspects of government activity and service delivery, the question of affordability arises. The full picture of resource consumption for security initiatives includes not only the acquisition of solutions to improve detection, interdiction, and response but also the ongoing maintenance and staffing of those solutions and the collateral impact on the economy.

- *Minimize disruption to individuals, communities, and the economy.* Countries around the world have adopted various approaches to security through the course of human history. The most restrictive are frequently the most effective. Achieving high levels of security generally involves a very high level of control and inspection by government. The immediate consequence of a shift toward tighter security is the economic and

societal impact, particularly in areas where the culture or economy relies on free movement of people and goods.

- *Maximize preservation of individual liberties and way of life.* The tradition in many countries — especially Western democracies — of personal freedom and privacy can be threatened by steps to heighten security through governmental monitoring, awareness, and detection of threats. In these countries, much debate and discussion will focus on the degree to which citizens will trade these liberties to have their government deliver higher levels of protection.

- *Deliver the greatest potential for sustainable protection.* In time we will probably see that some security enhancements are durable while other steps can be easily and inexpensively thwarted by a determined attacker. Even in the rush to increase security quickly, governments need to validate that the increases in protection are not temporary. Achieving this goal will require close review of security-enhancement measures by people who can think like those who want to circumvent the measures. The worst outcome is to have government investments deliver capabilities that inconvenience the compliant population while leaving unnoticed opportunity for an adversary to inflict damage.

Areas of Concentration

As governments around the world have awakened to the diversity and variety of threats, we have seen the emergence of a bewildering array of solutions to those threats. The complexity of areas such as border security and chemical or biological terrorism make it impossible for governments to turn to a single source for a comprehensive solution to any one problem. As a result, the capabilities in the market today are invariably solutions to a portion of a larger problem.

To avoid the deployment of a series of disjoined capabilities to serious issues, many governments are choosing to establish strategies around broad, functional areas of concentration and then procure and deploy compatible IT components within those areas. This approach provides a sensible balance between integration of solutions within key functions and rapid deployment of security-enhancing capabilities for many governments.

In many cases, the thorough assessment of threats and vulnerabilities requires prolonged effort, and the commitment to tactical actions proceeds even in the absence of agreed-to strategies. Where this is happening, the near-term actions will need to blend with strategic initiatives over time; this flexibility should be

allowed wherever possible in order to minimize the prospect of having to scrap and replace near-term solutions before their anticipated end of life.

We see several areas of focus emerging and initiatives clustering within each. Every one of these categories will place demands on government entities to collaborate closely with one another and in many cases with commercial entities to deliver desired results. This is particularly true of the initiatives that contain both proactive and reactive elements, because so many of the proactive assets of government related to security reside at the national level while the reactive elements tend to be associated with localities. The six areas of concentration that typify government activity in security are described separately in the sections that follow.

Public Health

This focus area addresses the direct threats to citizens from chemical and biological attack and from the aftermath of other attacks, including nuclear and radiological attacks, that may contaminate land area and endanger human health. The initiatives in this area draw heavily on the centralized knowledge within national organizations, including university research institutions, pharmaceutical suppliers, and the biological/chemical warfare assets of the military. Locally, these initiatives draw on traditional first responders who would be engaged in serving citizens in need of rescue or immediate medical treatment. Also included in the local resource base is the medical provider network of practitioners and hospitals. A key strategy to increasing the capability of public health assets is a close yet flexible interconnection of the resources that monitor and respond to health threats. Although linkages have existed across these organizations for a long time, their purpose has been predominantly the collection of epidemiological information.

Two elements must be enhanced to reach the level of collaboration required for public health resources to deliver their potential value to homeland security. These are (1) the development of bidirectional communication that allows the knowledge in national or centralized organizations to be delivered to a point of need as effectively as disease outbreak information is collected today and (2) a greatly shortened cycle time for both the collection and the dissemination of accurate information compared with that of any approach in common practice today. These crucial techniques for situations involving human health may be even more crucial in relation to plant and animal health in agricultural areas, which tend to be rural and where both monitoring and response resources are less plentiful.

Several IT disciplines offer promise to the initiatives being deployed for public health. The two principal elements are communication and collaboration.

Within this set of tools are technologies such as local and wide area networking (including wireless networking for field personnel from inspectors to responders), groupware for flexible collaboration across traditional organizational boundaries, knowledge management tools to support access to and propagation of information, and e-learning to allow first responders and providers to stay apprised of threats and proper response techniques.

Public Safety

The expanded focus on security has highlighted both the strengths and weaknesses of the deployment of public safety resources in developed countries. Separate from the public health initiatives noted above, we see public safety encompassing mostly law enforcement and investigative resources and emergency responders. These resources have critical roles to play in the collection of information that feeds organizations and processes designed to detect threats, the interdiction of activity and individuals known to represent a danger, and support for the recovery efforts that follow any incident.

The collaborative aspects of public health are echoed in public safety, although the approaches differ. In every case, there are national resources that need to link to their regional and local counterparts; but there are also other uniformed personnel, such as transit and housing authority police and fire investigators, and private resources, including security guards and even the general public. The key strategies emerging in the area of public safety cluster around two approaches: (1) improving the effectiveness of information collection to support threat identification and (2) improving dissemination of information for use by law enforcement personnel and even the public.

Many of the same IT disciplines that support public health also apply here because in both cases the needs are to improve linkages between people in a variety of organizations and to speed up the process of collecting and disseminating information. In addition to the communication and collaboration tools, there is a third element that is more visible in this space: data management and analysis. The most applicable data management technology for public safety is *data federation* technology. This set of techniques allows rapid, flexible interconnection of data from various sources to allow investigators with proper authorization to view the total picture. In this way, disparate information from national intelligence and local law enforcement can be combined with minimal effort to identify suspicious activity and reach appropriate conclusions. This analysis can be distributed securely to those with a need to know.

The end result of these strategies will allow existing public safety resources to be shaped into a net with a finer mesh, without the need to reorganize reporting structures or to reengineer information systems. These strategies are

especially sensible in light of the guiding principles mentioned earlier in this document and the asymmetric threats that concern many governments today.

Cyberattacks and Critical Infrastructure Protection

Developed nations that are concerned about security must focus on the threat of damage to critical infrastructure that could result from deliberate attacks, accidents, or natural disasters. A degree of protection is delivered by the geographic dispersion of critical assets and the localized nature of natural disasters. Even the most widespread damage from a hurricane, flood, or earthquake would not threaten the viability of a nation's economy. A coordinated terrorist attack against known critical points of failure or geographically dispersed critical infrastructure such as transportation systems, utilities, or financial networks could be devastating to a nation's economy in a way that no natural disaster could be.

More than any other development in recent years, the prospect of terrorist attacks has changed the way critical infrastructure is designated, designed, and protected. The key strategies to minimize risks vary, depending on whether the threat is a physical attack (e.g., demolition of key components in the electric distribution system or petroleum pipeline) or a cyberattack (e.g., denial of service for financial institutions or interference in the national telecommunications network). Security against the former can be aided with closer surveillance, monitoring, and access control; measures against the latter involve the definition and implementation of barriers and careful authentication of access to resources.

Although each of these categories involves the collaboration of multiple organizations (e.g., utility providers and their customers or the partners within a financial network), there is less reliance on communication and collaboration in this category than there is in the public health or public safety category. Infrastructure protection relies on all asset owners to secure themselves and the critical infrastructure they own and to be ready to recover that infrastructure if it is disabled. Beyond that, the reliance on extended enterprises and collaborative networks that link organizations across countries and industry boundaries places a burden on every organization to expand its relationship agreements to include the definition of mutual protection so that an attack at one point in a network can be contained and isolated, preventing the disablement of an essential element of a nation's infrastructure or economy.

Transportation

Much public and media focus has been given to the transportation segment because it has been a target of terrorist activity for decades. That attention

has concentrated on the role of central government agencies, airport authorities, and airlines in protecting the flying public and those on the ground from the threat of commercial-aircraft hijackings. The danger from an attack of this sort is certainly real, and the appeal for terrorists is obvious. Terrorism is a crime that is attracted to weak points and vulnerabilities. High levels of security around air travel in the absence of similar focus on land and sea transportation could simply shift the focus of terrorists. As a result, many governments are widening the focus from air safety and security to transportation security.

Within this set of issues, we expect to see widespread focus on technologies that support identification and authentication. These technologies can be applied to vehicles, cargoes, and, of course, people, including travelers and employees. The preoccupation with the concept of "trusted" travelers will likely be short-lived. Over time, identification and authentication technologies such as smart identification cards and biometric recognition will separate "known" from "unknown" rather than "trusted" from "untrusted" — particularly as it concerns travelers. This approach will allow trustworthiness to be established or validated at the time of travel for known travelers, cargoes, or even vehicles based on the privileges they attempt to exercise. Meanwhile, unknown entities will likely receive additional scrutiny from inspectors and law enforcement personnel.

This concept requires investment in infrastructure and data management capabilities to support the validation of trust on a transactional basis, but that investment will allow delivery of higher levels of security. This combination of databases that support authorization at the transaction level with identity authentication of people, cargoes, and vehicles can be applied to air and train travelers, transportation of hazardous waste, movement of shipping containers, and many other situations. In the domains of public mass transit and large public areas such as ports and waterways, there is significant applicability of surveillance and site-security technologies, including digital video monitoring and the many derivative technologies that can be applied to digital media data. Transportation security also links tightly to public health and public safety, given the focus on emergency response to transportation incidents and the now-common collaboration among multiple jurisdictions of law enforcement at transportation facilities such as airports and seaports.

Defense and Intelligence

Defense and intelligence, two cornerstone functions in national security, frequently lead the national effort in detection and interdiction of safety and security threats. The application of IT to these disciplines is already widespread and will increase. Particularly important to the intelligence community will be

the data management techniques that safeguard sensitive intelligence data and allow its appropriate use, including complex analysis without compromising sources to those without a need to know.

The application of data federation technology offers significant promise in this area. When properly linked with the communications and collaboration technologies that support public safety and public health initiatives, the intelligence community will be able to control the release of its insights and enable action by government agents across a wide variety of jurisdictions. Both defense and intelligence initiatives will benefit from the creation of new linkages between the layers of government and between government and private sector organizations. These linkages will support the collection of intelligence data and the careful release of thoroughly screened and declassified insights to law enforcement personnel. The technologies deployed in this environment focus much more on securing data and controlling its dissemination than on promoting widespread collaboration.

Immigration and Border Security

As with defense and intelligence, responsibility for immigration and border security tends to fall to central government. There are three key elements in the improvement of border security related to human travelers. First is the authentication of the travel documents being used for travel; second is the confirmation that the person presenting the documents is the person to whom they were issued; and third is connecting the person with a life history to determine the desirability of granting entry to a country. Similar steps might be taken with cargo shipments, which can be connected back to shippers and common carriers, whose trustworthiness can be assessed. Technologies available today such as smart cards and biometrics will clearly help to authenticate documents and the people who carry them. Perhaps the largest area of IT application over time will be in the validation of life histories to individuals.

The nature of the intra- and extragovernmental linkages in this area is different from that of those described above. Where linkages are desirable, they are likely to be between central governments or to global organizations such as Interpol.

The key technologies that will support immigration and border security over time will be identification/authentication and data management. These disciplines and techniques will interoperate to enhance immigration and border security very much the way they will for transportation security through the use of biometrics and extensive data-searching capabilities to authenticate people, cargoes, and vehicles.

The Application of Information Technology

The delivery of enhanced security for people and property through the use of information technology ultimately requires the selection and deployment of technologies that are affordable and effective for their intended use. Governments that have assessed their security threats and established directions frequently look for guidance from their peers, from think tanks, and from the industry on the areas that will deliver value.

The selection of solutions and technologies to advance safety and security in the focus areas described above is not straightforward. Some approaches prove valuable across governments of all sizes around the world, particularly in setting direction and making responsible choices for technology to support government goals. Here are several areas to consider:

- *Plan individual acquisitions within the context of an enterprise architecture.* The analogy of building a house is an easy way to illustrate this concept. If you are building a house, you start with an architectural plan for the entire house, then procure the doors, lumber, heating system, and other components. IT works the same way, yet many organizations purchase components such as networks and major software applications without planning how they will interrelate with other elements in the overall architecture. Given the scope, complexity, and sense of urgency for security, many governments have created sub-enterprise architectures that address areas such as public health, public safety, and the others described above. This is certainly an appropriate way to speed the process; however, government leaders should recognize that it may create the need for costly and complex integration across those functions at some point in the future.

- *Build strategies and solutions on recognized industry standards.* We have learned through the history of the IT industry that systems have longer lives than we anticipate and that we eventually want to connect things that were never planned for connection. The use of recognized industry standards — especially open standards — is a safeguard for investments in technology.

- *Focus solutions on delivering information to people who deliver security.* There has been a rush of activity toward solutions that purport to deliver safety and security automatically. Experience has shown that IT is applied to issues of safety and security as an aid and complement to human judgment, not as a substitute for it. We believe that the most effective, durable, and affordable investments in government safety and

security will be those that help government workers to do their jobs better.

