

# Citizen Enabled Open Government (CEOG)

## Enterprise Architecture Shared Interest Group (SIG)

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### SYNOPSIS

The following White Paper describes at the conceptual level a “Citizen Enabled Open Government” which is virtual, agile and adaptive in responding to citizen needs. It describes how citizens will be able to use data to create blended suites of government services to seamlessly navigate major “life cycle” events. This paper is not a prescriptive “how to” cookbook for achieving that goal, but rather is intended to foster a dialogue within the service provider community regarding developing a common vision of a collaborative path forward.



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*Government and Industry IT: one vision, one community*

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## **Enterprise Architecture Shared Interest Group**

In 1994 IAC introduced the concept of Shared Interest Groups (SIGs) to develop and maintain forums for the open exchange of information among the IAC member companies, both within and among SIGs, the IAC membership and the government IT community. Today there are eight SIGs including one on Enterprise Architecture. The Enterprise Architecture Shared Interest Group (EA SIG) provides thought leadership, objective advice, constructive review and best practices supporting the use of Enterprise Architecture (and related disciplines like SOA and CPIC) in Government.

Our objectives are to:

- Foster improved, performance-based, results
- Support the Office of Management & Budget's efforts to further define the Federal Enterprise Architecture (FEA) and demonstrate its value to Government,
- Support the CIO Council's Architecture Infrastructure Committee (AIC) and the OMB Chief Architect (FEAPMO) in the identification of promising industry developments and in developing best practices,
- Advance the use and maturity of Enterprise Architecture as practiced within and across agencies, government-wide,
- Serve as a clearinghouse and Point Of Contact to ensure a consistent voice on EA and related topics (including SOA) throughout all IAC activities and advice provided to the government.

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*“If you don't know where you are going, any road will get you there” – Lewis Carroll*

## Executive Summary

This paper seeks to describe at a conceptual level how government services can be delivered to citizens in the future drawing on the methods and lessons learned from Enterprise Architecture. Citizen Enabled Open Government (CEOG) offers a vision of greater citizen engagement in the services delivered to them. That citizen engagement is based upon greater choice and transparency with regards to the services available to them. It is hoped that this vision of a CEOG can help to establish a blueprint through which those goals might be achieved.

The audience for this document is broad. It first is intended to reach non-technical public sector executives and business managers, because without their participation the vision of CEOG will never mature. It is hoped that they will see the advantages of building out the CEOG as their best choice for delivering services to citizens in an agile, adaptive and transparent manner. And we seek to engage them accordingly. The second audience for this paper is the technical business managers with whom we would seek to collaborate in developing the technical platforms necessary for the delivery of services.

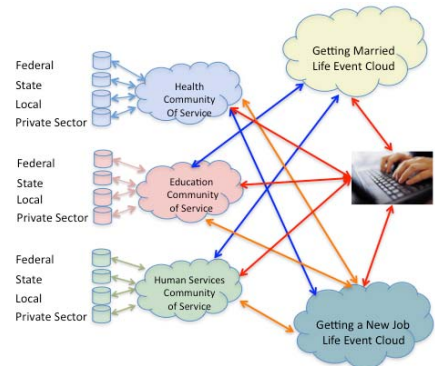
As government moves from “bricks and mortar” delivery of services to a technology-enabled model that allows resources to be managed virtually, its response to emergent needs can occur more quickly, dependably, securely and cost effectively. Government must gain a capacity to focus on managing the provision of complex services known as “value chains” – ranging from health care, and public safety, to things such as restaurant licensing--in a way that will support single, unified pools of data offering seamless interaction among all service providers in a chain. This emerging model will improve government services around so-called “Life Cycle Events”, such as birth, death, and health emergencies, resulting in lower inventories, shortened waiting times and higher customer satisfaction.

To achieve these goals in alignment with the Obama Administration’s Tech Agenda, this paper examines how the government might:

1. Convert it's IT assets into a utility serving the broad community,
2. Treat data as a national asset owned by the community at large to serve their needs, and
3. Foster broad areas of collaboration among the citizens with their government and among those serving them.

When implemented, Citizen Enabled Open Government will have:

1. A citizen-centric and service orientation.
2. Ubiquitous access to reliable, non-redundant, secure data.
3. A service infrastructure that more effectively and efficiently supports business and mission operations, utilizing innovative technologies and strategies, such as cloud computing;
4. A paradigm shift in mission business-process models that focus on cross-agency value chains and leverage automation to streamline operations and reduce the number of human interactions required for routine functions.



*Figure 1: Citizen Enabled Open Government Services*

In addition, this paper provides a description of seven central concepts supporting CEOG, briefly outlined below:

### **Virtual Government**

Virtual government will be based on collaborations among a diverse set of service providers, creating what we identify as “Citizen Enabled Open Government”.

Four foundational principles underlie CEOG:

1. Communities of Services (COS) – groups of service providers from a wide range of service sectors providing common shared services;
2. Life Cycle Events – clusters of COS’s organized around common events in citizens’ lives such giving birth, or health emergencies;
3. A Service Integration Model – a mechanism that allows service providers to virtually, agilely and adaptively respond to changing citizen needs;
4. Service Oriented Government (SOG) – a vehicle that leverages technology and architecture to streamline government, remove ambiguity and redundancy, and simplify government services.

### **Cloud Computing**

One of the key enabling technologies or services patterns underlying the CEOG vision is Cloud Computing which will allow IT resources and applications to be shared across agencies and between public and private sectors, enabling IT organizations to better align and apply infrastructure assets to their COS’s missions. In such an environment, servers come online as needed and turn off when not in use, resulting in increased utilization of data center assets (theoretically 100% of every server) and a dramatic reduction in administrative requirements. Because the infrastructure can dynamically react to business demand, the Cloud Computing model is massively scalable and more easily adaptable to changes in the value-chain; ensuring government agencies meet performance needs regardless of demand. These capabilities lower costs and increase efficiency while meeting the demands of citizens.

Two such initiatives are currently underway at GSA, they are Apps.gov which has a supporting repository of Cloud IT service applications providing a foundational block around which to expand Cloud Computing, and the soon to be released program, FedRamp, which provides joint authorizations and continuous security monitoring of shared IT services for federal departments and agencies that enter into contracts with outside providers.

### **Data and Information Transparency**

Data and Information Transparency are integral to the creation of Citizen Enabled Open Government. It is a key aspect of citizens’ secure, appropriate, unencumbered access to government data and will be a normal facet of future government operations. Providing data across platforms and agencies will drive the need for “controlled vocabularies” specific to formally registered Communities of Service. This development will allow streamlined operations, reduce requirements for human interactions and free staff to work, at the service level, on direct citizen access and support. Several key initiatives, such as National Information Exchange Model (NIEM), Data.gov, and the Open Government Directive are building blocks that need to be pursued to achieve that mission.

