Representing FEA in a Collaborative Environment

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EXECUTIVE SUMMARY

The General Services Administration (GSA), Office of Electronic Government (ME), along with its industry partners, is creating a collaborative environment for registering components called CORE.GOV—the Component Organization and Registration Environment. CORE.GOV is an environment for managing the component lifecycle process, from need to obsolescence, from component development to registration and reuse. CORE.GOV can also provide the collaborative environment for continual development of the Federal Enterprise Architecture (FEA) reference models.

The goals of CORE.GOV are to reduce the potential proliferation of redundant registries; standardize the definition of a component; present a unified vision of a component lifecycle; and enable government consumers to create, discover, reuse and enhance business-process and technology components. Through scalable architecture, CORE.GOV can become a primary repository for all government consumers—federal, state and local governments, along with their industry partners.

This white paper summarizes the FEA, providing a high-level definition for each of the reference models contained within it: Business Reference Model, Performance Reference Model, Services Reference Model, Data and Information Reference Model, and Technical Reference Model. It also lays out the planned architecture of CORE.GOV, as it relates to the existing FEA model and as it is implemented using CollabNet's SourceCast tool (through a hierarchy of categories that map the FEA, its models and their sub-functions). This paper also outlines the processes whereby CORE.GOV users will recommend, register and reuse components via SourceCast's robust collaborative development environment.

1.0 INTRODUCTION

The General Services Administration (GSA), Office of Electronic Government (ME), along with its industry partners, will deploy a Consolidated Component Registry/Repository, called CORE.GOV.

CORE.GOV will reduce the potential proliferation of redundant registries; standardize the definition of a component; present a unified vision of the component lifecycle (from need to obsolescence); and enable government consumers to create, discover, reuse and enhance business-process and technology components.

At present, no single registry/repository exists to which all agencies can turn when they need components. A small number of component registries exist, implemented by different organizations and set up with differing ideas of what a component is and how components should be managed. At present there is a gap between registries that serve very technical solutions and registries that provide management capabilities for business processes. This situation—namely, the lack of a unified component registry/repository—has inhibited wide stakeholder participation.

The goal of CORE.GOV is to become the registry/repository to which consumers—federal, state and local governments, along with their industry partners—turn when they need a technical or business-process component. CORE.GOV will contain or point to both components ready to be used and components that can be modified to meet specific needs.

Several white papers have been presented on the subject of a consolidated component registry/repository (see, for instance, "Component Lifecycle Process," and "Component-Based Architectures and the FEA"). These previous white papers clarified the need for a consolidated registry/repository and brought into focus ways in which such a collaborative environment might work.

This white paper, "Representing FEA in a Collaborative Environment," focuses on the following:

- The hierarchical structure that CORE.GOV will use to map components to the FEA
- The processes by which components will be recommended, certified and reused.

For CORE.GOV, we are using the definition of "component" provided by the Architecture and Infrastructure Committee Components Subcommittee (AIC CS): "a self-contained business process or service with predetermined functionality that may be exposed through a business or technology interface."[1]

CORE.GOV uses CollabNet's SourceCast environment for implementing the component repository. SourceCast does the following for CORE.GOV (see section 4 for more details):

[1] From Architecture and Infrastructure Committee Components Subcommittee, FY 2003 Work Plan, Version 1.1.

- Integrates applications for software development, knowledge management and component communication

- Controls access through a Web-based project workspace with a centralized, role-based permissions model

- Enables secure and cost-effective development across multiple agencies.

2.0 FEDERAL ENTERPRISE ARCHITECTURE OVERVIEW

2.1 About the FEA

The Federal Enterprise Architecture (FEA) is a business and performance-based framework to support cross-agency collaboration, transformation and governmentwide improvement. It consists of a collection of interrelated reference models designed to facilitate cross-agency analysis and the identification of duplicative investments, gaps and opportunities for collaboration within and across federal, state and local agencies.

FEA enables federal agencies to identify opportunities to leverage technology, alleviate redundancy and highlight areas where agency overlap limits the value of information technology (IT) investments. FEA can facilitate the integration of business patterns and processes, across organizational structures (e.g., federal, state and local governments). FEA focuses on the business patterns and processes, and other component types, that exist across horizontal and vertical organizational boundaries and that transcend individual organizational structures.