- *Advance capability progressively across a wide front.* We described above how great concentration in the security of air travel could shift the target of terrorist opportunity to land or sea transportation. This phenomenon repeats in every aspect of safety and security that we have studied — especially in the asymmetric adversarial environment. The sensible solution is to advance security in ways that do not create expensive, highly secured zones that can be bypassed by adversaries who will instead favor adjacent, unsecured targets.

- *Build solutions on a robust, secure, flexible infrastructure.* Because government IT is itself considered critical infrastructure, it should be secured as it is planned and built. This process includes incorporation of sound practices for information access and storage, secure networks and transactions, and appropriate backup and recovery capability.

Finally, here's a recap of the technologies that offer the greatest promise to improve safety and security when deployed in the government environment and the types of challenges each is well suited to address.

- *Messaging and Collaboration:* Some of the easiest improvements to achieve in safety and security are attainable through the use of basic technologies that allow government people to locate one another and exchange information. These tools are especially well suited to support the principle that safety and security systems should assist people in doing their jobs rather than do the jobs for them. Capabilities being deployed today in this space include basic e-mail, repositories of information that identify government experts whose assistance may be needed in times of emergency, groupware tools to support teams of people, and even instant messaging to help first responders communicate at emergency scenes. The defining characteristic of messaging and collaboration for safety and security solutions is flexibility. Many other government disciplines rely on predefined teams of people whose communication needs are predictable. The cadre of talent required to identify, interdict, and respond to emergency situations is highly unpredictable, and the tools that support them need to enable rapid team formation and deployment. The business processes that support this technology need to be adjusted to allow people who may never have met before to work effectively once they are connected as a team.

- *Communications and Extended-Enterprise Connectivity:* As an extension to messaging and collaboration, communications channels need to be in place that allow government people to get in contact and stay in contact. Most government people already have basic connectivity at the desktop using local area and wide area networks. The greatest amount of attention in this space today is focused on enabling the same reliable connections for people who are deployed in the field; improving the reliability and security of data communications that are already in place; and enabling tighter connections between government and nongovernment organizations such as transportation companies, utilities, and financial institutions. Deployments in these areas include wireless communications, encrypted data links for highly sensitive information, and network redundancy.

- *Data Management and Analysis:* These tools, for many years the mainstay of the intelligence community, are now becoming more common in all other aspects of safety and security. The advantages of effective data gathering and analysis are found in lower cost and shorter cycle time to deliver information to decision makers. This may include the cross-referencing of large data files to identify criminal activity, the assessment of epidemiological information that could be the first indicator of a bioterrorism incident, or the review of a cargo manifest to validate the trustworthiness of the shippers of hundreds of containers on an inbound ship. The most interesting new technologies in this area include data federation tools that allow interconnection of databases without actually moving them and tools that gather and analyze data from public sources such as the Internet.

- *Emergency Preparedness and Response:* In addition to using communication and collaboration tools such as those used in New York as part of the post–9/11 recovery effort, many steps can be taken to prepare for and recover from emergencies. The most essential and easiest to implement are steps to protect government infrastructure such as data centers and networks in the event they are disabled. Some of the interesting emerging capabilities involve the use of computer simulations to model the impact of emergency conditions on such areas as traffic flow and the use of massive, multiple-player gaming technologies to enable teams of first responders to train and drill on how to work together.

- *Identification and Authentication:* Many aspects of security require the government to establish and validate a person's identity. This is most visible in border crossing, for which the combination of a travel

document (passport or visa) and a visual inspection has been the standard. Traditional approaches of that sort have proven easy to foil and do not achieve the level of security desired by most countries today. The use of biometrics such as fingerprint recognition and of smart documents such as passports or visas with identification chips installed is proving to be effective for fast, reliable authentication of individuals. These tools can be extended to enable employee access to buildings, authorization for logging on to systems, and even the identification of shippers and the cargo they have packed. The emerging areas of face recognition, radio-frequency identification tags, and integration of physical security systems with computer security systems will extend these capabilities. Although concerns about privacy may slow deployment of the full range of capabilities somewhat, the technology either exists today or will soon be available to enable fast, inexpensive, reliable authentication of individuals in a wide range of environments. These identification processes can, in turn, support the validation of authority and the determination of trustworthiness. The end result is a government's ability to secure assets, facilities, and borders and to concentrate scarce inspection resources on those people whose identity cannot be validated or whose trustworthiness is in question.

- *Surveillance, Site Security, and Physical Assets:* The expansion of IT in support of security is not limited to traditional types of data. Increasingly, the techniques being deployed include multimedia forms such as digital images, digital video, and voice. In public places such as airports, output from surveillance cameras is being digitized to improve the efficiency of transmission, storage, and analysis. New software tools allow computers to "watch" these video streams and to alert security personnel if certain predefined conditions are met. These conditions include common security concerns such as abandoned parcels, tailgaters at security doors, and traffic in restricted areas. The net result of these advances is the ability to have personnel address genuine threats and incidents, rather than conducting routine, repetitive tasks. The extension of these capabilities includes facilities such as military bases, public places, government buildings, and other critical infrastructure areas.

These broad technology areas can be most effective when combined. For example, the use of identification technologies and physical security can greatly improve the security of access to government facilities; the use of data analysis and communication can improve public health efforts; and the use of emergency preparation and communication can facilitate more effective response by

firefighters from adjacent jurisdictions who may need to collaborate in the immediate aftermath of a major incident.

The Challenges Ahead

Clearly, many IT tools and disciplines can assist government organizations in delivering higher levels of safety and security for themselves and their citizens. The best practices to achieve the greatest value from technology in this area are being tested and refined continuously. Certainly, learning experiences and missteps lie ahead, but successes are beginning to appear. The common elements that define the successes are a solid understanding of the threats to be addressed, the use of technology to augment the capabilities of government personnel who address and respond to incidents, and a thoughtful application of technologies in ways that deliver near-term results and provide for long-term evolution.
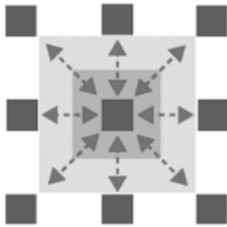
On Demand Workplace
A New Vision for e-Government

Tracy Denny
Service Area Lead
Public Sector On Demand Workplace

Imagine a high-performing government organization where senior executives are able to communicate the vision and priorities of the organization clearly to their employees; where skilled, highly productive employees perform their jobs within seamless business processes that deliver outstanding service to both internal and external customers; where activities are optimized to deliver more services and improved services without increased spending; and where information technology (IT) investment is aligned with the organization's business mission and objectives and delivers measurable return. Does this sound like most government organizations? Is this a realistic scenario that government organizations can achieve? Why not? New, fresh approaches to improve the business of government are needed to achieve this transformation.

New Challenges Facing Government

Government organizations face intense pressure to transform themselves into high-performing, highly efficient enterprises. Consumers of governmental services are demanding improvement in both the breadth and quality of services that government organizations provide. External drivers such as political management agendas and billion-dollar budget shortfalls for many state governments are challenging government leaders to focus on ways to improve organizational performance and reduce costs. Government line-of-business executives are being asked to do more with less and to build a better business case for every investment. Integration and closer partnerships among federal, state, and local governments, necessitated by heightened security in the United States, are critical in protecting our homeland.

Forward-looking government organizations are using these pressures to launch coordinated efforts toward fitter, more fluid, and more responsive working environments. This involves rethinking the very nature of work — as seen through employees' eyes and enabled by advanced Web technologies — all in the name of creating cost- and process-efficient "e-workplaces." Although IT support is of course crucial to this endeavor, thorough workplace transformation requires amending business processes and managing change throughout the organizational culture.

During the past few years, government organizations have focused significant sums of money on citizen-facing e-government (e-gov) initiatives that were often seen as ways to improve service delivery and offer greater access to government services. Although these e-gov initiatives have expanded citizen access to government services, government organizations have failed to realize the anticipated return on these initiatives, in either improved service or reduced costs. During the same period, many of the same organizations have implemented enterprise resource planning (ERP) systems to replace disparate legacy systems and streamline business processes. However, these efforts have not yielded significant efficiency improvements, nor have they had a measurable impact on overall organizational performance. With the challenges and demands facing government organizations today, it is time for a new e-gov focus.

Trends and Direction

Government organizations must turn attention to internal transformation — to finding ways to improve internal efficiency and employee effectiveness. The movement is toward a focus on the individual worker, on creating an environment in which government employees can perform most effectively: Could this be a key to helping government executives and organizations overcome significant management challenges? Peter Drucker, one of the leading management thought leaders of our generation, has stated:

> *"The most important contribution management needs to make in the 21st century is to increase the productivity of knowledge work and knowledge workers. It is on their productivity, above all, that the future prosperity — and indeed the future survival — of the developed economies will increasingly depend.[1]"*

In today's work environment, demands for multichannel accessibility, real-time communications, around-the-clock availability, simplified self-service, and enhanced intra- and extra-enterprise relationships continue to rise. To meet these expectations, government organizations must establish a wholly integrated infrastructure capable of providing compelling and timely content and

connections to the right people in the right way whenever they need it. At the same time, visionary government organizations must build flexibility into their culture, helping to ensure their ability to respond to, learn from, and fully exploit today's diverse and dynamic environment. It's no wonder that more and more government executives are realizing the true value of Web-enabling their organizations.

Creating collaborative e-workplace environments can help government organizations enhance organizational productivity and performance. Fundamental to the concept of the e-workplace is the workforce, a government organization's human face to its constituents. Consistent, effective constituent service — whether in person or through another channel — is in large part responsible for increasing constituent satisfaction. Technologies now afford more opportunities for communicating with and serving constituents; but a flexible, responsive, and progressive workforce initiative capable of boosting employees' morale, responsiveness, productivity, and knowledge is a crucial component of any true e-workplace.

At the same time, successful organizations must go beyond mere implementation of e-workplace technologies to manage process changes and personnel changes capable of delivering real benefit to the organization. Adopters of the total e-workplace concept are beneficiaries of comprehensive workforce strategies, enhanced productivity, informed collaboration, and new responsiveness. By working to achieve seamless and proactive workforce coordination, large government organizations can act like small, nimble organizations while still enjoying economies of scale. In this aligned environment, everyone becomes a "knowledge worker" — conducting self-service human resources (HR) responsibilities, utilizing collaborative development and distance learning options, employing mobile communications, and otherwise relating to each other and to the organization in a whole new way. These actions, although less visible than citizen-facing e-business activities, can go a long way toward helping government organizations put their own houses in order.

The resulting cost and process efficiencies offer the potential for a rapid and quantifiable return on investment (ROI) and sufficient savings to fund critical, mission-focused programs and initiatives. These savings will allow government managers to stretch existing budgets in an economic environment in which government organizations are struggling to fund basic programs and services. Indeed, an end-to-end, workforce-centered framework can help organizations build, extend, and measure capabilities beyond the traditional boundaries of the enterprise from employee to partner, supplier, and constituent relationships.

Perhaps most importantly, workplace initiatives should be implemented strategically, on a programmatic basis. Costly and redundant processes such as multiple HR activities can be addressed promptly to help achieve rapid and measurable value. In this way, leading-edge technologies and e-workplace applications can be chosen carefully and leveraged appropriately to provide direct and continuing value to organizations of all sorts and sizes.

What Is an On Demand Workplace?

An on demand workplace, or *e-workplace*, provides a single destination for employee workplace activities. It simplifies employee access to integrated business processes, fellow employees, other government organizations, constituents, and suppliers to help improve productivity and create a results-oriented environment. The on demand workplace offers new ways to communicate and work electronically, and it provides a roles-based workplace environment in which employees can access collaboration tools and resources, such as HR functions, financial systems, constituent services, performance metrics, and learning and training resources. A security-rich, enterprisewide portal framework enables employees to quickly obtain the information they need to do their jobs better and faster — virtually anytime, anywhere.

An on demand workplace integrates disparate systems and workflow through a single view, and it leverages existing investments in technology and people to help lower costs. Through an easy-to-use portal, employees have access to effective training, as well as to critical resources and information both within and outside the organization, enabling improved communication and the sharing of best practices. An on demand workplace can help reduce costs by delivering non-core services such as HR transactions, policies, and procedures.

A single, consistent interface integrates with existing systems, making it easier for employees to find and leverage consolidated information to support more-informed decisions. Utilizing an enterprise portal framework, the on demand workplace provides single–sign-on security to help simplify access to applications and tools.

The on demand workplace enables employees to collaborate and share knowledge with other employees, government agencies, business partners, and suppliers. Employees also get just-in-time access to training and knowledge, allowing them to keep their skills up-to-date and to deal effectively with changing legislation and work environments.

Strategic communication from government leaders, distributed through the on demand workplace, can help create a results-oriented environment. Improving workforce productivity with a consolidated view of information and integrated

workflow processes, the on demand workplace enables employees to deliver better citizen services with the same, or fewer, resources.

