Service-Oriented Modeling Framework (SOMF) Overview

Service-Oriented Development Life Cycle Modeling

Modeling Framework (SOMF) for the Enterprise
Service Structures

Composite service hierarchical formation

Indivisible software asset

Distributed and related software assets

Composite Service

Atomic Service

Service Cluster
Service-Oriented Modeling Conceptual Styles

Motivation: How to Discover Conceptual Services, Relate Concepts, Generalize or Specify Concepts, Create Organizational Service Taxonomies, Identify Service Reusability Opportunities, and Overcome Service Interoperability Challenges

Service-Oriented Modeling Styles for Messaging, Workflow, Orchestration, Logical Composition, and Service Transactional Patterns

Circular | Hierarchical | Network | Star
Service Life Cycle

- Conceptual Service
- Analysis Service
- Design Service
- Solution Service
Service-Oriented Discovery & Analysis Modeling
Service-Oriented Discovery & Analysis Modeling Benefits

- Service Discovery
- Proposing a Service-Oriented Solution
- Identifying Service Granularity Levels
- Service Life Cycle Traceability
- Business, ROI, and Founding Traceability
- Architecture Best-Practices Traceability
- Technological Traceability
- Tracing Service Transformations
- Software Asset Reuse
- Facilitating Efficient SOA Integration Strategies
- Offering Methods for Abstracting SOA Technologies
- Abstraction of Architectural Components
- Proposing Service-Oriented Asset Management Methods
- Fostering SOA Best-Practices
- Enabling Business & Technological Traceability
- Tracing Service Analysis Decisions & Train of Thought
- Resolve Business Process & Service Containment Aspects
Motivation: How to Discover and Analyze services for Granularity, Reusability, Interoperability Success, etc…
I have always wanted to own a bank. So my initial step was to provide Checking Account offerings to my first clients...
But my clients demanded more than a Checking Account service. I added a Savings Account service to my line of business!
To further generalize my business and expand it to other territories, I grouped these services under the name Banking Account Service, so in the future I can add more banking services...

Note the “Aggregated” notation used to depict service aggregation.
Composite Structures are Hierarchical Formations

Here I even suggested to accentuate Customer as the most important aspect of my business. Thus, I added Customer Accounts offerings to provide customer support, internet access, and more.

Note the “Aggregated” symbol used to identify containment.
Composite Structures Are Aggregated Formations

And finally I was able to provide a small Equity Trading Account Service to augment my business offerings!

Service G was aggregated into F
But when a recession hit the street, people diversified their investments, and moved their attention to Fixed-Income investment opportunities. My business suffered a great loss! Thus I instructed to retire the Equity Trading Account service.

Subtraction Operations Are all about Elimination of Assets!

The “Subtracted” symbol indicates service retirement

Partial Notation
Software Asset Consolidation is on the Horizon! We Start with Service Decomposition...

Just as every good business, it was the time to reorganize! It seemed logically that the Customer Accounts service should be consolidated with the Banking Account service. So what do we do next?

Use the “Decomposed” symbol to break down coarse-grained services.
I ordered to demote the Customer Accounts service before merging it with the Banking Account service.

Consider Decomposition and Transformation of Assets!

Use the “Transformed” symbol to signify the transition from a composite to an atomic service.
Continue with Decomposition of Assets!

And I also ordered the demotion of the Banking Account service!

The “Decomposed” symbol indicates service break down.
The Banking Account service was demoted. At this point, we were ready to consolidate....

Since service C is empty, it's being transformed to an atomic service A-C.
Unification of Atomic Structures

We finally consolidated these two service offerings in anticipation to even merge more assets.

