

## **Exercise #1, Part One – SOA Fundamentals**

### **Why would you want to implement SOA in your organization?**

- To Reduce IT complexity from the perspective of the business owners
- To increase IT agility and flexibility
- To increase the speed of delivery for new capabilities
- The way we've been doing it has not worked

### **Is SOA more about integration or architecture? Why?**

An architecture that is never implemented is worthless, but just integrating systems is not necessarily SOA. So both are necessary, but SOA is more about architecture. The architecture must be defined around SOA principles then integration occurs within the context of the architecture. Integration is a set of activities that are used during the implementation of a service oriented architecture, but is not the heart of SOA.

### **How important are Web Services for SOA? When would you use them, and when would you have Services that aren't Web Services?**

Web Services are a basis for SOA, but are not its entirety. While an SOA can be created without Web Services, they are largely a de facto standard component of SOA implementation. Web services should be used for services that fit well within the WSDL model. For services that are too complex to be represented well within the constraints of WSDL, other services should be used that are based on, but extend, WSDL.

### **Give two or three examples of how business agility would manifest itself in your organization. How might SOA help achieve these business agility goals?**

*Example 1:* Federated Query. Breaking a distributed search system down into services allows new datasets to be selected and rapidly added into the federated system. By not having to build an entire search infrastructure at each site and instead focusing on only exposing the new dataset as a service that is used by the central node, the organization can respond to changing operational priorities regarding which datasets should be added next.

*Example 2:* Executive dashboard. One of our organization's top executives recently asked for a new type of dashboard with specific types of new capabilities. We had already created an enterprise portal environment, and had a number of services and portlets that had not yet been operationally deployed to end users. Within three days we were able to construct the executive's dashboard out of existing services and provide him with a fully functional demonstration.

## Service Contract and Sample Details

### Interface Information

**Service Name (1):** Federated Query (FQ)

**Service Description (1):** FQ is a search service that searches across many disparate data sources without duplicating data, by passing only queries and results between systems.

**Semantic Model (0..1):** Standard entities: Person (Biographical and Biometric identifiers), Organization (Terrorist organization, business, education institution, etc.), Country, Location, Object (Weapon, Vehicle, Computer, etc.), Event, Date, etc.

**Number of Data Types (1):** 5 (simplified example)

**Data Types (0..n):** free text (*string/varchar2/CLOB*), date, integer, floating point, binary (*BLOB*),

**Number of Operations (1):** 10 (simplified example)

**Operations (1..n):** QueryDocuments, RateDocumentRelevance, RetrieveResultSet, RetrieveDocument, RetrieveScannedImage, ExtractEntities, RetrieveNextSet, RetrievePreviousSet, RetrieveNextDocument, RetrievePreviousDocument

**Service Pedigree (1):** Operational Production Service

### Security Information

**Access Criteria and Restrictions (0..n):** Business/Functional Role(s), Security Clearance, Security Caveats, Community of Interest (COI) Memberships, Security Attributes

**Information Security Marking(s) (0..n):** Classifications, Caveats, COIs, Attributes

### Service Level Information

**Number of Service Levels (1):** 3 (simplified example)

**Service Level Specifications (0.n):** Response time, Number of concurrent queries, data quality

### Implementation Information

**Number of Schedule Dates (1):** 7

**Schedule Milestones (1..n):** Implement initial service test environment, Implement initial service production environment, Add data set 1 text search, Add data set 1 scanned images, Add data set 2 text search, Add data set 3 text search, Add data set 3 scanned images.