Components of an On Demand Workplace Solution

The critical components of an on demand workplace can vary according to the needs of the organization. Key factors influencing the make-up of an on demand workplace solution include industry business drivers, cost and ROI considerations, current systems and Web-enablement status, and the workforce culture.

Organizations may choose a phased and/or modular deployment — establishing a flexible, scaleable, and unified framework for the overall solution upon which are built the critical applications for delivering the swiftest and most substantial benefits. A holistic, enterprisewide approach (see Figure 9.1) helps to ensure that top opportunities are addressed first and that individual initiatives do not replicate or conflict with others in the organization.
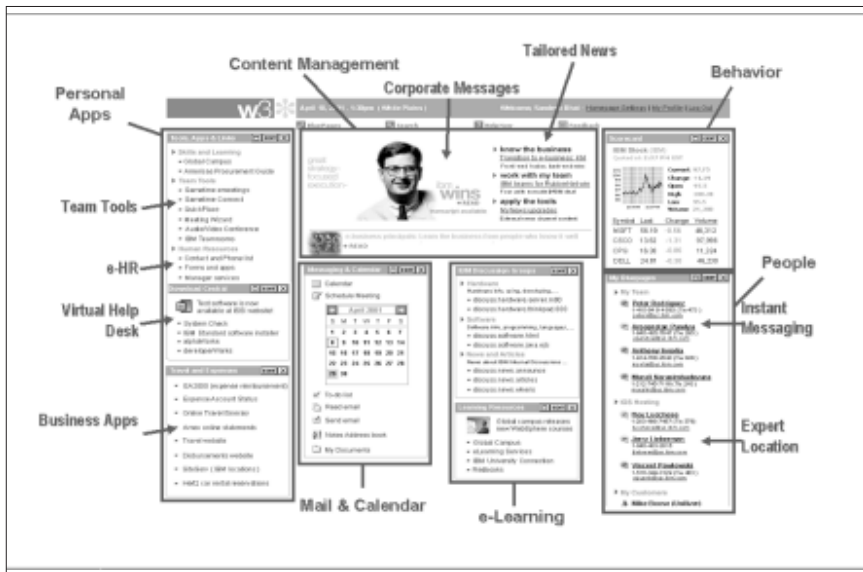
Figure 9.1: Example of an on demand workplace.

Key features of an on demand workplace can include but are not limited to the following.

The Enterprise Portal

An on demand workplace grows around a single, secure, and personalized Web portal for employees seeking access to applications, information, and people. Many government organizations maintain hundreds — sometimes thousands — of Web sites. Although maintenance of so many sites demonstrates a keen interest in workforce initiatives, it also reflects a lack of integrated oversight. The portal approach to information flow and interaction can empower the workforce, streamline communications, optimize the use of resources, and drive a better return on overall investment. In addition, it establishes a fully aligned, informed, and efficient foundation from which to launch other initiatives.

e-HR

Online HR initiatives improve employee access to information and facilitate electronic processing of common HR functions such as reimbursement or change processes. The result is a dramatic increase in organization responsiveness and employee satisfaction, at a lower cost.

e-Learning

Online learning helps a distributed workforce keep skills current while significantly improving productivity, reducing the need for travel, and increasing training attendance, all at a reduced cost to the organization.

Digital Collaboration

Organizations willing to culturally encourage and technically support e-meetings and instant messaging can dramatically reduce travel expenses and drive new ideas by bringing global employees together.

Mobile Office

In today's government on demand workplace, everyone can become a knowledge worker. Multichannel access to reliable, just-in-time data enables an organization's transportation teams, constituent support force, teleworkers, and line-of-business executives to communicate on an as-needed basis — anytime, from anywhere.

Expertise Location

Research shows that employees across industries spend 30 to 60 minutes a day looking for help in solving problems. An expert directory enables companies to recapture that time and increase innovation by building role-based communities.

Virtual Help Desk

As organizations become increasingly dependent on technology to improve operations and drive efficiency, virtual help desks can provide 24/7 electronic support for IT issues, thus reducing support staff costs and requirements.

Self-Service Processing of Travel Expenses

Organizations can reduce processing costs and errors by enabling employees to create, submit, and reconcile travel expenses online. Web-based processing also provides real-time data on travel patterns, enabling businesses to budget strategically and negotiate special rates with service providers.

e-Procurement

e-Procurement can drive quality improvements from suppliers of goods and services, reduce overall costs, and help to secure supplier relationships. These capabilities — and all business rules — are delivered directly to employees.

e-Customer Self-Service

Today's government constituents expect convenient, real-time, multichannel access to service and information. An organization that e-enables its workforce can facilitate consistent and superior service by helping to ensure the rapid and reliable sharing of information, a targeted and efficient workflow, and a standardized interface and database.

Executive Dashboard Key Performance Indicators

Organizations can speed and enhance executive decision making with Web-based performance and measurement functionality that begins to integrate financial and operational information. Automated assembly and delivery of key performance indicator reports can inform and empower operational decisions enterprisewide.

Benefits of an On Demand Workplace Initiative

An on demand workplace provides organizational value through enterprise portals and intranets; self-service human resource (e-HR) and distance learning (e-learning) applications; intelligent customer self-service; collaborative capabilities; mobile and multichannel support; and other connective, enterprisewide functions. Together, these capabilities can transform the way that colleagues communicate, employers relate to employees, and people perform their basic work activities.

For example, an effective on demand workplace solution grants users secure and consistent access to people and information via Web browsers, conventional and wireless phones, personal digital assistants, specialized handheld devices, self-service kiosks, and other channels. An on demand workplace can provide employees at every level with information geared toward particular work patterns and needs. The resulting reduction of time-consuming navigation and process redundancies touches everyone from budget analysts and first responder teams to revenue collectors and managers.

All in all, establishing an integrated, end-to-end on demand workplace can improve information flow across internal organizational units, enable more cost-effective processes, enrich collaboration, and simplify the infrastructure from which all relationships — among employees, partners, suppliers, and constituents — are managed. In a unified on demand workplace environment, government professionals at the office, at home, or in offsite locations around the world can contribute effectively and efficiently to the organization.

Helping to Enhance Organizational Performance

By enabling collaboration and knowledge sharing with other employees, government agencies, business partners, and suppliers, an on demand workplace helps employees quickly access information and resources and spend more time serving citizens, thus ultimately helping to improve the organization's public image. Employees also get just-in-time access to training and knowledge, allowing them to keep their skills up-to-date and to deal effectively with changing legislation and work environments. Strategic communication from government leaders, distributed through the on demand workplace, can help create a results-oriented environment. Improving workforce productivity with a consolidated view of information and integrated workflow processes, the on demand workplace enables employees to deliver better citizen services with the same, or fewer, resources.

Visionary government enterprises can use today's on demand workplace infrastructures as a springboard to

- Transform a sprawling enterprise into a single, integrated culture across agency boundaries and geographies.

- Manage a fluid government enterprise, including mergers, consolidations, and extra-enterprise relationships.

- Aid cultural transformation by utilizing an enterprise intranet as a vehicle for propagating cultural change. Government executives can

communicate messages and see that new directions are acted upon expeditiously and consistently throughout the organization.

- Inspire innovation by seeding access to expertise and facilitating collaboration; community building across the organization inspires innovation.

Proven Results

IBM, arguably the world's largest and most successful e-business, has already Web-enabled and optimized its workforce activities and relationships, resulting in quantifiable productivity improvements, process and cost efficiencies, and vigorous innovation across the enterprise. In just over four years, the company's global intranet and other business-to-employee (B2E) enhancements have saved the company US $6.2 billion and have transformed the very nature of IBM's corporate communications and employee relationships.

For the first time in the history of the organization, a majority of IBM employees consider the company's intranet to be their single most credible and useful source of enterprise information, preferred over traditional channels such as managers and coworkers. Nearly 15 million hits a day attest to this preference. Indeed, the IBM on demand workplace is a vanguard in corporate community, facilitating communications via e-meetings and instant messaging, saving money through e-HR and e-learning, driving collaboration with an enriched employee directory, supporting innovation with aligned content management, and much more.

In the four years leading up to 2002, IBM's use of an on demand workplace resulted in cost avoidance of more than $6.2 billion. The types and magnitude of savings and benefits are summarized in Table 9.1.

Other private sector organizations, such as Hewlett-Packard, American Express, Campbell's, and Ford Motor Company, have experienced similar results. In addition to measurable, hard dollar returns, organizations have utilized their on demand workplace portals as a key element of business transformation and culture change.

Can government organizations hope to achieve similar results? Organizations such as the U.S. Postal Service, the Defense Logistics Agency, and the New York City Parole Board have begun efforts to create their own on demand workplaces. These organizations have begun the journey, but it is too early to assess the full impact of their initiatives.

Table 9.1: IBM's savings and benefits realized through an on demand workplace	
Focus Area	**Savings and Benefits**
e-HR	HR costs were reduced by 57 percent.
	Thirty percent of HR transactions are now self-service (conducted through the intranet), and 55 percent are processed via HR call centers.
	Eighty-eight percent of IBM's U.S. employees enrolled for health care benefits online, saving more than $1 million.
	Employee satisfaction doubled, to 90 percent.
	The ratio of HR employees to total company employees went from 1:67 to 1:154.
	HR practitioners can focus on value-added strategic priorities rather than low-value administrative processes.
e-Learning	With a shift from classroom learning to e-learning, 42 percent of training is now done online.
	Cost avoidance through e-learning was over $400 million in 2002.
	Distance learning enables personalized pacing and just-in-time learning.
	Materials are always kept up-to-date.
Collaboration	An average of 26,000 employees participate in 4,800 e-meetings per month.
Content	IBM has realized over $50 million per annum in productivity gains.
	Time required to create proposals is significantly reduced — elapsed time is reduced by over 50 percent, and average effort is reduced from 200 hours to 30 hours.
	Time taken to create deliverables has been reduced by 50 percent.
	Over $10 million per year is saved in searching for people with critical knowledge.
Operational e-Finance	Expenses have been reduced by 38 percent after two years, a savings of $700 million.
	Worldwide results are now available in 7 rather than 18 days, with first view of results in 2 days.
e-Procurement	Savings of over $4 billion have been achieved since 1995.
	Purchase-order processing was shortened from 30 days to an hour.
	Maverick buying has been reduced from 45 percent to less than 1 percent.
	Employee satisfaction has more than doubled.
e-Customer Self-Service	Customer self-service through *www.ibm.com* handled over 87 million transactions, saving IBM over $700 million.
	In the same period, IBM sold $12.3 dollars in goods and services.

How an On Demand Workplace Can Address Government Challenges

An on demand workplace presents exciting opportunities for government organizations. We will now examine a few of the opportunities.

Reduced Costs

With shrinking budgets, many government organizations are looking for ways to reduce the costs of internal administrative and operational activities. Significant opportunities for cost reduction include reducing the cost of delivering common employee services such as HR and training, consolidating systems, and streamlining inefficient processes. These cost savings will allow government to redirect money to more important, mission-oriented programs and initiatives.

Better Management and Collaboration

With the creation of the Department of Homeland Security (DHS), the U.S. federal government has created one of the largest, most complex organizational mergers in recent years. DHS must consolidate and transform more than 20 sprawling agencies into a single, integrated culture across agency boundaries and geographies. This is no easy undertaking. Other large, diverse government organizations face similar challenges in attempting to craft a unified mission and culture across disparate agencies that have a history of autonomy. The on demand workplace can aid with collaboration and integration across agency boundaries and can provide an excellent vehicle for propagating cultural change.

Strategic Management of Human Capital

Governments at all levels are looking for ways to more strategically manage human capital and to maintain the skills and expertise of their employees. Many government organizations face the reality of large numbers of retiring employees in the next few years. Web-based learning-management systems provide a framework for workforce planning and competency assessments to proactively manage this workforce transition. E-learning applications deliver training programs via the Web, dramatically reducing the cost of training.

Expanded Electronic Government

Conversations about e-government tend to focus on "edge-of-the-enterprise" sites that connect to citizens, businesses, or other government agencies. This can be misleading, because many of the best opportunities to put the Web to work are internal and employee focused. Even the most wired of commercial businesses may find that they lack the infrastructure to do customer-facing and

supplier-facing e-business on a large scale; this is doubly true for government agencies. Government organizations may achieve greater value by building a technology architecture to support "e-government inside" first. Once the transformation to Web-based work is embedded in the organization, extending significant portal access to citizens, suppliers, and other government agencies will be more effective and less risky.

Creation of a High-Performance Workplace

For years, the Holy Grail of executive information systems has been to put an updated scorecard of critical performance metrics on the desk of each employee every day. Web-based analytics applications and portal presentation technology make this possible now — not easy, but possible — and at a cost that makes a desktop performance scorecard feasible for a broad base of senior and mid-level managers, not just a handful of top executives. In the meantime, less exotic Web applications make collaborative performance planning, aggregating and presenting performance data, and sharing of best practices much easier to do and much easier to extend across the agency.

