Making SOA Implementations Real: Six Steps for the Development of an SOA Strategy

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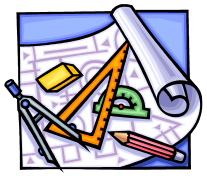
Agenda

Service-Oriented Architecture Background 

SOA Strategy Elements

Wrap-Up and Next Steps

What is SOA?



Service-oriented architecture is a way of designing, developing, deploying and managing systems, in which

- Services provide reusable business functionality via well-defined interfaces.
- Service consumers are built using functionality from available services.
- There is a clear separation between service interface and service implementation.
  - Service interface is just as important as service implementation.
- An SOA infrastructure enables discovery, composition, and invocation of services.
- Protocols are predominantly, but not exclusively, message-based document exchanges.

Services

Services are reusable components that represent business/operational tasks.

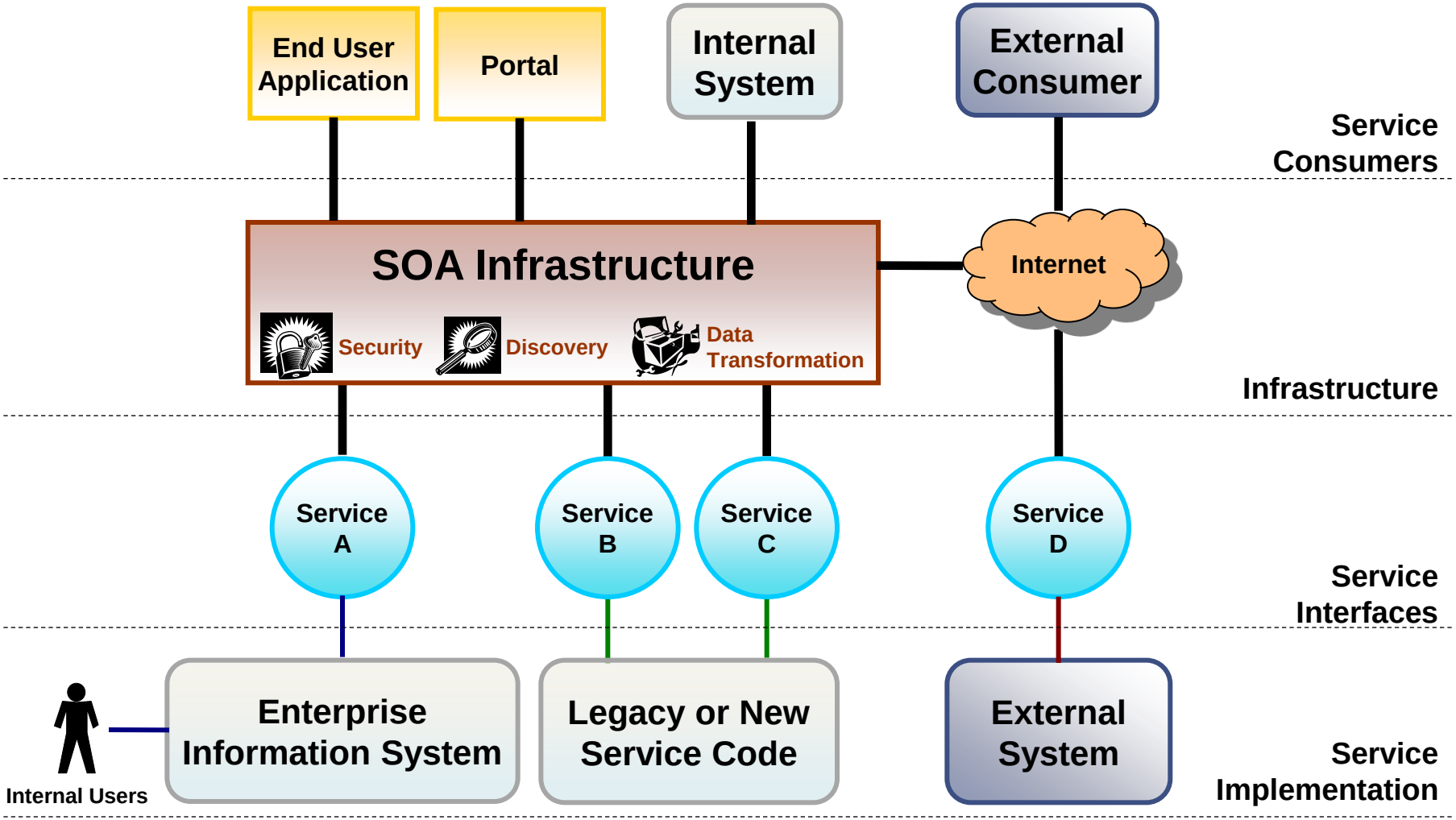
- Customer lookup
- Credit card validation
- Weather
- Hotel reservation