**Number of Operational References (1):** 2

**Operational Reference (0..n):** FedQ Test URI, FedQ Production URI

**Versioning Approach (0..1):** Major release, minor release, build, patch

### Point of Contact Information

**Number of Contacts (1):** 3

**Contact (1..n):** Project Manager, Technical Lead, Contract Officer, Contract Officer's Technical Representative

### Service Access Point Information

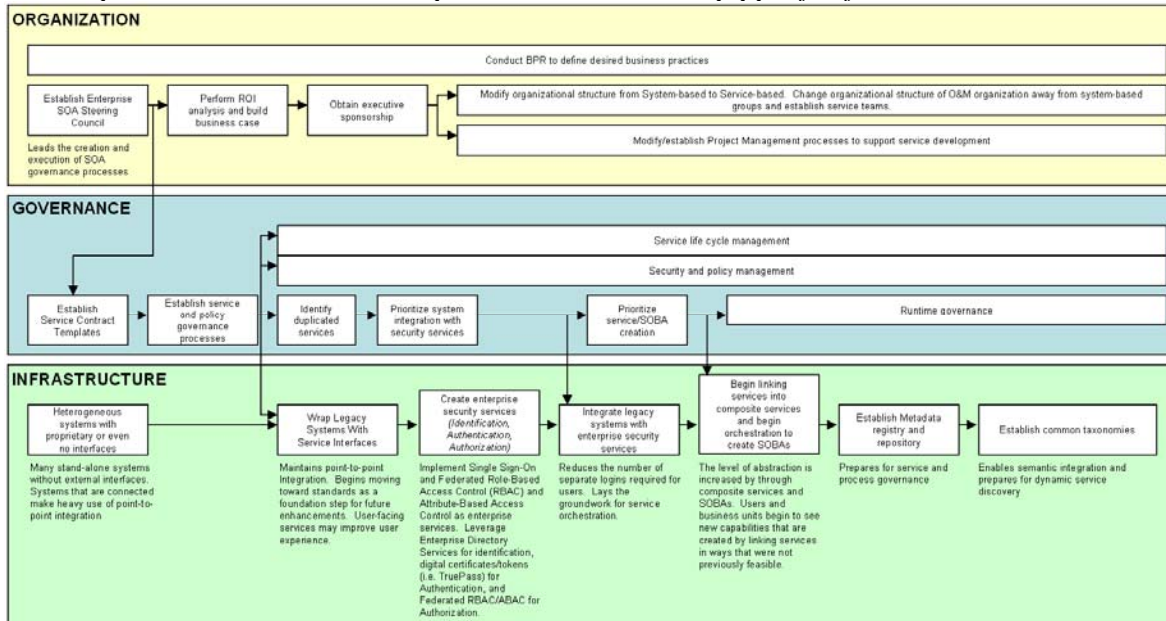
**Number of Service Access Points (1):** 3

**SAP (0..n):** Portal URL, Authentication Info, URI

## Exercise 2 – Creation of a SOA Roadmap/KPI Plan

Develop a visual SOA Implementation Roadmap based on the ZapThink SOA Implementation Roadmap poster.

See [ZapThink Exercise - SOA Implementation Roadmap.ppt] for full-sized version:



Sketch an outline of the primary iterations your organization should complete to execute on their SOA Vision.

Timeline steps are shown in the roadmap above. At a high level, some iterations include:

1. Establish governance process, governance team, and sponsor(s)
2. Approve policy changes to support agile service development
3. Create service contract template(s)
4. Implement messaging layer
5. (Begin iteration loop)
  - Select business problem
  - Perform BPR on selected problem
  - Design services
  - Create services and implement interfaces
  - Demonstrate business solution to sponsor
  - (Return to beginning of iteration loop)

**Identify at least four different categories of milestones to measure (such as infrastructure, organizational structure, etc) and identify how each measurement will help measure the progress and business relevance of the SOA implementation.**

1. Operational structure
  - a. SOA governance body created
    - i. KPIs: Number of members, number of meetings, number of topics reviewed
  - b. Agile process approved
    - i. KPIs: Name(s) of signers, Date of signatures, version number
  - c. Sponsor identified
    - i. KPIs: Name(s) of Sponsor(s), Title of Sponsor(s), Date of Sponsor approval
2. Governance
  - a. Contract template(s) created
    - i. KPIs: Number of contract templates, number of contract template elements defined, contract template “dictionary” created to provide guidance for interpretation and execution of contract templates
  - b. Initial services defined and prioritized
    - i. KPIs: number of services defined, priorities of services, date of prioritization
  - c. Metadata standards approved
    - i. KPIs: Version of metadata standards, Date of metadata standards approval, Names of approvers
3. Infrastructure
  - a. Identity Service available
    - i. KPIs: Date available, Number of production services that use the identity service, Date each production service connected to identity service.
  - b. Authentication Service available
    - i. KPIs: Date available, Number of production services that use the authentication service, Date each production service connected to the authentication service
  - c. Authorization Service available
    - i. KPIs: Date available, Number of production services that use the authorization service, Date each production service connected to the authorization service
  - d. Repository/Registry available
    - i. KPIs: Date available, Number of services registered, Number of artifacts stored in the repository (per type)
4. Architecture
  - a. Architecture design approved
    - i. KPIs: Date approved, Name(s) of approver(s), Version number
  - b. Messaging middleware system operational
    - i. KPIs: Date available, Number of services sending messages, Number of services consuming messages
  - c. 1<sup>st</sup> Line of Business complete
    - i. KPIs: Date completed, Number of services involved, Number of operational users (concurrent, daily, weekly)

**For each milestone category defined above (or as many as time will allow), outline at least three steps in each category that measure progress against outcomes determined by the business case.**

See sub-bullets under previous question.

**For each milestone above, what are the Key Performance Indicators (KPIs) or metrics that you will use to determine whether progress has been made?**

See sub-bullets under the question above.

### **Exercise 3 – Building a Service Model**

(Services implement a Federated Query process.)