Improved Financial Performance

Unfortunately, many government organizations lack the back-office systems required to produce reliable financial data, but the work required to "fix the plumbing" should be done with an eye toward moving this work to the Web. Web-based financial systems make it possible to close the books accurately every day.

Enterprise Technology Standards and Consolidation

We have said that the focus of on demand workplace programs is not primarily IT. However, a huge dividend of these programs is that they drive the development of enterprise standards for how services are delivered over the Web. Creation of an on demand workplace often leads to a single (or at least radically consolidated) technology architecture — commercial on demand workplace programs have produced very significant cost savings through reductions in IT infrastructure, maintenance, seat licenses, and support that go with developing standards for delivering Web services.

CIOs who have allowed hundreds of rogue Web sites and portals grow throughout their organization are wasting hardware, software, and IT resources. Government organizations cannot afford to support hundreds of portal sites. Each site requires its own mass of software, hardware, and IT staff. To reduce the amount of money spent on these sites, CIOs need a centralized portal infrastructure. Progressive government CIOs should seize the on demand workplace as a lever for putting the brakes on fragmented, standards-free IT spending

that results in no added value — the very problem most are struggling to overcome. With the significant IT spending at all levels of government, even modest IT infrastructure reduction and cost avoidance will throw off enough cash to fund other strategic initiatives.

Acting Effectively Requires a Strategy of Choice

Our view is that government leaders require a clear strategy of choice to transform their organizations into high-performing, highly efficient enterprises. By *strategy of choice*, we mean an approach that

- specifies a roadmap or critical path of prioritized actions that bridge the gap between where organizations are today and a vision of where they need to be in the future;

- conserves resources by building a foundation of capabilities that can be applied to diverse initiatives;

- makes a broad, significant, organizationwide impact, even with constrained resources;

- delivers real change over the course of a number of projects that are well aligned with the organization's real resources and capacity for change;

- produces tangible benefits and results quickly, spanning the projects required to deliver the strategy's objectives;

- provides "wins" for the diverse group of stakeholders whose support is required for real change: leaders, managers, employees, constituents, and so forth;

- incorporates a deep body of actual implementation experience;

- ensures that action taken today builds the foundation for action required tomorrow; and

- keeps technology in the service of the enterprise — not vice-versa.

A strategy of choice is not a cure-all or silver bullet, but it represents a realistic means to improve effectiveness of government organizations and lays the groundwork for potentially profound transformation. IBM's work with public and private organizations around the world has convinced us that such a strategy exists: the on demand workplace strategy for creating a role-based on demand workplace.

During the past few years, IBM has worked with numerous private sector organizations to implement tailored, role-based on demand workplace solutions —

organizations such as Campbell's, Hewlett-Packard, Ford Motor Company, ABN AMRO, Duke Energy, Sun Microsystems, AstraZeneca, and Kraft.

These corporations have been attracted to the On Demand Workplace approach because they face some combination of the following challenges:

- The promise of e-business remains largely unrealized. Experimentation with e-business solutions has produced successes but has not led to the expected impact on enterprise capabilities and has not produced an e-literate workforce. Business-to-business (B2B) and business-to-customer (B2C) programs have been difficult to integrate into the fabric of the enterprise. Efforts to move work to the Web have fueled a proliferation of hundreds of intranet sites and "e-solution" implementations, but many of these are redundant, inaccessible, lightly used, or poorly supported — in short, investments in Web-based e-solutions are not generating the expected return.

- Leaders have become increasingly frustrated with their inability to communicate quickly and directly with their employees because there is no effective single channel for doing so. The recent terrorist attacks have made the desire for this capability even stronger.

- Employees lack — or can't find — information, knowledge resources, and other services that their jobs require. They struggle to connect with other employees outside of their immediate community. A bewildering array of corporate technology systems and applications has made their work more complex rather than more productive. They lack services that would help them balance the demands of work and the demands of their lives outside the workplace.

- Years of decentralized, standards-free IT development have produced a complex, fragmented architecture for information and communications within the enterprise; such an architecture generates rising operational costs and declining responsiveness to changing business requirements. Efforts to resolve these problems bog down quickly because of organizational infighting, budget battles, and a lack of business leadership.

Over time these problems become harder and harder to solve, and the path forward is anything but clear. Every technology vendor and systems integrator claims to have the solution, but each is merely offering pieces of different puzzles.

Thus, corporate leaders ask these questions:

- What can we do now to start solving these problems?

- What should we do first?

- How can we move forward in a way that we won't regret later?

- How do we make an impact, even with the real constraints that we face?

- What does the roadmap for genuine transformation look like?

The on demand workplace strategy — using the Web and enterprise portal technologies to deliver personalized content, services, and business applications — has proven to be a good answer to these questions. The on demand workplace strategy starts with two simple premises that distinguish it from other so-called e-strategies.

The first premise is that real change can start with an organization's existing capabilities and can leverage resources already in place: Starting on the path to transformation does not require "blowing everything up and starting over."

The second premise is that the organization's work, including work with suppliers or work serving customers, is done by the organization's employees. Therefore, moving work to the Web should start internally, with employees, through the corporate intranet.

On demand workplace programs are a series of projects that move work to the Web in manageable steps. Each client must define a starting point, a strategic vision, and a tactical roadmap to realizing the vision. The roadmap may be different for every organization. Some organizations have focused on developing intranet services for a single function (HR) or have focused on delivering a single application via the Web (e-learning). Others have focused on developing an enterprisewide portal platform first and on adding content and service applications later. The common thread is that each successive release delivers measurable business benefits, improved functionality and access, additional content and services, and an increasingly transformed experience of work for the employee. Employees with access to a well-developed on demand workplace portal enjoy anytime/anywhere access to personalized, role-based information and applications. For these fortunate employees, all of the tools and services they require for high performance are available on the desktop of their PC (or laptop, personal digital assistant, or mobile phone). Indeed, for these employees, the desktop is the workplace.

Overcoming the Portal Trap

Both government and private sector organizations have had high expectations for employee portals. However, many of these portal initiatives have fallen short of achieving business goals. In a June 2003 survey of decision makers at $1-billion-plus firms conducted by Forrester Research, Inc., executives expressed similar goals and objectives for their portal initiatives. Ninety-three percent expect their portal to increase end-user productivity and improve access to content. Eighty percent hope to improve collaboration. Executives also expect to build employee portals to reduce expenses: Seventy-two percent expect to cut administration costs, and 69 percent want to trim spending on printing and distribution.

However, the executives indicated that many of these goals were not achieved. Only 67 percent of respondents report that their employee portals have improved access to content. Just 54 percent have seen an increase in employee productivity, and a mere 35 percent report improved collaboration. Eleven percent have not achieved any of their goals.[2]

Many of these organizations have made significant investments in portal technology. Although the survey did not include any government organizations, it is likely that a survey of government decision makers would yield similar results.

Some government organizations have invested millions on portal technology initiatives only to find that relatively few employees use the portal on a regular basis. Sadly, this is often the result of technology-focused portal initiatives that follow a "build it and they will come" approach. Effective on demand workplace programs must be tied directly to the organization's business objectives and priorities.

Even though the on demand workplace is about moving work to the Web, technology is not the primary focus of on demand workplace programs. In fact, IBM experience has shown that IT consumes only about 25 percent of the total on demand workplace effort — the balance must address the transformational change required of an organization's management and employees. Over the course of delivering scores of projects, IBM has learned that although every project is different, the roadmap for successful transformation has several key features that distinguish an on demand workplace program from a portal project.

- *Establishing strong program sponsorship.* Strong executive sponsorship and a complementary governance structure are crucial to the success of an on demand workplace program. Because the on demand workplace crosses functional, geographical, and agency silos in its delivery of integrated services, sponsorship must reside at a level above those silos.

- *Developing a clear strategy, a solid business case, and a compelling case for change*. For on demand workplace programs to deliver large-scale organizational change, the reasons for change must be clearly defined and communicated to stakeholders, and a clear business case must be communicated throughout the organization. The business case links the on demand workplace program to business drivers, prioritizes elements of the program, and becomes the baseline for measuring the program's success.

- *Designing a structure for program governance.* Effective governance of the on demand workplace balances the need for including diverse stakeholders with providing the responsive decision making required for delivering the program. Governance structures must also be flexible enough to accommodate changing requirements as the program is implemented. IBM's experience clearly indicates that without effective governance, enterprisewide transformation is impossible.

- *Establishing a common architecture and support infrastructure.* Developing a comprehensive architecture is essential to the success of on demand workplace programs. Developing this architecture will provide a blueprint for architecture development that is consistent with the strategic goals of the program.

- *Managing the release of high-value Web content and service applications.* The content and services delivered via the on demand workplace portal must add value to the organization and to its employees. Successful on demand workplace programs organize existing content and services and provide standards for implementing new applications.

The vision, strategy, business case, and roadmap define important differences between an on demand workplace program and a portal project.

Getting Started

On demand workplace programs often start by educating a broad group of leaders on the solution and on how it delivers value and benefits. As leaders become more familiar with the approach, they begin to generate scores of ideas on how to apply the on demand workplace to their own functions or departments. At IBM, we help clients get acquainted with on demand workplace programs by facilitating on demand workplace workshops in which participants ask, "Wouldn't it be great if we had an on demand workplace that would...?" This exercise is generally very productive because a huge gap exists between the tools and services most employees have today and what is possible with even small steps toward moving work to the Web.

Of course, not all of these ideas will be feasible, at least within practical constraints of time and funding. The next step is to prioritize the available options — adding Web content, adding service applications, adding portal functionality, and so forth — along two dimensions:

- Performance impact: How strongly will this initiative contribute to measurable improvements in performance? What is the proposed return on this investment? Why is this important to do now?

- Ease of implementation: Would this be relatively easy or relatively difficult to do now, based on our current situation? Is it expensive? Do we lack the necessary infrastructure? Is the technology immature or on the "bleeding edge"? Would this provoke strong cultural or political resistance? Do we have the right types of expertise?

This type of prioritization activity yields a short list of potential initial steps that represent the available "low-hanging fruit." This list is usually a mixed bag of actions related to Web content, services, functionality, and even early benefits-realization tactics. Identifying possible opening moves or releases of an on demand workplace strategy is part of the work of defining a vision for the on demand workplace program. Of course, it is also critical to ask, "What are our ultimate ambitions for this approach? Where could this lead us?" For some organizations, this will be a full-blown transformational vision; for others, envisioning the solutions of a few key problems or building a few new capabilities will be enough.

The Business Case and the On Demand Workplace Roadmap

Once the current situation has been defined and the vision of the future developed, the real challenge becomes getting from here to there. For on demand workplace programs, a business case is crucial at this stage. A business case does more than justify the project (although that is important); it helps establish priorities (What happens first?) and also defines the business benefits of implementing each component of the program.

The business case is the foundation for the on demand workplace roadmap, which specifies the following:

- the phases of activity necessary to realize the vision;

- the components of each phase: Web content, services, systems integration, portal functionality, scope of delivery, and so on; and

- the business benefits delivered by each phase or release.

Finding the Right Sponsor

On demand workplace programs cut across organizational boundaries, which often creates a problem because there is no natural owner of the program. Sponsorship for initial on demand workplace projects may come from corporate functions (HR, finance, IT) or from specific lines of business or departments, but eventually the program requires shared ownership and governance, and sponsorship must be elevated above the participating functions and departments. Sorting this out is usually difficult. This is why an on demand workplace program must maintain such an emphasis on governance and change management. Legislative mandates in the United States such as the President's Management Agenda are prescient in providing a solution to this problem: The agenda directs cabinet secretaries to designate a COO to have responsibility for the day-to-day operations of departments and agencies. Thus situated, the COO could be an ideal champion for an on demand workplace program. State and local government organizations, and those outside the United States, may not have such clearly defined directives; but within each organization, identifying the right executive sponsor is instrumental to the overall success of the on demand workplace program.

No Better Time to Get Started

Now is the time to act. Legislative and budgetary conditions, such as the President's Management Agenda, and staggering budget deficits provide the "burning platform" for government organizations to become more efficient and effective. Creating an on demand workplace can be part of the answer to meet the challenge.

Notes

1. Peter F. Drucker, "Knowledge Worker Productivity: The Biggest Challenge," *California Management Review* 41, no. 2 (1999): 79–94.

2. Moira Dorsey, "Best Practices for Employee Portal Design," *Forrester Research Inc. Techstrategy Report* (June 2003): 1.
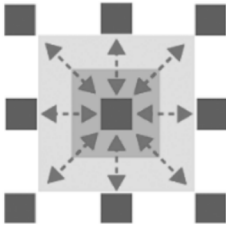
From Palm to Shining Palm

Janet Caldow
Director
Institute for Electronic Government

Mobility is one of evolution's most enduring principles. From the time the first prehistoric creature crawled out of a swamp to the era of space exploration in which we triumphed over Earth's gravity, and spanning the many ages and accomplishments in between — the migration patterns of early hunter-gatherers, the discovery of ocean trade routes, and the transportation inventions of the Industrial Revolution, to name a few — mobility has continually redefined our concepts of time, space, communications, and the nature of work.

