Prospects for the Virtual State

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Introduction

One of the most important developments in governance during the past century has been the rise of digital information and communication technologies. Explaining the means by which fundamentally new information and communication technologies are incorporated into the structures and processes of the state and of governance is a key research challenge. Every major government in the world is striving to use ICTs to enact governance. Each government asks similar questions regarding the strategic benefits of building a virtual state, the appropriate institutional locus of control and expertise, types of systems to be employed and, not least, how to construct a beneficial and expeditious path of change across departments, systems, and policy domains. Such comparisons across governments, however, remain largely unexplored by researchers. I have called states that make extensive use of information technologies *virtual states* to highlight fundamental changes to governance in the information age. The term, virtual state, is a metaphor meant to draw attention to the effects of digital information and communication systems on state structure, processes, and relationships with corporate and individual citizens.

This paper presents an analytical framework to guide exploration and examination, the technology enactment framework.[1] The original technology enactment framework is elaborated to account for key actors in technology enactment. I then illustrate the framework using an extended example of the institutional means developed to enact technology in the U.S. federal government from 2001 to present. The empirical focus of this paper is the development of inter-agency capacity. More specifically, the empirical referent is the Presidential Management Initiative e-government projects. The primary data collection methods I used are interviews with government policy makers, a survey of civil servants and extensive archival research. My analytic strategy is primarily inferential and interpretive. The paper concludes with a set of propositions and recommendations for researchers and policymakers.

In a sense, e-government represents a utopia of freedom. Karl Mannheim, the great German sociologist, developed the concept of utopias of freedom and described this concept in *Ideology and Utopia: An Introduction to the Sociology of Knowledge* in 1929.[2] Drawing from Mannheim, Rosalind Williams wrote recently in her book, *Retooling*:

> Innovation has come to define a utopia of freedom, an ideal place running by market and technological laws, where creative minds and free-flowing capital unite to make a new world abundant in possibilities and energy. This is a much more appealing world than the one we actually live in, where innovations become hardened into bureaucracies, where actions have consequences, and where waves of change wash back on shore. The utopian "no place" of market-driven innovation presents an agreeable escape from the complexities and consequences of a crowded, risky world . . . In the view of history as technological innovation . . . We can often discern a set of "wish-images" that is utopian without being especially progressive.[3]

There is a tendency for researchers and decisionmakers to think of technology and its effects in either utopian or dystopian terms. Yet technologies offer a range of potential effects from positive to negative. More importantly, technologies do not simply produce results autonomously. As I will explain in more detail in this paper, technologies are enacted in political,

social, economic and organizational contexts. The particular context in which technologies are enacted influences the design, development, uses and results of technological systems.

A structural approach that begins with organizations and institutions, as they currently exist and as decisionmakers experience them, offers a fruitful avenue to understanding and influencing the beneficial use of technology for governance. Focusing on technological capacity and information systems alone neglects the interdependencies between organizations and technological systems. Societies in industrialized nations are ordered through complex organizations, most of which can be classified as bureaucracies. Information and communication technologies are embedded and work within and across organizations. For this reason, it is imperative to understand organizational structures, processes, cultures and organizational change in order to understand, and possibly influence, the path of technology use in governance.

Political scientists typically explain the rise of the modern administrative state as a response to industrialization during the Industrial Revolution in the United States. However, the new organizational forms developed by state and industry also were rendered possible by technological achievements that underlay the Industrial Revolution. The steam engine, telegraph, telephone, and early adding machines all made possible bureaucracy as well as the interorganizational forms underlying business and government using vertical integration and spatially dispersed headquarters and field organizations. Technological developments did not determine these forms in an inevitable fashion. But they made them possible and, in some cases, completely logical developments.

One of the most important observers of the rise of the modern state, Max Weber developed the concept of bureaucracy that guided the growth of enterprise and governance during the past approximately one hundred years. The Weberian democracy is characterized by hierarchy, clear jurisdiction, meritocracy and administrative neutrality, and decisionmaking guided by rules which are documented and elaborated in precedent. His concept is the foundation for the bureaucratic state, the form that every major state, democratic or authoritarian, has adopted and used throughout the Twentieth Century.

Throughout the past century, well-known principles of public administration have stated that administrative behavior in the state must satisfy the dual requirements of capacity and control. Capacity indicates the ability of an administrative unit to achieve its objectives efficiently. Control refers to the accountability that civil servants and the bureaucracy more generally owe to higher authorities in the legislature, notably to elected representatives of the people. Democratic accountability, at least since the Progressives, has relied upon hierarchical control -- control by superiors of subordinates along a chain of command that stretches from the apex of the organization, the politically appointed agency head (and beyond to the members of Congress) down to operational level employees.

Rules are central to the Weberian bureaucracy as a source of order, as the chief means to reduce complexity, and as an instrument to produce equity through standardization. Weber argued that "The reduction of modern office management to rules is deeply embedded in its very nature."[4] There is really nothing new about the ubiquity of rule-based systems in complex organizations. Indeed, bureaucracy – which is what Weber means by "modern office management" – is essentially about rules. So any analysis or theory of information and communication technology and the organizations of government must include an account of the role of rules.

Many observers have labeled recent developments in information and communication technologies a "revolution." The significance and depth of effects stem from the fact that

information and communication technologies have the potential to affect *production* (or *capacity*) as well as *coordination*, *communication*, and *control*. Their effects interact fundamentally with the circulatory, nervous, and skeletal system of institutions. Information technologies affect not simply production processes in and across organizations and supply chains. They also deeply affect coordination, communication and control – in short, the fundamental systems of organizations. I have argued that the information revolution is a revolution in terms of the significance of its effects rather than its speed. This is because the effects of IT on governance are playing out slowly, perhaps on the order of a generation (or approximately 25 years). Rather than changes occurring at "Internet speed," to use a popular phrase of the 1990s, governments change much more slowly due to the complexities of the bureaucracy and the importance of related governance issues – such as accountability, jurisdiction, and equity – that must be debated and resolved.

What is the transformation process by which new information and communication technologies become embedded in complex institutions? And who carries out these processes? What roles do they play? Answers to such questions are of critical importance if we are to understand, and to influence, technology-based transformations in governance. Government decisionmakers acting in various decisionmaking processes produce decisions and actions that result in the building of the virtual state. Among the key actors are elected and appointed officials. A central role is played by career bureaucrats because it is these career civil servants who are redesigning structures, processes, practices, norms, communication patterns and the other elements of knowledge management in government. Career civil servants are not impediments to change, as some executive-oriented critics have argued. They are key players in government reform. This is evident from the experiences of the U.S. federal government beginning in approximately 1993. Career civil servants initiated and ultimately produced several innovations that became virtual agencies, web portals, one-stop shops, and other web-based tools, information repositories and service channels.[5]

One of the key research questions for understanding the future of governance follows logically from the importance of career civil servants and their actions in the crafting of new business processes, rules, routines, and norms: What are processes of transformation from the perspective of the experience and decisionmaking purview of public managers? Or: What does transformation in government mean as it is perceived and enacted by public managers who are designing and implementing new information systems and administrative and managerial practices? I differentiate transformation as it is carried out by public managers from transformation as it is perceived by legislators or by IT professionals or by the public. The perspective of the public servant is critical to understand because, I argue, they are the chief architects of transformation.

Technology Enactment

Many social and information scientists have examined the effects of technology on organizations and on government. Yet, the results of such research have been mixed, contradictory and inconclusive. For decades, researchers have observed that the same information system in different organizational contexts leads to different results. Indeed, the same system might produce beneficial effects in one setting and negative effects in a different setting. This stream of research, focused on effects and outcomes, has neglected the important effects of organization and politics on information systems and the processes by which such systems come to be embedded in organizations.

The technology enactment framework emphasizes the influences of organizational structures (including "soft" structures such as behavioral patterns and norms)on the design, development, implementation and use of technology.[6] In many cases, organizations enact technologies to reinforce the political status quo. Hence, in one sense technology enactment "…refers to the tendency…to implement new information technology in ways that reproduce, indeed strengthen, institutionalized socio-structural mechanisms even when such enactments lead to seemingly irrational and ostensibly sub-optimal use of technology." These early stage, path dependent effects may influence the development of a central government for decades because of the political difficulties, complexity and costs of changing large information systems even with advances such as adaptive enterprise architecture.

The assumptions of designers and other decisionmakers play a key role in the type of systems developed and the way in which systems are enacted in government. For example, the U.S. Army's design of the maneuver control system, a relatively early form of automated battlefield management, developed in the 1980s and 1990s, was developed with the assumption on the part of system designers that soldiers are "dumb" operators, button pushers with little understanding of their operations. When much of the detailed information the soldiers used for decision making was embedded in code and made inaccessible to them in their decisionmaking, there were substantial negative effects on the operational capacity of the division.[7]

The Technology Enactment Framework
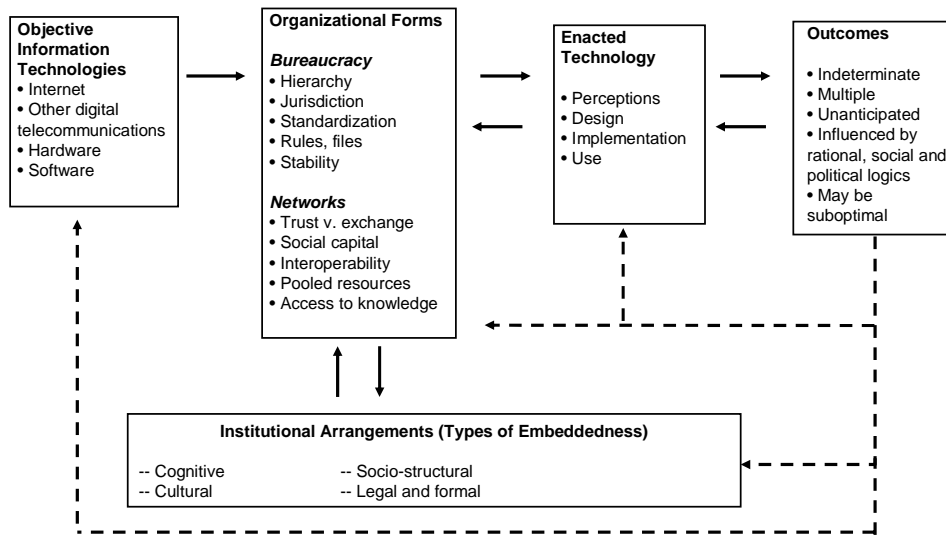
Source: J. E. Fountain, *Building the Virtual State: Information Technology and Institutional Change* (Washington, D.C.: Brookings Institution Press, 2001), p. 91. Copyright, Brookings Institution Press, 2001.

The analytical framework, called "technology enactment," that I developed in *Building the Virtual State: Information Technology and Institutional Change* (Brookings Institution Press, 2001), resulted from extensive empirical research regarding the ways in which career civil

servants and political appointees design and use information technology in government. If information technology is better theorized and incorporated into central social science theories that guide thinking about how government works, researchers will possess more powerful tools for explaining and predicting important current phenomena in governance. In other words, theory should provide guidance regarding the deep effects of IT on organizational, institutional and social rule systems that influence behavior.

The most important conceptual distinction, in the theorization of technology, is the distinction between "objective" and "enacted" technology. By objective technology, I mean hardware, software, telecommunication and other material systems as they exist apart from the ways in which people use them. For example, one can discuss the memory of a computer, the number of lines of code in a software program, or the functionality of an application. By "enacted technology," I refer to the way that a system is actually used by actors in an organization. For example, some organizations used email to break down barriers between functions and hierarchical levels. Other organizations use email according to communication channels that are quite traditional and hierarchical. In some cases firms have used information systems as a means to substitute expert labor for much cheaper labor by embedding as much knowledge as possible in systems and routinizing tasks to drive out variance. In other cases firms use information systems to extend their human capital and to add to the creativity and problem solving ability of their employees. Many organizations have taken a plethora of complex and contradictory forms, put them into pdf format and uploaded them to the web, where they can be downloaded, filled out by hand and FAXed or mailed for further processing. Yet other organizations have redesigned their business processes to streamline such forms, to develop greater web-based interactivity, particularly for straightforward, simple transactions and processes. These organizations have use ICTs as a catalyst to transform the organization. Thus, there is a great distinction between the objective properties of ICTs and their embeddedness in ongoing, complex organizations.

Two of the most important influences on technology enactment are organizations and networks. These appear as mediating variables in the framework depicted in the figure above. These two organizational forms are located together in the framework because public managers are currently moving between these two types of organization. On the one hand, they work primarily in bureaucracies (ministries or agencies) in order to carry out policymaking activities. On the other hand, public managers increasingly work across agencies and across public, private and nonprofit sectors – in networks – to carry out the work of government. Thus, these two major forms heavily influence the ways in which technologies will be designed, implemented and used.

Undergirding, the process of enactment and exerting a strong influence on cognition and action are four types of institutional influences. Cognitive institutions refer to mental habits and cognitive models that influence behavior and decisionmaking. Cultural institutions refer to the shared symbols, narratives, meanings and other signs that constitute culture. Socio-structural institutions refer to the social and professional networked relationships among professionals that constrain behavior through obligations, history, commitments, and shared tasks. Governmental institutions, in this framework, denote laws and governmental rules that constrain problem solving and decisionmaking. These influences play a significant role in technology enactment.

Note that causal arrows in the technology enactment framework flow in both directions. This indicates that there are recursive relationships among technology, organizational forms, institutions, and enactment outcomes. The term "recursive," as it is used by organization

theorists means that influence or causal connections flow in all directions among the variables. This term is meant to differentiate recursive relationships from uni-directional relationships in which, for example, variable A leads to variable B. For example, smoking leads to cancer. But cancer does not lead to smoking. In a recursive relationship, variable A and variable B influence one another. For example, use of IT influences governance. And governance decisions might influence the use of IT. IT and governance influence the nature of civic engagement. For these reasons, the framework does not predict outcomes. Rather, it predicts uncertainty, unanticipated results and iteration back through design, implementation and use as organizations and networks learn from experience how to use new technologies. The analytical framework is a theory of a dynamic, process rather than a predictive theory.

An extension of the model, presented in the figure below, highlights the distinctive roles played by career civil servants who are IT specialists versus program and policy specialists, other government officials at all levels from executive to operator, vendors and consultants.