CORE.GOV will map components to the interrelated FEA reference models:

- Business Reference Model (BRM)
- Performance Reference Model (PRM)
- Service Component Reference Model (SRM)
- Technical Reference Model (TRM)
- Data and Information Reference Model (DRM).

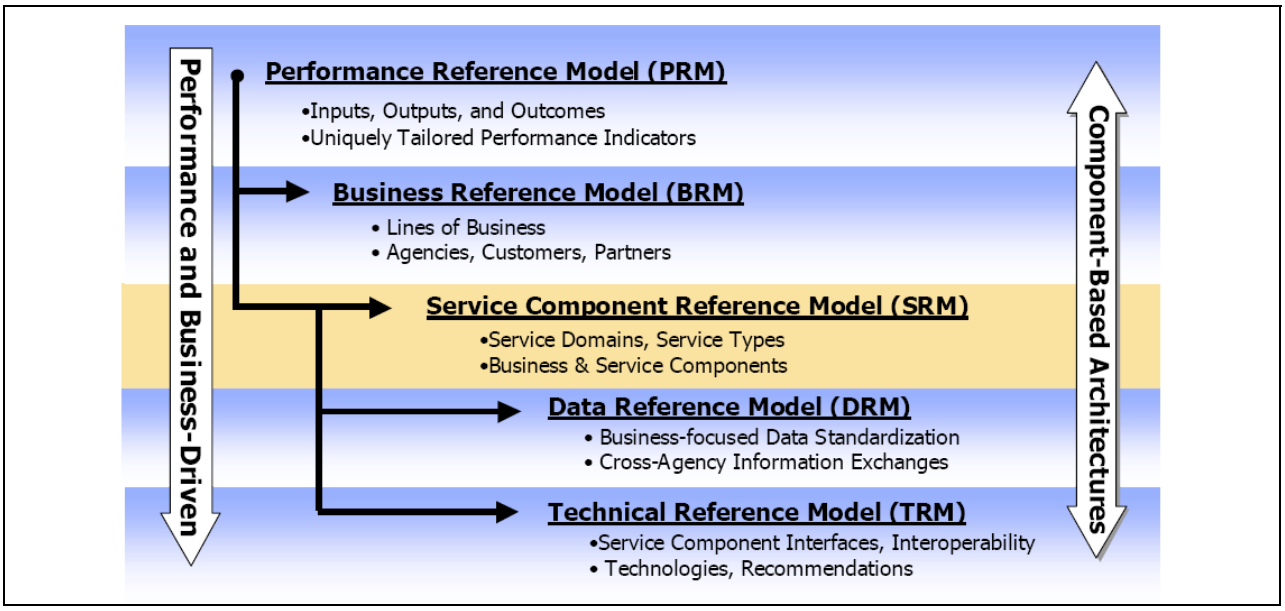

Figure 1. The Federal Enterprise Architecture and Reference Models

2.2 FEAMS

The Federal Enterprise Architecture Management System (FEAMS) is a web-based management system designed to provide agencies with access to initiatives aligned to FEA and associated reference models. FEAMS includes multiple features that provide users with an intuitive approach for discovering and leveraging components, business services and capabilities across the federal government. FEAMS provides agencies with the tools and functionality to discover cross-agency initiatives during and throughout budgeting processes.

However, a limitation of FEAMS is that it is a read-only environment and does not allow for interactivity or two-way communication. CORE.GOV complements FEAMS by offering an interactive, collaborative environment.

Feature	FEAMS	CORE.GOV
Interactive, 2-way communication		X
Web-based management system	X	X
Promotes an intuitive approach for discovering and leveraging components, business services and capabilities governmentwide	X	X
Provides a secure, password-protected repository where various levels of access can be authorized	X	X

Table 1. Comparison of FEAMS and CORE.GOV Features

2.3 Business Reference Model

As the foundation for the FEA, the functionally driven BRM promotes interagency collaboration by describing the federal government in terms of common lines of business and business areas

rather than through an agency-by-agency view. The BRM enables agencies to identify redundancies in business areas (such as financial management and human resources) and to identify opportunities to collaborate with other agencies and to consolidate tangible and abstract resources among the agencies.