The first few decades of computerization could be characterized as largely sedentary. Although the mobility of data through high-speed communications networks has been astounding, human access points are still largely anchored to physical infrastructures — data centers, desktop computers, wired phones, and fax machines. Innovative use of mobile or wireless communications in public safety has been the exception. (Can you imagine a police officer without mobile data and voice communications in the cruiser?) However, evolutionary forces march relentlessly forward. There's no turning back. Mobile/wireless capability has begun to permeate every governmental function.

Mobile computing means extending the availability of information technology (IT) infrastructure to mobile workers through mobile, wireless devices. It represents the continuing evolution of the nature of work. Whereas you used to "go answer the phone," the phone is now in your pocket. Before long, you won't have to "go to your PC" anymore, either. You'll literally carry your desk around in your pocket on any one of a number of handheld devices, keeping you connected wherever you go and whenever you need access.

But we're getting ahead of ourselves. In the mid 1990s a new class of small, user-centric devices began to appear. Known as personal digital assistants (PDAs), these devices provided functions similar to paper diaries, address books, and notebooks, popular primarily with early adopters of new technology who were highly computer literate. PDAs were largely viewed as expensive toys. However, newer PDAs are designed around open architectures with embedded support for protocols such as TCP/IP, Voice over IP (VoIP), Bluetooth for wireless data exchange, 802.11 a/b/g for wireless LAN (WLAN) connectivity, integrated wide area networking capabilities for anywhere/anytime access, and biometric for security.

Sociological Implications

Sociologically speaking, these new devices emerge at a time when work is no longer defined as a place but as a state of being. The distinction between modern white-collar and blue-collar workers, differentiated by access to computer technology on the job, is evaporating as notions of work are redefined. Field workers, previously cut off altogether from computer systems, suddenly will be able to interact with these systems and do things that before had been impossible. This will affect how government operates to the extent that wireless workflow is not only possible but becomes inescapable, due to obvious derived cost benefits. Additionally, a whole range of mobile/wireless government information and services to citizens not previously possible is developing.

e-Wireless Value Proposition in Government

So what does this mean for e-government? The answer is twofold. On one hand it means governments will interact with citizens wirelessly. All those people out there with all those wireless devices also happen to be citizens of governments. On the other hand, more than in any other industry, public sector workforces stand to gain the most from wireless advances.

Mobile Workforce

Even upon casual observation, one might conclude that even before the advent of high technology, at least 30 percent of government workers have always been "mobile." Among those who have "no office" or spend less than half their workday in an office include police officers, fire fighters, parole officers, traffic enforcers, health inspectors, building inspectors, transportation inspectors, fire inspectors, facilities management employees, fleet management personnel, internal mail carriers, social services case workers, transportation officials, parks and recreation employees, maintenance employees, and the list goes on. These

employees, by nature of their job responsibilities, are immediate candidates for wireless. Throw in another 25 percent of office workers who are projected to become mobile, and that's almost 50 percent of all governments' workforces! In fact, there is a mobile/wireless aspect to every worker's job when that employee is out of the office — whether traveling, at home, working in the field, or just attending a meeting in another building. Even *within* the office environment, wireless LANs are becoming a venue of choice for a variety of reasons. Governments need to extend their infrastructures so that workers through their wireless devices can interact with existing back-end, mission-critical systems.

A wireless workforce strategy covers a variety of government-to-employee (G2E) applications sharing common core technologies. These employees have similar requirements in their jobs, both mobile and wireless. Their range of needs includes messaging (e-mail), Internet connectivity, mobile incident or status reporting that can be uploaded or transmitted, query of back-end databases, alerts, personalized workflow management, updates, scheduling, dispatch, communication with coworkers, and access to mission-critical applications. Wireless technology allows employees to be mobile while maintaining the ability to access core applications. This frees them from the constraint of having critical information only while they are sitting at their desks. Mobile employees can get to information when and where they need it most, with levels of security proportionate to the nature of the transaction.

The value in transforming field-services employees into a mobile, wireless workforce includes exceptional improvements in productivity, effectiveness and efficiencies, reduced costs, decreased paperwork, auditability, elimination of redundant data entry, reduced cycle times, the immediate availability of secure information anyplace and anytime, improved employee safety, accelerated report preparation, and simplified review and approval of workflow processes.

In *public safety*, silent dispatch over a private data communications network eliminates eavesdropping on police calls; reduces errors caused by voice communication; allows direct access to local, state, and federal databases for motor vehicle and warrant information; reduces the number of paper forms used to report noncriminal incidents; enhances the ability to respond to calls with the closest officer location by touching an icon on a mobile computer monitor; makes it possible to perform en route lookup of hazardous-materials databases; and enables more effective monitoring of movements of persons under legal supervision. The Toronto Police save US $2.9 million each year through the use of eCops, a wireless-enabled system for managing police operational records. In Bullhead City, Arizona, the Police Department reduced over-the-air time for dispatchers by at least 50 percent and increased the accuracy of information received.

For *maintenance employees*, wireless technology optimizes on-call maintenance scheduling, reduces overall repair cost and time by providing the immediate ability to review service history, check maintenance manuals, determine product specs, check parts inventory for availability, process orders, and look up warranties and mechanical drawings while on location; and, when coupled with global positioning systems, provides more accuracy for utilities location and configuration. Improved preventive maintenance enabled by wireless communication also extends the operational life of vehicles and equipment. Continual wireless monitoring of the location, operation, and condition of major assets (such as fleet, heavy equipment, and costly portable/moveable assets) for preventive maintenance needs reduces cost of ownership by reducing incidence of major repairs.

Wireless technology empowers *social services caseworkers* with on-location access to information and the ability to report updates to back-end case records. Wireless technology leverages integrated case management by greatly improving service delivery with the ability to process and schedule instant collaboration and referral among social services agencies (such as police, public health, mental health, child welfare, alcohol and drug abuse, social services, housing, and child abuse). Wireless communication saves precious time, especially in basic safety and life-threatening situations; and the technology reduces the costs and time to prepare reports (caseworkers otherwise have to travel back to the office and make time for the office paperwork). Wireless technology alleviates overburdened case loads by allowing caseworkers more time with clients, and it improves the safety of the caseworkers themselves.

For *inspectors*, wireless communications boosts the effectiveness of the inspection process; saves time and overall cost associated with inspections; and improves public health and safety with immediate reporting and action such as license revocation and notification. Inspectors can conduct on-location queries of inspection histories, previous violations, and fines; prepare inspection certificates; and eliminate paper reports and time lags in reporting, as well as take advantage of general office functions through wireless scheduling, communications, and alerts. New York City's successful mobile building-inspection capability has prompted a citywide, cross-department mobile/wireless strategy.

Wireless Citizen Access

Governments can no longer assume that a citizen is using a traditional computer to access data and applications from a government Web site. To meet the anticipated demand, government's challenge is to deliver data and applications efficiently across the network regardless of citizens' access devices or connectivity configurations. Virtually all information and transaction services currently

developed for wired access will eventually need to incorporate support for wireless technology. Innovations in citizen service delivery will emerge.

Virginia's "Lobbyist in a Box," an interactive application accessible from mobile devices, allows citizens, legislators, and lobbyists to track the progress of bills as they move through the legislative process. For each bill, the application includes the bill number, the sponsoring patron, a brief summary, and the last action. A number of jurisdictions' public emergency preparedness plans include enabling their Web site information for use by citizens with wireless devices.

The wireless move isn't just for the big governments. In fact, small or rural government jurisdictions stand to benefit tremendously from all kinds of wireless capabilities. Quaint Nantucket Island, Massachusetts, installed a wireless LAN for public Internet access in the town library. The entire island is classified as a historical landmark with many construction restrictions. Given the nature of the historic library structure, a wireless LAN was not only the cheaper approach, but it also prevented the destruction associated with drilling and pulling cable throughout the building.

Wireless has the potential to significantly close the digital divide. Citizens who cannot afford traditional desktop computers can now opt for relatively inexpensive wireless devices and connectivity. Rural or underserved communities that lack ground communications infrastructure can suddenly leapfrog to wireless and eventually provide high-speed access for their citizens, governments, and businesses using WLAN and ad hoc networking technologies with back haul connectivity via satellite for network access.

How Does Wireless Work?

Going wireless isn't rocket science. However, it's useful to understand the process at a high level. Through a variety of modular hardware and software components, new technologies allow you to build upon your existing infrastructure to easily extend operations to wireless devices. Information exchange flows back and forth from the handheld device, through a wireless service provider's network, to the enterprise network, to the application server, and to back-end legacy systems and data (all depicted in Figure 10.1). At each step along the way, a technical translation of different protocols allows all these elements to communicate with each other. It's like converting English into German, then into French, then into Japanese, and then back into English.

When a request from a handheld device is initiated, an application server identifies the device type (e.g., cell phone, PDA) and captures the content. Using several logical processes, the application server processes the data into an Extensible Markup Language (XML) document, which can then be communicated

to back-end systems via the application program interface (API) connection. Going back the other way, the result of the requested data will be reformatted for the handheld device that made the request initially, end to end, in a reliable and secure manner.
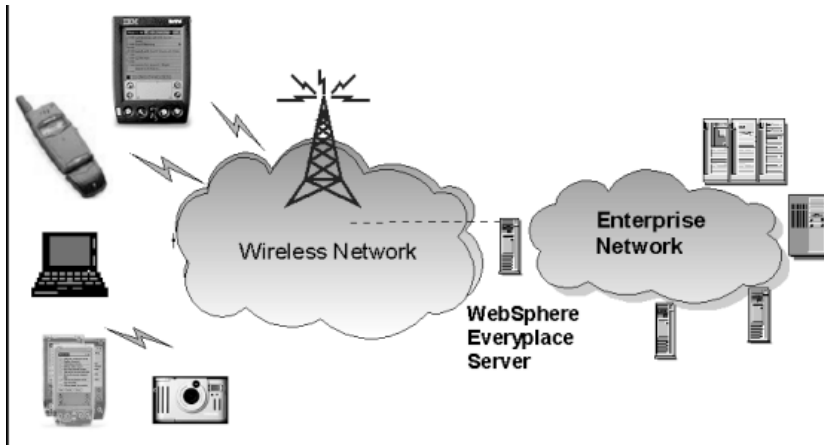
Figure 10.1: The flow of wireless information exchange.

The process can become complex very quickly, depending on the number of handheld devices supported and the types of services offered. New software and hardware products handle data dynamically to adapt it to a handheld device and easily integrate it with the back-end system, without rewriting code for each protocol.

The technology selects the correct screen template, formats the data for the handheld device, and delivers the requested data in a way that fits the constraints of small screens on mobile phones and PDAs, thus synchronizing handheld devices with enterprise solutions.

Handheld Devices

New wireless hardware pops up daily — among the examples are Web-enabled cell phones; two-way, e-mail-capable pagers; camera- and telephone-equipped PDAs; thin-client devices; and laptops, Palms, WorkPads, iPAQs, and smart phones. The operating systems of handheld devices are the software programs that manage basic operations. For example, Windows CE is a Windows "light" version developed by Microsoft and installed on many PDA devices. Palm OS, developed by 3COM, is the most popular OS on the handheld because of the large market share that the Palm Pilot owns today. It supports some Java applications. Linux is very promising for growth in this area. Based on open

source, Java friendly, and very efficient, Linux can be installed on many PDA devices and smart phones. Symbian (the new name for EPOC), an operating system primarily for smart phone devices, is used by Ericsson and Nokia and thus is one of the major operating systems in this market.

Each one of these handheld devices requires certain ways of communicating. They all require their own gateways to communicate with application servers. Various sizes of screen displays create different data and screen layouts. Different keyboards or other input methods generate diverse navigational options. The challenge for the application server is to sort out all these devices, recognize them, and send the data in the correct format to each handheld device. (This requirement, called *transcoding,* is discussed in the next section.)

Coverage, Connectivity, Transcoding, and Back-End Systems

Coverage refers to a wireless service provider's (WSP's) geographical service range. A handheld device accesses a local cell tower from the user's provider. The cell tower is responsible for delivering local geographical coverage in a certain region. The coverage is divided into hexagonal boundaries. The cell tower sends the data to a base station. The data is then transferred to a switching center. A mobile switching center connects all the base stations. The mobile network system will record and identify all of the user's information by home location register, if the user is in the geographical network. If not, then the visitor location register will be tracking the call; that is when you pay big bucks for roaming. Once the call is initiated, the device will send its identity via its electronic serial number and mobile identity number. This information is vital so the gateway can authenticate the user. This is also where the application server can prepare the data to send back to the appropriate unit to be displayed.

The *connectivity gateway* is the first point of entry to the network for handheld devices. The diverse nature of wireless devices necessitates significantly different protocols. For example, screen size, input mechanisms (keyboard, voice, etc.), information-processing capability, storage capacity, battery life, and network bandwidth vary greatly. Some devices are equipped with non–browser-based communications facilities to support occasional connected models of operation.

