



California Enterprise Architecture Program

# **Service Oriented Architecture (SOA)**

## ***Portal Review Board Architecture Approval***

December 02, 2005

<b>Rev. #</b>	<b>Document History / Approval</b>		<b>Date</b>
1.0	Present to Portal Review Board		12/02/05
	Action Taken		

## **Approval Items Requested:**

This Service Oriented Architecture (SOA) is a California Enterprise Architecture deliverable that provides a foundational framework necessary to achieving many of the goals of an integrated, shared, “customer centric” IT environment for California Government. There are several concepts that are presented for the Portal Review Board to approve. The complete “Draft” Service Oriented Architecture may be found at the California CIO website (<http://www.cio.ca.gov/ITCouncil/Committees/PDFs/SOA.pdf>). The approvals requested are as follows:

1. Approval for the draft Enterprise vision for SOA. This means achieving;
  - a. a common understanding, definition and taxonomy for SOA;
  - b. an Enterprise Governance process;
  - c. an Enterprise Operations process; and
  - d. a common architecture (standards and development process).
2. Approval for the draft SOA architecture as foundational to the development of the California Services Center and related goals of the California IT Strategic Plan. Goal #1 of the IT Strategic Plan seeks to, “Make Government Services More Accessible to Citizens and State Clients.” At the October 2005 Portal Steering Committee several recommendations were made that are made possible through the use of Service Oriented Architecture, and which necessitate an Enterprise focus to SOA that this architecture deliverable supplies. These include:
  - a. “...A federated management and governance approach to the development and maintenance of the State’s Internet presence.”
  - b. “... Identification of the shared services that should be developed for the State’s web presence.”
  - c. “... Transition from the existing state portal to the federated, shared-services architecture...”

The above approvals being requested are for the initial SOA architecture in its draft form with recognition that the completed architecture will only be finalized after complete vetting from stakeholders and focus groups made up of subject matter experts. After going through this vetting process, the final architecture will be presented to the Portal Review Board, and the Portal Steering Committee for final buy-off, approval and implementation. It should also be recognized that the proposed architecture will need to be implemented in phases and will be done over the course of an appropriate time-frame that is yet to be determined.

## **Background**

### **SOA Description:**

The need for a state-wide architecture for SOA is driven by a number of factors. One factor is that there is a great deal of misunderstanding about what SOA is, how it is implemented and maintained, and how services are shared among organizations. The SOA architecture is meant to assist the state of California in moving toward shared services in a cohesive manner and getting

the most value from our investment into service development.

The term Service Oriented Architecture (SOA) expresses a software architectural approach that defines the use of services to support the requirements of software users. With SOA, integration becomes forethought rather than an afterthought even though the end solution may be composed of services developed in different programming languages, hosted on disparate platforms with a variety of security models and business processes.

A service is a program that can be interacted with through well-defined message exchanges. Services must be designed for both availability and stability (see figure 1 for example SOA / Web Service). Services are built to last while service configurations and aggregations are built for change. Agility is often promoted as one of the biggest benefits of SOA—an organization with business processes implemented on a loosely-coupled infrastructure is much more open to change than an organization constrained by underlying monolithic applications that require weeks to implement the smallest change. Loosely-coupled systems result in loosely-coupled business processes, since the business processes are no longer constrained by the limitations of the underlying infrastructure. SOA also provides a methodology and framework for documenting enterprise capabilities and can support integration and consolidation activities which are at the heart of many of the goals in the California IT Strategic Plan.