#### **Business Services**

- Login
- Submit Query
- Display results
- Retrieve Document
- View Document
- View Scanned Image
- Display Entities/Concepts

#### **Infrastructure Services**

- Identification Services
  - Create User
  - Modify User
  - Delete User
  - Disable User
  - Restore User
  - Validate User
- Authentication Services
  - Assign Certificate
  - Revoke Certificate
  - Validate Certificate
- Authorization Services
  - Grant Role
  - Revoke Role
  - Create User Attribute
  - Modify User Attribute
  - Delete Attribute
  - Verify Role
  - Verify Attributes
- Service Registry
  - Register Service
  - Discover Service
- Indexing Services
  - Index New Data

- Search Service
  - Send query to nodes
  - Submit result statistics
  - Calculate top documents
  - Retrieve document abstracts
- Geospatial Services
  - Normalize Address
  - Geo-tag Address
  - Plot Locations on Map
- Entity Services
  - Extract Entities/Concepts
  - Resolve Entities (identify multiple records that refer to the same entity)
  - Extract Entity Relationships

### **Presentation/UI Services**

- Core presentation
  - Portal presentation service
- Analytical Services
  - Render geospatial map
  - Render relationship diagram

### **Service Domains:**

The service domains can be presented as a visual diagram as shown in the book showing the above hierarchy as the various folder, subfolder, and service levels.

### **Exercise 4 – Up-Front ROA Analysis**

**In what way will your SOA project contribute to a positive ROA for each of the five core business benefits we’ve discussed? (Reduction in expense, increase in reuse, improved visibility, business empowerment, and business agility):**

- Reduction in expense: by switching to a service model, much of the infrastructure can be leveraged and reused by each service, rather than recreating it all for each project/system
- Increase in reuse: see previous bullet
- Improved visibility: By presenting services to users through a consistent interface, with service discovery, users can find new services faster than they could in the previous stove-piped system paradigm
- Business empowerment: by improving efficiency of activities, and creating composite services and SOBAs, time to perform activities decreases, increasing the amount of work products that can be produced.
- Business agility: Increase in effectiveness of employees by providing new services more quickly than has been possible

**Which business benefits will your ROI analysis focus on? Why?**

- Business Agility

- Time to deploy new capabilities
- Business Empowerment
  - Improved efficiency of employee work (Return time to mission)
- Reduction in Expense
  - O&M reduction of duplicate services
  - Reduction of duplication

**How would you calculate your initial investment in this project? Work through the calculation, noting any assumptions you make for the purpose of the exercise.**

- Costs:
  - Number of legacy systems/services to be integrated times average cost per service
  - Implement portal (front door)
  - Implement messaging infrastructure ESB
  - Implement security services for single sign-on
  - Expand infrastructure hardware and software to support new services

**How would you calculate the final value of the project? Work through the calculation, noting any assumptions you make for the purpose of the exercise.**

- Cost avoidance
  - Employee hours (times average labor rate) that would be spent responding to an emergency event (that it is our mission to prevent.)
  - Operations and Maintenance hours (times average labor rate) not spent on the maintenance of duplicate systems and services, once they are retired and replaced with enterprise services.
- Efficiency
  - Hours (times average labor rate) saved by streamlining work processes
  - Number of increased work products generated through the additional time created through efficiencies

**What specific inefficiencies in the business is your SOA addressing? How much are you saving?**

- Duplication of effort
  - Design effort
  - Implementation effort
  - O&M effort
- Employee time inefficiencies
  - Time spend doing duplicate functions in multiple systems

**Exercise 5 – SOA Infrastructure Plan**

**Based on your SOA Roadmap, explain what infrastructure is needed to *define and expose Services* in the current IT environments.**

- Development environment (full Web/App/Data tier design – mirrors Production)
- Test and Integration environment (full Web/App/Data tier design - mirrors Production)
- Production environment (supports Test messages)
- Identify service (Attributes)
- Authentication service (cert/token)
- Authorization service (Role-Based Access Control, Attribute-Based Access Control, Discretionary Access Control)
- XML accelerators (Hardware or software)
- Messaging System
- Metadata Registry/Repository

**Explain what SOA infrastructure is needed to reliably *execute* those Services, without using the term “Enterprise Service Bus” (ESB). Use only exact requirements for the infrastructure runtime and network.**

- Development environment
- Test and Integration environment
- Production environment
- Security Services
  - Identification Service
  - Authentication Service
  - Authorization Service
- Presentation Service (Portal Server, Web/App servers)
- Java/.Net Services
- Messaging System
- Transport Mechanism (TCP)
- Network Layer (IP)
- Data Link Layer (Ethernet)
- Physical Layer (Fiber/Copper)

**Describe infrastructure requirements for metadata management, design time, and change management of those Services. Specifically, explore and explain the role of a Service registry / repository. How will it be used in design time, run time, and change time?**

	Design	Run	Change
<b>Metadata Registry</b>	Discover Services	Service lookup for binding	Discover Services
<b>Metadata Repository</b>	Design Artifacts - Conformance Docs - Schema - Contract Versions - Policies - etc.	Operational Runtime Store - Messages - Policies - Contracts - Logs/Certs/Keys - etc.	Versioning Info Policies

**Which of your infrastructure goals fit into which iterations on your SOA Roadmap?**  
(Inserted as text comments in the SOA Roadmap.)