Key Actors in Technology Enactment
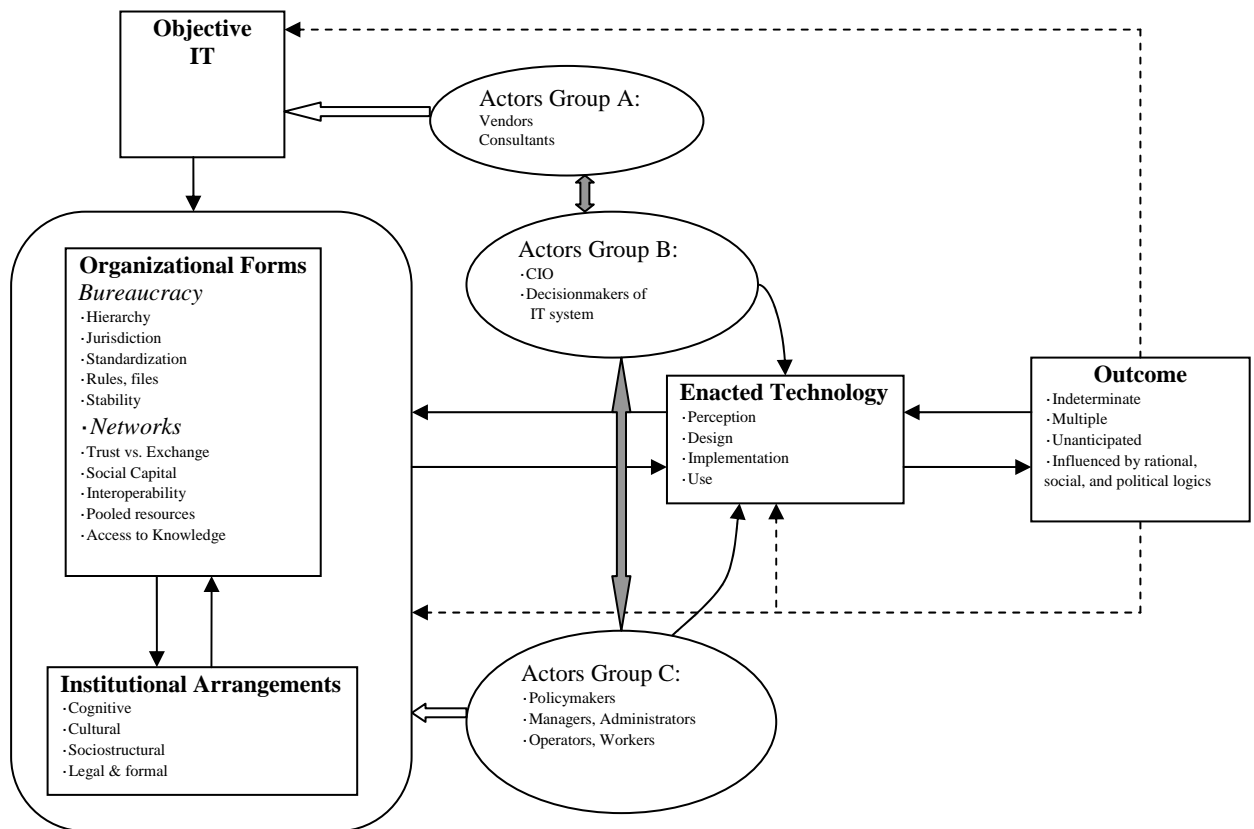
Copyright: Jane Fountain and Brookings Institution Press, 2001. Revisions by Hirokazu Okumura, 2004.

We can see from the figure that there are three primary groups of actors to consider in technology enactment. Actors in group A, comprised of vendors and consultants, are largely responsible for objective technology. Their expertise often lies in identification of the

appropriate functionality and system architecture for a given organizational mission and set of business processes. What is key here is that vendors and consultants fully understand the mission and tasks of a government agency before making procurement and design decisions. It is essential to understand the context and "industry" of government, just as one would have to learn the intricacies of any complex industry sector. Just as the information technology sector differs from the retail, manufacturing, and the service sectors, so the government sector exists in a unique environment. Within government as well, are varying policy domains and branches, whose history, political constraints, and environments are important to understand.

Actors in group B, according to this model, include chief information officers of agencies and key IT decisionmakers. These are the actors within government who are primarily responsible for technology enactment. Actors in group C – policymakers, managers, administrators, operators, and workers – influence both organizational and network structures and processes as well as technology enactment. These depictions are stylized and oversimplify the complexities of actual governments and the policymaking process. They are meant here to draw attention to the multiple roles involved in enactment and the primary points of influence exerted through each role.

Presidential Management Initiative E-government Projects

A marked rise in the use of the Internet, at the beginning of the 1990s, coincided with the beginning of the Clinton administration and the initiation of a major federal government reform effort, the National Performance Review, led by Vice President Al Gore. In addition to the development of regulatory and legal regimes to promote e-commerce, the administration sought to build digital government. A key strategy of the Clinton administration included the development of virtual agencies. The virtual agency, in imitation of web portals used in the private sector economy, is organized by client—say, senior citizens, students, or small business owners --and is designed to encompass within one website all information and services in the U.S. government regardless of agency as well as from relevant organizations outside government. If developed sufficiently, virtual agencies have the potential to restructure the relationship between state and citizen as well as relationships within government among agencies and between agencies and overseers.

In August 2001, the Bush administration released the Presidential Management Agenda, a plan to make the US federal government more "citizen-centered, results-oriented and market-based." The complete agenda includes five strategic, government-wide initiatives: strategic management of human capital; competitive sourcing; improved financial support; budget and performance integration; and expanded electronic government. This paper focuses on the e-government initiatives.[8]

The E-Government section of the plan, initially called "Quicksilver" after a set of cross-agency projects developed during the Clinton administration, evolved to focus on the infrastructure and management of 25, cross-agency e-government initiatives. (The 25 projects are described briefly in Appendix One.) The objectives for these projects are to simplify access to government information by individuals; to reduce the costs to businesses of providing government with redundant information; to better share information with state, local and tribal governments; and to improve internal efficiency of the federal government.[9] The 25 projects are grouped into four categories: Government to Business, Government to Government, Government to Citizen and Internal Efficiency and Effectiveness and one project which affects all others: E-Authentication. The projects by category are: Government to Business: rulemaking, tax products

for businesses, streamlining international trade processes, a business gateway and consolidated health informatics; Government to Government: geospatial information, disaster management, wireless communication standards between emergency managers, vital records information and consolidated access to federal grants. Government to Citizen: government benefit information, recreation information, electronic tax filing, federal loans and citizen customer service; Internal Efficiency and Effectiveness: training, recruitment, HR integration, security clearance, payroll, travel, acquisitions and records management. Also included is a project on consolidated authentication. (For further information concerning each project see www.e-gov.gov).

Cross-Agency, E-Government Initiatives

Government to Citizen	*Government to Government*
Recreation One Stop	Geospatial One Stop
GovBenefits.gov	Grants.gov
E-Loans	Disaster Management
IRS Free File (IRS only)	SAFECOM
USA Services	E-Vital
Government to Business	*Internal Efficiency and Effectiveness*
E-Rulemaking	E-Training
Expanding Electronic Tax Products for Business	Recruitment One-Stop
	Enterprise HR Integration
Federal Asset Sales	E-Records Management
International Trade Process Streamlining	E-Clearance
Business Gateway	E-Payroll
Consolidated Health Informatics	E-Travel
	Integrated Acquisition Environment
	E-Authentication

Source: http://www.egov.gov

These 25 projects, selected by OMB from more than three hundred initial possibilities, many of which were developed during the Clinton administration and which continue outside the rubric of the PMI, focus on the development of horizontal relationships across government agencies. Their objective is to reduce the operational and information processing autonomy -- the stovepipes -- of government agencies and departments and to reduce the redundancy of governmental operations. The projects move far beyond simply 'putting government forms online' (http://www.whitehouse.gov/omb/egov/about_backgrnd.htm); their goal is to transform the business of government and to redesign government operations increasing their accessible by individual and corporate citizens.

The projects are overseen and supported by the Office of E-government and Information Technology, a statutory office within the U.S. Office of Management and Budget established by law in 2002. The Administrator for E-government and IT is the Chief Information Officer of the federal government and an associate director of OMB reporting to the Director. The position
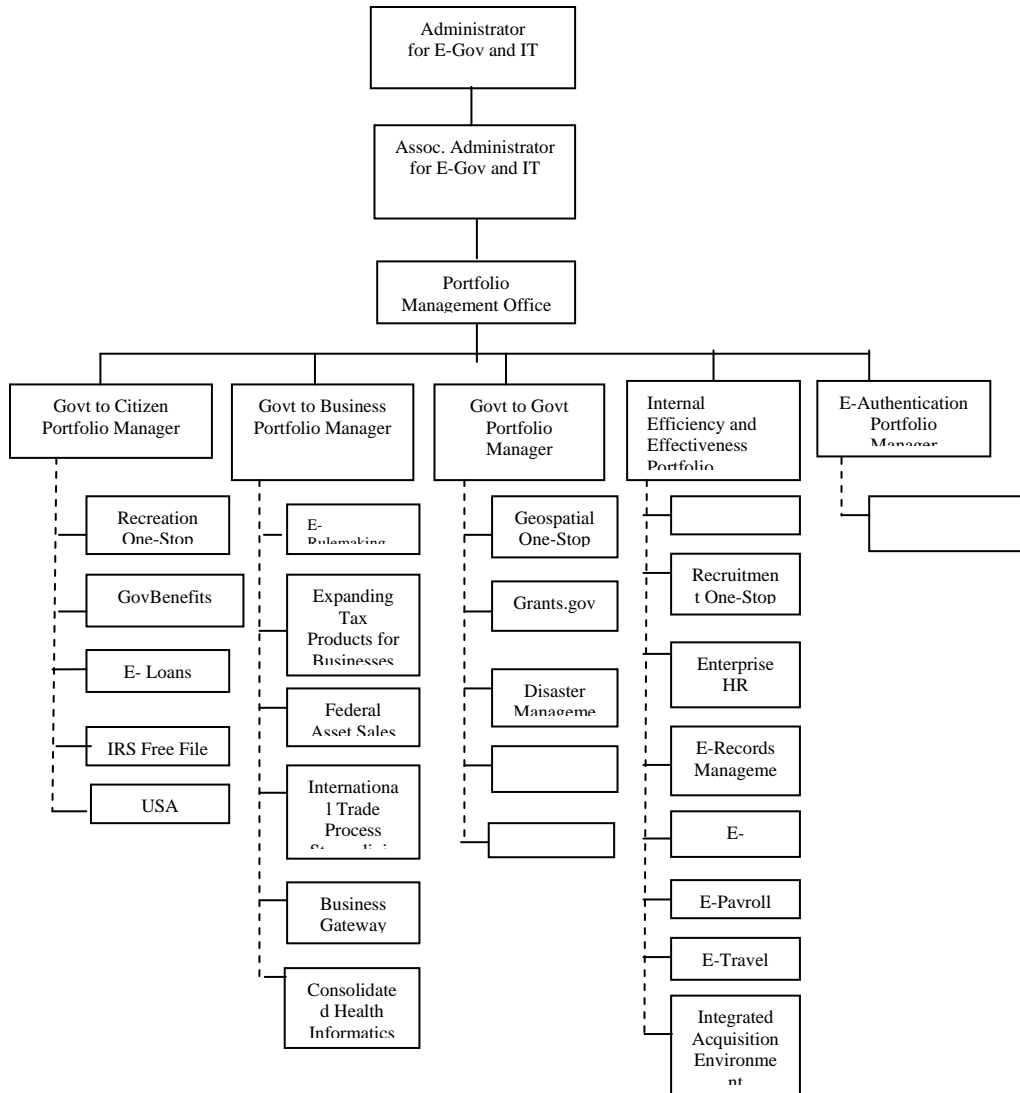
was initially held by Mark Forman and is currently held by Karen Evans, a career civil servant. The Associate Administrator for E-Government and Information Technology, reporting to the Administrator, is responsible for the PMI projects. Five portfolio managers – some of whom are career civil servants and others who are political appointees -- whose specific responsibility is to oversee cross-agency initiatives are organized to focus on government to government, government to business, government to citizen, and internal effective and efficiency categories. A management consulting group, who are not government employees but private contractors detailed to the OMB organization, has been responsible for most of the day-to-day communications and reporting with the programs.

The organization within OMB signals a major institutional development in the U.S. federal government. Before passage of the E-Government Act of 2002 (Public Law 107-347), which established the federal CIO and OMB structure, there was no formal structural capacity within OMB to oversee and guide cross-agency initiatives. The structural gap formed a major impediment to the development of networked governance during the Clinton administration. In terms of political development and fundamental changes in the nature of the bureaucratic state, we see in these organizational changes the emergent institutionalization of a governance structure for cross-agency, or networked, governance.

Note that the organization chart shows the 25 cross-agency initiatives reporting to portfolio managers within OMB. This representation is meant to indicate the oversight and guidance exercised by portfolio managers over the projects. In fact, the managing agency for each project is a federal agency rather than OMB. The projects are not part of the OMB hierarchy although OMB exercises oversight for these projects. The "ownership" of each project belongs to the federal agency designated by OMB as the "managing partner," or lead agency. The following grid arrays federal agencies along the top of the grid and projects along the left side. Agency partners for each project are marked with an x. The managing partner is denoted by an X in bold-face type. For example, the column and row colored blue indicate that the Department of Health and Human Services (HHS) is a partner agency in eight initiatives, and managing partner of two projects, health informatics and federal grants.

Managing partner agencies appointed program managers to lead the projects. The program managers are typically senior, experienced career federal civil servants. The program managers are responsible for developing a consultative process among agencies and in consultation with OMB to develop project goals and objectives. In most cases, program managers were also required to determine a funding plan in addition to a staffing plan. The E-Government Act, which codified the OMB E-Government infrastructure, specifically provided for federal funding for the initiatives of approximately $345 million over four years. But an average of only $4-5 million per annum has actually been appropriated by Congress. The overall infrastructure of the projects and their relationship to OMB is standardized across projects. But the strategies developed by each project for funding, staffing and governance vary widely. So far, the legislature has not adapted to networked government. This lag in institutional development makes it more difficult to build networked systems.

OMB Office of E-Government and Information Technology Organization Chart

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                    ┌─────────────────────┐
                    │   Administrator     │
                    │  for E-Gov and IT   │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │ Assoc. Administrator│
                    │  for E-Gov and IT   │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │     Portfolio       │
                    │ Management Office    │
                    └─────────────────────┘
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Govt to Citizen Portfolio Manager	Govt to Business Portfolio Manager	Govt to Govt Portfolio Manager	Internal Efficiency and Effectiveness Portfolio	E-Authentication Portfolio Manager
Recreation One-Stop	E-Rulemaking	Geospatial One-Stop		
GovBenefits	Expanding Tax Products for Businesses	Grants.gov	Recruitment One-Stop	
E- Loans	Federal Asset Sales	Disaster Manageme	Enterprise HR	
IRS Free File	International Trade Process Standardizi		E-Records Manageme	
USA	Business Gateway		E-	
	Consolidated Health Informatics		E-Payroll	
			E-Travel	
			Integrated Acquisition Environment	

Source: Office of Management and Budget "Implementation of the President's Management Agenda for E-Government: E-Government Strategy" p 19, 2/27/2002, http://www.whitehouse.gov/omb/inforeg/egovstrategy.pdf, and www.egov.gov, accessed 7/1/2004.