The BRM consists of 4 business areas—Services for Citizens, Mode of Delivery, Support Delivery of Services, and Management of Government Resources—which are broken down into 39 lines of business and 153 subfunctions.

BRM		
Business Area	Lines of Business	Sub-functions
Services for Citizens	19	66
Mode of Delivery	7	24
Support Delivery of Services	8	35
Management of Government Resources	5	28

Table 2. The Business Reference Model (BRM)

2.4 Performance Reference Model

The PRM is a standardized framework for measuring the performance of major IT investments and their contribution to program performance. Using the PRM, an agency can clearly articulate the cause and effect relationships between inputs, outputs and outcomes. The PRM helps with identifying critical information for IT project managers, program managers and key decision-makers for understanding to what extent technology is enabling progress towards desired outcomes.

The PRM uses the Program Assessment Rating Tool (PART) and the best existing approaches to performance measurement in the public and private sectors (e.g., Balanced Scorecard, Baldrige Criteria, Value Measurement Methodology, program logic models, the value chain and the theory of constraints).

2.5 Services Component Reference Model

The SRM helps agencies discover governmentwide business and application service components in IT investments and assets. The component-based SRM provides a business-driven, functional framework that supports the reuse of applications, application capabilities, components and business services.

SRM consists of 7 service domains, which are further broken down into service types (29 in all) and components (168 total).

SRM		
Service Domains	**Service Types**	**Components**
Customer Services	3	21
Process Automation Services	2	5
Business Management Services	4	20
Digital Asset Services	4	25
Business Analytical Services	4	19
Back Office Services	6	47
Support Services	6	31

Table 3. The Service Reference Model (SRM)

2.6 Technical Reference Model

The TRM provides a framework for describing standards, specifications and technologies that support the secure delivery, exchange and construction of business (or service) components and e-Gov solutions (e.g., XML schemas). TRM consists of four major Service Areas.

TRM Service Areas
Service Access and Delivery
Service Platform and Infrastructure
Component Framework
Service Interface and Integration

Table 4. The Technical Reference Model (TRM)

2.7 Data and Information Reference Model

The DRM (not yet released) will do the following:

- Help describe interactions and exchanges between government and government customers
- Describe the data and information that support program and business line operations
- Assist in describing the types of interactions and exchanges that occur between the federal government and its various customers, constituencies and business partners
- Categorize the government's information along general content areas
- Establish a commonly understood classification for federal data
- Lead to the identification and elimination of duplicative data resources
- Streamline the processes associated with information exchange both within the federal government and between the government and its external stakeholders.

3.0 REPRESENTING THE FEA IN CORE.GOV

For CORE.GOV to be the most efficient and effective, it must map components to the existing FEA model. This mapping will be accomplished by using SourceCast's categories feature. In SourceCast, a "category" enables projects to be grouped together in a variety of logical ways.

CORE.GOV will map each component project to a specific FEA Reference Model category (e.g., SRM > Business Management Services > Investment Management > Performance Management). Categories can be searched, allowing a user to view all component projects grouped together under a specific FEA Reference Model category. CORE.GOV will also use categories to create and nurture communities of users centered on specific issues. For example, within CORE.GOV, there will be a community of users who wish to discuss the relationship between the FEA and CORE.GOV. A SourceCast category will provide the community workspace to foster this relationship and discussion. The FEA/CORE.GOV community category will provide the following:

- A central location for discussions related to mapping components into the appropriate FEA element(s)
- A place for community involvement in the evolution of CORE.GOV in accordance with FEA evolution
- Discussion forums and mailing lists for exchanging experiences using CORE.GOV to implement the FEA
- Guides and lessons learned for proposing, building, maintaining and using components.
- A project specifically for the FEA Solution Architects Working Group (SAWG). This project can be used for SAWG-only discussions regarding CORE.GOV and FEA. SAWG can also use the collaborative tools provided by CORE.GOV to continue to develop and maintain the FEA.
- One subcategory for each reference model—BRM, SRM, TRM, PRM, DRM.

Figure 2 illustrates the relationship between the FEA category and its member projects and subcategories. Subcategories representing additional reference models or business patterns may be added when needed. The FEA project (left-most box) is the private project owned and maintained by SAWG.