You can plan and control the types of handheld devices your mobile workforce uses, but you cannot control what your citizens use. Therefore, to extend your infrastructure to citizens' wireless devices, the infrastructure needs to be network- and device-independent, accommodating a variety of wireless connectivity gateway protocols — Wireless Application Protocol, Global Systems for Mobile Communications, Code Division Multiple Access, Time Division

Multiple Access, GPRS, EDGE, and others. Although wireless progress in Europe and Asia has progressed much more quickly than in the United States (the two continents have had mobile standards for several years), new and faster networks have been introduced in the United States and Canada in recent months.

After the connectivity gateway comes the application server. Remote access authentication at this level has traditionally been a one-way street. The gateway determines the validity of the client requesting the session. The client cannot authenticate the gateway, however. In other words, how does the client know that it is communicating with a valid gateway? If the gateway is an impostor, the client's ID and password have now been intercepted. The impostor can gain access through the gateway with the intercepted user ID and password. To prevent this, it is important to authenticate both parties of a remote connection securely, using an advanced bidirectional authentication process. Authentication should be combined with authorization of what the client is allowed to do. To these ends, strong encryption can keep information secure and private, and digital signatures may be used for additional protection, when needed.

User IDs and handheld-device IDs are stored in the database at the application server level. The application server will access the database once a login request is received. The middleware database is used to prepare and format the data for the device requesting the login. The application server will also compare the registered device ID to the user ID for additional security verification. The application server communicates with the gateway server for the specific device that initiates the request. The gateway will push the information to the handheld device according to the connectivity networks like Cellular Digital Packet Data, short message service (SMS), Mobitex, and Code Division Multiple Access.

With up to 80 percent of all data residing on mainframes, governments need quick, easy, efficient ways to extend data to users on wireless devices. New technologies let you implement wireless without modifying the host applications. They enable easy mobile access to legacy data by managing the complexity of new devices and markup languages so that handheld devices, traditional PCs, and back-end systems can communicate with each other and readily exchange data.

The industry is separating content (information) from presentation (how you see it on your device) using Extensible Markup Language (XML). Transcoding software dynamically adjusts data going back to the user to suit whatever device the employee or citizen is using: smart phones, voice-capable browsers, PDAs such as the Palm Pilot, IBM WorkPads, handheld Microsoft Windows CE

devices, Symbian devices such as the Sony Ericsson P series, and Blackberries. For example, the transcoder converts images to links to retrieve images; converts simple tables to bulleted lists and removes features not supported by a device; reduces image size and color level to make them easier to transfer and quicker to render on each respective device; responds to the limited storage capacity of devices by subdividing content into small sections that can be viewed more effectively; and tracks network-connectivity profiles so that content can be transcoded according to network constraints.

Web content is written in Hypertext Markup Language (HTML), not in the specialized markup languages required by wireless devices. Transcoding dynamically also bridges the different HTML structures, tailoring the content to the specific device. The term *clipping* refers to the process of adapting Web page content when it is delivered to cell phones. This allows cell phone users to retrieve only the relevant portion of a Web page that they need, such as a daily stock price.

A Footnote on 3G, Bluetooth, and Location Sensing

Today's wireless networks, called second-generation (2G) networks, are quickly evolving into 2.5G (General Packet Radio Service) and 2.75G (EDGE) networks, which support cellular phones and PCs. Newer mobile devices are designed to exploit the packet-based networks to deliver content extremely well. The networks will continue to evolve into true wireless broadband with the introduction of third-generation (3G) networks, which will allow wireless users to access and conduct business at broadband speeds. 3G will be more than 35 times faster than today's fastest dial-up PC modems and more than 200 times the speed of most current handheld wireless data devices. That means even full-motion real-time video can be streamed literally to your fingertips.

Bluetooth is a new short-range wireless technology that can be embedded in mobile PCs, smart phones, and other portable devices. It provides three voice and data channels via a one-to-one connection with built-in encryption and verification. A Bluetooth-enabled PDA could access your Bluetooth-enabled cell phone and use it to dial up the Internet. With Bluetooth you can synchronize contacts in your PDA with your desktop just by putting them in the same room and then send names and telephone numbers straight to your cell phone — no docking cradle, no infrared dongles, no cables!

Location-sensing equipment is capable of supplying information about a mobile phone user's physical location or the location of a vehicle, providing the ability to deliver location-based services. This has huge implications for emergency response, as the proportion of 911 calls coming from cell phones is approaching almost 50 percent.

Going Wireless: Eight Practical Steps to Take Now

Put your government ahead of the curve while you still have time. By all accounts, you have about 12 to 18 months to prepare your infrastructure, enable a wireless workforce, and meet your citizens' demands in time to scale to critical mass. The following eight steps will help you crawl out of the swamp to meet the evolutionary challenges of mobile technology:

1. Get smart about wireless technology. Read everything you can. Consult with the many governments that have already implemented mobile and wireless solutions. Enlist the help of your IT partners to learn more. Go wireless yourself. Buy a handheld device and become familiar with what your citizens already know.

2. Build funds into budgets now for wireless devices and enabling software and include wireless capabilities in all your strategic planning. Be a leader. Challenge and stretch the thinking of your people.

3. Name a wireless leader, responsible for coordinating wireless implementation across agencies.

4. Pilot a mobile workforce. Select a group of employees who will benefit from going wireless and pilot a wireless program. Begin your strategic planning to roll out wireless to all applicable work groups. A pilot will take your IT employees up the learning curve.

5. Pilot wireless-enabled citizen services. Select a group of e-gov services and information on your e-gov portal (Web site) and enable your citizens to access them wirelessly *now*. You may not be ready, but they are. Lay the IT foundation and planning for remaining applications.

6. Liberate your office workers from their desks. Give them experience with wireless operations. Target an office group to go wireless and outfit them with handheld devices. Set parameters to monitor results.

7. Make the next LAN you install a wireless LAN. Document the cost savings and benefits in your own environment.

8. Beware of proprietary dead ends. Above all, you want an open, flexible infrastructure that's scalable, reliable, and secure. Choose your partners wisely.
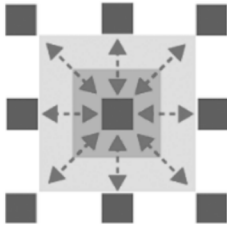
e-Democracy
Putting Down Global Roots

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Ask any farmer. It's one thing to sow seed, but quite another to nurture thousands upon thousands of seedlings, row upon row, so they put down strong roots and produce a high-yield crop. Although some governments have sown the first few e-democracy seeds, an abundant harvest seems elusive and distant at best. Don't blame technology. Today's (even yesterday's) technology can electronically support virtually every aspect of democracy. And don't blame lack of funds. The marginal cost of incorporating e-democracy initiatives into an e-government technology infrastructure is insignificant. What's missing is statesmanship and the resolve to nurture the first e-democracy seedlings whose mature fruits can sustain the next generation. As governments achieve more and more sophisticated levels of e-government, such as online services for citizens, strategy should include a companion progression to increasingly sophisticated levels of e-democracy within and beyond national borders.

Webster's defines *democracy* as "a government in which the supreme power is vested in the people and exercised by them directly or indirectly through a system of representation." Putting an "e" in front of democracy means nothing more than using information technology (IT) tools to facilitate, improve, and ultimately extend the exercise of democracy.

E-democracy has both a tactical side and a strategic side. On the tactical side, IT has advanced communication and the access to information arguably better than any known medium. But something even more fundamental is at hand. The underlying core principle of democracy is an informed and engaged citizenry. Most governments get passing marks for "informing" citizens via digital communication, but the vast majority have a long way to go to "actively

engage" citizens or to effectively exert global influence using digital media. These elements comprise the most overlooked dimension of e-democracy — the strategic side. How can a government use digital media to both actively engage citizens and advance its public policies to the world community?

Engaging your "own" citizens or constituents through digital media includes enhancing active participation in lawmaking, policymaking, and legislative process, all of which are influenced by a variety of forces: public opinion, debate, lobbyists, special interest groups, consultation with constituents, committee hearings, and expert testimony. The regulatory process (subsequent to enactment of law) follows many of the same communicative and collaborative patterns as lawmaking. Lest we forget, the ability to leverage digital technology by political parties, campaigns, and candidates is also part of the equation. Voter registration, election or referenda voting, and ongoing communication between constituents and their elected representatives are equally integral to e-democracy.

Despite an increasingly digital world, attention must be directed toward the digital divide. A 2002 national survey in India revealed that fewer than 1 percent of adults had used the Internet in the preceding three months. In response, a growing national network of owner-operated computer centers has emerged that may eventually serve up to 700 million people in 600,000 rural villages. Village entrepreneurs who provide cybercafé services tap into wireless technology through India's fiber-optic network, which reaches 85 percent of the country, compensating for the lack of access to telephone land lines. For small fees, citizens can access government officials, records, and online medical consultations. Other services already include education, commerce, and participatory democracy.[1]

The Internet has greatly lowered the costs of transmitting information, enabling people to bypass traditional intermediaries whose power revolved around the control of information: national governments, the diplomatic corps, and transnational corporations, among others. Nongovernmental organizations (NGOs), ethnic communities, individuals, and, yes, even terrorists, use the Internet to create global platforms and political influence.

There is a huge difference between information/communication within one's own borders and winning the hearts and minds of those in other cultures. Affecting world opinion through IT may not be as obvious but has far-reaching implications. The Aspen Institute defines *Netpolitik* as the "exploitation of powerful Internet capabilities to shape politics, culture, values, personal identity … and public perception."[2]

It further defines *soft power* as how a government uses persuasion, public information, education, communications, culture, trade, aid, investment, and marketing to secure public support of its interests, values, and policies."[3]

As parties to the democratic process, all government entities (international bodies, governments, political parties, elected representatives) need to urgently develop new and effective public and global communication skills using digital media.

Defeating Decontextualization

In virtually every communication medium, content can become separated from context — cultural, social, economic, and political. This is a significant hurdle, particularly true of the Internet. For effective messaging, government entities need to develop a new set of communication skills to overcome "decontextualization" on the Internet. Elizabeth Monk Daley, dean of the University of Southern California's School of Cinema-Television, illustrates this phenomenon with the following story.

A documentary filmmaker went to a popular Japanese bar in which American westerns are frequently shown. She asked the audience why they enjoyed the films. After all, American westerns are all about rugged individuals standing against society, and Japan is a society built on consensus. But the Japanese audience responded, "You don't understand your own films. They are about consensus around the campfire."[5]

As former U.S. Secretary of State Madeleine Albright and Robert Hormats, vice chairman of Goldman Sachs and a former top official at the State Department and Office of the U.S. Trade Representative, noted at the 2003 Aspen Institute Communications and Society Program Roundtable, it's not just the volume of information; it's also the velocity of information. In the past, "diplomatic communications were carried on through predictable venues and stable, deliberative processes. The circle of knowledgeable participants was well established. The number of participants with access to accurate, timely information was relatively small." Not anymore. With CNN and the Internet, coupled with privatization of mass communications, the sheer volume and speed of information forces instant reaction and decision making. Governments can no longer rely solely on formal intelligence reports, diplomatic cables and in-house experts. Survival dictates adopting a strategy to effectively influence input into digital media channels and dynamically monitoring and interpreting digital output of other entities.[4]

e-Democracy Models

Academics and others are beginning to explore models of e-democracy. The Organisation for Economic Co-Operation and Development (OECD) defines three types of e-democracy interaction — one-way information provision; a two-way relationship where citizens have the opportunity to give feedback on issues; and, finally, a partnership relationship whereby citizens are actively engaged in policymaking.[6] Similarly, Coleman and Gotze suggest four scenarios.[7] The first is technology supporting direct democracy. The second encompasses online grass-roots civic communities of interest. The third addresses online surveys and opinion polls, and the fourth points to technology as a way to engage citizens in policy deliberation.

Gartner Dataquest has developed a four-stage model of "e-development" that applies to citizen services as well as to e-democracy. In the first stage (presence), the Internet site provides information online in a static format. In the second stage (interaction), citizens search information, download forms, or access links to other relevant sites. The third stage (transaction) alleviates the need to complete a transaction by mail or make an office visit. The fourth stage is transformational. Some attributes of this stage are wireless access, enabling sites to push government information to citizens, and robust tools for customer relationship management. Inherent in this stage is a redesign of workflow and processes.

Consensus is clearly beginning to emerge, at least regarding e-democracy as it affects citizen engagement within borders. Progression is toward facilitating proactive citizen engagement that can influence and improve policymaking — not simply another form of citizen communication. However, these models fall far short of a strategic vision of e-democracy.