Investments will be required in building out a “Service Integration Model”, which will be needed by the Communities of Service, to provide mission mediation, quality control, resource management and allocation/de-allocation to support model driven development. Investment will also be required to align the metadata (e.g. a cataloging system pointing to the actual data) across all the process and data architecture redesign activities. Metadata is the lifeblood of true collaboration in the seamless delivery of services.

### **Service Oriented Government (SOG)**

If metadata is the lifeblood then Service Oriented Government is the circulatory system that connects the CEOG's vital parts. SOG enables the vertical integration of core mission segments (connecting federal, state, tribal, and local government agencies under a common information sharing framework) and horizontal integration of shared business segments (enabling back office functions) to reduce organizational complexity, remove cultural barriers and create Virtual Government. Value is created and sustained through the flow of real-time information among organizations that specialize in satisfying a given business need. SOG process flows may be sequential or dynamic.

SOG leverages technology and architecture to streamline government, remove ambiguity and redundancy, and simplify government services that support Life Cycle Events and other interactions with the government. These value chains, registered for use by any citizen, business, or other stakeholder, express the execution of process steps and the associated data exchanges that may cross government agency boundaries to deliver services to citizens and constituents – the true goal of CEOG.

### **Process Redesign/Enablement (PR/E)**

Process Redesign/Enablement (PR/E) is needed to attain Virtual Government and Citizen Enabled Open Government. Through PR/E, agencies examine current government processes and data exchanges and use technology supported through SOG and Cloud Computing to add, modify or eliminate processes, thereby enabling open government and transparent services. The aim of PR/E is to move from a paradigm in which the "agency" provides standard access to a standard service to one in which the "government" provides cross-agency, coherent and cohesive Life Cycle Event-based services. To choose a service, end users will "reach into" a secure, networked environment making the "Boutique On-Demand" self-service concept a reality.

There are a series of best practices for driving process redesign and enablement in this environment and governance must include the precise definition of the user population and who owns it. The only way architects will be able to handle the ever increasing volume of user types (roles), explosion of data exchanges, and the need for audit and quality control will be through the ability to manage and access them in a large library or repository. This library will contain available and certified processes, accessible through the Service Integration Model. They will be used to build the solutions for Service Oriented Government.

In many instances, new data processes will be channeled to newer inter-agency processes that will leverage new, more efficient technologies and re-enabled mission/business strategies, which are often horizontally and vertically integrated across government and driven by Citizen Life Cycle Event interactions.

## **Human Capital and Social Networking**

Designing architectures that leverage emerging social networking technologies is an important ingredient in the CEOG. They are bringing challenges and opportunities to the Federal workforce, including innovative services and capabilities for online information sharing, collaborations and working within COSs. Social networking capabilities, such as GovLoop, Twitter, Plaxo, LinkedIn, Ning, Xing and Facebook, are changing the way many government employees interact. These sorts of dramatic changes in employee roles and work styles are a significant feature of CEOG and Virtual Government.

As the Federal government takes advantage of automated and intelligent capabilities and services, government employees and supporting contractors will be freed from repetitive and time-intensive tasks and enabled to focus on program development and management, process improvement, problem-solving and solutions delivery. Much of this activity occurs within collaborative social networks: Communities of Service that self-regulate and self-monitor participants. These social networks can be supported and enabled by a growing set of collaboration tools (decision support, wikis, blogs and others) that are evolving across the Internet. Cumulatively they are sometimes referred to as Web 2.0 and Gov 2.0. As computing power and capabilities grow, government will be able to supplement and in some cases replace staff with intelligent automated systems.

## **Governance**

Governance shapes the way processes are designed and used. And new governance structures must be adopted to support constantly evolving service delivery situations. Virtual Government will need these governance mechanisms to move beyond “gateways and sessions” to become an “on demand” service that is embedded in the process itself. As service event participants converge to deliver something of value to the citizen, they need to know all the delivery aspects associated with the business process: its risks, dependencies, alignment to the operating state, and requirements for stakeholders/systems.

Collaborative governance capabilities already exist in the commercial world. Wikipedia normalizes data (words) and uses an agile process to propose, vet and adopt definition “evolutions”. In the future, citizen engagement will evolve in response to advanced technologies from Social Media Applications and Virtual Worlds. Engagement between citizens and government will be interactive, real-time and ubiquitous.

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This Executive Summary provides a glimpse at the components that make up Citizen Enabled Open Government. As stated, it is intended to serve as a vision of how government services might be delivered in the years to come. Since this is a conceptual paper, it is not intended to offer solutions. But more importantly, it should be viewed as a starting point for a vigorous conversation among citizens and government about how to build out that future in a way that provides citizens a more open and collaborative government that serves the public’s interest.

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*“If you don't know where you are going, any road will get you there” – Lewis Carroll*

## ***Introduction***

At present, there is no agreed-upon long-term vision or blueprint for what future government services should look like. There is, however, a pressing need to create a more responsive and agile structure of government that can restore citizen confidence in government services. Too often, the experience of citizens seeking assistance from the government is marked by depersonalization and the sense of having to navigate a “Kafkaesque” labyrinth of stilted, unaccountable bureaucratic processes.

With this paper, Citizen Enabled Open Government (CEOG) offers a potential blueprint for how government services might be structured in the future. We hope to encourage further analysis and a dialogue within the stakeholder community (the organizations providing services and the customers of those services) as the first step in finding a way forward.

The audience for this document is broad. It first is intended to reach non-technical public sector executives and business managers, because without their participation the vision of CEOG will never mature. It is hoped that they will see the advantages of building out the CEOG as their best choice for delivering services to citizens in an agile, adaptive and transparent manner. And we seek to engage them accordingly. The second audience for this paper is the technical business managers with whom we would seek to collaborate in developing the technical platforms necessary for the delivery of services.

The vision addresses several key needs:

1. To register service needs in real time, provide citizens with on demand, self-service capabilities at a single point of contact.
2. To ease the process of qualifying for services, implement “enter once, multiple use” capability that captures data once and uses it to automatically pre-populate all required electronic and paper records.
3. To better meet individual citizen needs, offer blended, customized suites of bundled “communities of service” supported by cross-agency value chains<sup>1</sup>.
4. To eliminate new requests for supplementary service related to the same “life event” (i.e. birth of a child), develop suites of “life cycle event” services.
5. Provide virtual services aggregated from multiple sources:
  - A combination of Federal agencies.
  - State and local government entities.
  - Non-governmental organizations.
  - Private sector.
6. To enhance responsiveness (to changing demographics, new legislation, disasters), build a structure of government that is adaptive and agile.
7. To empower citizens, provide them access to information related to services, they are provided while ensuring stewardship and accountability for those services.