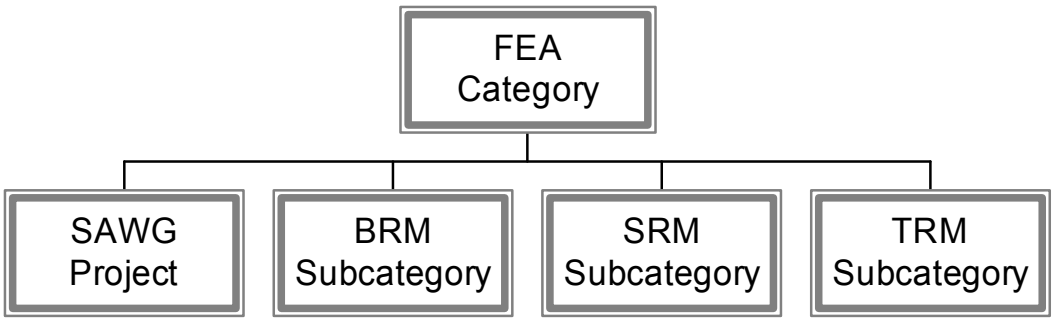

Figure 2. FEA Category

3.1 Representing the FEA Reference Models

Each reference model (SRM, BRM, TRM) will be represented by a SourceCast subcategory, and membership in each subcategory will be open for governmentwide participation. Each subcategory will provide the means to accomplish the following:

- Foster community discussion around a reference model and its relationship to CORE.GOV

- Enable agencies and agency representatives to research existing and planned components that are related to a reference model

- Create a central workspace for information regarding a reference model and its relationship to CORE.GOV
    - Example information may include understanding how to determine where a candidate component fits within a reference model and how to find existing or proposed components

- In the future, a private project can be created and maintained for the evolution of the reference model itself. Using CORE.GOV to develop and maintain a reference model does not preclude it from continuing to be published to http://www.feapmo.gov; it simply serves as a collaborative workspace for the reference model authors. By providing this workspace in CORE.GOV, authors can correspond with the larger community of component developers. This interaction between authors and developers can yield opportunities for enhancing reference models to further meet the needs of FEA component producers and consumers.

Ideally, authors of each reference model will participate in the reference model subcategory projects and provide community leadership for their reference models, helping others to create, maintain and use components that implement the model.

Each reference model category will contain a hierarchy of categories. For example, the Business Reference Model subcategory will contain subcategories representing each business area. Figure

3 provides an example of the relationship between the BRM subcategory and its member project and subcategories (in this case, the four business areas). The BRM project is a working space for the reference model authors. Other CORE.GOV members can have as much or as little visibility to this project as the reference model authors prefer.

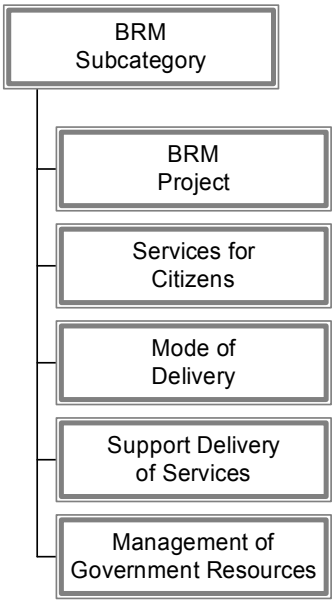

Figure 3. BRM Subcategories (including the four business areas)

Figure 4 provides an example of a fully drilled-down hierarchy of BRM subcategories (BRM > Services for Citizens > Law Enforcement > Crime Prevention).

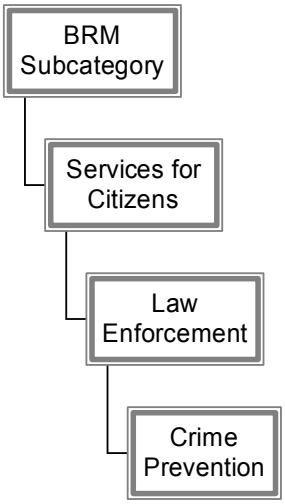

Figure 4. Subcategory Hierarchy for the BRM

3.2 Communicating within the FEA Using CORE.GOV

Within these subcategories, the CORE.GOV Domain Administrator will maintain mailing lists that include the owners of each member project. This will provide a convenient mechanism to communicate with all component owners within a particular business area or service domain. For example, if a change is made to the Services for Citizens business area, all owners of components supporting that business area can be notified by e-mail.

