Implementing Real Solutions Using the NGOSS Methodology

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Implementing Real Solutions
Using the NGOSS Methodology:

NGOSS Lifecycle & Methodology

Joel J. Fleck, II
Chief Architect, Hewlett-Packard
Why an NGOSS Lifecycle?

- To assure that roles, requirements, models, implementations and deployments all contribute in a holistic manner to the solution.
- To provide traceability throughout the lifetime of an NGOSS Solution
- To provide a documented means of utilizing, extending and enhancing the NGOSS Knowledge Base
Why an NGOSS Methodology?

- To provide a consistent, documented manner for understanding, defining, modeling, developing, integrating and deploying NGOSS Solutions
Goals of the NGOSS Lifecycle and Methodology

Develop an NGOSS Lifecycle and Methodology that:

- Utilizes/borrows the best parts/strengths of Zachman, RM-ODP, MDA and USDP
- Promotes and strongly encourages linkage between NGOSS eTOM, NGOSS SID and NGOSS Architecture
- Emphasizes “consumer” - “provider” relationship for each level of decomposition
- Facilitates the identification of “testing” points that can be used to test/monitor/manage the health of both NGOSS solutions under development and deployed NGOSS solutions
Service Provider Business Perspectives

- Agility
- Cost Reduction - Profit Improvement
- Joined up solutions
- Flexible Service Creation
- More Performing: People & Systems
- Autonomic capability - policy based management
“The challenge has been, and still is today, to rapidly find the exact knowledge artifact needed for a given situation. As the volume of available knowledge increases, so does the difficulty of locating the correct artifact. Because of how we have structured our information- document-centric world, we are constantly engaged in this tug of war. The more voluminous our libraries get, the harder it becomes to recall anything with a high degree of precision.”

Arthur J. Murray, D.Sc, J-KMCI Vol. 1 No 1
What Should an NGOSS Methodology Include?

- Formalized expression of Business Problem/Solution
- Linkages from the Business Problem/Solution to the technical/realization models (i.e., Architectural Traceability):
  - Traceability from the business problem/solution through each level of decomposition & refinement (vertical traceability)
  - Traceability from the process model to the data model to the policy model at each level (horizontal traceability)
- Documented steps and guidelines for developing an NGOSS Solution using the NGOSS Methodology
- Capability of being mapped onto major Architectural Frameworks
- Use Case driven
- Iterative
What Are We Borrowing?

- Zachman
  - Emphasis on Enterprise and Business Model

- MDA
  - Meta-Models
  - Business (CIM) - Technology Neutral (PIM) - Technology Specific (PSM) Separation of Concerns
  - Ability to use a model to specify architectural artifacts (as the model changes, code is updated to reflect those changes)

- RM-ODP
  - Viewpoints (particularly Computational, Engineering and Technology)
  - Strong support for modeling distributed architectures

- USDP
  - Use Case Driven
  - Iterative Approach
NGOSS SANRR Methodology

1. **SCOPE**: Define Solution Boundary including Solution Mission Goals, and High-Level *Use Cases*

2. **ANALYZE**: Document existing (legacy) and desired environments with detailed *Use Cases*, *Process Maps*, *Activities* and *Policy Lists*

3. **NORMALIZE**: Map current view onto common vocabulary to achieve a “single unified model” (using *SID*)

4. **RATIONALIZE**: Examine normalized model for needed changes (Gap Analysis, Replication Analysis, Conflict Analysis). Terminate when no more changes needed

5. **RECTIFY**: Modify, delete or add functionality (*Contractually Specified*) to resolve needed changes identified in Step 4. Once complete, cycle to Step 3.
Roles in NGOSS Lifecycle

Create Solution High Level Use Case

Business Solution Definition Use Case

Roles

- Solution Manager (1)
- Subscriber (2)
- Market Analyst (2)
- Account Manager (2)
- Customer (3)

Supporting Use Cases

System Solution Design Specification Use Case

Roles

- Solution Designer (1)
- Information Modeler (1)
- System Architect (1)
- Service Architect (1)

Supporting Use Cases

Solution Implementation Use Case

Roles

- Solution Delivery Manager (1)
- Subscriber (1)
- System Manager (1)
- Service Operator (1)
- Network Operator (1)
- Data Modeler (2)

Supporting Use Cases

Notes:
- Bold Italic: Roles indicate accountability
- Following numbers (n) indicate Primary, Secondary or Tertiary Actors
- Interactions between Accountability Roles for each View follow indicated doubled headed black arrows
- Use Cases that span one or more Views are constructed as a coordinating Use Case that orchestrates the use of non-spanning Use Cases
Implementing Real Solutions
Using the NGOSS Methodology:

NGOSS Information Models

Cliff C. Faurer
Technical Director – NGOSS Program
NGOSS Lean Operator: Strategy

- Goal, Context, Capabilities & Constraints
- A Blueprint for Change
  - Understand the current behaviors
  - Communicate the desired behaviors
  - Actionable plan to implement the necessary changes
  - Continuous monitoring and management to maintain desired course
- Policies and Processes drive behavior

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Business requires fluid adaptability at all levels:

- **Process & Policy**: rules are “applied” to govern the expected behavior (both at people and systems level) to achieve the desired outcome – reach the goal!