Presidential Management Initiative E-Government Projects: Partner Agencies and Managing Partners

| Projects / Departments	DoC	DoD	DoE	DoEd	DoI	DoJ	DoL	DoT	EP	FDIC	FEMA	GSA	HHS	HUD	NARA	NASA	NRC	NSF	OP	SBA	Smithsonian	SSA	Statte	Treasury	USAID	USDA	VA
Consolidated H'lth Informatics		X											**X**									X					X
Disaster Management	X	X			X	X		X			**X**	X	**X**	X			X			X		X				X	
E-Authentication	X	X		X		X		X	X			**X**	**X**			X				X		X		X		X	X
Grants.gov	X	X	X	X	X	X	X	X	X			X	**X**	X		X		X		X					X	X	X
E-Payroll		X	X																X			X		X			
E-Training		X				X	X					X							X			X					
E-Travel		X						X				**X**								X				X			X
E-Vital		X		X		X	X						X							X		**X**		X		X	X
E-Records Management		X	X		X			X	X						X									X		X	
GovBenefits.gov			X	X			**X**					X	**X**	X								X	X			X	X
Expanding Electr. Tax Products																						X		**X**			
IRS Free File																								**X**			
Federal Asset Sales		X		X					X			**X**		X						X				X			X
Geospatial One-Stop	X	X	X	**X**			X	X	X				**X**	X		X	X		X							X	
Integrated Acquisition Env.	X	X		X			X					**X**				X				X						X	X
Enterprise HR Integration		X																	X				X	X		X	
E-Clearance	X	X	X			X												X		**X**			X	X			
Int'l Trade Proc. Streamlining	**X**					X														X				X	X	X	
Business Gateway	**X**						X	X	X											**X**				X			
E-Loans			**X**								X		**X**	X						X						X	X
E-Rulemaking						X	X	**X**														X	X		X	X	
Recreation One-Stop	X	X		**X**				X														X	X	X	X	X	
Recruitment One-Stop	X	X		X		X	X	X						X		X				**X**						X	
USA Services							X				X	**X**	**X**						X			X				X	X
SAFECOM	X	X			X	X		X			**X**		**X**											X		X	

Source: OMB Project Management Office: E-Gov Partner Agencies Public.xls, unpublished document, no date., Revised, July 1, 2004.

U.S. Federal IT Budget

U.S. federal investments in government IT spending increased steadily from approximately 36.4 billion dollars in 2001 to 59.3 billion in 2004. According to OMB estimates, eighty percent of this spending is for consultants. Technical expertise and human capital in the federal government is being greatly weakened as a result under the "competitive outsourcing" policy and lack of human capital with IT expertise in the federal government. But this increase in investment also suggests a commitment to building a virtual state.

U.S. Federal Government IT Spending
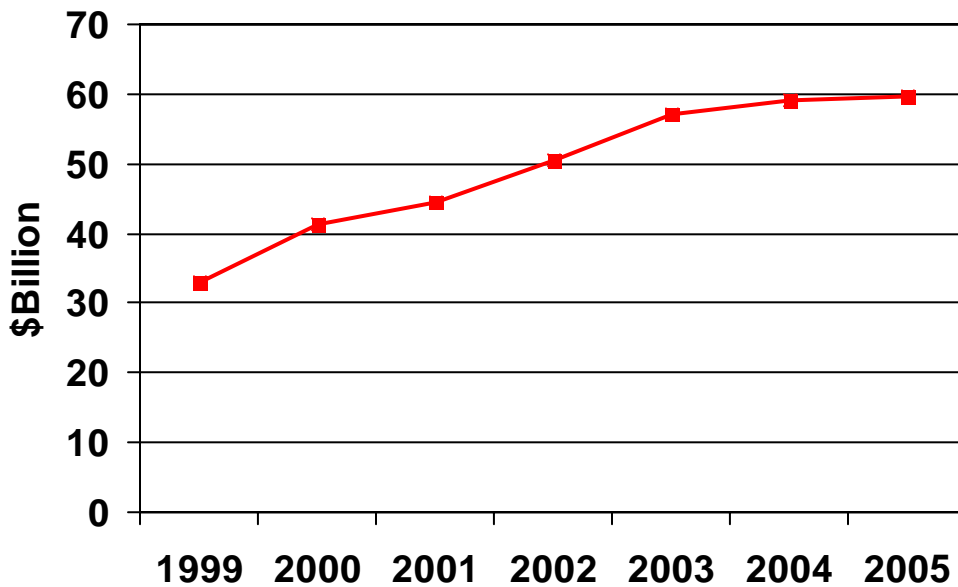
The E-Government Act ties appropriations to strategic, business and IT plans of agencies and created a fund of $345 million to support cross-agency initiatives and monitoring of their development. In contrast to the bottom-up approach of the Clinton administration, the Bush administration approach is top-down, engineering in its approach to systems development, and emphasizes strict and rigorous project management. The table below indicates the disparities between the funds allocated to the e-government projects, and the budget requests for the President's e-government initiatives, in contrast to congressional appropriations for fiscal years 2002 to 2004. As John Spotila, former director of Information and Regulatory Affairs in OMB, remarked: "… Even without homeland security absorbing most of the IT dollars, cross-agency projects have never been a favorite of Congress, where appropriations are awarded through a 'stovepipe system' of committees that makes a multi-agency approach difficult."[10] The most recent appropriation for the 25 cross-agency initiatives indicates both the stress on the federal budget of the deficit and the war in Iraq as well as the continuing assumption on the part of Congress that agencies should generate cost savings through IT that will "self fund" technology innovation. A congressional source recently noted: "We have never been convinced that the fund [requested to support cross-agency initiatives] doesn't duplicate what already exists in other agencies or performs unique functions … It has never been well-justified, and we don't have a lot of spare cash lying around."[11]

Spending on 25 E-Government Initiatives

- Requested: $20 million
  Appropriated: $5 million

- Requested: $45 million
  Appropriated: $5 million
  (Provided for in the E-Government Act of 2002: $45 million

- Requested: $45 million
  Appropriated: $ 3 million
  (Provided for in the E-Government Act of 2002: $55 million

- Total funding allowed under the E-Government Act of 2002 (FY02-07): $345 million

Sources: E-Government Act of 2002, (H.R. 2458/S. 803), http://www.regulations.gov/images/e-Gov%20Law.pdf, http://www.fcw.com/fcw/articles/2002/0218/cov-budget1-02-18-02.asp, and http://gcn.com/23_3/news/24892-1.html, all sources in note accessed July 2, 2004.

Grants.gov: A Case Study

In February of 2002, the Grants.gov project was officially launched by the Presidential Management Initiative.[12] (See www.grants.gov for the project website.) But years of discussion and development concerning standardization of grants administration across agencies preceded the current project. The aim of Grants.gov is to consolidate and streamline the location of and application for federal grants by providing a unified web-based interface. The first phase of the project does not seek to standardize grants processes across agencies but simply to build a standard web-based interface that all agencies would connect to. This virtual integration would simplify grants seeking and administration for the public and, it is assumed, would create a path to deeper integration across agencies. The project's initial meeting was held in February 2002 and the initial product, a central, web-based "storefront" officially was launched by the Secretary of the Department of Health and Human Services, Tommy Thompson, in November 2003. Although not yet officially complete, by most measures the project is judged a success.[13]

Annually, approximately $360 billion in federal grants are offered by 26 federal agencies through roughly 800 programs, and comprise more than 210,000 individual awards. Grants are disbursed to state, local and tribal governments as well as educational institutions and non-profit organizations. The grants process is relatively mature, having developed for the past 25 to 30 years. Within agencies, strong autonomous cultures for grants processing and idiosyncratic data requirements have evolved as well. Like most government processes, the federal grants process was largely paper-based with each agency and grant program using dissimilar forms, data, and certification procedures.

As agencies began to automate their grant processes, it became clear that the result would be hundreds of stove-piped, computerized grants systems. Ironically, customer service strategies and decentralized approaches to innovation and computing led to hyper-customization and further fracturing of grants processes across the government enterprise. The net result for the grantee community was not greater responsiveness, but cacophony. In the environment of decentralized government computing which characterized the U.S. government in the 1990s, attempts to unify the process of application for federal grants had been attempted several times before without success.

Grants.gov offered the promise of benefits both to organizations applying for federal assistance, as well as federal agencies themselves through simplification of the grants process. For grant applicants, search for grant programs and procedures was labor intensive and demanded specialized, tacit knowledge. Web-based interfaces across grants programs also differed substantially with autonomous layouts and organization. In many cases, potential grant recipients experienced difficulty locating appropriate programs. Often the experience or tacit knowledge required in the application process poses a barrier to entry to many deserving potential grant recipients to apply, thereby limiting and biasing access to public goods. As one senior government official remarked: "[the federal government] has been doing business in a relatively high-handed way …`If you want the money, you've got to play the game our way.' The playing field hasn't been level. Sometimes, it's been a secret handshake club to try and figure out … how to apply in order to … get awarded. People would have to buy – hire – experts in order to find opportunities and to get an application that would get funded. And that's not fair and that's not transparent."

The project is sequenced in several phases. This case details the initial phase, the current state of development. The next phase focuses on improvement of the management of the newly implemented grants process, focusing on delivering "… simplified, unified mechanisms for grant award, financial reporting, and performance reporting." A future phase is planned to consolidate the participating agencies' back-end grants management processes.

The key objectives of the first phase of the project were determined at the original assembly in February 2002 by then Director of the Office of E-Government and Information Technology, Mark Forman, of OMB with constituents, users and team members. The objectives are: to develop a single storefront to enable potential applicants in a unified fashion both to find appropriate grants, and to apply for them. A single interface requires standardized data across all agencies, unique identifiers for applicants, and one web-based interface (the storefront).

The current grant application environment, prior to the grants.gov redesign, is presented in the figure below showing the repetition and autonomy of grants administration processes in each agency.

Grant Application Current Environment

| Applicant 1 | Applicant 2 | Applicant 3 | ..... | Applicant N |

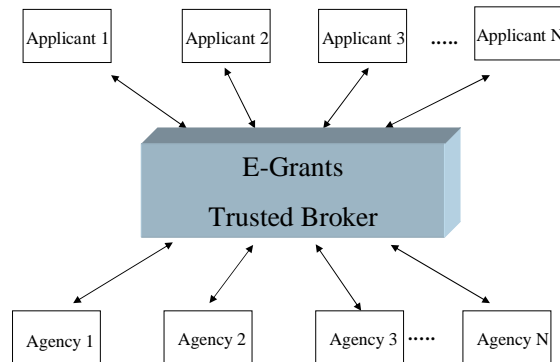| Agency 1 | Agency 2 | Agency 3 | ..... | Agency N |
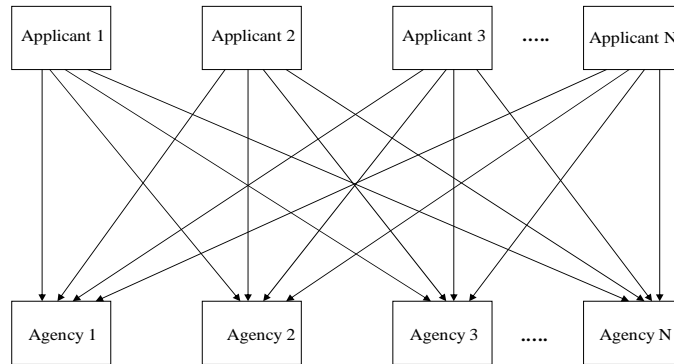
"Many-to-Many" is Costly for Applicants and Agencies

Source: E-Grants Program Manager: *Overview of the E-Grants Initiative ppt.*

The Grants.gov single system solution will provide one interface for users of the federal grants processes. The figure below shows a schematic view of the single system approach. Note that the actual agency systems are not redesigned. An additional interface has been developed on top of current agency systems.

Single System Solution

| Applicant 1 | Applicant 2 | Applicant 3 | ..... | Applicant N |

E-Grants
Trusted Broker

| Agency 1 | Agency 2 | Agency 3 | ..... | Agency N |

Source: E-Grants Program Manager: *Overview of the E-Grants Initiative ppt.*

As the largest grantor of federal funds, the Department of Health and Human Services (HHS) was designated the managing partner agency for Grants.gov. Other partner agencies include the Department of Transport (DOT), the Department of Education (DOE), Housing and Urban Development (HUD), the National Science Foundation (NSF), the Department of Justice (DOJ), the Department of Labor (DOL), the Department of Agriculture, Department of Commerce (DOC), the Department of Defense (DOD), and the Federal Emergency Management Authority (FEMA). The initial program manager, Charles Havekost, is a career civil servant who has worked on IT projects in health-related policy areas. His background also includes a brief period in a dot.com start-up in the private sector. Several other program managers possess non-traditional federal government backgrounds as well. Havekost has recently been named as CIO for HHS, his position as program manager for Grants.gov being taken over by the previous deputy program manager, Rebecca Spitzgo.

While the institutional infrastructure of the 25 projects was in place (i.e., project designation, goals, and agencies and oversight in an OMB program office) specific resources such as funding and project staff were not provided. Each of the 25 project managers have been responsible for sourcing their project's funding and staffing. (A senior government official has noted that the actual spending of the projects has well exceeded the original $345 million budget request, thus alternate sources of funding would have been required in any case.)

Lack of funding, which in many cases often led to program managers expending a large percentage of their time and effort on budgetary Memoranda of Understanding and tracking budgetary transfers between agencies, also resulted in some innovative funding programs, such as the one implemented by Grants.gov.

Staffing and funding for the project was determined to be 15 people and $20 million over the first two years of the project. A funding algorithm was then developed, dividing partner agencies into three groups: large, medium and small. This proposal was approved by the project's executive board (see below), and in large part was successful, in that most partner agencies contributed their share. After the funding algorithm was approved, it was published on the program's website, allowing the project team to also publish the contributions, another point of leverage to the agencies holding back on providing their contributions to the funding. As one official commented, "… it's a hall of fame, which also conversely is a hall of shame."