This pattern repeats at the next level. Continuing with the previous example, each line of business subcategory will maintain mailing lists of the owners of components that support it. If a change affects the Natural Resources Line of Business only, then the announcement can be targeted to just the component owners of sub-functions under that line of business. This high level of granularity allows CORE.GOV leadership to fine-tune the target audiences for announcements and other communications.

All messages will also be archived. New component owners can review the archives to familiarize themselves with the evolution of the business area, line of business or sub-function. The archives serve as "organizational memory" that is independent of changing project membership.

3.3 Searching Archives on CORE.GOV

CORE.GOV provides members with the following ways to search for and research information:

- **Keyword search at CORE.GOV and project-scope level.** Searches may be conducted against all or a subset of the available tools. For example, a member may perform a keyword search across CORE.GOV and restrict results to only mailing lists, artifact types and HTML-static content. Roles and permissions are respected, ensuring that search results are limited to only those items the member is allowed to access.

- **Archived project mailing lists.** Project members with appropriate permissions may browse the archives to review electronic conversations. Project repository update messages (commits and additions) are also archived, allowing members to review the rationale for changes.

- **Archived threaded discussion forums.** Discussion forums provide a more structured way to explore a specific topic. Project members may search and review any or all previous "threads" on their project.

4.0 REPRESENTING A COMPONENT

Each component will be represented by one SourceCast project. The project will provide the tools for collaboration throughout the component lifecycle. Each component can also belong to one or more FEA Reference Model subcategories.

- Figure 5 provides an example of a component—computer-based training concerning flood prevention—that belongs under both the BRM (>Services for Citizens>Natural Resources>Water Resource Management) and the SRM (>Digital Asset Services>Content Management>Content Publishing & Delivery).

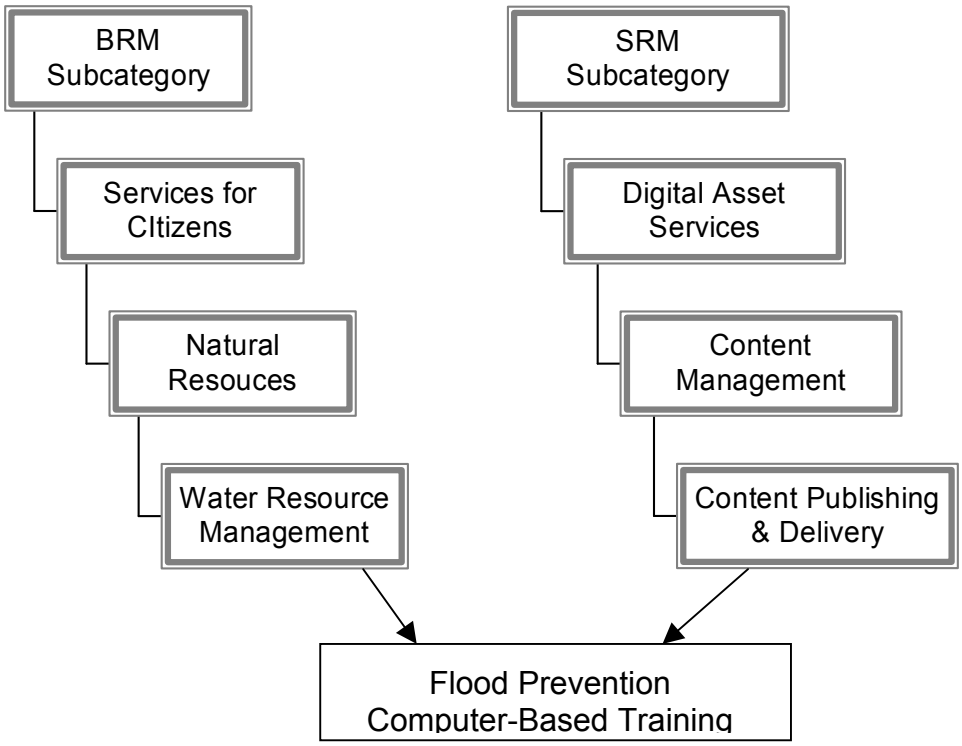

Figure 5. One Component Mapped to BRM and SRM Subcategories

4.1 Recommending Components

CORE.GOV will contain a project at the root level, called RecommendComponent.CORE.GOV, for the process of recommending components for inclusion in CORE.GOV. This project will include the following:

