Semantic Architecture Knowledge

Fundamental Business Architecture Framework
Strategic Business Architecture

**WHY**
- The ‘Formal Link’

**WHAT**
- Extreme Semantic BPMN

**HOW**
- Business Strategy
- Business Processes
- Applications, Services, Data, Infrastructure
Business Strategy and Operating Models

OMG Business Motivation Model

Business Operating Model

Business Model Canvas

Value Reference Model
## Levels of Detail

### Strategy / Scope
- Planning
- A “context diagram”
- Clarify boundaries, process vs. organization
- Decomposition
- Operating Model

### Concept / Operation
- Understanding “Business-oriented” overview of concepts
- Maximize participation
- The “flow of work,” case by case (“tell a story”) Boxes and lines – Value Streams

### Detail / Execution
- Specification
- All detail for implementation
- Completeness and rigor
- Detailed flow (BPMN) plus “out of context” rules, procedures, logic, etc.
- Boxes, lines, operators, ...

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### Process

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**Diagram:**

- Boxes, lines, operators, process flow.
• Policy Level
  – Ambiguity is necessary to preserve implementation options

• Implementation Level
  – Precision is necessary to ensure consistent and compliant execution
Hierarchy of Models

Operating Model
- Provides Context
- Show Focus Areas

Value Chain
- Show Dependencies
- Organized around Outcomes

Value Chain Segments
- Show High-Level Info Flow
- Organized around Key Concepts

Business Process Map
- Shows Activities, Decisions, Services, and Responsibilities
- Organized around Objectives
Policy Level

Business Strategy / Model / Goals

End-to-End Processes

Business Process Area

Business Process

Implementation Level

Precision through Decomposition

Level of Ambiguity

Refinement and Specification
Modeling Views

Milestones

Handoffs  Decisions  Procedures
The Essential Link

H2R → P2P → O2C → B2C

Determine Need → Select Supplier → Purchase Good/Service → Receive Good/Service → Pay Supplier

Business Strategy / Vision / Goals

Milestones

Handoffs → Decisions → Procedures

Business Capabilities

View Projection
Business Capability

• The ability to achieve a Desired Effect
  – under specified [performance] standards and conditions through combinations of ways and means [rules, activities, and resources] to perform a set of activities.
    • Desired Effect: a (specific) desired state of a (specific) resource.
      – A precise and detailed way of stating a strategic goal

• This is something we want, not something we do
  – Capabilities are directly related to Strategic Goals
    • They should be associated with metrics / targets
Activity

• Work, not specific to a single organization, weapon system or individual that transforms inputs (Resources) into outputs (Resources) or changes their state.

• This is something we do in order to achieve what we want
  – Activities are composed into processes
  – At some level, a process realizes a capability
  – Distinction between operational ‘business’ process and procedural ‘implementation’ system level process
    • Operational is ‘what’, implementation is ‘how’
So What?

• Capabilities are things we want
  – Abilities to achieve goals by any means

• Activities are things we do
  – Ways and means of realizing a capability

• Distinguishing what we want from what we do is critical for strategic management and analysis, allowing us to:
  – Compare different things we do to achieve the same thing we want
    • Analysis of alternatives
  – Identify when we do the same thing in different places to achieve what we want
    • Redundancies
  – Assess how well we are achieving what we want
    • Measurable goals
  – Assess how well we are doing what we do
    • Measurable activities
Architecture & Vocabulary

Consistent Rendering from Requirements Capture to Implementation

Model Structure
Model Data

Domain Content

Vocabulary

Target Audience: Engineer/Implementer

Target Audience: Domain Expert

Fit-for-Purpose Rendering based on Stakeholder Needs

Model Architecture & Vocabulary

Architecture
Model

Described by
Captures
Captures
Captures

Model Data Saved as

Vocabulary Saved as

9/14/11
Architecture as Semantic Information
Models and Meta-Models

Meta-Model

- Capability
- Value Chain Segment
- Activity
- FlowNode
- SequenceFlow

Model

- H2R
- P2P
- Create Procurement Requisition
- Develop Procurement Strategy
- Award Procurement Instrument
- Finalize Request For Proposal
- Review and Approve Request for Proposal
Minimal Core Meta-Model

Define Capabilities
What is the architecture supposed to achieve?
Items: • Objectives • Goals • Value

Define Activities
Which processes/activities will provide the capabilities?
Items: • Verbs

Define Resources
Which data/resources will be consumed or produced?
Items: • Nouns

Define Performers
Who/What will be involved?
Items: • Roles • Systems • Actors
Relationships Among Concepts

Define Capabilities

- Capability

Define Activities

- Activity (Process)
- Sub-Activity (Activity)
- Resource (Data)

Define Resources

- Resource (System/Person)

Define Performers

- Performer

Capability realized through Activity

Performs Resource

Resource (System/Person) is a Performer

9/14/11
Distributed Federation

Enterprise ‘upper’ Meta-Model

- Capability
- Activity
- Resource
- Performer

Strategy / Policy

- Enterprise Vocabulary (metamodel extensions)
- Enterprise Architecture (reference models)

Functional Domains

- Functional Domain Vocabulary (metamodel extensions)
- Functional Domain Architecture (reference models)

Operating Units

- Operational Vocabulary (metamodel extensions)
- Operational Architecture (reference models)

Implementation Models

- Implementation Vocabulary (metamodel extensions)
- Implementation Architecture (execution models)

Scope

Concept

Detail

Systems / Services
Summary

• Semantic approach leverages ontologies to describe domains (meta-model) and content (model)
  – Lean minimal core that easily extendable
  – Supports linkage of distributed federated domains
• Need ‘upper’ ontology to provide basic core concepts
  – For elementary concepts (capability, activity, resource, performer)
  – For elementary properties (relationships between concepts)
• Agile extension with domain ontologies to provide context
  – Domain-specific concepts and relationships (BPMN for process, FIBO, …)
  – Domain ontologies map to concepts in the upper ontology
• System ontologies to provide architecture details
  – System-specific concepts and relationships
  – Map to domain ontology or directly to upper ontology