- **People**: effective collaboration, decision making and accountability throughout the solution lifecycle: business – system – implementation – deployment

- **Technologies**: requires technology neutral architecture framework capable of integrating and being implemented by any technologies
Beyond SoA: NGOSS System Architecture ...

- Problem Understanding - Use Case
  - Capture and communicate stakeholder understanding of the challenge
  - Description of what should happen

- Solution Specification - Contract
  - Capture and communicate results of working the challenge into a solution statement
  - Description of how the challenge will be met
  - Unit of service specification

- Component - unit of service deployment
# Enhanced Telecom Operations Map®

**Enterprise Management**

<table>
<thead>
<tr>
<th>Strategy &amp; Enterprise Planning</th>
<th>Enterprise Risk Management</th>
<th>Enterprise Effectiveness Management</th>
<th>Knowledge &amp; Research Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial &amp; Asset Management</td>
<td>Stakeholder &amp; External Relations Management</td>
<td>Human Resources Management</td>
<td></td>
</tr>
</tbody>
</table>

**Strategy, Infrastructure & Product**

<table>
<thead>
<tr>
<th>Strategy &amp; Commit</th>
<th>Infrastructure Lifecycle Management</th>
<th>Product Lifecycle Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing &amp; Offer Management</td>
<td>Service Development &amp; Management</td>
<td>Resource Development &amp; Management (Application, Computing and Network)</td>
</tr>
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<td>Supplier/Partner Relationship Management</td>
<td></td>
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**Operations**

<table>
<thead>
<tr>
<th>Operations Support &amp; Readiness</th>
<th>Fulfillment</th>
<th>Assurance</th>
<th>Billing</th>
</tr>
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<tbody>
<tr>
<td>Customer Relationship Management</td>
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**Customer Effectiveness Management**

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**Enhanced Telecom Operations Map®**
eTOM v4.0
NGOSS SID – Product-Service-Resource

involvedProductOfferings

ProductOffering 0..1 0..n

Product 1

ProductItem 1

ProductSpecification 0..n 0..1

madeAvailableAs

offeredAs

hasProductItems

involvedProductSpecs

ProductItem 0..n

Service 1

ResourceFacingService 1

CustomerFacingService 1

Resource 0..n

ResourceFacingService cfRequiresRFServices

LogicalResource 1 0..n

Resource 0..n

physicalResourcesHostRFS

LogicalResource ForRFS

pResourceSupportsLResource

PhysicalResource 0..n 1..n
NGOSS SID – Top of Generalization Tree

```
RootEntity
  userDefinedName : String
  description : String

Entity   Specification   Identification   Role   Characteristic   Party   Location   Management Domain   Policy
```

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Roles in NGOSS Lifecycle
Create Solution High Level Use Case

Business

Business Solution Definition Use Case
- Solution Manager (1)
  - Subscriber (2)
  - Market Analyst (2)
  - Account Manager (2)
  - Customer (3)

Roles

Supporting Use Cases

System

System Solution Design Specification Use Case
- Solution Designer (1)
  - Information Modeler (1)
  - System Architect (1)

Roles

Supporting Use Cases

Solution Deployment/Operation Use Case
- Service Delivery Manager (1)
  - Subscriber (1)
  - System Manager (1)
  - Service Operator (1)
  - Network Operator (1)
  - Data Modeler (2)

Roles

Supporting Use Cases

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Example: Order Handling Business Use Case

Order Handling

- Customer
- Supplier Partner
- Customer Interface

Pre-Order Processing

Amend Order

«extend»

Cancel Order

«include»

Analyze Order Feasibility

Process Order

Authorize Credit

Issue Order

Track Order

Manage Jeopardy

Complete Order

Internal Engineering

NOC

Receive Order Request

Validate Order Request

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Courtesy PEA and mldapce
Example: Business Flow for Product Ordering
Example: Business Contract governing Product

GovernsBusinessServices 0..n

BusinessContract 0..n

GovernsBusinessResources 0..n

GovernsBusinessServiceDetails 0..n

GovernsBusinessProductDetails 0..n

GovernsBusinessProduct 0..n

Product 0..n

ProductHasCustomerFacingServices 0..1

ProductHasPhysicalResources 0..1

Resource 0..n

ResourceFacingService 0..n

CustomerFacingService 0..n

Service 0..n

PhysicalResource 0..n

LogicalResource 0..n

LogicalResourcesImplementRFS 0..n

PhysicalResourcesHostRFS 0..n

CFServiceRequiresRFServices 0..1

PResourceSupportsLResource 1..n
View of the data from Market, Sales and Order points-of-view