Achieving the vision of Citizen Enabled Open Government in one bold step will not happen. The CEOG is a marked departure from how we do business today and it will take time for us to learn how to conduct the business in a more open and collaborative manner. Therefore, it must be addressed in

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<sup>1</sup> A *value chain* is a collection of interconnected activities that produce a result of value to the consumer. Each process step in the chain may be performed by a different organization and adds value to the final product or outcome. For example, the value chain for a medical treatment would include steps for collecting information, tests and evaluation, diagnosis, treatment and follow-up (as well as payment for services).

tactical, incremental steps that can begin to demonstrate measurable results in three to five years. In the near term, service oriented government and human capital management can free employees from repetitive tasks and promote collaboration through social networking. The portions of CEOG most reliant on technology will be easiest to implement. CEOG will bump up against the current organizational structure of government's implementation progresses. It will take time to resolve issues related to institutional governance and culture, national politics and other interests that are vested in the current shape and delivery of government services.

The technology exists to make government more accessible and more responsive to citizens. The technology needs to be structured in an architecture that will simplify the delivery of services. This architecture --we call it enterprise architecture--will help citizens to recognize and understand the relationship and interdependencies between programs that exist for their benefit. It will simultaneously provide users with ease of self-service. Citizen Enabled Open Government seeks to transcend the structural rigidities of federal agencies by introducing a framework of virtual communities of service, described in more detail in the following section. Such an architecture would transcend the compartmentalization and "stove piping" that limit the agilities and force duplicative efforts across multiple entities.

New technologies and their architecture will accommodate the growing segment of computer-literate citizens who want to interact with government in the same way that they interact with other institutions. This new architecture will allow government to perform as a seamless community of networked participants spanning local, state and federal authorities. This paper describes how this open process will enable citizens to efficiently access multiple layers of government, on their own terms, when events in their lives require them to access government services.

The critical elements around which CEOG revolve are:

1. Virtual Government
2. Infrastructure & IT Innovations (e.g. Cloud Computing)
3. Data and Information Transparency
4. Service Oriented Government
5. Process Redesign/Enablement
6. Human Capital and Social Networking
7. Governance

The following example highlights how the Citizen Enabled Open Government is being applied in the healthcare industry.

### ***Data Driven Solutions in Healthcare***

Electronic health records (EHRs) are digital repositories of health information about individual patients and large populations. EHRs include a range of data in comprehensive or summary form, including demographics, medical history, medications and allergies, immunization status, laboratory test results, radiology images, and billing information. Their effectiveness relies on data shared across a breadth of health care service providers--i.e. a Health Care Community of Service (HC COS). EHRs highlight other key components of CEOG, as well, such as Service Oriented Government, data transparency, and infrastructure and cloud computing.

EHRs provide value by reducing workloads of clinical staff that no longer have to hunt down patient histories or make redundant entries of patient information. Information posted by any care provider is immediately available to any other clinician. Patient safety increases as care providers receive more complete information on which to base treatments. EHRs' built-in knowledge bases identify and prevent potentially dangerous drug interactions that can occur when a patient with multiple medical conditions is

prescribed various medications. Built-in checklists and other resources help to prevent other medical errors as well.

EHRs contribute to the advance of evidence-based health care by providing researchers access to searchable medical histories of entire populations. This capability could lead to faster determinations about the relative effectiveness of competing treatments and help in the detection and prevention of public health problems. These various benefits could play an important role in controlling health care costs.

## **Virtual Government - Describes and models the conceptual platform supporting Citizen Enabled Open Government**

As government moves from a “bricks and mortar” delivery of services to a technology-enabled model that enables resources to be managed virtually, it allows the response to emergent needs to happen more quickly, dependably, securely and cost effectively. Government will gain capacity to focus on managing the provision of complex services known as “value chains” – ranging from health care, public safety, all the way to things like restaurant licensing--in a way that will support single, unified pools of data offering seamless interaction among all service providers in a chain. This emerging model would improve government services around so-called Life Cycle events, such as birth, death, and health emergencies, resulting in lower inventories, shortened waiting times and higher customer satisfaction.

As these delivery vehicles mature, the point of origin of individual services will become less obvious. While there continue to be a lead agency or champion responsible for each Life Cycle event, providers will become increasingly anonymous and even immaterial to recipients of services.

Ensuring the performance of CEOG requires measuring the effectiveness of the entire value delivery chain as well as the contribution of each participant in the outcome. Each link in the value chain must be evaluated to determine contributions to cost, schedule and performance. Ongoing assessments will make it easier for policy-makers and executives to understand underlying causes of problems in service delivery. Assessment also provides a basis for continual improvements.

When implemented, Citizen Enabled Open Government will have:

- A citizen-centric and service orientation.
- Ubiquitous access to reliable, non-redundant, secure data.
- A service infrastructure that more effectively and efficiently supports business and mission operations, utilizing innovative technologies and strategies, such as cloud computing;
- A paradigm shift in mission business-process models that focus on cross-agency value chains and leverage automation to streamline operations and reduce the number of human interactions required for routine functions.

Citizens will realize benefits:

- On demand, self-service capabilities.  
CEOG optimizes self-service opportunities far beyond current approaches, enabling citizens to complete requests for services in real-time, often with forms pre-populated with citizen data on file. It will also allow citizens to tailor service requests to their needs and accelerate receipt of services. (Enabling self-service will reduce staff requirements for routine and repetitive tasks and activities.)
- Data Transparency and Access to Records  
Citizens will be able to easily access and retrieve needed data using cell phones and laptops anywhere in the world. The system will reduce redundancy, ensure eligibility for services, and appropriately provision services based on policy objectives and desired citizen and/or government outcomes.

This target represents government operations in the longer term – perhaps 15 years from today. Recognizing that enterprise architects and government executives need more tangible guidelines, our work seeks to address incremental steps toward this target; steps that will provide current value and/or value in the near term (3-5 year time horizon).

## The Virtual Government Framework

Four foundational principles underlie CEOG:

1. Communities of Services (COS) creating suites of shared services.
2. Rationalized government response to the breadth of issues related to Life Cycle Events.
3. A Service Integration Model that allows these services to be provided virtually, agilely and adaptively.
4. Service Oriented Government (SOG) establishing value chains of services across agencies and levels of government (described in greater detail in Chapter 4).