### **Exercise 6 – Building a Governance Framework**

**Which policies are within scope?**

- Design Policies
  - Security
    - All Services must leverage IAA security services
    - All services must use central audit service
  - Metadata
    - All metadata must adhere to approved standards
    - All metadata must be stored in repository
- Runtime Policies
  - The system must adhere to the documented Quality of Service
  - The system must adhere the documented Service Level Agreement
- Change Management / Versioning Policies
  - All development must be performed in the Development environment
  - All code must be built into automated installation packages
  - All code must be deployed to the Test and Integration environment using the automated installation packages
  - All changes must be tested in the Test environment
  - Changes may not be deployed to the production environment with any remaining Priority 1 or 2 defects
  - All changes must adhere to the versioning standards
  - All changes must adhere to applicable coding, engineering, and SOA standards

### **Who is responsible for creating policies?**

- SOA Governance Council
- Enterprise Architects
- Business Representative(s)
- Operations and Maintenance Organization Lead
- Chief Technology Officer
- Project Management Executive

### **Which policies are automatable?**

In general, policies that deal with how data flows through the system and is handled are automatable, whereas policies that describe human actions or interactions with the system may be *measurable*, but are not automatable.

Security, Metadata, and Versioning policies are examples of prime candidates for being automated. Service Level Agreement and Quality standards can also be largely automated, with the exception of mandated human actions. Some Configuration Management policies can be automated, but others (such as a manual promotion of software between disconnected Development and Test networks) can not be automated.

### **How will policies be created and communicated?**

Policies will generally be created and approved by the SOA Governance Council

Policies will be documented in an XML representation and stored in the metadata repository and may be published using the registry. All service developers access relevant policies from the repository. Policies that support automation should be automated in a Business Rules Engine or other policy engine.

### **How will policies be represented?**

Policies will be represented in XML and stored in the repository.

### **How will policies be discovered?**

Policies will be stored in the repository and published through the registry.

### **What tools will people use to follow policies?**

- Policy mediation system
- Business Rules engine
- Registry/Repository
- Test cases to validate compliance

### **How will management get visibility into policy compliance?**

- Policy mediation system
- The metadata repository, by looking at stored compliance documentation and other artifacts
- System Performance Metrics (for SLAs and Contracts that prescribe mandatory ranges for key metrics)

**How will mitigation issues be addressed?**

Design-time non-compliance will be identified, and corrective action will be required by the SOA Governance Council. Corrections will be made in the service implementation, policy mediation system and/or repository as appropriate, and then verified by the SOA Governance Council.

Run-time policy compliance issues, such as SLA non-conformance, will be evaluated by the SOA Governance Council. If changes to a Business Rules Engine or a similar system would allow for automated handling of future policy non-compliance, then those changes should be made. If manual steps are required then those steps will be identified and performed.

**How should you structure policies for staff to leverage the new SOA-based applications?**

- XML format
- Entered into repository
- Include sample code, schemas, or other artifacts as necessary to assist staff with understanding policies

**How should the architecture team be involved in the new governance framework?**

The enterprise architects should be *core* members of the SOA Governance Council. They should be involved in:

- Establishing contract templates
- Establishing policies
- Managing changes
- Establishing metadata standards
- Prioritizing services
- Reviewing compliance

**How do you draw lessons from a current SOA iteration so that the same mistake doesn't affect the next iterations?**

- Capture lessons learned in the repository as governance artifacts.
- Update repository sample code, contract templates (with new versions), schemas, and other documentation as necessary to address the mistakes.
- The team would then use the updated artifacts as guidance for the next iterations.

## *Exercise 7 – Creating a SOA Project Plan*

### **The Tasks you will need to complete in this project:**

- SOA Preparation
  - Establish enterprise SOA steering Council
  - Perform ROI analysis
  - Build business case
  - Obtain sponsorship
  - Identify project funding and resources
  - Write and propose PM process to support agile service development
  - Get approval for agile development processes
  - Establish service contract templates
  - Establish service and governance processes
- Federated Query (FQ) Activities
  - Perform BPR for FQ process
  - Create process definition (high level)
  - Create Service/SOBA definitions (high level)
  - Perform data analysis (logical)
  - Create data definition (logical)
  - Data modeling (detailed)
  - Service modeling (detailed)
  - Process modeling (detailed)
  - Design Identification service
  - Implement identification service
  - Design authentication service
  - Implement authentication service
  - Design authorization service
  - Implement authorization service
  - Create and configure message broker
  - Design FQ hub node services
  - Implement FQ hub node services
  - Register FQ hub node services
  - Design FQ 1<sup>st</sup> remote node services
  - Implement FQ 1<sup>st</sup> remote node services
  - Register FQ 1<sup>st</sup> remote node services
  - Orchestrate services
  - Test in development/test environment
  - Deploy to production in test mode
  - Test in production
  - Activate to end users