The “Unified” symbol indicates Consolidation of services.
Comments and Sequence of Events are always Welcome!
Aggregation of Services Combines Related Software Entities

A-C, A-F atomic service transformed to CF (composite service) because it aggregates now services D and E.
Distributed Service Formations

- Understand Distributed Formation
- Understand Interoperability
- Understand Reusability
- Understand Service Relationship
Creating Cluster Formations

Cluster CL-A aggregates services D and G.
Cluster CL-A also aggregates services E and F.
Exploring Service Commonalities

Cluster CL-B aggregates services H, J, and I.
Clusters CL-A and CL-B intersect. Services E and F reside in the overlapping clusters' area.
Application Level Service-Oriented Analysis
Imagine a Java Program named BankingAccount.Java that has 16 business activities that provide Banking Account services:

- Get User ID
- Get User Password
- Get User Profile
- Authorize User
- Deposit To Savings Account
- Get Savings Account Balance
- Get Savings Account Interest Rates
- Get Savings Account Balance
- Deposit To Checking Account
- Get Checking Account Balance
- Get Checking Account Interest Rates
- Get Checking Account Balance
- Get Accounts Statement
- Get Accounts Total Balance
- Get Accounts Total Withdrawals
- Get Accounts Total Deposits
 Wouldn't it be Easier to logically partition these methods into four distinguished groups?

1. Login method group
2. Savings Account method group
3. Checking Account method group
4. Banking Account method group
...And Wouldn’t it be practical to regard each of these method groups as a service?
1. Login Service
2. Savings Account Service
3. Checking Account Service
4. Banking Account Service
If this makes sense, we can visualize this formation as a composite service that contains smaller and finer grained services. The most generalized service, the Banking Account service that consists of general banking account activities (methods), is regarded as a composite service that aggregates smaller services (fined-grained), each of which is an atomic service (indivisible entity).
During your service-oriented analysis phase, you may want to decompose your Baking Account Composite Service, reduce its size and increase the reusability rate of the Login Atomic Service. The Login.Java is the program that executes the Login Atomic Service.
While analyzing your services, the Login Atomic Service may be a candidate for aggregation. You may want to include it in the already existing BankingUtility.Java program to join the other utility services that are aggregated into the Banking Utility Composite Service.
Service Analysis Process Traceability Perspective

Analysis Decisions are Your Company's Intellectual Property.
SOMF Can Assist You to Document this Process and Your Train of Thought, and Preserve Analysis Considerations
The Service-Oriented Modeling Framework (SOMF) introduces a formal language that can be used to describe an analysis process. This approach advocates that you preserve and document the train of thought that influenced your analysis decisions. Note the sequence of events in the below service analysis diagram.
SOMF Enables Business & Service Life Cycle Traceability
If you are describing a service life cycle you can even add next to each step the affiliated costs and execution dates. This can improve your future business traceability and enhance your future budget projections.
Architecture Traceability Best-Practices
During your service-oriented analysis process identify SOA best practices that are advocated by your SOA government organization.
Enterprise Level Service-Oriented Analysis Modeling
Service-Oriented Business Integration Modeling
Service-Oriented Business Integration is About:

- Understanding Business Ownership
- Facilitating Efficient Service-Oriented Funding System
- Assist with Establishing a Business Sponsorship System
- Aligning Business & IT Operations
- Creating Architecture Style Taxonomy
- Categorizing & Cataloging Business Architectures
- Cataloging & Cataloging Technical Architectures
- Understanding Business Structures: Business Layers & Tiers
- Understanding Contextual Business Architecture
- Understanding Business Distributability
- Aligning Business Architecture & Technical Architecture
- Establishing Service Distribution Strategies
- Encouraging Software Reuse
- Fostering Software Asset Consolidation
- Alleviating Interoperability Challenges
Service-Oriented Business Integration Modeling Notation

Motivation: How to Align Business & IT, Align Services with Business Processes, and integrate Services with Business Domains
What are the Business Integration Types?