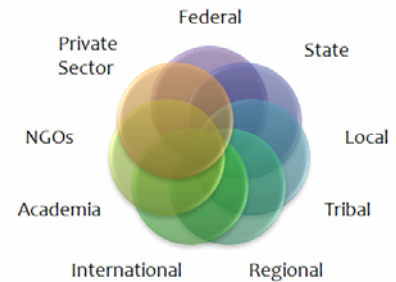


Figure 2: Community of Service Model

### Communities of Service (COS)

Communities of Service (COS) are organized to identify and provide suites of common, shared services. Government agencies across federal, regional, state, tribal and local levels are collaborating to design and provide services required within their communities. Increasingly, they will be joined by non-governmental agencies, the private sector and foreign governments. The services they provide will be jointly defined, integrated, and held to common standards.

This trend is already at work in the health, financial, transportation, first-response and environmental sectors. As they demonstrate efficacy, COSs eventually will organize around and improve all areas of government services and capabilities. Figure 2 depicts the potential types of organizations that will provide functional services. In practice, this approach responds naturally and closely to the second principle - Life Cycle Events. Ideally CEOG aims for “one click” service wherever achievable.

### Life Cycles Events

A Life Cycle Event is a common incident in a citizen’s life requiring interaction with multiple Communities of Service. A Life Cycle Event can trigger responses within a wide spectrum of government and non-government entities. The diagram, Figure 3, illustrates some of these interactions.

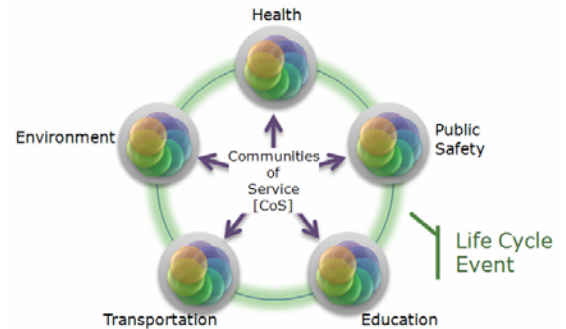


Figure 3: Life Cycle Event

An example of a Life Cycle Event is a health emergency. The event may trigger service needs from several agencies at the federal, state and local levels and may be tracked or supported by other government and non-government entities. A health event can cascade through multiple Communities of Service requiring data notification. For instance the Public Safety COS would have to be notified if the event is a viral outbreak of pandemic proportions. Education could be involved in terms of school closings. Such a health emergency could also identify environmental issues that require tracking. At present, these COSs, though possibly connected to each other, are typically not integrated.

Unsurprisingly, citizens experience frustration when they must interface separately with many government agencies at multiple levels, wasting time for both the citizen and the government and resulting in errors, inefficiencies and increased costs. Erroneous and/or conflicting data in various systems lead to poor services or no service at all.

The logical solution is the familiar “enter once/multiple use” single point of data entry cascading across the network of COSs that relate to various Life Cycle Events. Multiple use also presents opportunities to seek process streamlining and consolidation. Given the breadth of agencies, non-governmental organizations, private sector and academic institutions that may be involved in supporting these Life Cycle Events, opportunities will materialize for major business process transformation and consequent cost savings. The advent of Web 2.0 and its social networking capabilities will have an impact on COSs in multiple areas.

Citizen Enabled Open Government must have the agility to respond effectively to new requirements based on changing demographics, legislation, technologies or community needs. To do so it must be able to reorganize, when necessary, the COSs around which the Life Cycle Event is organized--or create new ones. This requires a process for integrating new stakeholders into the New Life Cycle Event, for redesigning process flows and adapting government processes to ensure effective oversight of the new enterprise.

### **Service Integration Models**

Service Integration Models aim to achieve agile and adaptive operation among stakeholders who must coalesce around emergent issues quickly and flawlessly. The Services Integration Model, depicted in Figure 4, consists of four main components:

- Mission Mediation focused on managing strategic themes of the enterprise.
- Resources Management focused on allocating resources needed to execute the themes.
- Quality Assurance to ensure appropriate results are achieved.
- Collaboration Tools to ensure that stakeholders work in a transparent and effective environment.

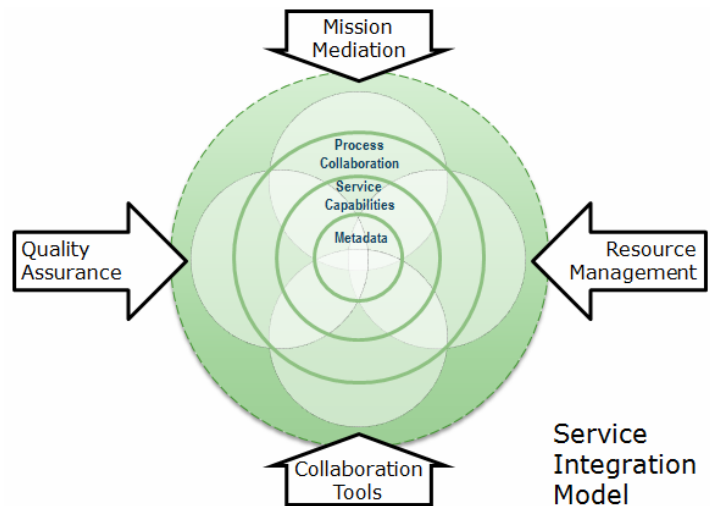


Figure 4: Service Integration Model

Those components will be accessible via Cloud Computing and supported by Metadata, Service Capabilities such as management routines, and Process Collaboration.

## **Critical Success Factors Facing Citizen Enabled Open Government**

### **Stewardship/Accountability**

To address the issues of stewardship and accountability, citizens need feedback mechanisms, such as Wikis and other channels that would allow them to correct inaccurate data (if they have authority).

CEOG will provide citizen access to shared data, spreading the risk and accountability for its maintenance, accuracy, integrity and privacy among participating agencies. Administrators will have to evaluate trade offs between ease of access and privacy of data. Public confidence will quickly erode if suspect, inaccurate or erroneous data leads to bad decisions or outcomes.

### **Adaptability and Agility**

For the Life Cycle Event model to work properly, it should rapidly adapt to new circumstances, such as laws mandating new service requirements. As circumstances change, the underlying architectures will

use “plug and play” and “hot-swap” features to add or subtract COS capabilities, thereby avoiding down time, unnecessary delays or service gaps.

#### Organizational Transformation

Organization of Life Cycle Events will result in identification of service overlaps among the agencies and relevant COSs, presenting opportunities for service consolidations and streamlining of operations across government.

#### Technological Innovation (e.g., Cloud Computing)

Appropriately exchanging and managing data around Life Cycle Events requires, Cloud Computing capability, which enables multiple agencies and their customers to share common, networked computer resources.

#### Acquisition and Allocation of Resources

The ability to acquire the IT assets, including Cloud infrastructure, needed to support enterprise-wide solutions, will require resolving issues of ownership and allocation of resources across the enterprise.