**The resources (people) that you will need to complete this project:**

Project Manager – 1

System Development Manager (Tech Lead/Architect) – 1

Database Administrator – 0.5

Information Systems Security Officer – 0.5

IBM WebSphere specialist – 1

Network engineer – 0.25

Systems Engineer – 1

COTS search tool specialist – 0.5

Service Development Specialist (service interfaces/architecture) – 0.5

Service Developer (programmer) – 1

BPM Specialist – 0.5

Orchestration Specialist – 1

Governance Specialist – 0.25

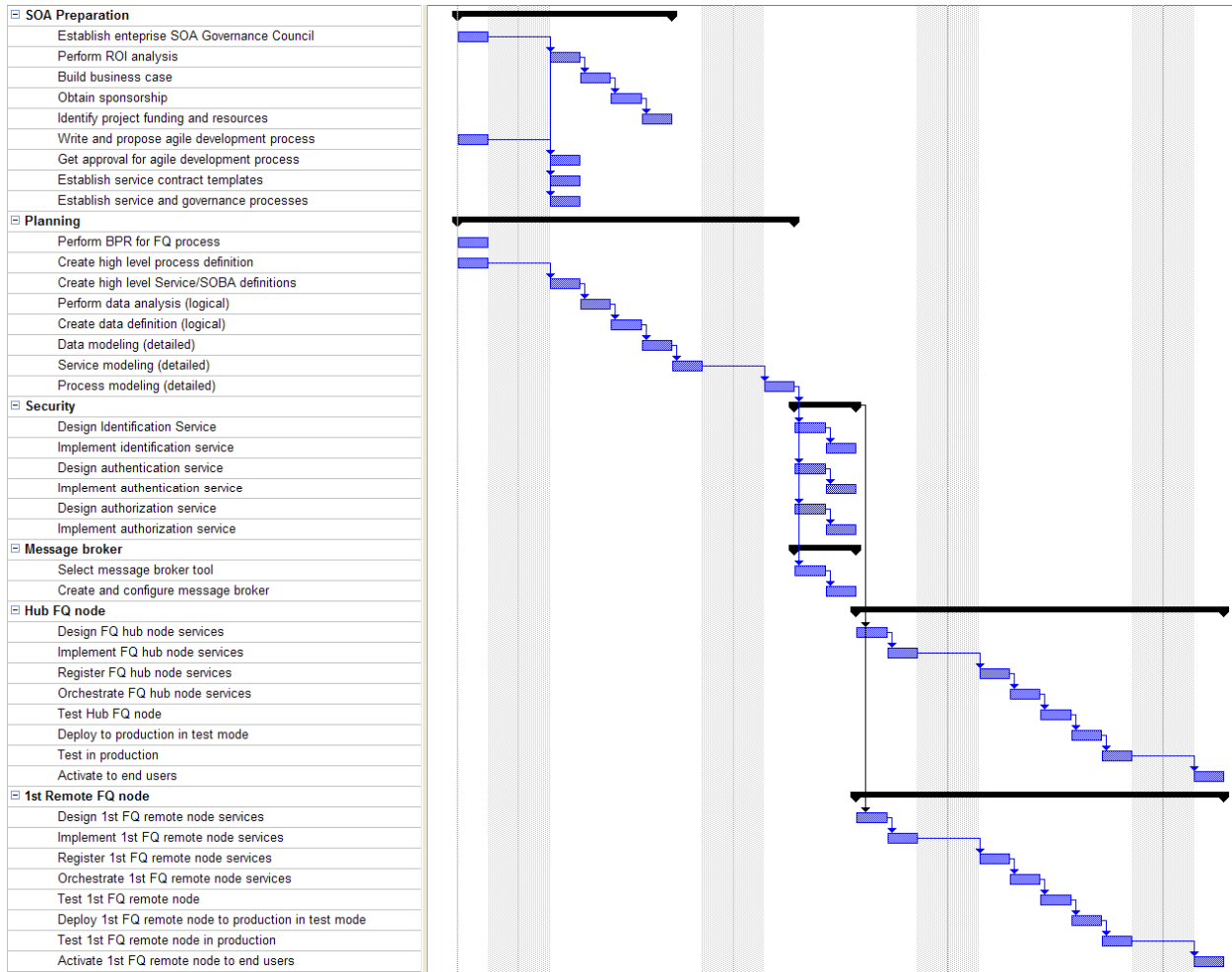
Configuration Management Specialist – 1

Test Specialist – 1

QA Specialist / Project Archivist – 1

Total: 12

**A Gantt chart reflecting the project plan. Your Gantt chart should have tasks along the vertical axis and time along the horizontal axis, with horizontal bars indicating the duration of tasks and dependencies among tasks:**



## ***Exercise 8 – SOA Implementation Test Plan***

### **What is the scope and approach of your testing efforts?**

- Business Function: Federated Query
- Services comprising the composite SOBA – One SOBA for the Federated Query service
- Orchestration Level Testing – test orchestration between component services
- Service Level Functional Testing
- Security Testing – Penetration, Scanning, Process Evaluation (to ensure non-technical vulnerabilities are addressed as well.)
- Integration Testing – data/message level testing of each service
- Governance Testing – contract/policy testing (SLAs, etc.)
- Performance/Stability Testing

### **What features or capabilities will you be testing?**

SOBA: Perform federated search and review results.