Funding Formula for Grants.gov by Agency

	Agency	Awards	Award%	Dollars	Dollars %	Total %
Large Partners	HHS	69,000	38.0%	60,000,000,000	33.6%	71.6%
	DOT	28,274	15.6%	37,600,000,000	21.1%	36.6%
	Ed	19,678	10.8%	30,400,000,000	17.0%	27.9%
	HUD	14,150	7.8%	26,100,000,000	14.6%	22.4%
Medium Partners	NSF	20,526	11.3%	4,150,000,000	2.3%	13.6%
	DOJ	10,200	5.6%	5,000,000,000	2.8%	8.4%
	Labor	5,027	2.8%	9,500,000,000	5.3%	8.1%
Small Partners	Ag	7,304	4.0%	1,540,000,000	0.9%	4.9%
	DoC	2,982	1.6%	1,580,000,000	0.9%	2.5%
	DoD	2,780	1.5%	793,000,000	0.4%	2.0%
	FEMA	1,667	0.9%	1,800,000,000	1.0%	1.9%
	Total	181,588	100.0%	178,463,000,000	100.0%	200.0%

In addition to funding, a cross-agency project of such scope requires adequate staffing. The program manager has the challenge of convincing agencies to free up scarce human resources to contribute staff to the project. A key argument employed focused on opportunities for professional development. A second, politically important argument was the advantage to departments of having "eyes and ears" on the project. By the end of 2002 Grants.gov was staffed at levels prescribed by its charter with career civil servants, largely on six-month detail to the project. (See the figure below for staff levels and agency of origin.)

The staffing strategy lent advantages and disadvantages. On the positive side, the team structure allowed for useful cross-fertilization of ideas from different agencies. As one official put it: "It's turned out that the detail experience has been just wonderful because these people come in from these different agencies kind of speaking different vernaculars, talking about different processes. And it's just kind of a mind blower every time somebody new comes in who's been at a different agency and starts talking about, 'Well, we do it this way' or 'We do it that way.' It's been a fabulous, fabulous experience." The official continued: "I think a lot of times people who have been at one agency for a long time tend to think, 'Oh, we're smart and every other agency is dumb. We do things the right way and everyone else – who knows why they do it that way?' It pulls this together, this ecumenical group here. We get to find out that there are good people at all those other agencies." On the other hand, the use of six-month details meant that staffing needed to be continually addressed. As the program manager commented: "We had a day long retreat to make sure that everyone's on the same page and the only really scary moment there was, we went around the table and … we asked them to say what day their detail runs out. And we had three people on the team right now who began their detail on the 13th of January, which means that on the 13th of July their six months is over. Some of the agencies may extend, but it's not a given."

The program team also had to persuade senior HHS management to approve designated office space for the project, not an easy process. Shared space, in addition to regular informal team gatherings, later proved a contributor to the 'esprit de corps' which developed among project members.

One of the key issues involved in working across agencies is governance. While senior government management may agree in principle to a project or direction, in practice those working on the project report to middle managers within separate agencies. These managers often have their own goals which are not necessarily aligned, in fact are often at odds with, those of the cross agency project. To address this challenge, program manager Havekost created a governance structure whose chief components are an Executive Board and a Steering Committee. This simple structure has proven robust and valuable for conflict resolution; it has been adopted as a "best practice" by other E-Government projects.

According to its charter, the Executive Board is to "…have oversight of strategy and timetables, ensure partner agency consensus, provide executive sponsorship for [Grants.gov] outcomes in the partner agencies and resolve interagency issues."[14] Havekost arranged for the Secretary of the Department of Health and Human Services, Tommy Thompson, to invite the other 10 partner agency heads to appoint executive board members for the project, apparently not an easy process. In due course, senior agency representatives with authority to speak for their respective agencies were appointed. (The table below lists the names and titles of the executive board members.)

According to Havekost, there was little disagreement with the concept of the program, that is, almost all agreed that the project was a good idea.[15] That the program was *possible* was harder. The program team focused on four main tasks in order to build momentum.

First, the team demonstrated to its agency partners that their objective had already been

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Grants.gov Executive Board Members, 2002

- Marc Weisman, HHS, Acting Deputy Assistant Secretary for Grants and Acquisition Management; also Co-Chair, Grants Management Committee
- Bryan Keilty, DOL, Deputy Assistant Secretary for Employment and Training Acquisition
- David J. Litman, DOT, Senior Procurement Executive
- Vickers B. Meadows, HUD, Assistant Secretary for Administration/CIO
- Joseph Marshall, USDA, Associate CFO/Financial Policy & Planning
- Mary Santonastasso, NSF, Director of the Division of Grants and Agreements
- William Berry, Ph.D., DOD, Director for Basic Research
- David Zeppieri, DOJ, CIO of Office of Justice Programs
- Jack Martin, Education, Chief Financial Officer
- Otto J. Wolff, Commerce, CFO and Assistant Secretary for Administration
- Patricia A. English, FEMA, Senior Procurement Executive

Ex-officio Members:
- Charles Havekost, E-Grants Program Manager
- Anthony Frater, OMB, E-Gov Government-to-Government Portfolio Manager

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accomplished in another form under the fedbizopps.gov project. Federal Business Opportunities was a cross agency project similar in concept and functionality to Grants.gov. Second, the team actively engaged the agency's clients and constituents. According to Havekost, active stakeholder management persuaded grants applicants that the program team is committed to building an inter-agency process. It also signaled to agencies that their customers were aware of the project and would exercise voice if progress was delayed by an individual agency.

Third, early on the project team forced agreement on an issue that had previously proved a stumbling block for prior efforts to streamline federal grants processes. In July 2002, well ahead of the stated deadline of October later that year, partner agencies agreed on the standard data to be collected by grant applicants. This standard was based on the OMB standard approved Form 424 and policy standard ANSI X.12 194. Prior efforts at standard development had started from a blank slate, by erasing the form, and agencies debated every addition. In effect, this amounted to rewriting policy and created rifts between agencies. The adoption of standard data collection was not only operationally important but also psychologically significant. This early accomplishment reportedly built a strong reputation for the project and the seriousness of intent of its participants. It also reinforced the reputation of the program manager, Havekost, as an entrepreneur who could deliver results.

Finally, the project team looked for creative ways to work around lack of cooperation and noncompliance of some partner agencies. Initially many agencies sought means to resist cooperation with the project. The project team responded by acknowledging the issues and then by seeking methods to solve problems posed by agencies. For example, one agency reported that

they would be unable to comply because their grants process required them to have data on paper. The Grants.gov team promised to print out the information and send it to them.

In summary, the Grants.gov project has built an inter-agency interface to integrate the process of finding and applying for federal grants. They developed a governance structure and a funding structure that has been imitated by other PMI e-government projects. A shared perception of equity in terms of agency contributions has been a vital element of success. The entrepreneurship and skill of the project leader has proved critical.

U.S. Federal Enterprise Architecture

Adaptive enterprise architecture is the logical response to the development of myriad, inconsistent systems, applications, and architectures. The enterprise architecture approach seeks to build coherence and strategic connections among people, business processes, organizational complexity and technology. The definition employed by the Institute for Enterprise Architecture Developments communicates the multiple levels that enterprise architecture frameworks seek to address: "Enterprise architecture frameworks consist of conceptual models intended to communicate, at a high level, the complexity and interdependencies of EA to a broad audience, while, at a low level, conveying requirements for complex system design."[16]

According to many accounts, enterprise architecture (EA) began with a comprehensive framework developed at IBM by John Zachman in the 1980s.[17] Since its inception, EA has been used by large firms throughout the globe including General Motors, Volkswagen AG, and Barclays Bank. The formal planning and modeling at the center of EA is a critical component of the "on demand" strategy currently being marketed by several vendors, perhaps most notably, by IBM. It is central to Hewlett Packard's "adaptive enterprise" strategy. Approximately a year ago, HP released a reference architecture called "Darwin," meant to assist large organizations to develop standardized, flexible IT architectures.[18] It is an essential strategy for the U.S. federal government given its existing investments in and reliance on enterprise architecture. An enterprise architecture is necessary for continued development of cross-agency, government-wide, and enterprise approaches to governance. It is likely to have significant effects on service production and delivery and, perhaps more importantly, on the policymaking process.

What has the U.S. federal government experience been concerning its development and use of the EA? This section assumes a basic background in the enterprise architecture approach and provides an overview of developments and challenges within the U.S. federal government. (Appendix 2 includes selected web-based background materials on the enterprise architecture approach. Appendix 3 lists selected General Accounting Office reports on Federal Enterprise Architecture and E-Government.) The U.S. government describes its approach to the Federal Enterprise Architecture (FEA) as follows: "The FEA is a business and performance-based framework to support cross-agency collaboration, transformation, and government-wide improvement. It provides OMB and the Federal agencies with a new way of describing, analyzing, and improving the Federal Government and its ability to serve the citizen."[19]

The U.S. federal government identified the need for an enterprise architecture approach during its evaluation in 2001 of the Quicksilver, or cross-agency, e-government projects. The U.S. Office of Management and Budget (OMB) began development of a Federal Enterprise Architecture (FEA) on February 6, 2002. As noted by OMB, "the purpose of this effort is to identify opportunities to simplify processes and unify work across the agencies and within the lines of business of the Federal Government. The outcome of this effort will be a more citizen-

centered, customer-focused government that maximizes technology investments to better achieve mission outcomes."[20]
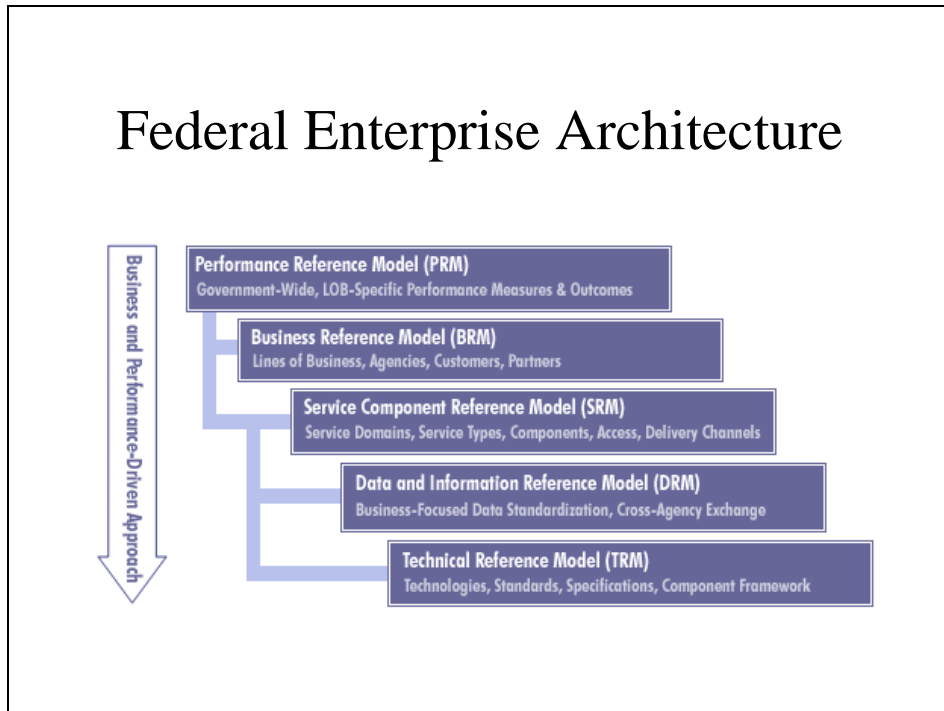
The central office for EA in the U.S. federal government is the Federal Enterprise Architecture Program Management Office (www.feapmo.gov/) located in OMB. The website provides the complete set of documentation developed and related materials by the U.S. federal government. The office is part of the new IT and statutory Office of E-Government and Information Technology. In organizational terms, it is parallel, but separate from the portfolio managers who oversee the PMI projects. It is led by an Associate Administrator of E-Government and Information Technology who reports to the federal CIO, Karen Evans.

As a first mover in the development of e-government, the U.S. government, through the activities of federal agencies, began an intense period of exploration and innovation during the 1990s that lasted until approximately 2001. That exploratory period, characterized by grassroots innovations within and across agencies, has been followed by a renewed focus on architecture, through the Federal Enterprise Architecture (FEA), characterized by development of consistency and planning at the level of the entire government, or the enterprise, rather than at the level of individual, or small groups of, agencies.

The accompanying management system for the EA -- the Federal Enterprise Architecture Management System, or FEAMS -- is described by the government as "a web-based management system designed to provide agencies with access to initiatives aligned to the Federal Enterprise Architecture and associated reference models. FEAMS includes multiple features to provide users with an intuitive approach to discover and potentially leverage business services, components, and data across the Government."[21] The Component Organization and Registration Environment is the repository for business process and technical components in the U.S. federal govenrment. The website, www.core.gov, includes a searchable list of components that may be used in their present form or customized for an agency's needs. Agency employees may recommend components for inclusion in the repository by using the website, www.core.gov.

The following figure indicates the tight interconnection among strategy, business, operations, and technology that is the objective of enterprise architecture. Performance reference models are meant to inform business reference model. These in turn influence the development of service components, data and information definitions and elements, and, finally at the foundation, lie the technical reference models. Organizational coherence is gained through consistency across the models which are meant to inter-relate and to be driven by business and performance priorities. It takes little imagination to realize that the consistency sought is never perfectly achieved, but represents a dynamic effort to build strategic coherence among the many systems and processes of a large, complex organization. (Appendix 4 presents excerpts and a key figure depicting the business reference model for the U.S. federal government.)

Federal Enterprise Architecture

Business and Performance-Driven Approach

Performance Reference Model (PRM)
Government-Wide, LOB-Specific Performance Measures & Outcomes

Business Reference Model (BRM)
Lines of Business, Agencies, Customers, Partners

Service Component Reference Model (SRM)
Service Domains, Service Types, Components, Access, Delivery Channels

Data and Information Reference Model (DRM)
Business-Focused Data Standardization, Cross-Agency Exchange

Technical Reference Model (TRM)
Technologies, Standards, Specifications, Component Framework

Source: http://www.feapmo.gov/fea.asp

In April 2004 the Federal Enterprise Architecture Program Management Office, within OMB, made available an assessment tool for agencies "to evaluate their enterprise architectures, set baselines and address problems."[22] The Enterprise Architecture Assessment Framework Version 1.0 allows agencies to rate their modernization plans. The tool complements the EA Management Maturity Framework developed by the General Accounting Office. The OMB tool is meant to encourage agencies to evaluate their EAs along four criteria: alignment with agency strategic goals, strategic and architectural dimensions of managing change, development of interoperability and connectivity through the use of standard interfaces, and integration of IT in conformance to the Technical Reference Model.

In a speech of May 20, 2004, Mark Forman encouraged federal agencies and the U.S. federal government to transition from a "symmetrical multiprocessor" approach to a "service-oriented architecture."[23] Forman argues that FEA has reached "a critical juncture because agencies are slow to use the component-based architecture and adopt Web services."[24] The traditional symmetrical multiprocessor architecture uses servers to process incoming requests for government services. Although the method is flexible, it is also limited by the extent to which the workload of the processors can be divided. By contrast, service-oriented architecture links shared information and services across agencies using Web services technology. The approach allows agencies to use their current system components.