#### Governance

As organizational transformation occurs, new governance structures must be adopted. A more in-depth discussion of this issue can be found in Chapter 7.

## **Infrastructure and Innovations - Describes the architecture and operational model for innovation using a Cloud Computing environment**

### **Enabling the CEOG Vision**

Through Cloud Computing, IT resources and applications can be shared across agencies and between public and private sectors, allowing IT organizations to better align and apply infrastructure assets to their COS missions. In such an environment, servers come online as needed and turn off when not in use, resulting in increased utilization of data center assets (theoretically 100% of every server) and a dramatic reduction in administrative requirements.

Cloud Computing can lower costs, increase efficiency and lower the government carbon footprint while meeting the demands of citizens. Service Integration Models provide a gatekeeper function for metadata that resides in the cloud, allowing innovative processes to spread among multiple agencies. Two such initiatives are currently underway at GSA. They are Apps.gov which has a supporting repository of Cloud IT service applications providing a foundational block around which to expand Cloud Computing, the soon to be released program, FedRamp, which provides joint authorizations and continuous security monitoring of shared IT services for federal departments and agencies that enter into contracts with outside providers.

### **Enabling Service Oriented Government**

Because the infrastructure can dynamically react to business demand, the Cloud Computing model is more easily adaptable to changes in the value chain. This frees organizations to change their offerings to match market demand without having to purchase and install costly infrastructure.

### **Security and Privacy**

Security and privacy of information in the cloud is an issue that is of prime importance, since cloud users capture, process, send, and store data outside of organizations' proprietary infrastructures. Public trust in CEOG activities that use cloud capabilities will quickly erode if it is apparent that information sharing isn't private and secure. Data security will be key to operating in the cloud, and

therefore best practices such as data encryption and process standardization are areas that will need to be incorporated.

### **Scalability and its Impact on Agility**

Because of the massive scalability of Cloud Computing, government agencies can ensure performance regardless of demand. The elasticity of Cloud Computing enables resources to be shifted to high priority applications. Cloud Computing platforms allow for the monitoring of usage demands and the continuous increase in computing, storage, and network resources, as required. The Cloud will fundamentally change the procurement process; the long lead-time to acquire new capability could be potentially eliminated or at least reduced significantly.

This scalability also enables greater agility when completing high-value, ad-hoc tasks or responding to unplanned events. When faced with time-sensitive tasks, agencies can quickly allocate infrastructure to meet demand. Adding computer resources through public, private, or hybrid cloud environments, allows them to execute critical tasks without acquiring permanent resources.

### **Implications for Virtualization of Services and Vertical Government Integration**

COSs can access appropriate applications and be assured of a guaranteed Service Level performance, regardless of location. In the same manner that commercial organizations rely upon Salesforce.com for customer relationship management applications, instead of purchasing their own, Government COSs can subscribe to common applications – such as contact center or help desk support – to execute needed services without regard to the location of the application or physical assets that support it.

This pattern is applicable to vertical applications and is compatible with Community of Service clouds. In this model, agencies executing similar core mission functions can subscribe to the same “best practices” services.

### **Implications to the IT organization**

Cloud computing allows IT departments and COSs to tune process and technology components to maximize efficiency and cost effectiveness. Applications, compute resources, storage, and networking can be shifted from lower priority applications to those of higher priority--at any time. This shift is regulated by a set of business rules for each application service formulated into a Service Level Agreement (SLA) and accessible through the Service Integration Models described above. Based upon a given business event, the infrastructure can respond by adding, shifting, or removing compute power.

## **Data and Information Transparency - Describes government-wide issues and how they relate to service oriented government (SOG) and vertical integration**

### **Data and Information Transparency**

Data must be treated as a national asset, “owned” by those whom it serves. Therefore, Data and Information Transparency are integral to the creation of Citizen Enabled Open Government. It refers to citizens’ secure, appropriate, unencumbered access to appropriate levels of government data as a normal facet of government operations. Several key initiatives, such as National Information Exchange Model (NIEM), Data.gov, and the Open Government Directives are building blocks that need to be pursued to achieve that mission.

### **Implications of Data and Information Transparency**

Providing data across platforms and agencies will drive the need for "controlled vocabularies" specific to formally registered Communities of Service. The National Cancer Institute, for example, has made strides in its implementation of metadata standards.

This development will allow for streamlined operations; reduce requirements for human interactions and free staff to work, at the service level, on direct citizen access and support.

Some potential areas of strategic impact include:

1. Data usage:
  - There is a danger that data defined and maintained in one context will become transparently accessible and be repurposed, out of context, for inappropriate purposes whether innocent or nefarious. Citizens could potentially extract data from disparate government sources to reach inappropriate conclusions regarding services or natural catastrophes. Such a scenario, were it to occur, would have grave consequences for CEOG, seriously eroding public trust in such efforts. Safeguards are needed to guard against such an eventuality.
  - Mission creep in the use of the data that subverts the original intent of secure data sharing initiatives.
  - Data reporting as an unfunded mandate. Agencies must be prepared to address the administrative costs of managing and reporting data, especially when the data is highly dynamic and subject to frequent changes.
2. Privacy of data. As CEOG matures, there will be serious cultural issues related to what citizens will consider the appropriate amount of information for government to have. The Department of Defense, for example, has been shifting from a philosophy of providing information on a "need to know" basis to a philosophy that it has a "responsibility to provide that information. Robust, widely accepted, commonly understood and coherent data sharing standards are needed. Duties and responsibilities around data management should be spelled out early in the strategic planning process.
3. A sense of urgency must underlie investments in building expertise needed to develop and re-engineer procedures to modernize data management functions.
4. Investments in the environmental elements necessary to support the data management competencies. *The DAMA Guide to the Data Management Body of Knowledge, 1<sup>st</sup> Edition 2009*, specifically defines these. Examples of organization and cultural issues that must be considered include: management metrics, critical success factors, teamwork and group dynamics, authority and empowerment, shared values and beliefs, cultural mores, and organizational heritage.
5. Investments will be required in building the Service Integration Model, as needed by the Communities of Service, in order to provide mission mediation, quality control, resource management and allocation/de-allocation to support model driven development.
6. Investment will be required to align the metadata (e.g. a cataloging system pointing to the actual data) across all the process and data architecture redesign activities. Metadata is necessary to achieve true collaboration in the seamless delivery of services.