(All features or capabilities will be evaluated for functionality, stability, and performance.)

Services:

- Business Services:
  - Submit Query
  - Retrieve Document
  - View Document
  - View Scanned Image
  - Extract Concepts
  - Display Concepts
- Infrastructure Services:
  - Identification
  - Authentication
  - Authorization
  - Service Registry
  - Indexing
- Presentation/UI Services
  - Portal Presentation
  - Render geospatial map
  - Render relationship diagram

**What are the relevant testing tasks, and who on your team will complete them?**

- Develop and document test cases for each layer and type of testing (functionality, stability, and performance)
- Develop test data sets
- Develop test harnesses and stubs
- Install and configure security testing tools
- Install and configure functional testing tools
- Install and configure performance testing tools
- Build test scripts
- Execute security/functional/performance tests
- Panic
- Open defect reports
- Repeat iterations of problem fixes and test execution until no priority 1 or 2 defects remain.

**What risks require contingency planning, if any? Sketch out those contingency plan(s).**

Any risk that affects the ability of the project or services to meet functionality, stability, performance, or business requirements needs contingency planning.

Examples:

- Risk: Network or service fails. Mitigation: Test “off nominal” conditions prior to deployment and ensure services fail gracefully.
  - Preferred result: no user visible effect (this should be the case with sufficient system redundancy)
  - Potentially acceptable result: the affected services are unavailable with graceful notification to users. All other services should remain available.
- Risk: Performance is unacceptable. Mitigation: Test performance and perform tuning prior to deployment
- Risk: Key personnel leave. Mitigation: encourage cross-training throughout development to minimize the effect of loss of a single person.

**What are the release criteria for your project?**

- No priority 1 or 2 defects remain
- Successful completion of User Acceptance Testing
- Completed Operational Readiness Review
- Approval to Operate (ATO) granted by the Security organization

## **Exercise 9 – Development of a Business Case for SOA**

### **Description of the Organization in which SOA Solution will be Proposed**

*(Describe the business overall including its size, IT organizational makeup, and relevant organizational challenges.)*

The SOA solution will be proposed for a large federal government agency with approximately 38,000 employees spread across the nation and many foreign countries. The IT organization includes a mix of government and contract staff of approximately 1,800. The IT organization is broken into four divisions, an IT Policy and Planning Office, an IT Project Management Office, an IT Operations Division, and the Office of the Chief Technology Officer.

The organization is very heavily structured around a system-centric mindset. When new capabilities are needed, a project is started to build a system to address the need. In most cases, integration or even consideration of other systems is minimal. The separation of the IT Policy and Planning office, which includes the enterprise architects, from the Office of the Chief Technology Officer that leads implementation of some enterprise systems significantly limits the role that EA plays in system development. Furthermore, other non-IT divisions fund and execute technology development projects with little direct oversight or direction from the IT organizations, although there are active efforts underway to change this.

There is a *very* heavy project management lifecycle and governance system. An agile development process has been written and proposed (by me) but has not yet been formally approved. There is a rigorous security testing process prior to deployment of any new system, service, or capability.

## **Description of Pressing Business Problem to be solved through SOA**

There are several closely interrelated business problems.

1. It takes a very long time to deploy new capabilities, if they succeed at all. This is primarily focused within the IT division, but limited IT development occurs enterprise wide, so this is actually an enterprise-scale problem.
2. It takes an extremely long time to access key data because it is scattered across many data systems that are currently owned by multiple divisions. This is definitely an enterprise scale problem.
3. It is impossible for users to use analytical tools analyze *all* data because it is not in a system where it can all be accessed. As a result, the staff must do analysis by hand, which is a very slow and time consuming process. This is also an enterprise-scale problem due to the number of different data systems owned by different divisions. The creation of analytical tools can be an IT division problem, but connecting them to key enterprise datasets is an enterprise problem.
4. There is a high cost of maintaining the separate systems, which often duplicate capabilities, and the hundreds of point-to-point interfaces that have evolved among the various systems. As IT functions are consolidated into the IT organization, this is becoming primarily an IT division problem, although there are elements scattered around the enterprise as well.

**Choose one or more ROI characteristic(s) of SOA to be applied and explain how it will address business problem.**

*ROI Characteristics: 1) Cost Reduction, 2) Reuse and Aggregation, 3) Reduction in Liability, 4) Business Empowerment, 5) Increase in Business Agility*

### ***Cost Reduction***

SOA would over time replace the hundreds of point-to-point custom interfaces between systems with a smaller number of loosely coupled standards-based interfaces. These would be significantly cheaper and easier to maintain.

If data were available to be found and accessed through a single system, users would save a considerable amount of time that is currently used with accessing multiple systems. Sometimes, the user has to still travel to specific workstations to access particular data sets. The user has to know and use different interfaces to search for and retrieve data. The user needs to consolidate the data so it can be analyzed together. (Because of the disparate systems, this is often easiest to do in paper form which uses resources that cost money and takes time.) The user then needs to manually analyze the data and determine the next appropriate actions.