Forman urged agency IT decision makers to take the following steps to transition to service-oriented architecture: (1) "Automate more IT services to improve their quality;" (2) Build applications using the service-oriented architecture approach rather than single agency approaches; (3) Share IT resources across agencies and build for integration and reuse of components rather than continuing to pursue single-agency design and development; and (4) Make use of commodity hardware and software rather than building proprietary systems.

The politics and economics of increasing reliance on vendors to design and develop, and to operate and control, government IT systems is a subject that should be debated in detail. Major global firms are outsourcing their IT systems development and management. The government of Australia decided some time ago to outsource its systems management. If the U.S. government has made this decision, it has not been formalized. Nor does there seem to have been much debate on the issue. Added to these political challenges is the revolving door phenomenon of government executives moving to corporate positions with the vendors who might possibly stand to gain by the so-called service-oriented approach. In this instance, Forman was speaking at a conference sponsored by the vendor, Systinet.

Federal government projects that are currently moving toward a service-oriented architecture approach include the "lines of business consolidations initiatives," the projects under the heading "internal effectiveness and efficiency" within the Presidential Management Initiative e-government projects. These include E-Travel, E-Payroll and E-Training.

One of the chief arguments made for the service-oriented architecture approach is lower costs. It is not known whether there have been economic analyses of the traditional versus the service-oriented approach. In addition, it is not clear why the approach is called service-oriented rather than reuse-oriented or commodity component oriented. It provides better service only to the extent that it would make government IT based services more affordable and therefore more easily and rapidly implemented. If it works, it would also make it easier for the government to develop interoperable systems and to redesign components as future needs become apparent.

A white paper on reusable components, "Service Component-Based Architectures, Version 2.0," was developed earlier this year by the Enterprise Architecture Committee of the Chief Information Officer Council.[25] The objective of the white paper is to provide a strategy agencies can use to share software. The white paper is part of an effort to build a registry that will allow the federal government to track components via OMB's component registry, which is available at www.Core.gov. At this time, the CIO Council is deciding what information concerning components will be saved in the registry and what technology the registry will use.

As part of the government's effort to build an enterprise architecture approach, the CIO Council and OMB initiated the Chief Architects Forum during spring 2004. The Forum was created to build shared dialogue and understanding among the federal government's chief architects concerning strategic, management and operational challenges related to developing enterprise architecture. According to Kim Nelson, the co-chairwoman of the Enterprise Architecture Committee: "From this grass-roots group, we have heard chief architects say that their greatest challenge is educating their own senior officials that EA is not just an IT concept but a strategic management planning tool that positions agency leaderships to manage the complexity of programs and the delivery of their services."[26]

Government IT Workforce and Human Capital

The CIO Council Committee on IT Workforce and Human Capital will cooperate with the CIO Council's Federal Architecture and Infrastructure Committee to build human capital into the business reference model for Federal Enterprise Architecture. Human capital planning will be critical to agency planning and management. The workforce committee is also likely to cooperate with the Office of Personnel Management Human Capital Leadership and Merit System Accountability Division as well as the Chief Human Capital Officers Council. These groups will assume responsibility for forging a critical element of the government's IT strategy, a government-wide IT workforce strategy within which the criteria for the future IT workforce

for the government will be developed. These criteria include the required certification, experience, and other credentials for mission-critical IT positions in the government.

On May 28, 2004, the CIO Council released the results of the 2003 Clinger-Cohen Assessment Survey. The results indicate that the average IT specialist in the U.S. federal government holds a bachelor's degree, has more than 20 years experience in the federal government but lacks experience in the private sector. Average IT workers in the government are classified within the civil service system as General Service level 13. They range, on average, between 46 and 50 years of age. Sixty percent of the IT employees who responded to the survey reported that they plan to retire in 11 to 20 years.[27]

The survey results indicate that federal IT employees lack strong experience in e-government, enterprise architecture, security, privacy and records management. Clay Johnson III, the Office of Management and Budget's deputy director for management, has stressed the need for government accountability in IT project management: "A consulting group can't be in charge. It has to be a person on your payroll that can be held accountable."[28] Yet the survey results reveal that less than 15 percent of the 19,000 government IT employees who responded to the survey reported that they have wide-ranging knowledge of cybersecurity. Less than five percent reported extensive knowledge of e-government and only slightly more than six percent reported broad understanding of enterprise architecture. These weaknesses suggest that the location of critical IT knowledge for governance increasingly lies outside the government in the contractor community and that there is a lack of training and certification within the government IT community.

Interest Groups and Alliances for Enterprise Architecture

In addition to the many contractors responsible for developing the FEA, several industry networks have formed to advise the government and presumably to compete as teams for large government contracts. Typically, such industry networks are incorporated as non-profit entities, often dependent upon membership fees for their resources. They sponsor conferences, workshops, and other events and become key sources of information to government decisionmakers. Thus, in addition to contracts let by the government for specific projects, a complex network of industry organizations using various names such as "institutes," "centers," and so on to signal their focus on education and knowledge management provide advice and influence decisionmaking in the federal government. Three associations are briefly described here to indicate the networked structure of knowledge and influence creation and management with respect to Enterprise Architecture.

An industry network was formed recently. In May 2004, several large corporate and one government organization began an EA users group, called the Enterprise Architecture Internet Group (EAIG).[29] The users group includes large firms and vendors as well as university and government actors: General Motors, Volkswagen AG, DaimlerChrysler AG, Booz Allen & Hamilton, Oakland University, Sandia National Laboratories and the Zachman Institute for Framework Advancement. One of the goals of the group is standardization and consistency across vendors in EA tools and models.

A second industry group formed to interact with government, the E-Gov Institute is an industry entity that organizes conferences and forums to bring together vendors and government decisionmakers. The Institute also sponsors an award for enterprise architecture. According to its website, "The E-Gov Institute is part of the FCW Media Group, publishers of Federal Computer week, FCW.com, the Government CIO Summits, and Federal 100 Awards. For 17

years, Federal Computer Week has been the premier publication serving the government IT market. And seven years ago, the E-Gov Institute was created to meet the demands of the evolving government technology community tasked with implementing the President's E-Gov initiatives … The E-Gov Institute -- where, in 2003, over 2,500 government and industry professionals turned for complete education and over 6,000 came to meet face to face with the more than 500 solutions providers -- fosters the building of community, sharing of ideas, and creating of new government solutions." (www.e-gov.com/).

A third example: The American Council for Technology (ACT) is an interest group organized as a membership-based nonprofit organization that facilitates relationships among the IT industry and government. ACT encourages education, communication and collaboration across all levels of government. In 1989, ACT created the Industry Advisory Council (IAC) to deepen communications between government and industry. ACT includes 400 IT companies as members of its Industry Advisory Council. ACT surveys federal CIOs yearly on key technology challenges and presents the results of these surveys in reports that are available on their website. Their sample, however, includes not only government CIOs but also vendors, other government employees and other actors, so it is not possible to draw conclusions about the challenges faced by government CIOs from the survey results. The argument for surveying the IT community is that a broader representation in the survey sample provides more robust, interesting results.

Many more industry associations -- often using names that sound collaborative, educational and community oriented -- form a substantial part of the influence network in the IT industry focused on government contracts. Their conferences, workshops, surveys (which are typically unscientific in method), reports, and speakers are biased toward industry approaches to governance. They have much to contribute to governance, but should not be confused with objective actors or scientific knowledge.

Key Issues for Federal Enterprise Architecture

Enterprise architecture approaches are the most recent effort in systems development and in management to bring strategic coherence to organizations that are heavily reliant on strategic information systems and their architecture as well as their articulation with corporate strategy, business processes, work design and relationships with partners. According to the testimony of several firms, enterprise architecture has been responsible for substantial savings and significant cuts in application inventories. However, among the challenges that accompany EA are lack of maturity and specificity in the approach itself; the lucrative market government presents to vendors of EA.

As Richard Taggart, the Chief Architect of General Motors and one of the leaders of the new Enterprise Architecture Interest Group recently noted, EA remains an "art form" rather than an engineering discipline. Many of the key challenges for government of the Federal Enterprise Architecture are identical to those faced by decision makers in the private sector. In a presentation to government decision makers, Taggart enumerated the following current challenges in EA as it is used in industry:

- Fuzzy definition
- No consistency of deliverables
- No foundational standards
- No common methodologies
- No certification

- Limited reuse
- No commonality between sourcing vendors (and often none within sourcing vendors)
- ….So EA is now an art form, not an engineering discipline[30]

The complexity and scope of the EA approach combined with scarcity of human capital in IT in the U.S. federal government demands that agencies award multi-million dollar contracts to vendors. An initiative of such scope and vagueness of methods and deliverables raises the question of vendor interest – or supply push. That is, vendors have a strong financial interest in marketing formal planning and enterprise architecture approaches to governments throughout the world because the government sector in most countries is one of the largest and most lucrative. There is no doubt that flexible enterprise architectures would bring greater coherence, cost savings, and tighter alignment to government organizations. But it is not clear where enterprise architecture should fall in terms of government priorities, who should be in charge or what the pace and scope of change should be. Ironically, the early exploratory and innovative systems development in e-government in the U.S. means that there are many more systems and applications to be made consistent and strategically coherent than there may be in other countries which are not considered as far ahead as the U.S. in terms of technology use in government.

The enterprise architecture approach is not unlike business process re-engineering, but is substantially more comprehensive and demanding. Indeed the level of enterprise architecture models that focus on the business are highly similar, if not identical, to process redesign in its objective of linking operations seamlessly across functional and organizational boundaries. Business process redesign forms a necessary and highly desirable set of tasks for organizations and is necessary for organizations to strategically leverage information systems. But it is an indisputable and disheartening fact that the history of business process re-engineering is one of stunning failures. This legacy should sound a caution to those enthusiastic about enterprise architecture.

What has been learned from re-engineering? First, top leadership from business executives is critical. Re-engineering, and enterprise architecture, cannot be delegated to IT experts or operations specialists. The modifications in systems, workflow, and organizational design require high-level leadership and business involvement. Second, re-engineering efforts that sought to redesign entire organizations often failed because their requirements in terms of time, effort, and organizational change typically exceeded the ability of large organizations. Smaller, focused, phased approaches have a history of greater success. Third, it is not clear and usually not stated what the manpower requirements are of comprehensive planning and modeling efforts. These need to be estimated and recognized. Consequently, estimates of the organization's ability to meet these requirements need to be made before large projects are embarked upon.

In addition to the above-mentioned challenges, the U.S. federal government faces a series of other challenges that focus on the management of change and the politics of change in government institutions. As stated previously in this paper, cross-agency projects, notably the PMI cross-agency projects, began before the EA was underway and have had to meet milestones as the EA standards and models have been developed by OMB. The cross-agency projects will have to retrofit as they can. Other countries, following the U.S., will have the benefit of comprehensive planning for architecture before agencies have embarked upon cross-agency initiatives. Yet there is an argument to be made that the organizational learning and cultural change that has taken place in the U.S. federal government during the past ten years has been

essential to its current ability to view the central government as an enterprise. This learning is a result of more than ten years of agency and cross-agency innovation, cultural change, and shifts in mindset. The U.S. central government, more than any other large state, has a history of highly autonomous agencies. Related to this history has been lack of management leadership from OMB. This also has changed, particularly since 2001 when the OMB established the Office of IT and E-government.

Agency IT personnel are unfamiliar with EA principles and the level of comprehensiveness in planning required. Moreover, EA cannot work unless the business executives in government begin the process with high level models concerning mission. Following on these models, business requirements must be thoroughly modeled. The IT modeling is meant to follow these processes, not to lead them. It is typical for U.S. government to imitate the engineering and technical elements of comprehensive approaches while ignoring the strategic and business requirements. This would be a serious error.

It is not clear that the U.S. federal government has the human resources to undertake the level and comprehensiveness of planning and modeling required to make the EA a strategic investment. Nevertheless, as cost savings accrue and as other results are gained in "best practice" cases, the approach is likely to spread. The FEA in the U.S. government is not possible without a very high level of partnership and contracting with the private sector. The expertise for this type of modeling resides in the private sector. Several contractors are involved in this effort. In addition, several industry groups and alliances are key players in the development of e-government in the U.S.

Is the FEA instilling even more inertia into the bureaucracy because of the overarching requirement in EA for consistency and coherence? Will achievement of short term efficiencies obscure longer-term innovation which would require exploration and transformation? Organization and management theorists have raised questions regarding the potentially dampening effects of process management frameworks – including enterprise architecture – for long-term, and in particular for disjunctive, innovation.[31]

By the accounts of several public managers involved with e-government projects, the Enterprise Architecture approach has not progressed strongly to date in the U.S. government. It may be that the initial requirements to develop models involve a core of actors whose work may not be visible to most managers. The E-loans Project, for example, is re-using some system components and applications that have already been developed by one of the agencies involved in the project. As a practical matter, when project participants can further the EA framework, they do so. But when following the EA framework would greatly delay or disrupt their projects, they are trying to ignore or work around the requirements.

The approach is elegant and logical on paper and in theory, but movement from models and "architecture" to the messy world of bureaucratic change is challenging. Enterprise architecture does not include within it, transition plans and implementation skills. It does not tell agency decisionmakers "how to take the next step," in other words, how to move forward given the systems they already have in place. So, the reality for large agencies is that they must fashion new systems from their old systems in incremental, piecemeal, fragmented fashion. In a government the size and complexity of the U.S. and given the historic autonomy of agencies, the incremental process will take years. As one can infer from the comprehensive and interlocking nature of the schema shown above, enterprise architecture is quite time-consuming and labor intensive -- and politically difficult -- to develop. The reality is that most agencies must advance in a rather incremental fashion piecing together solutions. Incrementalism is intensified due to

lack of funding for these projects. The federal government needs a clear estimate of the human resources, and the cost, of enterprise architecture development.

Nevertheless, the Enterprise Architecture concept is useful and necessary because it, too, fosters the continuation of a change in the mindset of bureaucrats from agency-centric to enterprise-wide decision making. What is not yet clear is where the political conflicts in such a sea change lie.

Discussion

This section steps back from recent developments in the U.S. federal government to discuss in broader terms an additional set of challenges for governments in the form of multiple criteria for performance, or the competing logics, that guide government decisionmaking. It then turns to development of a set of propositions, based on the technology enactment framework and some of the empirical research presented above. These propositions are meant to guide future research on the enactment of technology in government.

Competing Logics

All decisionmaking is guided by "logics," theories or sets of assumptions, premises, and decision rules. Professionals are trained to use particular methods and objectives in their decisionmaking and problem solving. For example, lawyers are trained to reason in terms of the law and to find solutions to legal problems. Their concern is not economics or social value, although these might play a role in their thinking. Information scientists are taught to develop information rules that are effective and consistent. They often make simplifying assumptions or must ignore ambiguities or inconsistencies in order to develop systems. Democratic activists tend to think about ways to ensure greater access and more information for citizens. They may neglect economic constraints or security concerns. Hence, each profession focuses on some types of rules and tends to think less about other types of rules. For these reasons, it is often difficult to talk across the professions and across different fields.