Service-Oriented Business Integration Toolbox

Structural Integration

Contextual Integration
Structural Business Integration
Service-Oriented Logical Design Modeling
Benefits of Service-Oriented Logical Design Modeling

- Establishing Service Relationship
- Understanding Service Cardinality
- Founding Service Visibility & Containment Aspects
- Planning Efficient Message Exchange Synchronization
- Service Interface Discovery
- Discovering SOA Intermediaries
- Establishing Service Behavior
- Discovering Service Contract Structure
- Modeling Service Transactions
- Establishing Service Indirection Strategies
- Establishing Service Compositions that Drive Implementation Strategies
- Finalizing Service Packaging
- Encouraging Software Reuse
- Fostering Software Asset Consolidation
- Alleviating Interoperability Challenges
Motivation: How to Present Service Relationships, Design Message Exchange Paths, Package Services, Design Transactions and Depict Service Behavior

Service-Oriented Logical Design Notation

Intermediary Flags

Assets Notation

Design Relationship Connectors

Apparent Unidirectional

Implied Unidirectional

Comment

Apparent Bidirectional

Implied Bidirectional

Transaction Connectors

Originating Activity Connector

Intermediating Activity Connector

End-of-Activity Indicator

Design Composition Styles

Circular

Hierarchical

Network

Star

Atomic Service

Composite Service

Service Cluster

Consumer
Service-Oriented Analysis Proposition Diagram

Proposed in the Service-Oriented Discovery & Analysis Phase

Download Market Overview Composite Service (analysis service)

Visual Effects Composite Service (analysis service)

Market Analysis Atomic Service (analysis service)

Images Atomic Service (analysis service)

Stock Charts Atomic Service (analysis service)
Here is how this is being translated to Logical Design Relationship Diagram.
Service-Oriented Conceptual Architecture Modeling
Service-Oriented Conceptual Architecture Benefits

- Abstracting Technical Assets for Better Asset Reuse
- Generalizing Architectural Concepts by Employing Architectural Metaphors
- Providing Technological Direction
- Depicting Organizational Architectural State
- Establishing Architectural Roadmap
- Employing a Modeling Language to a Depict Conceptual Architecture
- Discovering Architecture Imperatives
- Aligning Architecture Initiatives with Business Goals
- Establishing Business Ownership
- Establishing a Technology Stack
- Encouraging Software Reuse
- Fostering Software Asset Consolidation
- Alleviating Interoperability Challenges
Motivation: How to Describe an SOA Technological Environment, Generalize SOA Technical Concepts, Identify Business Stakeholders, Create an SOA Technology Stack, and Depict an Architectural Direction?
Service-Oriented Conceptual Architecture Diagram

Sports News Database Services (technological asset)

Sports News Web Services (technological asset)

Sports News Broadcaster Architectural Concept (data machine)

Sports News Station Architectural Concept (rendering machine)

Sports News Portal (JSR 168) (technological asset)

Application Server (technological asset)

Sports News Hub Architectural Concept (connecting machine)

Sports News Division (business domain)

SOA Enterprise Service Bus (technological asset)

SOA Intermediary (technological asset)
Service-Oriented Logical Architecture Modeling
Logical Architecture Operation Notation

- Utilized
- Executed
- Comment

Logical Architecture Ecosystem

Motivation: How to Depict an SOA Logical Environment, Integrate SOA Software Assets, Establish SOA Dependencies, Identify Reuse Opportunities, and Encourage Loosely Coupled Architectural Environment
Service-Oriented Logical Architecture Service Utilization Diagram

Financial News Network

<table>
<thead>
<tr>
<th>Consumer Tier</th>
<th>Service Tier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial News Consumer Portal (technical Asset)</td>
<td>Financial News Provider Service Cluster (technical Asset)</td>
</tr>
<tr>
<td>‘Attains Financial News by Utilizing’</td>
<td>‘Transmits Financial News by Utilizing’</td>
</tr>
<tr>
<td>‘Exchanges Messages with’</td>
<td>‘Exchanges Messages with’</td>
</tr>
<tr>
<td>ESB Products</td>
<td>SOA Intermediary Products</td>
</tr>
</tbody>
</table>
To Read More About SOMF...

Service-Oriented Modeling Framework (SOMF) for the Enterprise