## Service Oriented Government (SOG) - Describes how SOG is the predominant paradigm for delivering/receiving future government services

The federal government currently consists of many “stove-piped” programs embedded within deeply hierarchical agencies. While each of these programs may be effective for its specific function, the collection of programs across government is neither efficient nor effective. Service Oriented Government (SOG) leverages technology and architecture to streamline government, remove ambiguity and redundancy, and simplify government services that support Life Cycle Events and other interactions with the government. These value chains, registered for use by any citizen, business, or other stakeholder, express the execution of process steps and the associated data exchanges that may cross government agency boundaries to deliver services to citizens and constituents – the true goal of CEOG. While many value chains exist today in government, most consumers identify and access the government services from various agencies.

Service Oriented Government is the glue that holds CEOG together. SOG enables the vertical integration of core mission segments (connecting federal, state, tribal, and local government agencies under a common information sharing framework) and horizontal integration of shared business segments (enabling back office functions) to reduce organizational complexity, remove cultural barriers and create Virtual Government. Value is created and sustained through the flow of real-time information among organizations that specialize in satisfying a given business need. SOG process flows may be sequential or dynamic. Partners in the value chain are continually measured and monitored based on Service Level Agreements (SLAs).

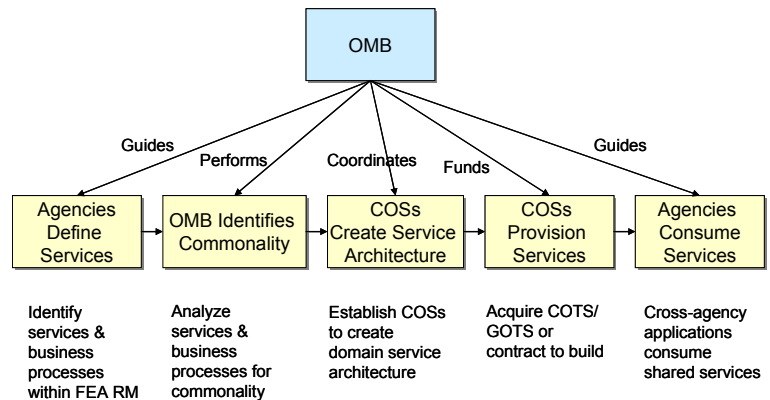


Figure 5: Service Oriented Government

There are many small- and large-scale change initiatives in government today that embrace the value chain approach, including patent application processing, grants applications and military recruitment processing.

There is growing official interest in promoting the approach. The Defense Information Security Agency has shown strong leadership for the Defense Department in this area. GSA could do the same for civilian agencies. The White House's Office of Management and Budget (OMB) might also promote the concept in its budget proposals. The General Services Administration (GSA) could provide a tactical structure to support moves toward the Service Oriented Government as well as establish a Services Center of Excellence (SCOE) focused around Communities of Service, described in Chapter 1, and modeled after SCOE in commercial organizations and a few federal agencies. The SCOE could take the lead for establishing standards (methodologies, tools, metadata, information sharing profiles, etc.) and creating a common environment for shared services. GSA might take responsibility for maintaining the federal services registry/repository (and associated service classifications), establishing a training program to ensure consistency across agency service initiatives, and certifying services as meeting a set of common criteria.

**Service Oriented Government: NYC – *Business Express***

New York City's Business Express as depicted below is a recent SOG initiative. It is leading to better service, more manageable government processes. Ultimately it will lead to lowers cost of providing services.

**Service Oriented Government: NYC – *Business Express***

New York City has launched an initiative to improve the delivery of services to businesses. The goal is to use technology to meet business needs and increase the transparency and accessibility of City services. This initiative, called *Business Express* is a model for Service Oriented Government. In NYC, multiple agencies are responsible for managing the requirements to operate a business. With *Business Express*, interacting with the City – to obtain licenses and permits, certifications, inspections, file business taxes, etc. – will be clearer, faster, simpler and online. The approach to achieve this is to create end-to-end, customer-driven web-based processes to manage interactions with the City, i.e., Service Oriented Government.

The first phase of *Business Express* supports the “*opening a restaurant*” value chain. In NYC, opening a restaurant requires the owner to interact with up to 11 different agencies to satisfy more than 30 requirements. Prior to *Business Express*, prospective restaurant owners had to know what requirements they had to meet and the proper order for filing applications. With *Business Express*, a restaurant owner is led, “wizard-style,” through a web-based portal process to identify applicable City requirements and determine the necessary steps to meet these requirements, including applying for permits and licenses. Application data is collected once and sent to each agency at the appropriate step in the process. Interaction with the agencies is performed in a manner transparent to the restaurant owner using Service Oriented Architecture (SOA).

**Process Redesign/Enablement (PR/E) - Redesign of governmental service delivery processes, for agency and COS key mission areas**

Process Redesign/Enablement (PR/E) is needed to attain Virtual Government and Citizen Enabled Open Government. Through PR/E, agencies examine current government processes and data exchanges and use technology supported through the Cloud to add, modify or eliminate processes, thereby enabling open government and transparent services.

**The Enterprise Architecture of PR/E**

Process redesign and enablement occurs in three phases; technology, e-Gov and CEOG. The first phase focuses on current and future use of technology, along with a transition plan. In the e-Gov phase, current uses are examined for potential streamlining and use of web services. In the envisioned CEOG phase, use will be extended to citizens and other service recipients through social networking and other user-friendly, self-managed, secure and private processes.

The architecture will be flexible and agile. Using robust central process and data exchange repositories, it will enable new and revised processes to easily go into effect. These requirements for streamlining and enablement will prove challenging to many government workers, businesses, and citizens. The anticipated challenges, in the technology and culture, are based on more than 40 years of established practice. The new processes must provide consistent service delivery to attain high degrees of customer satisfaction.

**User Access**

The aim of PR/E is to move from a paradigm in which the “agency” provides standard access to a standard service to one in which the “government” provides cross-agency, coherent and cohesive Life Cycle Event-based services. To choose a service end users will “reach into” a secure, networked environment. It will make the "Boutique On-Demand" self-service concept described in Chapter One a

reality. Services will be an extension of the "Google/Amazon/Salesforce.com Model," whereby initial administrative work will be completed before the user arrives at an agency site.

There will no doubt be a struggle over ownership and contractual control of this data (the initial Web interface that greets citizens) because it will point to the "answers." This means that the data will need to be customizable based on usage patterns such as frequency of visits, browsing vs. buying, etc. Process enablement will need to account for the spectrum of potential users having diverse needs and anticipated levels of service.

For government, this will raise acquisition and security issues. Current security and privacy systems are not robust or scalable enough to handle this new form of government presentation and use. Such systems will need to be developed to support the CEOG.

### **Best Practices Drive PR/E**

There are a series of best practices for driving process redesign and enablement in this environment. Governance must include the precise definition of the user population and who owns it. The only way an architect will be able to handle the ever increasing volume of user types (roles), explosion of data exchanges, and the need for audit and quality control will be through the ability to manage and access a large library or repository. This library will contain available and certified processes, accessible through the Service Integration Model. They will be used to build the solutions for Service Oriented Government.