Services can be

- Globally distributed across organizations
- Reconfigured into new business processes

Service interface definitions are well-defined artifacts available in some form of service registry.

Components of a Service-Oriented System



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Six Steps for Development of SOA Strategy

SOA Vision	SOA Adoption Goals	Sources for Components of Service-Oriented Systems
Budget and ROI	Workforce Skills	Implementation Plan

SOA Vision

A SOA Vision is a succinct statement describing a long-term picture of SOA adoption effects on the organization

- “All communication with external organizations is done via services …”
- “Services are available in a repository for application developers in order to eliminate duplication of effort and provide a single source of data …”
- An online portal is available to provide controlled access to all reports produced by the organization …”

Starting points for establishing an SOA vision

- Existing organization mission or vision
- High-level goals from enterprise architecture
- Statement of purpose for SOA adoption

SOA Adoption Goals

SOA Vision	**SOA Adoption Goals**	Sources for Components of Service-Oriented Systems
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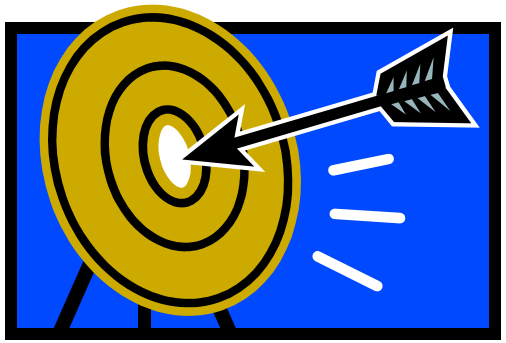
Goals for SOA Adoption

In the shorter term, business and mission goals need to drive decisions on SOA adoption.

Examples of business goals

- Reduce time-to-fielding for new systems
- Increase information available to customers
- Integrate coalition or business partners
- Decrease development cost by increasing reuse
- Reduce maintenance costs
- Improve customer service
- Improve internal processes



How Business and Mission Goals Can Lead to Different SOA Adoption Goals

Business Goals	SOA Adoption Goals
Increase information available to business customers	• Creation of services related to information of interest to customers • Deployment of an intuitive customer portal
Integrate business partners	• Documentation of business rules and processes for integration with business partners • Deployment of a SOA infrastructure that promotes heterogeneous interoperability
Improve business processes	• Identification of key business processes • Elimination of application and data redundancy • Creation of services from legacy systems that support key business processes

SOA Adoption Goals

A *SOA Adoption Goal* is a single, well-defined and desired future state to be achieved by the organization on its way to reaching its *SOA Vision*.

Criteria

- traceable to the *SOA Vision*
- separable from other goals
- important to the organization and its mission
- realistic for the organization
- clear
- strategic

Example of a SOA Adoption Goal: *The availability of services reduces application development time by 40% for financial applications*

Sources for Components of Service-Oriented Systems

SOA Vision	SOA Adoption Goals	**Sources for Components of Service-Oriented Systems**
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Components of Service-Oriented Systems

The elements of a service-oriented system are

- Services (Service Interface + Service Implementation)
- Service Consumers
- SOA Infrastructure

The next element of a SOA strategy is the identification of sources for these components

- What services best support the SOA adoption goals?
- What service consumers will make use of these services?
- What SOA infrastructure needs to be in place to connect service consumers to services and meet requires system qualities and organizational policies?