Many different "logics" are required to guide problem solving and decisionmaking. These logics are inconsistent with one another and sometimes contradict one another. For example, the most democratic, or accessible, information system may not meet security standards. The level of security that would make all hacking impossible would not be economically feasible. And so several complex trade-offs are involved in public management and public policymaking. The Internet and the promise of technology does nothing to simplify these trade-offs. In fact, multiple logics make decisionmaking quite difficult because of future uncertainties and lack of experience with new information systems.

The current emphasis on performance management and the use of metrics makes evident the problems of multiple logics in public management. The development of digital government presents a collection of competing logics to decisionmakers and scholars.[32] Among these logics are those that underlie democratic states including equity, fairness, and the development of citizens. The logics of system and information privacy in a digital environment include requirements for anonymity, rules regarding access, and several challenges regarding combinations of data and databases. A third logic, that of system capacity and maintenance, focuses on questions of efficiency, interoperability, and rationalization of processes. Administrative feasibility is similar in some respects to system feasibility but current notions of administrative feasibility include client issues as well as internal procedural rigor and efficiency. Political feasibility must attend to the power and interests of stakeholders.

The logic of technology enactment draws attention to institutional arrangements that influence the design, development and implementation of information technologies in complex institutional environments. Finally, the logic of economics influences decisions about system costs and the payoff from digital information systems.

Following directly from the competing logics underlying the development of digital government are multiple and contradictory metric systems. The new public management orients measures toward customer satisfaction. Thus, measures of convenience, access, speed of transactions and usability come to the fore under the heading of customer-oriented metrics. Engineering metrics flow from system capacity and management logics. Measures under this heading include system capacity, security, power and speed. A series of economic measures would seek to capture the costs and benefits of digital government applications. Similarly, political measures would capture costs and benefits in terms of a variety of stakeholders. Perhaps the most important, and possibly often neglected, measures flow from democratic theory. Transcending simple measures of winners and losers, these metrics would ideally include the development of equality, citizenship, and liberty.

Clearly, developing a set of metrics for digital government programs involves a series of tradeoffs and compromises among competing measures of effectiveness. A focus on one type of measure might preclude attention to other, equally important metrics.

Adding to the competing logics of digital government in the United States are the number and variety of governments involved. The U.S. Census Bureau figures include 87,568 governmental units including executive and independent federal agencies, state and local governments and special and school districts. There are 39,159 federal, state and local government units (65 federal, 50 state, 39,044 local) and 19,372 municipal, 16,629 town, and 3,043 county governments in the United States. Each of these governments will develop digital government strategies and systems. Interoperability of systems and data surface one set of logics. Competing strategies, user interfaces and designs point to a different area of competition.

Here I develop just one of the multiple metric systems and logics influencing digital government development, that of economics. The economic benefits of web-based government information and service provision are arguably significant. Potential cost savings stem, in part, from the enormous scale of government activities. A small subset of annual transactions with government including registration of births; elementary, secondary, and college enrollment; motor vehicle registration and inspection; voter registration; construction permits for new housing; and patent and trademark applications sum to nearly 443 million transactions per year according to the U.S. Census Bureau. (See a detailed table of these annual transactions in Fountain with Osorio-Urzua 2001). Hundreds of millions of paper-based transactions are conducted annually, in the form of bill payments or document submissions that involve public agencies, to which similar types of efficiencies can be applied.[33] The U.S. Department of Commerce has estimated that the cost to government for processing a payment would be reduced from the current range of approximately $1.65-2.70 for paper-based administrative processing to $0.60-$1.00 for web-based processing. Private sector vendors typically report that the movement from paper-based to web-based processing of documents and payments typically generates administrative cost savings of roughly 50 percent, more for highly complex, transactions. These figures ignore additional savings of money, time, travel and effort to citizens and intermediate institutions.

If no other pressure for electronic government existed, the market potential for businesses alone would move forward digitization. Private sector estimates suggest the contours of the

political economy of electronic government. The firm, Forrester Research, predicts that by 2006, governments at the local, state and federal levels will collect 15 percent of their total collections, or $602 billion, via the web.[34] The development and management of digital government forms a particularly lucrative market for private sector firms that typically charge a fee on each transaction. Observation of government websites at the federal, state, and local levels indicated that by the summer of 2000, nearly every federal agency and most state and larger local governments provided information and some services on the web. At this time, may government websites allow downloading of forms, electronic tax filing, obtaining or renewing professional licenses online, searchable state employment databases and sex offender registries, and searchable databases of potential government contracts.

In previous work, I introduced the technology enactment analytic framework to account for the role of institutional arrangements and organizational structure as mediating variables in the design, development, and implementation of information technologies in government (see figure 1) (Fountain 2001). I have argued that the logics of bureaucratic forms differ from, and compete with, those of network forms of organization. These competing institutional and organizational logics influence the design and development of electronic government introducing a greater degree of unpredictability and variation than determinist or simple rational actor frameworks suggest.

As noted in previous research (Fountain, 2001; Fountain with Osorio-Urzua, 2001), the number and sources of variation and competing logics imply that the levels and rates of digital government developments will vary greatly among state, county and local governments.

Interoperability may be a greater challenge than anticipated by most proponents of digital government as well as by many public managers who lack technical expertise. The penetration of Internet use by governments varies greatly across levels and within levels of government.

These variations suggest several implications for research. First, research on digital government is inherently interdisciplinary. This follows from the multiple logics that underlie digital government. Second, as a consequence of the first point, multiple methods are required for a research program that captures the complexity of this phenomenon. Third, the long developmental trajectory ahead for technologies and government implies that research should explicitly address the emergent design of digital government, change processes, transition and transformation. Finally, a comprehensive research program would address the range of informal relationships among public, private and nonprofit actors that contribute to the shape and purposes of digital government. And comparative studies would yield important insights into the ways that political economies around the globe are using information technology for state building.

In addition to the development of web-based government-to-citizen services and government-to-business digital procurement processes, development of government-to-government connectivity might usefully be analyzed within a competing logics framework. Agency autonomy, competition, lack of interoperability, and stovepipes flow from a set of logics that run counter to interagency coordination, networked communication, and joint policy problem solving in government. Open standards and protocols on the Internet allow all computers to be connected resulting in the remarkable connectivity, size, range, and richness of the web. The technical infrastructure for connecting government computers fails to encompass and account for new institutional infrastructure needed to support coordinated practices, procedures, cultures, and incentives.

Significant government challenges are reflected in the choices facing decisionmakers regarding reorganization and restructuring, at a depth important enough to modify institutional

arrangements. Policymakers have yet to come to terms with the need for greater integration and reorganization in the bricks and mortar of government as a consequence of the Internet.

Propositions

My argument regarding the development of technology and government is outlined briefly in terms of six propositions. These propositions derive from more than a decade of empirical research. They also derive from a synthesis of concepts and empirical research findings from several fields in the disciplines of political science, sociology and psychology as well as the practical fields of public policy and management.

Proposition 1: Perverse incentives

Public servants face a set of perverse incentives as they make decisions regarding the possible uses of technology in their programs and agencies. In the U.S. public executives learn to try to accumulate larger budgets and more staff in order to increase their power and autonomy. They also learn to fight for appropriations for their program and agency. In fact, in adversarial democracy, such conflicts among programs and agencies are assumed to force public servants to sharpen their arguments and rationales for programs, to produce results in order to sustain resources. This view of adversarial democracy dates at least as far back as J.S. Mill and the ideas of neo-classical economics. But the adversarial model of democracy does not align well with the development of networked approaches to government.

For this reason, public executives face perverse incentives. If they implement new information systems that are much more efficient, they will not gain greater resources; they will probably have their budget decreased. If they implement new information systems that reduce redundancies across agencies and programs, again, they are likely to lose resources rather than to gain them. If they develop inter-agency and enterprise-wide systems with their colleagues in the bureaucracy, they will lose autonomy rather than gaining it. So the traditional incentives by which public executives have worked are "perverse" incentives for networked governance.

Equally troubling are the conflicting logics that public executives and managers are faced with as they make decisions regarding technology and governance. I will say more about this later in the paper.

Proposition 2: Vertical Structures

The bureaucratic state, following from the Weberian bureaucracy, is organized vertically. By that I mean that the government is organized in terms of superior-subordinate relations, a chain of command that extends from the chief executive to the lowest level employees of the government. Similarly, oversight bodies such as OMB, the General Accounting Office and even the legislature exercise oversight through the chain of command structure.

These vertical structures are the chief elements of government institutions. They make it difficult and complex to use technology to build networked government. The more complex difficulties are not technical. In fact, it is rather easy to imagine how a federal enterprise architecture should be designed. What is difficult is reconceptualizing accountability, oversight, and other basic elements of governance in networked relationships.

Proposition 3: Misuse of capital/labor substitution

In the U.S. federal government, agencies were not provided with resources to develop IT. They were told by Congress to find resources by using IT to cut labor costs. Although labor costs can

be reduced by using IT, there are a few complexities that should be enumerated here. First, organizations must learn to use IT. This requires human labor and experienced human labor is critical. So, in the short run, it is difficult to downsize and to learn at the same time. Second, although some jobs can be eliminated, the use of IT in government creates many other types of jobs. Specifically, IT positions must be created. And large organizations have found that IT staffs are expensive. In particular, website managers and the care and upkeep of complex websites requires labor-intensive attention. Third, the U.S. government has made a commitment to provide services through multiple channels: face-to-face, telephone, mail, and Internet. Thus, they are faced with the complexities of designing, developing, implementing and managing in multiple channels. For these reasons, and others, the simple idea of substituting technology for labor is misleading and erroneous.

Proposition 4: Outsourcing may appear to be easier than integration

It may appear to political decisionmakers that it is easier to outsource operations than it is for government managers to negotiate the politics of integration, that is, information sharing and working across agencies. For this reason, there is a danger that some services and systems will be outsourced in order to avoid the political difficulties of integration. But in some cases, outsourcing would be a mistake because the negotiations within the government form a necessary element of enacting technology, specifically, making the new systems fit the political, policy and operational needs of the government. Outsourcing may appear to be the easier course of action. But many projects require the expertise and experience of government managers.

Proposition 5: Customer service strategies in government

First, customers are in a different relationship with firms than citizens are with government.[35] Customers have several options in the market; citizens have but one option for government. Customers pay for services; but citizens have a deeper relationship and great responsibility toward their government. They do not pay taxes in exchange for services. In a system of government "of the people, by the people, and for the people," citizens have deep obligations to government and governments have deep obligations to the polity. So the customer service metaphor is a degradation, minimization, and perversion of the state-citizen relationship in well functioning democracies.

Second, in the private sector, larger and wealthier customers are typically given better treatment than those customers who have little purchasing power or who have not done business with a firm in the past. This market segmentation is not morally or ethically appropriate for governments. Moreover, customer service strategies in U.S. firms have rewarded those customers who complain with better service in order to "satisfy" the customer. Those customers who do not complain do not receive better service. This, again, is not morally or ethically appropriate for government. Some citizens cannot exercise voice, or articulate their needs, as well as others. Government servants must find ways to provide services equitably regardless of the education, wealth, or language skills of the citizen.

As the U.S. government tried to adopt some of the customer service ideas that were popular in economic firms, they did increase their responsiveness to citizens and public servants experienced a deep change in their attitudes and behavior. In many cases, the culture of agencies and programs changed to become oriented toward citizens rather than toward the internal bureaucratic needs of agencies. These were positive benefits from customer service.

But in some cases, powerful corporate citizens used "customer service" as a way to pressure agencies to provide benefits and to develop policies and rules that were inequitable and that would advantage some firms or industries over others. Ford Motors, Motorola, and Ciso are large "customers" of the U.S. government. But the regulatory regimes developed for industries cannot serve some "customers" better than others. At this level, the customer service metaphor breaks down. For these reasons, the Bush Administration discontinued the use of "customer service" as a government strategy. They use the term "citizen-centric" instead.

Proposition 6: Embeddedness and cultures

One of the chief learnings from the experiences of the U.S. government in the development of e-government has been the strong role of embeddedness and culture. Embeddedness refers to the fact that information systems are situated in the context of complex histories, social and political relationships, regulations and rules, and operational procedures. It is not a simple matter to change an information system, therefore, when it is embedded in a complex organizational and institutional system.

Conclusions

The bureaucratic state is not outmoded, but in many ways it is changing fundamentally. It is not vanishing but remains critical to standard setting, rule by fiat softened by consultation, integrity of processes, and accountability. It is the locus of the "national interest" in an increasingly globalized network of nations. The virtual state is intersectoral, interagency, and intergovernmental yet achieves connection through standardization, rationalization, and systems interdependence.

Although communications researchers have used the concept "co-evolution" to refer to reciprocal relationships between technology and organizations and their co-development, the reference to co-evolution connotes that enactment simply happens. By contrast, I have developed the technology enactment framework to examine how the actions of public officials and others concerned with government decisions combine to enact technology. So the technology enactment framework builds specificity and explanatory power into models of co-evolution of technology and government organizations

This paper has focused on structural and institutional changes to the state in the elaboration of the technology enactment framework and the extended illustration of recent efforts by the U.S. government to create inter-agency structures and processes. But technology plays a key role in changing the capacity of public servants to engage in information knowledge creation and exchange. These informal exchanges among professionals within and outside government through the Internet comprise a powerful change in the public policymaking process. Information technology has afforded the capacity for different and greater communication, for different and great information and knowledge sharing, and for greater transparency and display of complex information. All of these change the types of conversations and dialogue for government officials. The daily, informal exchanges are among the most important and potentially far-reaching changes in policymaking and governance. The more formal, top down, enterprise architecture approach can enrich and lend coherence to dialogue by building shared language, terminology, goals, processes across agencies. The two can co-exist. The challenge is in managing the two to work together synergistically.

The virtual state is intersectoral, interagency, and intergovernmental. But it achieves this fluidity and cross-boundary character through standardization, rationalization, and the management of interdependence. Is the virtual state, therefore, a non-place?

The idea of a "non-place" comes from contemporary theory in anthropology and refers to the increasing use of generic systems, applications, interfaces, terminologies, and more to replace unique, particular place-based images, systems, terms and other markers.[36] Generic, corporate systems tend to ignore the particularities of countries, regions, cities, and other local geographic and historic "places." In fact, the desire of corporations to communicate their "brand," intensifies the diminishing of place. For example, McDonalds looks the same in every country regardless of "place." Airports tend to look the same so that a person in an airport may have few markers that provide information about the particular culture of a place.

I have not yet drawn out the implications for government and governance of this increasing homogenization of approaches. But I would say that there might be a loss of attention to the particular problems and political issues that belong to particular places given their unique history and geographic features. This is the general idea of a "non-place."