- Documentation, such as policies and processes, for recommending components for inclusion in CORE.GOV

- A Project Tracker Artifact Type for recommending component projects (one aspect of which will be determination of FEA Reference Model categorization).

Users will be able to search proposed and approved components to minimize duplication of efforts. In addition to self-search, the AIC Component Subcommittee (or its approved agents) will be able to refer those recommending components to other proposed or existing component development teams prior to approval. All electronic communication will be recorded, providing a record of the rationale for each recommendation's approval or rejection.

Users who recommend a component for inclusion in CORE.GOV will access SourceCast's Project Tracker from RecommendComponent.CORE.GOV and provide the information needed to classify and define the proposed component. After users have entered the required data, they will submit the request to the AIC CS for approval.

Both the submitter and the AIC CS will receive e-mails about the new proposed component. The AIC CS will then access the information concerning the proposed component and evaluate the data entered for completeness and correctness. During that evaluation, the AIC CS will communicate with the submitter via the comments section to ask for data modifications or clarifications.

The AIC CS will make a determination about the validity of the proposed component and either approve or reject the recommendation. If approved, a SourceCast project will be created (based on the data provided by the submitter in RecommendComponent.CORE.GOV) and ownership of the component project will be assigned to the submitter.

If the AIC CS believes that the proposed component is a duplicate of an existing one, they can reject it, note the reason as "duplicate," and refer to the pre-existing component's reference number.

Throughout the process, both the submitter and the registrar will be aware of all data and status changes via automatically generated e-mails.

4.2 Certifying Components

Users who wish to submit a component for certification will also access a root-level project called ComponentCertification.CORE.GOV. They will then enter the data needed to classify and define the proposed component. After all of the required data has been entered, users will submit the artifact for certification.

The certification process mimics that of the recommendation process above. However, there is one key difference: a component may go through this process multiple times as each release of the component must be certified.

During the certification process, communication between the examiners and the submitter will be done primarily through the comments each adds to the certification process form filled out for the proposed component. However, most comments will probably be more informal notes to help

clarify the entries already made. Of course, if the discussion involves a broader community, then a new mailing list can be started on the component project to facilitate the ongoing discussion.

Components can be submitted for certification that were not developed within the CORE.GOV environment (i.e., were not recommended previously). Also, even if they are certified, they may not be physically moved onto the CORE.GOV repository. For such components that are approved, a SourceCast project will be created for the purposes of communication and collaboration with regard to that component. Approved components that are registered but not a part of the CORE.GOV repository become semi-accessible to the community at large because they are registered on CORE.GOV with information about which other repository has the component in its database.

4.3 Frequent Reuse of Components

The value of a component registry/repository is determined by the frequency of successful component reuse. From that aspect, it is critical that appropriate data is collected about a component during the recommendation and certification processes. Collecting the right data makes it possible for the user seeking a reuse component to find good candidates. The hierarchical categorization and project architecture used within CORE.GOV allows users to logically search the architecture to find components that meet their needs. CORE.GOV provides an exceptionally robust approach to finding components by allowing for the querying of numerous pieces of qualifying information via its use of SourceCast's Project Tracker during the recommendation and certification processes.

A traditional library uses the concept of a "card catalog" (though in most cases the "card" is a database entry rather than a physical piece of paper) to help users find a specific book that meets their needs and interests. Users are not expected to have to find the bookcase associated with the general topic and peruse each book to find ones that might meet their needs. CORE.GOV is set up to provide similar, efficient searching from an electronic perspective.

As noted earlier, the certification process collects the key information about a specific component. This information should provide most, if not all, of the general information that users want to know about a potential reuse component they may reuse.