The IEG Model

The Institute for Electronic Government's (IEG's) model (presented in Figure 11.1) takes a leap forward in both the definition and implementation of e-democracy. The IEG model is not limited to the citizen-to-government point of view; rather, it maps a progression from an informed to an engaged citizenry. It also serves as a scorecard of digital savvy — how successfully a government entity interprets and responds to the digital world and exploits technology accordingly to advance influence. That "entity" might be an elected representative, a legislative body, a provincial or national government, a political party, or an international organization. The model helps leaders think through how to fold both tactical and strategic e-democracy efforts into an overall e-government strategy. With one glance, a government can identify its current position

against characteristics at various sophistication levels and see which e-initiatives can take them to the next level. One axis measures the degree of engagement, and the other measures influence.
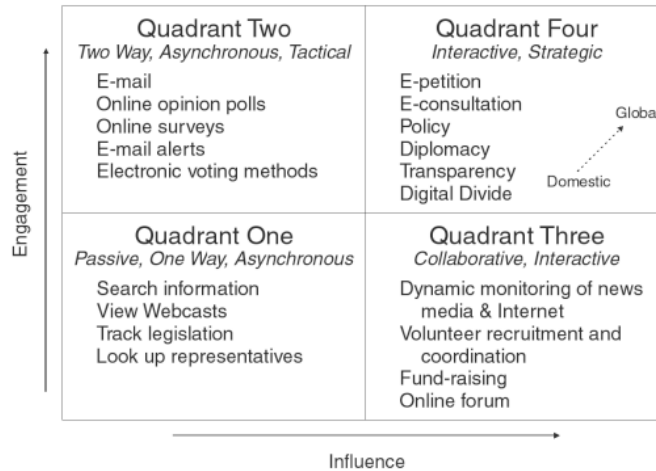
Figure 11.1: An e-democracy model from the Institute for Electronic Government.

Quadrant One

Most government entities — governments, legislative bodies, international organizations, political parties — have done a pretty good job of making information available online. That's a fundamental step in e-democracy tactics. According to the recent Pew Foundation's Internet & American Life Project (April 2002):

- 68 million Americans visited a Web site, up from 40 million in just 12 months.

- 42 million Americans used government Web sites to research public policy issues.

- 23 million Americans have used the Internet to send comments to public officials about policy choices.

- 13 million Americans have participated in online lobbying campaigns.

- 14 million Americans have used government Web sites to gather information to help them decide how to cast their votes.

Legislatures have begun to understand not only how to use technology to communicate with constituents but how to operate as modern businesses that exploit technology. Evidence of the growing awareness and importance of technology, the Council of State Governments reports that over the past four years, 34 U.S. states have provided laptops or PCs in legislative chambers, linking representatives to party leadership, to legislative systems, and to their constituencies. Many regularly Webcast and archive proceedings.

Despite all best efforts, remaining in Quadrant One for very long severely limits capacity to influence and engage.

Quadrant Two

Entities in Quadrant Two have made great strides to open two-way communication. Let's look at this from the citizens' point of view.

Who exactly is "the government" anyway? As they say in the film *Ghostbusters*, "Who you gonna call?" Is it the city councilman or mayor? The appointed school board member? Maybe it's the governor. Could it be a state legislator, a member of Parliament, or the chair of a Senate subcommittee? Is it a county or federal agency? Is it 10 Downing Street or the White House? Increasingly, is it the European Union or the United Nations?

The correct answer, of course, is "all of the above." We are citizens of towns, cities, states, provinces, countries, and, yes, the world. That's the challenge. Every public institution and all who serve in them are obliged to move beyond information dissemination to open two-way communication channels relevant to the digital age in which we live.

Although entities in Quadrant Two may have achieved two-way capability, its nature is still largely asynchronous. The Congressional Management Foundation reports that in 2001, U.S. Senate offices received as many as 55,000 e-mails a month. Some congressional offices report that up to 60 percent of all correspondence arrives through e-mail. Even so, the report notes that 75 percent of House members respond to constituent e-mail with postal letters!

The Massachusetts Institute of Technology's Artificial Intelligence Laboratory has explored managing public access and participation via the Internet in government inquiry and regulatory processes. Because the Internet broadens and cheapens access to these processes, it can dramatically increase the number of responses to proposals. Fighting fire with fire, overload can be addressed using a variety of technologies to manage technology, such as software to sort and respond to e-mail.

Inviting citizens to sign up for e-mail alerts on various issues is one proactive communication strategy to reduce the volume of unnecessary individual e-mail. Many times, citizens just want to tell government what they think; they do not necessarily expect a response. For example, U.S. Sen. Don Nickles (R-Okla.) reduces unnecessary e-mail volume on hot topics through a preemptive strategy: "You Called It!" is an innovative feature on his Web site that lists the top five issues about which constituents contacted him in the past week, as well as his position on each. This way, constituents who want to know the senator's view don't have to contact the office — the information is easily found on his home page.[8]

As one of its Homeland Security initiatives, Arlington County, Virginia, launched a citizen emergency alert system (*www.arlingtonalert.com*) to contact residents in the event of an emergency. The system sends alerts, updates, and notifications to *all* of a citizen's listed devices and e-mail accounts, including cell phones, pagers, Blackberries, or other personal digital assistants. Messages are sent in English or Spanish. During the regional Hurricane Isabel emergency and resulting widespread power outages, use of this communication tool skyrocketed.

The city of Fairfax, Virginia, has an extensive e-message alert system for both emergency and non-emergency communication. The city pushes information to registered citizens (by either e-mail or phone), including reminders of property tax due dates, road closures, school closings, city events, and weather alerts.

The town of Issy-les-Moulineaux, near Paris, regularly polls a representative sample of 650 residents online on a variety of local issues such as public safety, schools, and urban development. This consultation must now precede any major local project and gives the town council a tool to help in decision making.

Quadrant Three

The third quadrant of the IEG model extends interactive capability. Although still largely asynchronous, communication begins to evolve into collaboration. Most visible in this stage are political players and the electoral process, with tactics such as recruiting and organizing volunteers online, online fund-raising, campaigning, communication with constituents and the media, voter registration, and voting.

In the United States, more than 3,000 counties currently deploy voting at over 200,000 polling sites. The range of technologies in use includes punch cards, optical scanning, levers, direct-recording electronics, and paper ballots. Many of these are aging or obsolete systems. Few, if any, standards exist, even within states. Numerous countries, most notably Brazil, Australia, the UK, and

Switzerland, have employed various forms of new electronic voting methods both at the polling place and outside the polling place. These initiatives include touchscreen voting machines, interactive voice response technology, PC-based systems, public kiosks, interactive digital TV, and voting using handheld mobile devices via short message service. However, these electronic voting devices have had their share of controversy, including questionable auditability, accountability, reliability, and recount capability and the lack of permanent records or uniform standards. Very few governments have ventured past the pilot stage of voting over the Internet. In January 2003, the small Swiss village of Anieres outside Geneva held its first legally binding Internet vote.

The collection and counting of votes is only one part of the challenge. Many times, changes made to traditional voter registration systems (such as address changes) are not processed in time for election day. Redundant voter data may exist in several locations within a state (if the voter moves). These straightforward technology issues of database design and integration are relatively easy and inexpensive to correct.

Quadrant Four

Quadrant Four encompasses two dimensions – domestic citizen engagement and global engagement.

Domestic Citizen Engagement

Managing the policymaking process is not unlike managing the product life cycle. The earlier in the policymaking cycle, the more likely it is that citizens can influence the outcome. The Hansard Society in the UK contends that mechanisms need to be devised for promoting public deliberation, embedding it within the constitutional process, and demonstrating real links between public input and policy outcomes. They highlight five reasons for governments to do so:

1. to improve the quality of policy by tapping wider sources of expertise under conditions of increasing complexity;

2. to prepare for greater and faster interactions demanded by the information society;

3. to integrate public input into policymaking;

4. to respond to calls for transparency and accountability; and

5. to strengthen trust in government.[9]

Quadrant Four represents the highest level of e-democracy sophistication, at least for the foreseeable future — strategic, interactive, synchronous, and

global in nature. Democratic institutions should at least actively pilot initiatives in these areas now.

 If there is any doubt that leading-edge governments are already exploiting technology to gather input from citizens and businesses to subsequently determine a course of action, one need only to visit a few sites to identify this trend.

On the Queensland, Australia, Web site (*www.qld.gov.au*) citizens have an impressive array of opportunities to interact with the government. The "Get Involved With Government" choice links citizens to their representatives, to Queensland agencies, and to Parliament. The "Queensland Agencies" link gives citizens background information on an issue, current law, or proposed legislation and invites citizens' direct comments, which go to committee and then eventually to Parliament to help formulate policies and standards on a variety of legislative issues. The "Queensland Parliament" link empowers a citizen to make a formal, direct request to Parliament in the form of an e-petition with the object of "persuading Parliament to take some particular action." Citizens can also review existing e-petitions, add their own signatures in a show of support, or express their objections. The site also surveys users about the e-petition process itself — a built-in mechanism for quality control and improvement.

Likewise, the Scottish Parliament was an early innovator in e-petitioning. Scottish citizens can create an e-petition or comment or add their support to an existing e-petition — all electronically (*www.scottish.parliament.uk/e-petitions/index.htm*). The International Teledemocracy Centre, founded in 1999 by Scotland's Napier University and BT Scotland, aims to develop and apply advanced information and communication technology to enhance and support the democratic decision-making process. The center's mission includes the following:

- Promoting the application of information and communications technologies by governments and parliaments worldwide so that elected members and supporting staff can conduct their business more effectively and efficiently.

- Demonstrating how technology can contribute to more openness and accessibility in government.

- Encouraging and assisting the public, voluntary organizations, and businesses to participate in government through the use of technology.

In 2001 the European Commission adopted an Interactive Policy Making (IPM) project to improve the European Union's (EU's) governance. Through its Web

site, "Your Voice in Europe" (http://europa.eu.int/yourvoice), the IPM collects and analyzes citizen and business input to evaluate existing EU policies and to solicit consultations on new initiatives. The purpose is to make EU policymaking more transparent, comprehensive, and effective, giving stakeholders an active role in the policymaking process.

Global Positioning of Democracy

The focus of most e-democracy efforts to date has been largely directed internally to stakeholders, a jurisdiction, or a domestic audience. That is clearly appropriate to communicate and engage citizens. Yet, the Internet knows no borders, and harbingers of change are emerging.

In 2001, Prime Minister Koizumi of Japan launched the Koizumi Cabinet Mail Magazine. This e-mailed magazine (e-zine) is distributed weekly from the prime minister's office to explain his policy positions. More than two million subscribers now participate. For the anniversary celebration of the 100th edition, 20 subscribers were selected by lottery to meet in person with the prime minister to discuss a broad range of issues. Although the e-zine is available only in Japanese at this time, the initiative is an intriguing step toward a more strategic view of e-democracy that extends beyond Japan's borders.

Canada gets high marks for effectively advancing its public policies to a global audience (*www.canada.gc.ca*). This site probably represents early state-of-the-art in terms of explicitly expressing Canada's perspective on a variety of world issues directed to non-Canadians. Through the Web site's area for non-Canadians, people can further link to "Canada and the World." Here, content ranges from Canada's view on foreign policy, such as peacekeeping and

The ABCs of e-Democracy
Accountability
Bills, ballots
Consultation, community
Discussion, diplomacy
E-mail, e-petitions
Feedback, forums
Governance
Homeland Security alerts
Information, interaction, influence
Jurisprudence
Kids' Web pages
Legislatures, lobbying
Messaging, marketing
Neighborhoods
Online
Public alerts, policy
Queries
Referenda
Surveys
Transparency
Understanding
Voting, virtual hearings, voice
Webcasts, Web portals
X-gen constituents
Youth
Zip code

counterterrorism, to the country's position on humanitarian aid, arms control, science, and technology.

There are countless international Web sites for indigenous peoples, activist groups, grassroots organizations, and others who employ a variety of influence techniques ranging from information portals to activism. Government entities have much to learn from these early adopters to advance domestic and foreign affairs, enhance security, and promote democracy.

Time to Embrace e-Democracy

Over the next decade, e-democracy efforts will start to bear long-awaited fruit. But it won't happen without reasoned and deliberate action. First, leaders need to understand the importance of e-democracy in their role as statesmen in a digital world. Second, leaders need to understand why their IT infrastructures are essential to this vision. Government entities invest in IT infrastructures for a variety of purposes. E-democracy should be one of those driving forces.
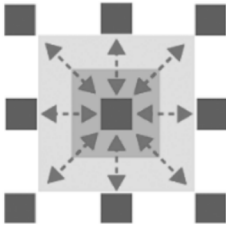
Most leaders recognize that technology infrastructure is the enabling foundation for internal government transformation and a vehicle to provide government services to citizens. The very same technologies can support sweeping changes in e-democracy. It's time to graduate from the now commonplace delivery of information and government services online to a more strategic view that promotes the philosophy and practice of democracy in the free world.

Notes

1. John Lancaster, "Village Kiosks Bridge India's Digital Divide," *The Washington Post* 13 October 2003: p. 1.

2. David Bollier, "The Rise of Netpolitik: How the Internet Is Changing International Politics and Diplomacy" (The Aspen Institute, 2003).