Process for Service Identification

1. Identify business processes that support SOA adoption goals.
2. Identify candidate services.
   - Top-Down
     - Shared steps between business processes are identified as service candidates.
   - Bottom-Up
     - Legacy system inventory is performed.
     - Systems with functionality to support business processes are identified as migration candidates.
3. Select services based on relationship to SOA adoption goals.

What Constitutes a “Good Service”

Represents common tasks across multiple use cases or workflows

Have (or may have) multiple consumers

Enables consumers to bind to services programmatically

Corresponds to functionality of a stateless nature

- Service has no knowledge of previous visits or expects to be invoked in a certain order—not coupled with other services

Enables service inputs and outputs that do not require the construction of very complex consumers

Is of a request-response nature

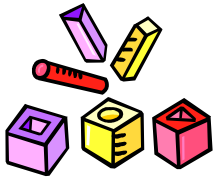
- Although SOA 2.0 supports events

Legacy System Challenges

It may not always be possible to reuse functionality of legacy systems by exposing them as services.

Cost of exposing a legacy system as services may be higher than replacing it with a new service-oriented system.

Examples of Challenging Legacy System Characteristics



Poor separation of concerns

- User interface code tightly coupled with business function code

Tool availability

- Target is Web Services; XML and SOAP libraries are not available for all legacy platforms.

Architectural mismatch

- The asynchronous call to the service might be in conflict with legacy system synchronous behavior.

Operational mismatch

- The legacy system is batch-oriented, the service user expects an immediate response.

Dependencies on commercial products

- Licensing issues?

Service Consumer Identification

Service consumers are clients for the functionality provided by the services

- End-user applications
- Internal systems
- External systems
- Composite services

Consumers programmatically bind to services

- There is code in the service consumers that binds to the service
- This is not the same as web-enabling a system—providing a web interface to an existing system
- The “user” for a service is the service consumer developer

SOA Infrastructure Decisions 1

The SOA infrastructure is the set of technologies that bind service consumers to services

- Often considered middleware—not wrong, just limited
- A common commercial implementation of a SOA infrastructure is an Enterprise Service Bus (ESB)

Real-world SOA implementations show three things

- SOA infrastructures are usually not implemented out-of-the-box
- SOA infrastructures are a set of products rather than a single product—which is usually why it is referred to as the *SOA Stack*
- SOA infrastructures need to be set up before service development starts because they will place constraints on services

SOA Infrastructure Decisions 2

Decisions related to SOA infrastructure that will need to be made at some point—sooner rather than later

- Degree to which implementation will be “plain vanilla” or complex
  - Factors include special needs for security, service composition, service registry, management, logging, etc.
- Criteria for selecting technologies and tools
- Standards to implement
  - There are currently 250 different WS-* standards for implementation of Web Services, sometimes competing standards
- Process for contextual evaluation of tools, technologies and standards
- Technical and educational support (pre- and post-deployment)

Budget and ROI

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Costing for SOA Projects

One way to view cost is from the perspective of the components of a service-oriented system

- Infrastructure
- Adaptation/Creation of Service Consumers
- Services
  - Service Interfaces
  - Service Implementation
- Governance

Another way to view cost is from a life cycle perspective

- Preparation
- Implementation
- Deployment
- Management

Cost and Budget Recommendations

Consider all elements of service-oriented systems

Take an incremental adoption approach (more on this later)

Do not underestimate preparation costs

Make upfront decisions on funding for shared services

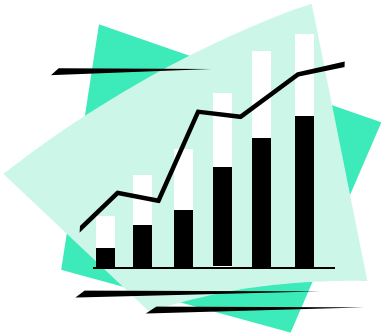
- Codify some of the elements as SOA Governance
- Consider maintenance as well as development costs

SOA and ROI

Calculating the ROI for any software project is difficult, especially when it is based on technologies that a new for an organization.