I do not think that the virtual state in any country will become a "non-place" for many years. But I want to issue a warning about the increasing use of pre-packaged, generic applications, interfaces, and systems in governments around the world. These homogenized, standardized products are those of major multi-national firms. They provide organizations and inter-organizational networks with the ability to inter-operate, which is a great benefit to governments and societies. But they diminish local particularities that provide a sense of place and serve to maintain distinctive cultures.

Transformation involves much more than simply team problem-solving and cultural change. Transformation is political because structural change has the potential to affect the distribution of benefits inside a government and among the polity. For example, e-rulemaking might make it easier for small groups to voice their opinions in the rulemaking process. This would give small groups more power. Thus, the transformation is political, not simply operational or even strategic, in nature.

The International Trade Data System, a project whose development is reported in detail in *Building the Virtual State,* is another example of transformation with political importance. An interagency system for processing trade would allow more agencies to fulfill their mandated procedures for examination and inspection. This would change the power relationship between Customs and the large firms that Customs helps by expediting their trade processing. Since firms have different types of relationships with different agencies, if one changes the power of agencies with respect to a group of firms, the effect is political, not simply operational. So transformation has political dynamics.

A third example: the original plan for online tax filing through the Internal Revenue Service used private firms to process taxes online. Firms decided to charge citizens to file taxes over the Internet. It took a decision at the top levels of OMB to force the IRS the re-negotiate with firms to assure that taxes could be filed online at no charge. This type of decision is primarily political, rather than economic or strategic, because the question of fees is principally a question of citizen rights and obligations. It is also a political question because the issue at hand encompassed the right of private firms to charge a fee for handling an obligation of citizens to their government, filing tax returns.

The challenges that lie ahead are not simply technical. Indeed, the technical challenges are relatively simple. The more complex and difficult challenges related to the virtual state are

intellectual, governmental and practical. As the use of ICTs in government moves forward there is much more at stake than simply increasing efficiency and service levels. Bureaucracies and the bureaucratic model have been the source of government accountability, fairness, and integrity of processes. If the bureaucratic form is changing, what forms, structures, and processes will replace it? Given these governance challenges, business models and business language can be limiting and misleading as a source of wisdom and advice for building the virtual state. Business experience can inform operations and systems development. Indeed, as discussed in this paper, enterprise architecture can provide significantly more strategic coherence in governments. But public servants and the polity will have to engage in deliberation to bring clarity to the governance questions.

The role of the public servant is changing but remains critical in democracies. Civil servants play a vital role in domestic – and increasingly in transnational and global -- policy regimes. Professional, experienced public servants are essential to the virtual state. I suppose that it is obvious to say that professional, experienced public servants are critical. But in the United States, many conservatives would like to eliminate the public service and to use contract workers instead. So, my comment is made in the context of a debate about the privatization of the public service. The argument is that e-government and networked government make professionalism and experience even more important within the entire public service. IT is not a substitute for experience and professionalism. It is not a strategy for deskilling the public service although it may be possible to eliminate some jobs made redundant by IT. It is critical also for IT professionals to have better interaction with other professionals.

All public servants need to be knowledgeable about IT, if not in a technical sense then in terms of understanding its strategic and political importance. Governments must be careful customers of private consultants and vendors. I do not think that most private firms really understand the differences between government and private sector organizations. And most do not care about these differences or view them as their responsibility to understand. Hence, public servants must understand the differences between systems built for the private sector and the requirements necessary for government systems. Vendors generally do not understand the higher standards of accountability that are the obligation of the state, fair and equal treatment of citizens, access, transparency and, in particular, security and privacy necessary for government systems.

These are not obvious statements in the present business environment. In the U.S. some public servants have been intimidated by Congress and private consultants to believe that they are inferior decision makers, that they are out of date in their thinking and that, in nearly all cases, that the private sector "can do it better than government." Public servants, in many cases, insufficiently value their knowledge and experience to negotiate in a strong way with private firms. It is necessary for contractors to build the large systems for government. But it is also necessary for public servants to play a strong role in the design, development and implementation of those systems. They are the decision makers with the experience and depth of knowledge of government operations and politics. Thus public servants are the decision makers who know when to import a system from the private sector and when a system needs to be modified for public use.

Researchers and practitioners are just beginning to explore the potential for cross-agency capacity and policymaking. Extending the ideas presented in this paper beyond inter-agency relationships within the federal state, one can readily imagine that we may have to redefine and modify ideas about federalism due to networked governance. Moreover, the increasing use of

inter-sectoral relationships – that is, relationships among the public, private and nonprofit sectors -- marks the virtual state. There is strong evidence to support the claim that virtual integration, that is, the location of information and services from different agencies and programs on one website, does in some cases lead to pressure or the desire of decision makers for actual organizational level integration.

Appendix One
25 E-Government Initiatives: Brief Descriptions

Program	Description
Government to Citizen	
Recreation One-Stop www.recreation.gov	"Provides a single point of access, user-friendly, web-based resource to citizens, offering information and access to government recreational sites" http://www.whitehouse.gov/omb/egov/gtoc/recreation.htm
GovBenefits.gov www.govbenefits.gov	"Provides a single point of access for citizens to locate and determine potential eligibility for government benefits and services" http://www.whitehouse.gov/omb/egov/gtoc/govbenefits.htm
E-Loans www.govloans.com	"Creates a single point of access for citizens to locate information on federal loan programs, and improves back-office loan functions" http://www.whitehouse.gov/omb/egov/gtoc/online_loan.htm
USA Services	"Develop and deploy government-wide citizen customer service using industry best practices [to] provide citizens with timely, consistent responses about government information and services via e-mail, telephone, Internet, and publications" http://www.whitehouse.gov/omb/egov/gtoc/usa_services.htm
IRS Free File http://www.irs.gov/app/freeFile/welcome.jsp	"Creates a single point of access to free on-line preparation and electronic tax filing services provided by Industry Partners to reduce burden and costs to taxpayers" http://www.whitehouse.gov/omb/egov/gtoc/irs_free.htm
Government to Business	
E-Rulemaking http://www.regulations.gov/	"Allows citizens to easily access and participate in the rulemaking process. Improves the access to, and quality of, the rulemaking process for individuals, businesses, and other government entities while streamlining and increasing the efficiency of internal agency processes" http://www.whitehouse.gov/omb/egov/gtob/rulemaking.htm
Expanding Electronic Tax Products for Business	"Reduces the number of tax-related forms that businesses must file, provides timely and accurate tax information to businesses, increases the availability of electronic tax filing, and models simplified federal and state tax employment laws" http://www.whitehouse.gov/omb/egov/gtob/tax_filing.htm
International Trade Process Streaming http://www.export.gov/	"Makes it easy for Small and Medium Enterprises (SMEs) to obtain the information and documents needed to conduct business abroad" http://www.whitehouse.gov/omb/egov/gtob/trade.htm
Federal Asset Sales http://www.firstgov.gov/shopping/shopping.shtml	"Identify, recommend, and implement improvements for asset recovery and disposition, making it easier for agencies, businesses, and citizens to find and acquire/buy federal assets." http://www.whitehouse.gov/omb/egov/gtob/asset.htm
Business Gateway http://www.business.gov/	"Reduces the burden on businesses by making it easy to find, understand, and comply (including submitting forms) with relevant laws and

	regulations at all levels of government" http://www.whitehouse.gov/omb/egov/gtob/compliance.htm
Consolidated Health Informatics	"Adopts a portfolio of existing health information interoperability standards (health vocabulary and messaging) enabling all agencies in the federal health enterprise to "speak the same language" based on common enterprise-wide business and information technology architectures" http://www.whitehouse.gov/omb/egov/gtob/health_informatics.htm
Government to Government	
Geospatial One-Stop http://www.geo-one-stop.gov/ ; http://www.geodata.gov/	"Provides federal and state agencies with single point of access to map-related data enabling the sharing of existing data, and to identify potential partners for sharing the cost for future data purchases" http://www.whitehouse.gov/omb/egov/gtog/geospatial.htm
Disaster Management http://www.disasterhelp.gov/	"Provide citizens and members of the emergency management community with a unified point of access to disaster preparedness, mitigation, response, and recovery information from across federal, state, and local government … Improve preparation, mitigation, response and recovery for all hazards through the development of interoperability standards that enable information sharing across the nation's emergency management community …." http://www.whitehouse.gov/omb/egov/gtog/disaster.htm
SAFECOM www.safecomprogram.gov	"Serves as the umbrella program within the Federal government to help local, tribal, State and Federal public safety agencies improve public safety response through more effective and efficient interoperable wireless communications." http://www.whitehouse.gov/omb/egov/gtog/safecom.htm
E-Vital	"Establishes common electronic processes for Federal and State agencies to collect, process, analyze, verify and share vital statistics record information. Also promotes automating how deaths are registered with the states (Electronic Death Registration (EDR))." http://www.whitehouse.gov/omb/egov/gtog/evital.htm
Grants.gov http://www.grants.gov	"Creates a single portal for all federal grant customers to find, apply and ultimately manage grants on-line." http://www.whitehouse.gov/omb/egov/gtog/egrants.htm
Internal Efficiency and Effectiveness	
E-Training	"Create a premier e-training environment that supports development of the Federal workforce through simplified and one-stop access to high quality e-training products and services …" http://www.whitehouse.gov/omb/egov/internal/training.htm
Recruitment One-Stop	"Outsources delivery of USAJOBS Federal Employment Information System to provide state-of-the-art on-line recruitment services to job seekers including intuitive job searching, on-line resume submission, applicant data mining, and on-line feedback on status and eligibility." http://www.whitehouse.gov/omb/egov/internal/recruit.htm
Enterprise HR Integration	"Streamlines and automates the electronic exchange of standardized HR data needed for creation of an official employee record across the Executive Branch. Provides comprehensive knowledge management workforce analysis, forecasting, and reporting across the Executive

	Branch for the strategic management of human capital." http://www.whitehouse.gov/omb/egov/internal/enterprise.htm
E-Clearance	"Streamlines and improves the quality of the current security clearance process" http://www.whitehouse.gov/omb/egov/internal/eclearance.htm
E-Payroll	"Consolidates 22 federal payroll systems to simplify and standardize federal human resources/payroll policies and procedures to better integrate payroll, human resources, and finance functions." http://www.whitehouse.gov/omb/egov/internal/epayroll.htm
E-Travel	"Provides a government-wide web-based service that applies world-class travel management practices to consolidate federal travel, minimize cost and produce superior customer satisfaction. The E-Travel Service will be commercially hosted ..." http://www.whitehouse.gov/omb/egov/internal/etravel.htm
Integrated Acquisition Environment **www.BPN.gov** **www.ContractDirectory.gov** **www.EPLS.gov** **www.FedBizOpps.gov** **www.FedTeDS.gov** **www.FPDS-NG.com** **www.PPIRS.gov** **www.WDOL.gov**	"Creates a secure business environment that will facilitate and support cost-effective acquisition of goods and services by agencies, while eliminating inefficiencies in the current acquisition environment." http://www.whitehouse.gov/omb/egov/internal/acquisition.htm
E-Records Management	"Provides policy guidance to help agencies better manage their electronic records ... Four major issue areas: Correspondence management, Enterprise-wide electronic records management, Electronic Information Management Standards, Transferring permanent records to NARA." http://www.whitehouse.gov/omb/egov/internal/records.htm
E-Authentication	
E-Authentication	"Minimizes the burden on businesses, public and government when obtaining services on-line by providing a secure infrastructure for on-line transactions, eliminating the need for separate processes for the verification of identity and electronic signatures" http://www.whitehouse.gov/omb/egov/ea/eauthentication.htm

Appendix 2
Excerpts from the Business Reference Model, Version 2.0

"The Business Reference Model is a function-driven framework for describing the business operations of the Federal Government independent of the agencies that perform them."

The **Business Reference Model Version 2.0** provides an organized, hierarchical construct for describing the day-to-day business operations of the Federal government. While many models exist for describing organizations -- organization charts, location maps, etc. -- this model presents the business using a functionally driven approach. The Lines of Business and Sub-functions that comprise the BRM represent a departure from previous models of the Federal government that use antiquated, stove-piped, agency-oriented frameworks. The BRM is the first layer of the Federal Enterprise Architecture and it is the main viewpoint for the analysis of data, service components and technology.

The BRM identifies four Business Areas that provide a high-level view of the operations the Federal Government performs. The four Business Areas comprise a total of 39 external and internal Lines of Business and 153 Sub-Functions.

The **Services for Citizens Business Area** describes the mission and purpose of the United States government in terms of the services it provides both to and on behalf of the American citizen. It includes the delivery of citizen-focused, public, and collective goods and/or benefits as a service and/or obligation of the Federal Government to the benefit and protection of the nation's general population.
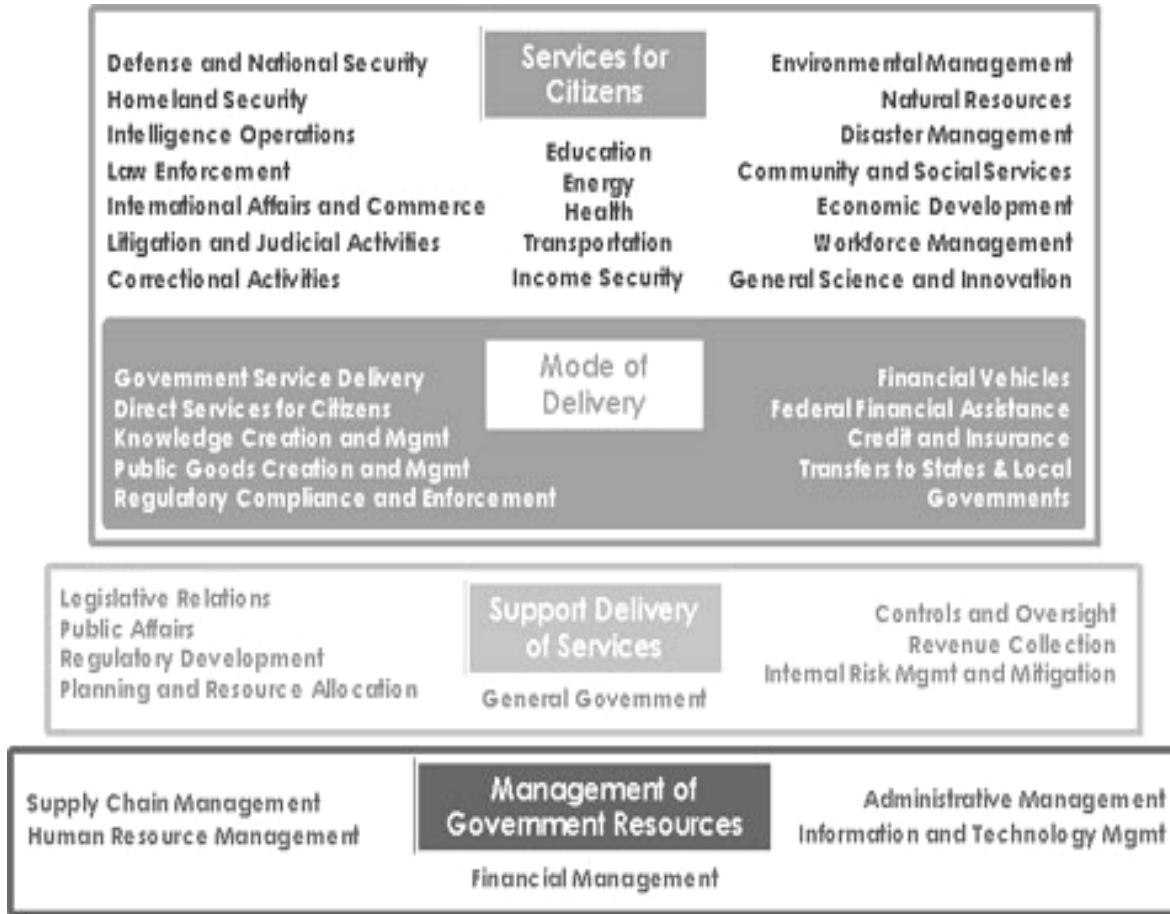
The **Mode of Delivery Business Area** describes the mechanisms the government uses to achieve the purpose of government, or its Services to Citizens. It includes financial Vehicles, Direct Government Delivery, and Indirect Government Delivery.