In the future, the number of processes and data exchanges will increase by orders of magnitude. Generating services for the customers on a continuous basis requires governance and management of complicated processes and data exchanges.

This will put pressure on tool vendors to let users create usage scenarios and match them to the inventory of available processes. Business Process Management (BPM) technologies are already beginning to handle these challenges. BPM is used to build and model business processes with easy, variable changes to test many potential process scenarios. Once an existing process is thoroughly understood, new variables and changes can be introduced to examine how they will affect the process without the risk of real world implementation.

As critical processes are redesigned and documented in various models, they will be monitored and compared to targets. Interactive management contingency features will be available in the event of processes going out-of-control. Governance entities will review processes for continuous improvement.

### **Achieving Citizen Enabled Open Government**

In many instances, new data processes will be channeled to newer inter-agency processes that will leverage new, more efficient technologies and re-enabled mission/business strategies, which are often horizontally and vertically integrated across government and driven by Citizen Life Cycle Event interactions.

As technology frees government employees from some tasks, opportunities for greater collaboration through social networking will open up, and roles will dramatically (and favorably) change.

## **Human Capital and Social Networking - Describes the evolution of human capital across government, freed from repetitive and menial tasks and refocused collaboratively on higher order tasks**

Designing architecture to leverage new innovative social networking technologies are bringing challenges and opportunities to the Federal workforce, including innovative services and capabilities for online information sharing, collaborations and working within COSs. Social networking capabilities, such as GovLoop, Twitter, Plaxo, LinkedIn, Ning, Xing and Facebook, are changing the way many government employees interact. The expected dramatic changes in employee roles and work styles are a significant feature of CEOG and Virtual Government.

### **Communications**

The commitment of the Obama Administration to transparency, innovation, collaboration and efficiency can be supported by these growing communication capabilities. However, they must be leveraged appropriately. Transparency must be balanced against security, privacy and efficiency. All innovations must recognize and measure resulting productivity outcomes.

### **Changing Workplace Roles – Increasing Collaboration**

As the Federal government takes advantage of automated and intelligent capabilities and services, government employees and supporting contractors will be freed from laborious and time-intensive tasks and enabled to focus on program development and management, process improvement, problem-solving and solutions delivery. Much of this activity occurs within collaborative social networks: Communities of Service that self-regulate and self-monitor participants. These social networks can be supported and enabled by a growing set of collaboration tools (decision support, wikis, blogs and others) that are evolving across the Internet. Cumulatively they are sometimes referred to as Web 2.0 and Gov 2.0.

### **Advent of the Virtual Workplace**

The very technology that supports this newer, more helpful self-service also provides workers with opportunities for more engaged roles as subject matter experts, operational agents and knowledge workers. Technology-enabled virtual workplaces also allow for a great increase of telecommuting by government workers, from almost anywhere.

### **Tools to Fill Knowledge Gaps**

As computing power and capabilities grow, government will be able to supplement and in some cases replace staff with intelligent automated systems.

### **Communities, Collaboration and Social Networking**

Government enterprise architects have a variety of forums for sharing information and practices. In the future, these interactions will occur in more functional areas and will be mostly virtual. Not only does networking enhance the feedback; it also tends to improve skill-sets, efficiency and performance. In many ways, social networking provides a form of mentoring that leads to knowledge enhancement.

This technology supports information sharing, yet it also forms the basis for involving employees in the governance of their work. There are numerous future roles that will require professionals to interact and make decisions about the standards, capabilities, and rules of conduct that govern their work, among them health-care workers, pilots, weather experts, firefighters, police and law enforcement professionals, forensic specialists and others. These communities of workers will play an important part in enabling virtual government and CEOG.

## Governance - Describes the process and structure to empower stakeholders who collaborate to deliver services to citizens

### Issues with Current Governance Methods

As Communities of Service and Life Cycle Events mature, governance of them will grow in complexity. While we are currently use to managing relationships lineally on a one to one, or a one to many basis, we are not used to managing relationships that are many to many among an entire stakeholder community. We will be forced to invent, and adopt, new non-lineal governance models to accommodate this emerging realty. New governance structures must also be adopted to support constantly evolving service delivery situations.

A CEOG enabled government should provide citizens with sufficient transparency into the services provided them to be able to intelligently ask their government questions regarding the fair and equitable distribution of those services as well seek explanation for the value gained from them. However, the challenge for citizens will be for them to know how to engage this new CEOG virtual government structure. They will need some sense of a “brick and mortar” reality through which their voice can be heard and their service issues resolved. CEOG will not long survive if citizens do not feel a strong sense of transparency and accountability for the services delivered to them. While services will be delivered in more virtual settings, it is important to identify “Champions” for each discrete service, who can serve as a mediator of services for citizens and as an honest broker within the stakeholder community to ensure delivery of services within cost, schedule and performance standards.

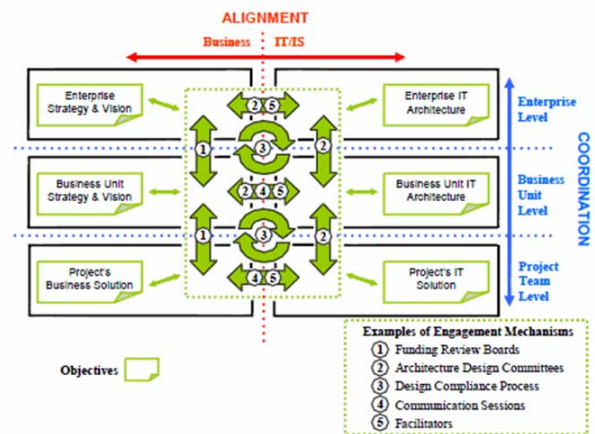


Figure 6: MIT CISR Engagement Model

The MIT Center for Information Systems Research [CISR] has developed an excellent example of IT engagement, shown in Figure 6 that incorporates the latest thinking about how the multiple-tiers of governance should be structured. The MIT CISR engagement model is central to the Service Integration Model described in the chapter on Virtual Government.

### Governance for Virtual Government

Virtual Government will need these governance mechanisms to move beyond “gateways and sessions” to become an “on demand” service that is embedded in the process itself. As service event participants converge to deliver a service (considered here as a series of business processes delivering something of value to the citizen), they need to know all the delivery aspects associated with the business process: its risks, dependencies, alignment to operating state, and requirements for stakeholders/systems. These elements, collectively known as “business metadata,” provide a standardized package of control information that will be required to effectively govern processes in a consistent and scalable way.