3. Ibid.

4. Ibid.

5. Ibid.

6. "Citizens as Partners: Information, Consultation, and Public Participation in Policy-Making" (Paris: Organisation for Economic Co-operation and Development, 2001).

7. Stephen Coleman and John Gotze, "Bowling Together: Online Public Engagement in Policy Deliberation" (London: Hansard Society: 2001), p. 5.

9. Kathy Goldschmidt, Nicole Folk, Mike Callahan, and Rick Shapiro, "E-mail Overload in Congress: Managing a Communications Crisis," a 2001 report of the Congress Online Project (a partnership between the Congressional Management Foundation and George Washington University, funded by the Pew Charitable Trusts) available at *http://www.congressonlineproject.org/emailoverload.pdf*.

10. From p. 19 of "Citizens as Partners: Information, Consultation, and Public Participation in Policy-Making" (Paris: Organisation for Economic Co-operation and Development, 2001), as cited on p. 2 of Stephen Coleman, Nicola Hall, et. al, *Hearing Voices: The Experience of Online Public Consultations and Discussions in UK Governance* (London: Hansard Society, 2002).

Procurement for an On Demand World

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Central to government transformation is the changing relationship between the public and private sectors. In the past, the relationship between the government as purchaser and the private sector as provider has tended to be an arm's-length relationship. Essentially, government contracting has primarily taken the form of "master-slave" arrangements characterized by risk aversion rather than risk management. These somewhat restrictive arrangements are largely due to outdated government procurement policy. In the future, the relationship needs to be based on partnership and trust. This is not a cry from the private sector to take more money from the public purse; rather, it is cry to adjust an important instrument of public accountability to fit today's needs.

Procurement Policy Ensures Accountability

Accountability is why procurement policy exists. When spending taxpayer dollars, politicians and administrators need to be sure that the expenditures are wise. *Best value* or *value for money* is a difficult concept, sometimes confused with *cheapest* (meaning having the least cost). Proven mechanisms exist for the objective assessment of value for money — for example, the use of an approach in which a set of criteria is defined and weighted so that evaluation considers price as simply one factor, albeit perhaps with a significant weight. Normally, the more complex the solution, the less important price should be in the overall evaluation model. A lower price won't necessarily deliver better value if the supplier does not understand the problem or is unable to deliver the desired results. Unfortunately, these methods are not widely employed.

The issues that arise from a rigid procurement process go deeper than finding ways to demonstrate value for money. We can follow the process and demonstrate value for money, but then later negotiate a contract that provides no room to maneuver. This is less of a problem with a product or commodity purchase where the specifications may be known. However, it is a big problem for services delivered over a period of time and where the specifications may be unknown. The trend is that more and more purchases are likely to be for services rather than products and for services that may also contain products.

Time and again we see examples in which a contract is agreed upon for delivery of a system over, say, an 18-month period. The contract is tight. Both sets of lawyers are happy. They protected intellectual capital and dealt with liability. However, a particular piece of technology may be written into the contract. These days, technology turns so quickly. If a new generation of a technology is available within the timescale of the contract, then what do we do? One option is to exercise a contractual change. In such a situation, it is difficult to test value for money if there is only one source of supply. Another option is to plow ahead with the old technology, which means delivering a system that doesn't provide value for money after all.

Performance-Based Contracts

What is needed is a review of government procurement to determine how to introduce contracts based on performance. Purchasers should worry less about *how* something is delivered and more about *what* performance they need. We can specify most systems in terms of performance. For example, we need to make these payments; we need 24/7 availability. *How* this is achieved is less important. If there is, as evidence suggests, a shift toward business-process outsourcing, then we will have to get better at contracting in this way.

The government's traditional procurement process is even more problematic when it is used for major transformation projects. Although the desired outcome may be well defined, significant analysis and planning is necessary to determine what to do and how to do it. This is best accomplished through a close working relationship between the customer, the various partners in the delivery chain, and any providers who will assist in the transformation process. There are many cost-benefit trade-offs as a detailed plan is developed and implemented. It is almost impossible for a government to define the skills, types of offerings, or quantities of services that might be required in a transformation project. With only a general idea of what a government plans to do, contractors cannot provide valid pricing or even detailed plans for implementing change. For this reason, Canada, the United States, and other governments created modified procurement models to use in transformation projects. These usually include a government assess-

ment of the capabilities and experience of potential providers and the selection of the partner who seems best suited to help the government succeed. Project planning and analysis is done jointly and work proceeds only when both parties agree on scope, cost, and schedule. This enables either party to end the partnership with minimal disruption of the overall plan.

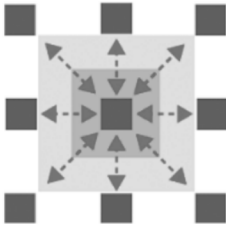## Procurement as Local Business Development Aid

In this environment, how can governments encourage small businesses in the face of increasingly large and sometimes overwhelming global companies? Through its regulatory policies and practices, government plays an important role in encouraging economic and industry development. Government procurement policy — at least in most democratic governments — developed over time into one of the regulatory instruments used to level the playing field between local and global companies. Departments or agencies are often required to direct a specified percentage of outside contracting to local or specially designated business. Because the local company performs directly on a contract, this can help build and sustain valued business capabilities.

Large bids often require a minimum of the content to be provided by local companies. By giving preferential treatment in evaluation models, governments hope to accelerate business development of local companies, especially those owned by protected groups such as indigenous populations. Unfortunately, these provisions in large bids often create complex management challenges that negatively affect the ability deliver results on schedule. Rather than artificially forced relationships, governments should recognize that linkages between large and small businesses within the private sector are inherently symbiotic. Global businesses depend upon small local businesses not only for local services but also for innovation. Small businesses are nimble and innovative; they see and react to trends much more quickly than large companies. Large companies need small businesses as incubators of innovations, and small businesses need large businesses to acquire their services.

Government procurement policy and national or local industry development need not be unhappy bedfellows. They are linked. But the starting point in this linkage is industry development and not, as often seems to be the case, the other way around. Implementing a procurement policy to encourage local industry is not likely to lead to significant and sustainable growth in GDP.

Government procurement policy *is* an important instrument of accountability. But in today's connected world, where the economy is so important to government survival, it is an instrument that needs to be tempered and honed much more effectively than it has been in the past.

C H A P T E R **13**

Are the Benefits Worth the Effort?

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Moving through the four waves of transformation and becoming an on de-
mand government sounds like a long, complicated journey. In addition
to normal resistance to change, governments encounter additional obstacles
that often delay decisions to move forward aggressively.

Government leaders who look at successful transformations in private compa-
nies correctly point out that the public environment is more complex. Govern-
ments do not have a profit or a stock price that creates a sense of urgency and
that measures progress. Government decisions are generally open to public re-
view and opposition political parties are quick to criticize. Legislatures may re-
sist change and be at political odds with the executive branch of government,
making it difficult to get laws enacted. Political terms limit the time in which to
implement changes. Governments are also more limited in their ability to hire
and fire workers. These real differences must be acknowledged and understood.

Despite strong initial enthusiasm, many governments are disappointed in the re-
turn on their early efforts in the e-government journey. The public-relations
value of putting services online was short-lived because the public viewed the
governments as just catching up with private industry. Real cost savings seemed
elusive. The added costs of creating and supporting a new Internet channel for
customers are not offset by savings that can be readily identified. Use of the on-
line channel jumps initially but often levels off at 10–20 percent of the transac-
tions, making it difficult to reduce staffing on other more expensive channels.

If transformation is difficult and the benefits are disappointing, why proceed?
The short answer is survival. Waiting means continued security exposures,

increased health care costs, and growing costs to comply with government regulations — all of which affect the competitiveness of local businesses in the global economy. Waiting means that the costs to support aging populations will grow exponentially, robbing funds from infrastructure projects and initiatives to improve quality of life. Government is the gearbox of a society. Transformation has impact on not only the workings of government but also the extended community that interacts with government. Companies struggled with transformations also, but those that succeeded are thriving today. Those that did not are no longer viable. Governments that successfully transform create an environment that promotes economic growth and prosperity. Those that do not will become an increasing drag on the progress of their society.

Let's look at some practical ways to demonstrate results and capture benefits from e-government transformation efforts.

Lessons Learned from Early e-Government Implementations

Most wave 1 applications struggle to show cost savings. Yet a detailed study of vehicle license renewals in Arizona found that an online transaction cost the state almost 70 percent less than a face-to-face transaction. Why does the potential to reduce costs not translate into big savings for government? The answer lies in the limitations of the early implementations and the willingness of government to take actions to realize the savings.

Because wave 1 applications usually automate existing processes, they merely create a new channel for the customer to use. Rarely do these applications simplify the steps a citizen or business must take to complete a transaction. Many wave 1 applications only provide information or a form that must be faxed or mailed back into the government agency. Although more convenient for the citizen, this procedure does not reduce the government labor required to process the form. It is not surprising that online wave 1 applications are often used only 10 percent of the time, mostly by people who are trying to beat a deadline at the last minute. Citizens still need help to understand all the steps required to complete a transaction.

Wave 2 creates a portal that, on the surface, makes it easier for citizens and businesses to find and use online services. Unfortunately, many portals are not optimized for ease of use. Studies have shown that as many as 50 percent of active users at a Web site will quit before continuing to the next click of the mouse. Therefore, it is important to design a site so customers complete some desired action within two to three clicks. (Through heavy use of customer focus groups, the Canadian central government succeeded in creating a user-friendly

site that requires minimal successive clicks and uses terminology that makes sense to customers.)

Many governments focus on the number of services that are available online as a measure of success. A better measure is the percentage of transactions that are done online. Driving up online utilization for a few high-cost services produces a better return than low utilization on a broad array of services. High online utilization of a specific service concentrates workload transfer in a function and creates the opportunity to move resources to other more productive areas.

Online applications must be designed well to attract large numbers of users and generate significant cost savings. Online use increases in response to creative marketing and incentives to use Web sites. Citizens are very sensitive to fees. In the state of Arizona, online registration renewals doubled when Internet fees were dropped. In contrast, businesses *will* pay fees for online transactions if they clearly see the return or savings to their operations.

Even if marketing and portal design are done well, governments may have difficulty taking actions to capture the savings. Reducing the workload on the direct face-to-face channel means that offices can be consolidated or closed to reduce costs. This may not be a politically popular action, particularly to the politician who represents the area where an office is closed. If demand is rising, there is an opportunity to avoid adding new direct resources to handle the increased service requests. Governments need accurate productivity data to demonstrate these cost-avoidance savings.

Capturing the Full Benefits of On Demand Government

Moving beyond wave 1 and wave 2 generally requires more robust business cases. Wave 3 and wave 4 implementations take more time and resources but offer significant benefits that go well beyond internal government savings. These benefits grow almost exponentially as governments become more integrated internally and extend the transformation to partners and suppliers. Benefits can be grouped into three broad categories.

Internal Government Benefits

Delivering services online can be 70–90 percent less expensive than traditional face-to-face operations. Integrated services can drastically reduce support costs to help customers determine where to go to complete the transaction. A Web site that determines the information that a citizen or business must provide to complete a registration or report a change in status eliminates multiple calls to government agencies to find out what to do. These support savings are often much larger than the savings resulting from moving the transaction itself

online. Internal training costs drop because customers and government employees can use the Web site to determine how to complete the transaction. For example, New York State training costs dropped 90 percent when the state no longer had to run classes to teach government employees where to refer calls that involved other agencies.

Even if resources are not reduced to reflect lower support requirements, people can move into more productive roles such as finding delinquent payers or eliminating fraud and abuse. Customer data in electronic form reduces errors and rework associated with data entry from handwritten forms. Electronic access can increase sales of government products, information, and services. For example, specialty stamp sales increase when they can be purchased online rather than at post offices, and businesses will pay fees to get online access to information needed for their business.

External Returns

The greater impact is often outside government. If government integration and transformation efforts reduce the burden on businesses by 25 percent or even 50 percent, the savings fall directly to the bottom line of the business, providing the opportunity to create more jobs, invest in new markets, or price goods and services more competitively.

Faster payments and approvals can speed time-to-market for products and services. Businesses are often very willing to become advocates and report results to demonstrate the return on government investments. In the pharmaceutical business, faster approval of new drugs is worth billions of dollars to the company, and the use of the new drug may have even more significant impact on health care costs, workforce productivity, and quality of life.

Improved Outcomes

Benefits don't stop with improved productivity and efficiency. Integrated processes improve security, education, and health care, all of which in turn improve the quality of life for almost everyone. Creating impact on outcomes that politicians deem important is the most effective way to get political support for a wave 3 or wave 4 project. The integrated case management and more intelligent use of available programs reduce the time to move a citizen from a dependent role to a productive role in society. Better access to job openings reduces the level of unemployment. Integrated criminal justice systems can reduce crime by leading to earlier arrests of offenders and by enabling the gathering of intelligence that can be used to identify and respond more quickly to new criminal patterns. Systems that improve collaboration among emergency response organizations can save lives and minimize damage and disruptions from unexpected events.