But in the end, from a business perspective, the main concerns include

- Is it worthwhile to invest in SOA?
- What is the full range of the required investment?
- What are the benefits and the time frame for achieving the benefits?
- How can the benefits be operationalized?
- Are the benefits being realized within the expected time frame?
- If not, what are the reasons?
- Is the investment in SOA justified?



Workforce Skills

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Budget and ROI	**Workforce Skills**	Implementation Plan

Service-Oriented Systems Require a Different Mindset

Traditional Systems	Service-Oriented Systems
Tight coupling between system components	Loose coupling between service consumers and services
Semantics shared explicitly at design time	Semantics shared without much communication between developers of consumers and services —In the future, even at runtime
Known set of users and usage patterns	Potentially unknown set of users and usage patterns
System components owned by the same organization	System components potentially owned by multiple organizations

Some Implications for Requirements Activities

Requires an business process management (BPM) focus

Must deal with a larger number of stakeholders

First step is to look at the inventory of business processes and services

- Negotiation and adaptation to increase reuse
- May cause refactoring of services
- A high quality registry makes the process easier

In the case of service providers, in many cases they need to work with potential requirements

- In the same way COTS product vendors work

Some Implications for Architecture and Design Activities

The responsibilities of each system component need to be clearly defined—consumers, services and infrastructure

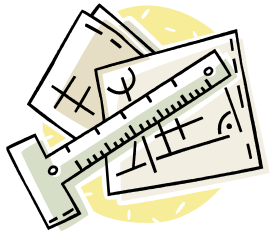
- Security, transaction management, data transformations, etc.

Constant technology evaluation

Evaluation of expected quality of service (QoS)

- Tradeoff analysis
- Contextual experimentation
- Implications of external consumers and services

All architecture and decisions must promote reuse



In the End: Less Control

Requires giving up full control—not easy

- Tradeoff is agility

Important to anticipate objections and understand validity.

- Security
- Performance
- Control

Greatest challenges come from

- Single organization may not own the complete system
- Services used in unknown ways by (potentially) unknown users

Education and training on new mindset is needed.

Strategic Development of Workforce Skills

Make sure the workforce understands the change in mindset.

Determine if appropriate skills are available.

- Determine needed skill mix and map to current resources.
  - Both in-house and among relevant contractors
- Develop plan for acquiring or growing skills.
  - Needs for hiring or for adding consultants
  - Training curriculum based on courses, webinars, books, journals, magazines, etc.
- Develop hands-on experience appropriate to job requirements

Develop “how-to” guides to ease training of new workforce

Implementation Plan

Pilot Projects

Ideal pilot projects are those with the greater impact but the lowest risk, e.g.

- Access to widely used data
- Infrastructure services
- Replacement for redundant functionality

Start within one area.

Pilot projects are also ideal for technology evaluation.

A service registry is often the biggest “seller” within an organization.

- Advertisement for present and future services

Implementation Plan

Make decisions on services, service consumers and infrastructure

- Identify source of services
- Develop standards for evaluating and selecting services
- Identify service consumers
- Identify infrastructure requirements

Start developing SOA Governance

Implement an initial pilot project

- Develop schedule and resource requirements for pilot
- Develop success criteria for pilot
- Implement pilot
- Evaluate pilot against success criteria
- Document lessons learned
- Plan next increments

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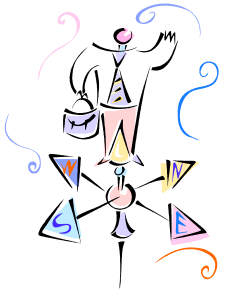
Summary



A SOA Strategy is a high-level plan for strategic SOA adoption.

- SOA Vision
- SOA Adoption Goals
- Sources for Service-Oriented System Components
- Budget and ROI
- Workforce Skills
- Implementation Plan

SOA adoption requires a change of mindset that has to be represented in the SOA Strategy.