Many of those steps will be drastically reduced in duration (and potentially material expense) if the user can access all the data through a single system, and apply advanced analytical tools to the data through the same interface. All of these factors can be estimated and total amount of saved time per year per person could be calculated and converted into dollars (by multiplying time by hourly rate.) Improvement in quality of work product due to an ability to perform more advanced analysis on a larger amount of data is harder to quantify, but just as real and compelling.

### ***Reuse and Aggregation***

Instead of one system having 147 point-to-point interfaces to other systems that were custom coded over time and must be maintained, a much smaller number of common services can be exposed that all other systems link to. Each other system can similarly expose common services. Those services would then be *heavily* reused by having a central messaging and orchestration system that then brokers information between those standard interfaces to serve the same function of the previous 100+ custom interfaces.

Data from disparate systems would be aggregated, allowing much more efficient searching and location of information (a key business factor), and enable new kinds of information analysis that are not currently possible (another key business factor.)

### ***Business Empowerment***

As mentioned above, a significant amount of a user's time (that can be estimated) will be freed for the user to do additional work. This enables the organization to get more work out of the same number of employees. In addition, the quality of the work will increase, because it will be based on a broader range of information than may be practical now, and more advanced analytical tools can be leveraged.

### ***Increase in Business Agility***

One of the biggest reasons for the current IT difficulties is the extremely long time it takes to create or even modify any capability, and the culture that creates a new *system* to serve a new need instead of adding the new capability to existing enterprise systems.

Once an SOA infrastructure is in place, services and service orchestrations can be changed *much* more quickly and cheaply than making the changes to monolithic systems. New capabilities can be created and deployed to end users *much* faster than is currently possible because the infrastructure is reused instead of recreated.

### **Identify who your key influencers will be in the decision making process and their influencer role (executive, economic, technology, or other.)**

- Congress
  - Strong oversight and governance role,
  - Economic (funding) role
- Agency head
  - Executive role, and a strong driver of change, since he is held accountable
- CIO
  - Economic role, since he controls much of the funding
  - Executive role. The CIO is the deciding authority for many technological and strategic questions
- CTO
  - Technology role in selecting the best technologies for given problems
  - Executive role, as he is the decision authority for many technology-related decisions
- Project Management Executive
  - Governance role. The PME is in charge of project management processes, which have a large influence on the process of developing and deploying new capabilities
- Head of IT Policy and Planning
  - Governance role. This office is in charge of project management governance processes. This also has a large influence on the process of developing and deploying new capabilities
- Heads of Functional Divisions
  - Executive and Customer roles. The end users work in functional divisions that are divided by mission area. The heads of these divisions represent their staffs, determine allocation of resources (both funding and personnel) to support new IT projects. These individuals strongly influence the priorities of IT development.

**For each influencer, identify how SOA solution will benefit them and how important the addressed business problem is to their daily responsibilities.**

- Congress
  - Our organization will be able to demonstrate a significant acceleration in creating new capabilities and improving our ability to perform our mission.
  - This is of strong interest to them, but is relatively minor in the overall context of their daily responsibilities.
- Agency head
  - He is held accountable to Congress and others for our organization's ability to perform our mission. He will be able to demonstrate the new capabilities and show our accelerated improvements.
  - This has a very strong impact on his day to day responsibilities.
- CIO
  - The CIO controls the IT budget, and loses a great deal of his budget to maintaining hundreds of custom interfaces and other inefficiencies. He is held accountable by the agency head to deliver new capabilities and improve existing capabilities. The SOA solution will enable him to accelerate the pace of both of these needs.
  - This has a very strong impact on his day to day responsibilities.
- CTO
  - The CTO is held accountable for implementing new technologies on behalf of the CIO. A SOA architecture would allow the CTO to respond to new requirements much more rapidly and at less cost than is currently possible.
  - This is a significant part of his day-to-day job, and would have a strong impact.
- Project Management Executive
  - The Project Management organization is responsible for planning and managing the projects to create new capabilities. This is now almost exclusively treated as the development of new systems. There is a very heavy overhead involved in managing larger projects, and they are inherently very risky. An SOA infrastructure would allow projects to be broken down into much smaller pieces, simplifying management and oversight requirements (and reducing the associated costs) and reducing risk.
  - This has a relatively small effect on the day to day responsibilities of this influencer compared to the others.
- Head of IT Policy and Planning
  - The head of IT Policy and Planning is held accountable for IT governance activities. This currently involves a very time consuming review of thousands of pages of project documentation and artifacts for very large projects. Breaking projects down into much smaller efforts to create services would reduce the current governance overhead, which simultaneously changing the types of governance activities performed. New SOA-related governance would be added. Instead of being the "paperwork police" they would be actively involved in improving the infrastructure and processes.
  - This would have a significant impact on day to day activities, because it changes their nature considerably.