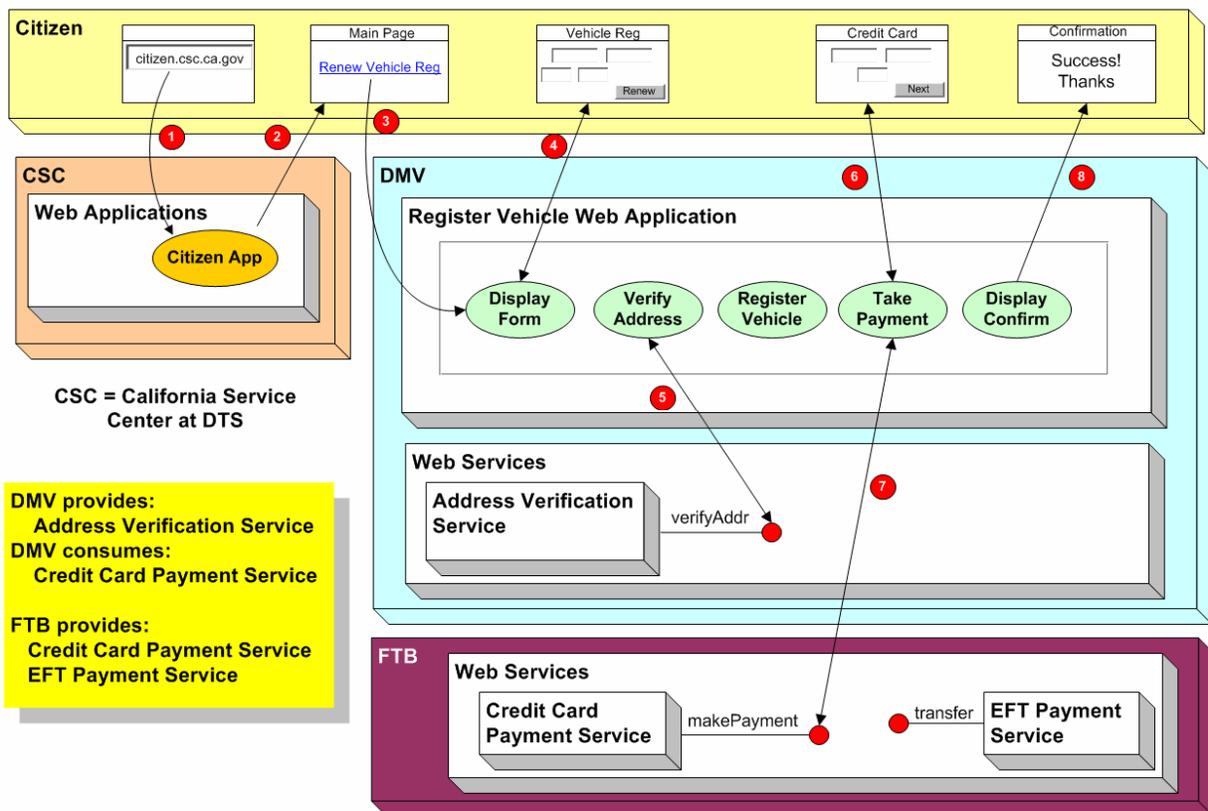


Figure 1 – Web Service / SOA Example

*Note: Departmental and service references are for example purposes only*

### **SOA Key Architectural Driver(s):**

- Need to reduce the total cost of ownership of Information Technology (IT) solutions.
- Need to be more responsive to changing business requirements. Therefore, need to reduce the time to develop new applications.
- Need to utilize State IT assets more effectively.
- Need to reduce the number of technology disparities. That is, need to standardize architectures, platforms, packaged applications, and reuse component functionality wherever practical.
- Need better control over deployed IT assets.
- Need to reduce the risk of application development by reusing proven, tested services.

### **SOA Enterprise Architecture (EA) Goal(s):**

- Provide the blueprint for a service oriented architecture that supports California business services.
- Provide a key set of SOA principles
- Establish a California SOA Center of Excellence to provide SOA leadership, governance, and management of SOA components.

## **The SOA Architecture Framework**

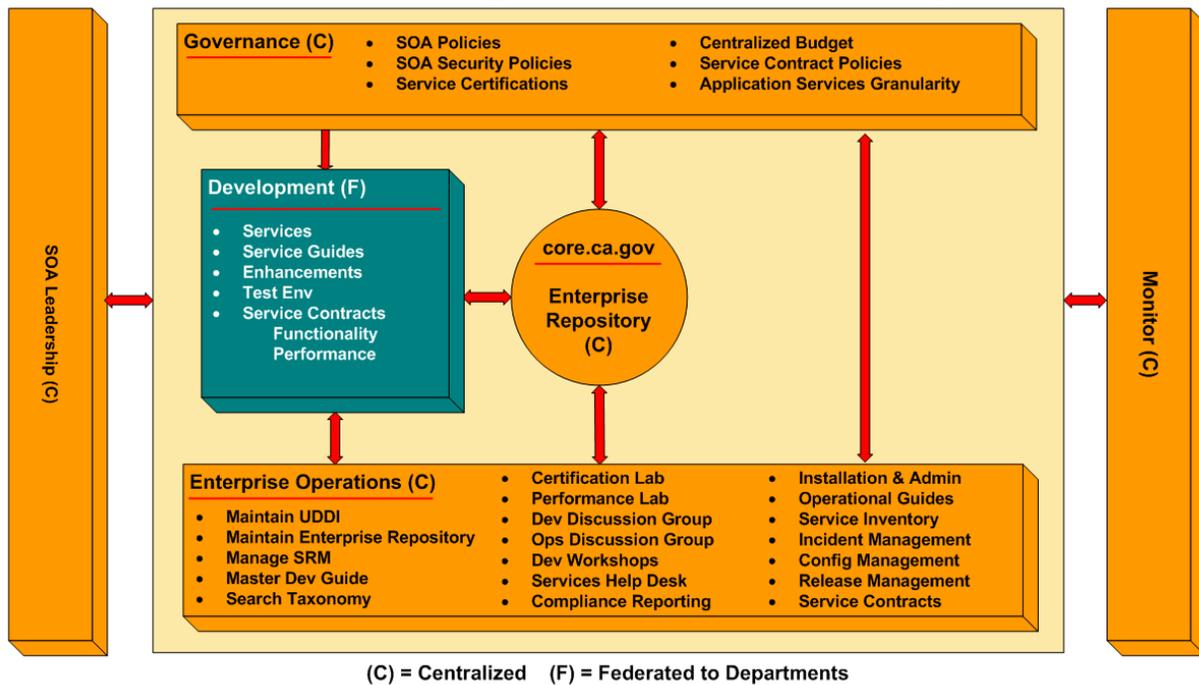
There are three parts to the Enterprise SOA: Governance, Operations, and Architecture (development).