Support Delivery of Services provides the critical policy, programmatic and managerial Foundation to support federal government operations.

Management of Government Resources refers to the back office support activities that enable the government to operate effectively.

Appendix 2 (continued)
The Business Reference Model for the U.S. Federal Government

Defense and National Security
Homeland Security
Intelligence Operations
Law Enforcement
International Affairs and Commerce
Litigation and Judicial Activities
Correctional Activities

Services for Citizens

Education
Energy
Health
Transportation
Income Security

Environmental Management
Natural Resources
Disaster Management
Community and Social Services
Economic Development
Workforce Management
General Science and Innovation

Government Service Delivery
Direct Services for Citizens
Knowledge Creation and Mgmt
Public Goods Creation and Mgmt
Regulatory Compliance and Enforcement

Mode of Delivery

Financial Vehicles
Federal Financial Assistance
Credit and Insurance
Transfers to States & Local Governments

Legislative Relations
Public Affairs
Regulatory Development
Planning and Resource Allocation

Support Delivery of Services

General Government

Controls and Oversight
Revenue Collection
Internal Risk Mgmt and Mitigation

Supply Chain Management
Human Resource Management

Management of Government Resources

Financial Management

Administrative Management
Information and Technology Mgmt

Source: The Business Reference Model (BRM) Version 2.0, www.feapmo.gov/feaBrm2.asp.

Appendix 3
Annotated List of Resources on the Federal Enterprise Architecture

The Federal Enterprise Architecture Program Management Office (FEA-PMO) was established on February 6, 2002, based upon the directive of the Associate Director of the Office of E-Government and Information Technology, Office of Management and Budget (OMB). "The lack of a Federal Enterprise Architecture had been cited by the 2001 Quicksilver E-Government Task Force as a key barrier to the success of the 24 Presidential Priority E-Government initiatives approved by the President's Management Council in October 2001." (Source: http://www.feapmo.gov/about.asp, accessed 6/21/04)

General

- FEA homepage: http://www.feapmo.gov/

- Conference for agencies on conformance with the federal enterprise architecture (July 2004): http://www.iqpc.com/cgi-bin/templates/genevent.html?topic=233&event=4994

- Conference for agencies on conformance to FEA (September 2004): http://www.e-gov.com/events/2004/ea2/

- FEA documentation: http://www.feapmo.gov/resources/fea_document_map_rev_1.pdf

Interaction of FEA with 25 E-Gov initiatives
http://www.feapmo.gov/resources/24_PPE-Gov_Init_Rev_1.pdf

Congressional hearing on FEA: May 19, 2004

- Testimony of Karen Evans, Associate Director, OMB: http://www.whitehouse.gov/omb/legislative/testimony/evans/040519_evans_fea.html

- GAO testimony: http://www.gao.gov/new.items/d04798t.pdf
    o FEA still maturing, little real accomplished 2001-2003

- Industry Action Committee story and link to testimony: http://www.public-cio.com/newsStory.php?id=2004.05.25-90393

  From the article: "… '[H]igh marks should be given for progress on creating a blueprint for improved federal IT investment management, but major hurdles exist for cross-agency collaboration and information sharing.' … [S]ome of the major challenges that exist … [include] the lack of incentives for federal departments and agencies to collaborate; lack of emphasis in overcoming cultural, organizational and change management issues; and a dearth of sufficient funding, key resources, and skills to implement the FEA across the government -- all of which could derail future progress … [The] major success factors for FEA … [include] strong executive leadership, clear governance and positive incentives for agencies to collaborate as keys going forward on FEA."

- "Federal Enterprise Architecture Needs More Work," *InformationWeek,* May 20, 2004. Summary: The Bush administration is making progress, witnesses told a Congressional panel--but they didn't agree on how much: http://www.informationweek.com/story/showArticle.jhtml?articleID=20800241

FEA Contacts:

- There does not appear to be a current Chief Technology Officer or Chief Architect of the FEA.

- Bob Haycock, former chief architect, left OMB in April 2004 (new e-mail address): Robert_d_Haycock@nbc.gov. National Business Center, Department of Interior, Colorado. (Alternate National Business Center contact: Vickie_L_Borden@nbc.gov)

- Norm Lorentz: Former Chief Technology Officer, Enterprise Architecture director (political appointee, left government in September 2003), now Senior Vice President, Civilian Operations, DigitalNet. Digitalnet main number: (703) 563-7500

- Dave McClure: Vice President of E-Government, Council for Excellence in Government, former General Accounting Office IT director, main switch numbers: Phone: (202) 728-0418, Fax: (202) 728-0422

- Federal Enterprise Architecture Project Management Office:

  FEA-PMO Mailing Address:
  E-Gov Program Management Office
  Suite 4013
  725 17th Street, N.W.
  Washington, D.C. 20503

  FEA-PMO Phone Number:
  Switchboard: (202) 395-0379
  Fax: (202) 395-0342

General background articles

- Story on congressional hearing of May 2004: http://www.enterpriseappspipeline.com/collaboration/20900034

- Federal Computer Week, May 17, 2004: "The federal government has never been better positioned on its enterprise architecture, but agencies still lack the ability to keep up that performance over the long term, officials said this week:" http://fcw.com/fcw/articles/2004/0517/web-fea-05-20-04.asp

- GAO testimony at beginning of FEA project, 2002:
  http://www.gao.gov/new.items/d02389t.pdf

- Bob Haycock appointed chief architect, October 2003:
  http://www.gcn.com/vol1_no1/daily-updates/23786-1.html

- Bob Haycock leaves, April 2004:
  http://www.gcn.com/vol1_no1/daily-updates/25460-1.html

- FEA PMO releases EA assessment tool for agencies:
  http://www.gcn.com/23_10/enterprise-architecture/25791-1.html

- Core.gov (FEA core component repository for agencies):
  http://gcn.com/23_5/enterprise-architecture/25168-1.html

- "Advanced Performance Consulting Group, Inc. Wins $6.4 Million Support Services Contract for OMB Federal Enterprise Architecture Implementation," October 2003):
  http://www.apcg.com/Profile/101703ombnews.html

- Danish FEA model:
  http://fcw.com/fcw/articles/2004/0531/mgt-denmark-05-31-04.asp

- 2002 Lorentz presentation on FEA PMO:
  http://www.e-gov.com/events/2002/egov/downloads/full/Conf%20Sessions/1

Appendix 4
Selected Reports on Enterprise Architecture and E-Government, U.S. General Accounting Office

Information Technology Management: Governmentwide Strategic Planning, Performance Measurement, and Investment Management Can Be Further Improved. (GAO-04-49), January 12, 2004

Information Technology: Leadership Remains Key to Agencies Making Progress on Enterprise Architecture Efforts. (GAO-04-40), November 17, 2003

Information Management: Challenges in Managing and Preserving Electronic Records (GAO-02-586), June 17, 2002

Electronic Government: Challenges to Effective Adoption of the Extensible Markup Language (GAO-02-327), April 5, 2002

Information Technology: OMB Leadership Critical to Making Needed Enterprise Architecture and E-government Progress (GAO-02-389T) , March 21, 2002

Information Technology: Enterprise Architecture Use Across the Federal Government Can Be Improved (GAO-02-6) , February 19, 2002

Electronic Government: Challenges Must Be Addressed With Effective Leadership and Management (GAO-01-959T) , July 11, 2001

Electronic Government: Opportunities and Challenges Facing the FirstGov Web Gateway (GAO-01-87T), October 2, 2000

Electronic Government: Federal Initiatives Are Evolving Rapidly But They Face Significant Challenges (T-AIMD/GGD-00-179) , May 22, 2000

ENDNOTES

[1] The technology enactment model and detailed case studies drawn from the U.S. federal government during the Clinton administration have been reported in J.E. Fountain, Building the Virtual State: Information Technology and Institutional Change (Brookings Institution Press, 2001). This paper draws from the explanation of the technology enactment model in Building the Virtual State and presents new empirical research on current, major e-government initiatives in the U.S. central government.

[2] Karl Mannheim, *Ideology and Utopia: An Introduction to the Sociology of Knowledge,* Harcourt Brace, 1936 [1929].

[3] Rosalind Williams, *Retooling: A Historian Confronts Technological Change* (Cambridge, MA: MIT Press, 2002, pp. 15-16.

[4] Max Weber, "Bureaucracy," *Economy and Society*, 1978 [1922]).

[5] Many of these innovative developments are presented in the cases included in *Building the Virtual State*. See, for example, the cases concerning the development of the International Trade Data System, the U.S. Business Advisor, and battlefield management systems in the U.S. Army.

[6] J. E. Fountain, *Building the Virtual State*.

[7] This case is reported in detail in *Building the Virtual State*, chapter 10.

[8] For further details see the initial press release describing the initiative at http://www.whitehouse.gov/omb/pubpress/2001-30.html and Executive Office of the President and OMB: "The President's Management Agenda," at http://www.whitehouse.gov/omb/budget/fy2002/mgmt.pdf.

[9] For further details see "The President's Management Agenda," p.24 http://www.whitehouse.gov/omb/budget/fy2002/mgmt.pdf.

[10] Quotation from *Federal Computer Week*, February 18, 2002: http://www.fcw.com/fcw/articles/2002/0218/cov-budget1-02-18-02.asp

[11] John Scofield, spokesman for the House Appropriations Committee, quoted in *Government Computer News*, February 9, 2004. See http://gcn.com/23_3/news/24892-1.html, accessed July 2, 2004.

[12] At inception, the project was known as 'E-Grants', and changed officially to 'Grants.gov' in 2003. For consistency, the name 'Grants.gov' will be used throughout this paper.

[13] The information in this case study is drawn from archival research and taped interviews with the program manager, team members and officials from OMB.

[14] E-Grants Executive Board, Charter, p.1.

[15] E-Grants Stakeholder Opinions, p. 3.

[16] See www.enterprise-architecture.info/, accessed August 13, 2004.

[17] See John Zachman, "Concepts of Framework for Enterprise Architecture" for an introductory paper on EA. http://members.ozemail.com.au/~visible/papers/zachman3.htm. See also the website of the Zachman Institute for Framework Advancement, a membership organization focused on EA. (www.zifa.com/). A tutorial on EA developed by the Veterans' Administration, a U.S. agency, outlines the Zachman approach. (See www.va.gov/oirm/architecture/EA/theory/tutorial.ppt, accessed August 12, 2004).

[18] See www.infoworld.com/article/04/05/19/HNuserarchitecturegroup_1.html?SERVER%20HARDWARE, accessed August 12, 2004.

[19] www.feapmo.gov/, accessed August 12, 2004.

[20] http://www.feapmo.gov/feaHistory.asp, accessed August 12, 2004.

[21] www.feapmo.gov/, accessed August 12, 2004.

[22] Jason Miller, "Agencies told to assess EA capabilities," Government Computer News, May 3, 2004, vol. 23, no. 10. www.gcn.com, accessed June 20, 2004.

[23] Jason Miller, "Forman calls for new approach to the Federal Enterprise Architecture," Government Computer News, May 20, 2004. www.gcn.com, accessed June 20, 2004.

[24] *Ibid*.

[25] For a summary of the paper, see Jason Miller, "CIO Council crafting reusable-components paper," *Government Computer News*, June 4, 2004. www.gcn.com, accessed June 20, 2004.

[26] Quotation from Jason Miller, CIO Council crafting reusable-components paper," Government Computer News, June 4, 2004. www.gcn.com, accessed June 20, 2004.

[27] Results of the Clinger-Cohen Assessment Survey for the U.S. federal government IT workforce are summarized in Jason Miller, "CIO Council finds IT workers lack necessary skills," Government Computer News, June 1, 2004. www.gcn.com, accessed June 20, 2004.

[28] Lloyd Batzler, "Building a 'results environment," Government Computer News, May 19, 2004. www.gcn.com, accessed June 20, 2004.

[29] See www.infoworld.com/article/04/05/19/HNuserarchitecturegroup_1.html?SERVER%20HARDWARE, accessed August 12, 2004.

[30] The bulleted points are quoted from Taggart's lecture: see http://www.actgov.org/actiac/documents/whatsnew/EAatGM.ppt, accessed August 11, 2004.

[31] See, for example, Mary J. Benner and Michael L. Tushman, "Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited," Academy of Management Review, vol. 28, no. 2, April 2003, pp. 238-256.

[32] An earlier version of this argument appears in J. E. Fountain, "Competing Logics in the Development of E-Government: State-level Data," paper delivered at the annual meeting of the American Political Science Association, September 2001.

[33] For a more detailed set of estimates regarding the economic implications of networked computing in government see Jane E. Fountain with Carlos Osorio-Urzua, "Public Sector: First Stage of a Deep Transformation," in Robert Litan and Alice Rivlin, eds., The Economic Payoff from the Internet Revolution (Washington, D.C.: Brookings Institution Press, 2001).

[34] Jeremy Sharrard, "Sizing US eGovernment," Forrester Research, August 2000.

[35] See J. E. Fountain, "The Paradoxes of Customer Service in the Public Sector," *Governance*, 2001, for an extended analysis of differences between customer service strategies in economic firms and their use in government. In this working paper I simply mention a few of the more important arguments published previously.

[36] See Marc Augé, *non-places: introduction to an anthropology of supermodernity* (London: Verso, 1995). Translated by John Howe.