May require new device to use enhanced features

Translated into ProductSpecs, ProductOfferings, and Products

Customers Contract

Product Contract

Physical Resource Contract

CustomerFacingService Contract

ResourceFacingService Contract

Gold Service

Route Forwarding

VoIP

VPN

Device OS

Traffic Identification

Traffic Conditioning

Import Policies

Export Policies
NGOSS Lifecycle and Methodology
address all stakeholder views

No big bang project, must use tools to make knowledge visible and manageable through each solution project iteration
Implementing Real Solutions Using the NGOSS Methodology:

DSL Fulfillment Example

Giuseppe Covino
Project Manager, Telecom Italia Labs
The context of the project – model requirement

The research project is investigating practical usage of TMF guidelines and artifacts along with evolution of OSS platforms beyond bus based architectures.

Data model is a key factor: to mitigate the pain of OSS integration, it must:

- cover all SP domains
- be extensible and “tailorable”
- be powerful and/but not too complex
- aim to broad diffusion.

SID was the choice
Case study: DSL fulfillment

SOHO customer requests of rich DSL offerings delivery, comprising
- broadband Internet connectivity
- LAN configuration at their premises
- mailboxes

Order handling and network activation phases are considered (Billing for next phase).

Multi-vendor and multi-technology network equipments involved:
- ADSL DSLAM Alcatel, Marconi, Siemens
- ATM switch Cisco 86xx, 88xx; Element Manager CWM
- B-RAS Cisco 6400, 7500
Ports, CTP, connections and links

- TTP trail (end-to-end)
- CPE
- CTP connection
- CTP link
- DSLAM
- Mr. Dante's port
- transport & IP network
Resource domain model – Logical Resource

**ManagedTransmissionEntity**
- «Attr» additionalInfo : CDMstring
- «Attr» mteAdministrativeState : CDMinteger
- «Attr» logicalAlarmReportingEnabled : CDMboolean = true
- «Attr» logicalAlarmStatus : CDMinteger = 0
- «Attr» isMTEOperational : CDMboolean
- «Attr» typeOfMTE : CDMinteger
- «Attr» operationalState : CDMinteger

**Pipe**
+ «AttrReq» isUniDirectional : CDMboolean
+ «Attr» operatingLayerRate : CDMstring

**TerminationPoint**
+ «AttrReq» direction : CDMinteger
+ «Attr» vendorTPName : CDMstring

**Pipe**
+ «AttrReq» isUniDirectional : CDMboolean
+ «Attr» operatingLayerRate : CDMstring

**Connection**

**Trail**

**ConnectionTerminationPoint**
- «Attr» mappingMode : CDMinteger
- «Attr» ctpState : CDMinteger
- «Attr» supportedConnectionRates : CDMinteger

**TrailTerminationPoint**
+ «AttrReq» id : CDMIdType
+ «AttrReq» label1 : CDMinteger
+ «AttrReq» label2 : CDMinteger

**LogicalPortTI**
+ «AttrReq» id : CDMIdType
+ «Attr» name : CDMstring
+ «Attr» description : CDMstring
+ «AttrReq» adminStatus : CDMinteger
+ «AttrReq» operStatus : CDMinteger
+ «AttrReq» index : CDMinteger
+ «AttrReq» customerInterfaceNumber : CDMstring
+ «AttrReq» isInterfaceEnabled : CDMboolean

**CTPointTI**
+ «AttrReq» id : CDMIdType
+ «AttrReq» label1 : CDMinteger
+ «AttrReq» label2 : CDMinteger

**LogicalPortTI**
+ «AttrReq» id : CDMIdType
+ «AttrReq» portType : CDMstring
+ «AttrReq» customerInterfaceNumber : CDMstring
+ «AttrReq» isInterfaceEnabled : CDMboolean

**PhysicalPortTI**
+ «AttrReq» id : CDMIdType
+ «Attr» name : CDMstring
+ «Attr» description : CDMstring
+ «AttrReq» adminStatus : CDMinteger
+ «AttrReq» operStatus : CDMinteger
+ «AttrReq» index : CDMinteger
Lesson learnt

- SID wider coverage is very good for an ISP, ranging from customer accounts to termination points of connections.
- SID/UML extensibility has revealed essential to fit specific SP needs.
- Network technology specific models have been plugged in (e.g. ATM).
- The interconnected models are somehow complex: learning curve a bit slow, so...
- More guidebooks are welcome to understand semantics of entities and where to extend.
Thank You!

For more information visit:

tmforum.org