### What is Business Metadata?

The idea of “metadata” is not new. Library card catalogs were a highly effective way to govern vast amounts of information *before* the digital age. The system (card catalogs) was used to manage a much larger system (libraries) using packages of information (genre, author, publish date, description, etc). Today, technology is ubiquitous. This means that the power of business metadata can be elevated to an entirely new level. Architectural concepts such as traceability, reusability and integration, which are critical to the sustainability of the value chain, can be managed using sophisticated business-process management tools via a shared service.

In this new context, governance shapes the way processes are designed and used. That shaping can be tactical at the project level (how to do it), operational at the segment level (what must be done to achieve service/mission objectives), and strategic at the enterprise level (how well the goals of government are being realized). The levels of shaping are synchronized (via traceability) so that each level is visible on dashboards that contain current, relevant and consistent information that a user needs to do his or her job. Users also see data related to decisions made at other levels (dynamic linkage).

Maintaining a dynamic linkage provides a means to strengthen mission and business outcomes. For example, the effects of government rules and regulations for access, security, and privacy will likely point to needed reforms in policy and perhaps even legislation. Managing dynamic linkages (via traceability of all the steps in each business operation) will become a critical tool to shape how the government collaborates and tackles its missions across multiple programs and organizations.

### **Role of Enterprise Architecture**

Managing collaboration will result in a *truly* integrated Federal Enterprise Architecture strategy. Traceability (illustrated in the diagram above) and shared metadata are instrumental in providing the building blocks for agile, proactive governance. Innovations are captured during collaborations, providing an evolving resource for good ideas to address new government environments and situations.

### **Role and Result of the Advancement of Technologies**

Collaborative governance capabilities already exist in the commercial world. Wikipedia normalizes data (words) and uses an agile process to propose, vet and adopt definition “evolutions.” In the future, citizen engagement will evolve in response to advanced technologies, from Social Media and Cloud Computing to Mobile Applications and Virtual Worlds. Engagement between citizens and government will be interactive, real-time and ubiquitous.

## **Conclusions**

Citizen Enabled Open Government (CEOG) is a framework that can be built upon to transform how government provides service to citizens. It gives citizens greater access to the data that underlie government's operations, thereby providing citizens the opportunity to gain a stronger voice in how those services are delivered. Fully implemented, CEOG can radically transform government operations. But to achieve transformation on the scale that CEOG suggests, it must be undertaken in incremental stages with the launch of pilot initiatives that test the viability of the underlying assumptions that support the framework. Initiatives like CEOG that strive for wide and deep transformations represent too great a risk to the continuity of government operations to be undertaken in one bold stroke.

As this document demonstrates, there are a number of issues that must be taken into account in order make CEOG a reality.

1. It is critical to remember that IT alone cannot deliver the envisioned CEOG. Change requires people, process and technology. Without addressing policy and human capital issues, the best that anyone can hope for is a fancier portal application.
2. Staff roles will change from process execution to higher-order functions like process redesign and enablement. Outcomes will increasingly depend on government's capability to anticipate citizens' needs associated with re-enabled technology supported by innovative capabilities. CEOG process enablement is about the best processes to produce quantifiable results and not just the best way to execute the processes.
3. Data architecture is the driver that will either make or break the vision of CEOG. Metadata will be a major component of that vision, allowing the concepts of Communities of Service and Life Cycle Events to function properly.

4. Work needs to be done to build out the Service Integration Model to ensure that the concept can become operational.
5. The number of processes and data exchanges supported through CEOG will increase by orders of magnitude, requiring governance and management of very complicated sets of processes and data exchanges to generate services for the citizen/customer on a continuous basis.
6. Current best practices need to be built upon within the Communities of Service to ensure that they are leveraged and maximized.
7. The implications of virtual government will need to be examined in detail.
  - How far the transformation process can be pursued in changing from the traditional "bricks and mortar" paradigm to one that is more virtual and adaptive in the provision of services will be subject to numerous pilots.
  - Governance of process will be a huge issue in determining who is in charge of providing direction and making strategic decisions regarding allocation of resources and execution of process.
  - Virtual government invites many non-traditional stakeholders to the table as service providers. Issues of data ownership, reliability and security will be major concerns in this environment. As the process moves forward, there will be numerous instances of duplicative or overlapping services that will need to be resolved.
8. As access to data by citizens becomes more common, a number of issues will arise:
  - There will be a significant increase in the number of requests for information from the public. Funding for the administrative costs of dealing with these requests will often not be forthcoming, making it an unfunded mandate.
  - There is real danger that data accessed from disparate government sources will allow citizens to draw erroneous conclusions wrapped in a cloak of legitimacy. Such a scenario could seriously harm the legitimacy of future data sharing efforts.
9. Partnerships with both the private sector and the academic community are important alliances that should be pursued to capture best practices and expertise in building the CEOG model. The work of both the Industry Advisory Council and the Enterprise Architecture Academic Coalition are excellent examples of those types of collaboration.

## Glossary of Terms

1. **Cloud Computing:** A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, data and services) that can be rapidly provided and released with minimal management effort or service provider interaction.
2. **Community Cloud:** A community cloud is controlled and used by a group of organizations that have shared interests, such as specific security requirements or a common mission. The members of the community can share access to the data and applications in the cloud.
3. **Hybrid Cloud:** A hybrid cloud is a combination of a public and private cloud that interoperates. Users typically outsource non-business-critical information and processing to the public cloud, while keeping business-critical services and data in their control.
4. **Line of Business:** A set of common business services that respond to a particular customer-business need
5. **Private Cloud:** A private cloud offers many of the benefits of a public Cloud Computing environment, such as being elastic and service-based. The difference is that in private clouds, data and processes are managed within the organization without the restrictions of network bandwidth, security exposures and legal requirements that using public clouds might entail. In addition, private cloud services offer greater control of the infrastructure, especially security, because user access and networks are restricted.
6. **Public Cloud:** In simple terms, public cloud services are characterized as being available to clients from a third party service provider via the Internet. The term “public” does not necessarily mean free, although it can be free or fairly inexpensive to use. Nor does it mean that a user’s data is publicly visible. Public cloud vendors typically provide users with the means to control access. Public clouds provide elastic, cost effective means to deploy solutions.
7. **Stakeholder Community:** This represents all of the various managers, both from the business and the technical communities, who have a vested interest in either producing or using the products from an enterprise endeavor. They also include both internal and external users/customers.
8. **Value Chain:** A value chain is a collection of interconnected activities that produce a result of value to the consumer. Each process step in the chain may be performed by a different organization that adds value to the final product or outcome. For example, the value chain for a medical treatment would include steps for collecting information, tests and evaluation, diagnosis, treatment and follow-up (as well as payment for services).