- Heads of Functional Divisions
  - The head of each functional division is held accountable for that division's ability to meet its mission. They are almost universally frustrated at the slow pace of IT change. All heads of the functional divisions would see an improvement in their employees ability to perform their mission if the IT organization was able to begin adding new capabilities and improving the efficiency of the existing capabilities to meet their needs.
  - Improving the pace of IT enhancements and providing new services that meet their requirements would have a profound effect on their divisions' abilities to perform their mission.

## Exercise 10 – Planning SOBAs

**In this exercise, consider the Services in your Service model, as well as the business processes at your organization or the ones in the Zapco scenario. Construct at least three new business processes using the Services in your Service model.**

### ***1. Federated Search with Entity Expansion***

This SOBA performs a federated search, but includes entity expansion within it, so if a user submits a query for a person, but an alias for that person is contained in another system, the alias is extracted and automatically inserted into the query. The SOBA uses the following services, in order. (Note the same service, Submit Query, is used twice in this SOBA with different data.) The services in blue are the ones that differ from the standard Federated Search SOBA.

- *Submit Query*
- *Security Validation*
  - *Validate User*
  - *Validate Certificate*
  - *Verify Role*
- *Extract Entities (from search terms)*
- *Resolve Entities (identify any other aliases or names that may in fact be the same person)*
- *Submit Query (with original terms and resolved aliases)*
- *Search*
  - *Send query to nodes*
  - *Submit results statistics*
  - *Calculate top documents*
  - *Retrieve document abstracts*
- *Display Results*

### ***2. Federated Search with Location Extraction***

This SOBA adds geospatial mapping services into the standard federated query SOBA. Locations are extracted from the relevant documents and automatically displayed in a map on the search results screen. The services in blue are the ones that differ from the standard Federated Search SOBA.

- *Submit Query*
- *Security Validation*
  - *Validate User*
  - *Validate Certificate*
  - *Verify Role*
- *Search*
  - *Send query to nodes*
  - *Submit results statistics*
  - *Calculate top documents*
  - *Retrieve document abstracts*
- *Retrieve Document (repeated for the top N documents.)*
- *Extract Entities/Concepts (pulls location information from free text documents)*

- *Process Locations (repeated for each extracted location)*
  - *Normalize Address*
  - *Geo-tag Address (convert address to geospatial latitude/longitude coordinates)*
  - *Plot location on map*
- *Display Results*
- *Render geospatial map*

### **3. Federated Search with Entity Expansion and Location Extraction**

This SOBA combines the previous two to search on the primary search terms plus aliases, and extract location information from resulting documents and display on a map. Blue and Green lines represent the services that differ from the standard Federated Query SOBA.

- *Submit Query*
- *Security Validation*
  - *Validate User*
  - *Validate Certificate*
  - *Verify Role*
- *Extract Entities (from search terms)*
- *Resolve Entities (identify any other aliases or names that may in fact be the same person)*
- *Submit Query (with original terms and resolved aliases)*
- *Search*
  - *Send query to nodes*
  - *Submit results statistics*
  - *Calculate top documents*
  - *Retrieve document abstracts*
- *Retrieve Document (repeated for the top N documents.)*
- *Extract Entities/Concepts (pulls location information from free text documents)*
- *Process Locations (repeated for each extracted location)*
  - *Normalize Address*
  - *Geo-tag Address (convert address to geospatial latitude/longitude coordinates)*
  - *Plot location on map*
- *Display Results*
- *Render geospatial map*

### **Which of the business processes lend themselves to SOBAs? Why?**

They type of business processes that lend themselves to SOBAs are made up of multiple steps which are consistent and repeatable, where the steps can be automated as services and orchestrated. If a business process needs services to be executed in different orders or in an ad hoc manner, it is probably not a good candidate for an SOBA and may be better to remain as separate services.

### **Which Services in your Service model are more likely to be reused in SOBAs? Why?**

- Security services
  - These are common infrastructure services that are likely to be required by a large number of other services
- In general, services that accept data and either translate it into a different format or extract new types of information from the input, are prime candidates for reuse. Examples from my service list include Extract Entities, Normalize Address, Render Geospatial Map, etc. Entities can be extracted from many types of data sources, many data systems contain addresses in “dirty” form that can be cleansed and normalized, and many different data sets lend themselves to geospatial mapping.

### **Which SOBAs should be exposed as mashups? Why?**

SOBAs that provide data, process data, and result in a user display lend themselves to being exposed in a mashup. Mashups are focused around the presentation to the user. Services that display documents to users, display structured database records on people or organizations, display visual diagrams showing relationships between entities, and display location information overlaid on a geospatial map are all examples of user-facing services that lend themselves well to being exposed in a mashup.

### **Given your governance framework from the previous exercise, how will you govern your SOBAs?**

SOBAs should be governed as any other service. They should be stored in the repository with all their metadata and artifacts, exposed through the registry, and managed by the same governance process (i.e. Enterprise SOA Council) as any other service.