4.4 Finding Components To Reuse

The process for finding reuse component candidates is for the user to execute a query against the certification artifact type. That query will result in a list of components that match the criteria entered by the user. At this point, a deeper investigation will come only by the user interacting with the component community directly. To that end, each artifact instance will contain a link to the component's development community (i.e., SourceCast Project). The component project owner will be notified via e-mail about the user's request for information.

When users access the component project, they will be able to peruse documents and files, project tracker artifacts, and mailing list archives. In addition, they will be able to communicate with the component's development community via a mailing list. That will provide them with

access to the information they need to fully determine the fitness of a particular component to meet their needs.

After users have identified the specific components they would like to reuse, they will request a reuse role for that component project. If the component owner grants that role, it will give the user access to a predefined section of CORE.GOV's version-control repository. This process provides a consistent delivery mechanism for downloading components of various types (binaries, source code or both) and may include documentation on the component, its installation and other details.

4.5 Ongoing Collaboration Among Reuse and Developer Communities

CORE.GOV is designed to facilitate a thriving development and reuse community. Given that perspective, those who reuse components should be encouraged to participate at the level they can and want to. Rather than being occasional visitors coming only to find a new component or perhaps, recommend one, there is a benefit, for both reuse and component development-communities, to have a high level of interaction and involvement.

Since those reusing components become full-fledged project team members, they have the ability to subscribe to all the non-private mailing lists. This allows users to do the following:

- Communicate with the component development team
- Discuss how to use the component they have downloaded
- Get support on its use
- Conduct discussions on and get guidance about modifications the reuser may want to make to the component.

4.6 New Versions of Existing Components

Assuming those reusing a component are implementing it in an application (having more than a limited lifespan), there will be obvious interest in new versions of components chosen. The ability to subscribe to an announcement mailing list allows users to keep abreast of planned and deployed releases. As a result, they can proactively consider how the new versions impact the next version of their application, from both functionality and release-date perspectives.

One of the key benefits to both the component development and component reuse communities is the ability for the latter to stay involved in discussions involving future revisions of the components. It gives the component development community an interested, but outside, perspective on what should be included in future revisions and how functionality might be best implemented. From the perspective of those reusing the component, it gives them visibility into future functionality with an ability to potentially influence what functionalities are focused on.

Additionally, there are going to be times when those reusing a component are interested enough in a future version of that component that they are willing to provide resources to help produce that next version. These users are already project members who can participate in discussions regarding future development on the project mailing lists. Therefore, they can see and submit artifacts to those mailing lists that define defects and enhancements that need to be addressed in a future release. Component reusers can also review requirements documents and development plans.

If that visibility and participation convinces reusers to help produce new versions of the components, they can request development roles on the component projects. The component project owner can choose to accept their offer to actively help produce the next version of a component or not. If acceptable to the component owner, component reusers can provide resources that the component owner may not otherwise have access to, which can result in faster development or more inclusive functionality.

Table 5 highlights the CORE.GOV features and possible collaborative activities.

CORE.GOV Feature	Possible Collaboration Activities
Role and Permission Management	Fine-grained permissions allow the component owner to control the visibility access of project members and non-project members. The component development and maintenance can be as private or as public as desired.
Version Control	Centralized management of the project's repository ensures all component team members have the same view of the state of development.
Mailing Lists	Mailing lists provide notifications of revisions to the component's repository, newly found issues and changes to issues, and general project communication. All mailing-list communication is delivered in each member's e-mail and archived for easy access and history research by existing and new project team members.
Discussion Forums	Discussion forums provide a more secure (i.e., not Internet, e-mail based) mechanism for discussing topics. These threaded discussions are archived.

Table 5. CORE.GOV Features and Possible Collaboration Activities

5.0 CONCLUSION

CORE.GOV will present business and technical components within an architecture that corresponds to the structure of the FEA. It will organize the various facets of the FEA into SourceCast categories with components implemented as projects at the final rungs of the FEA category hierarchies (i.e., the final rungs of the BRM, SRM and TRM). It will support ongoing discussions about the FEA itself. However, more importantly, CORE.GOV will provide a focal point as a key, governmentwide component registry/repository. Clear processes have been defined to support users in recommending, certifying, and reusing components.

CORE.GOV will provide an easy-to-use interface for collaborative communities and a thriving component marketplace for federal-, state- and local-government agencies.