### **1. Governance (figure 2):**

Because enterprise components in an SOA architecture can be developed by many organizations (the concept of federated development), are managed in a distributed environment, and they affect many departments, partners, and employees, certain governance requirements are critical to a successful SOA implementation.

Fundamental decisions must be made regarding how enterprise components are developed, tested, certified, deployed, monitored and managed. Those participating in an SOA environment must agree to adhere to standards in governance and policy. The fundamental need for enterprise governance is due to security, performance, and reliability issues in an SOA environment. The SOA Architecture that is being presented for draft approval includes the following governance recommendations and topics:

## California SOA Management – Centralized Operations



*Figure 2 – Centralized SOA Operations*

*Note: The full SOA Architecture presents an optional federated operations model*

- Federate development, centralized operations (for deployed services)
- Centralize service certifications
  - Develop and manage certification process
- Centralize SOA security policies
  - This includes a need for an identity service
    - i.e., determine if identity is required, invoke appropriate identity authority
  - Establish SOA security group to determine security policies and their details.
- Centralize some enterprise services (example: California Service Center)
  - Search, Identity, Subscriptions, Knowledge, Profile
- Create SOA Center of Excellence
  - Vendor & Analysts liaison
  - WS\* Standards liaison
  - State, Federal, local (City/County) collaboration
  - Provide SOA operational guidance based on operational feedback
  - Conduct briefings, targeted presentations
  - Conduct demos
  - Facilitate Executive SOA discussion group (optional)

## 2. Enterprise Operations (also reference figure 2)

There are certain parts of an SOA implementation that must be centralized under an enterprise operations group. While enterprise services can be developed by any department, it is more efficient and least costly to manage them in a centralized operations environment once they are deployed. This leverages the security, hardware, and network infrastructure. It also simplifies configuration, version control, and help desk functions.

- Set up operations to manage enterprise services
  - Must support both platforms .NET and J2EE
- Create and manage the Enterprise repository
  - Evaluate repository vendors and select tool
  - Maintain alignment with the Enterprise Architecture Reference models (Business, Service, Technical, Data)
    - Design and create model structures (hierarchies)
    - Manage models
  - Application and Project profiles
  - Web services code (shared services)
  - Version control and backup maintenance
  - Service inventory (deployed service statistics)
- Create and manage certification lab
- Create and maintain UDDI - Universal Description, Discovery, and Integration (or equivalent)
  - Service description and location repository
- Design, build, deploy, and maintain enterprise services, such as:
  - Search
    - Centralized engine, web service interface
    - Centralized indexes and user profiles
    - Centralized taxonomy (long term goal)
    - Federated search applications utilizing standard search engine interfaces
  - Identity
    - Determines need for identity for a given user interaction
    - Invokes appropriate identity authority
  - Subscriptions/Alerts/News
    - Based on RSS feed service
  - Knowledge
  - Profile – Personalized interaction environment
- Set up and manage enterprise services help desk
- Implement and manage compliance processes
- Establish SOA Admin group
  - Install, configure, and administrator enterprise services
  - Produce operational guides
- Configure Incident Management for enterprise services
- Set up release management process for enterprise services
- Establish process for managing service compliance
  - Reporting
  - Process for handling out of compliance services

- Select, install, and manage Edge Enforcement Agents (XML Firewalls – required for secure web services)
- Create and facilitate developer discussion group
- Create and facilitate operations discussion group
- Conduct developer workshops
- Create Master SOA Developer Guide

### 3. SOA Architecture

While an SOA architecture generally focuses on web services, there are other components like enterprise service buses and data driven objects. Since SOA is still relatively new (at least from the web services perspective), there are a large number of standards that are still evolving and some standards are further up the maturity curve than others. So, while it is very important to base web services on standards, it must be recognized that the standards will change as they are merged and new ones are created. For this reason the Enterprise Architecture must be adaptive to the standards environment and reflect changes as necessary in the architecture.

Fortunately, major vendors like IBM, Microsoft, Oracle, SAP, BEA, and Sun Microsystems are cooperating well on the standards.

Web services must be carefully managed. They must map to business services and they should be developed with appropriate granularity. In many cases, identity and access will be required components in an enterprise web services environment. This requires agreement on security policies and structures.

- Single point for user interactions (example: CSC)
  - Citizen, Business, Employee
- Services publish to Service Reference Model
- Based on Web Service standards
  - Base services
  - Composite services
  - Interfaces
  - Security
- Each service in the SRM should tie to one or more services in the Business Reference Model
- Enterprise Service Bus

### Conclusion

SOA and Web Services are important advances in how applications are developed, reused, and integrated. In absence of an Enterprise Architecture for SOA, organizations, departments, and programs may begin developing “siloed” SOA architectures that may not interface or may not take advantage of the re-usability of a given service. Further, the services that are developed may not be as secure, or as reliable as they could be, or may not adhere to appropriate standards. The Enterprise Architecture for SOA addresses these complex issues and recommends a framework and structure for standards, governance, and operations.