Tutorial

Using UML and ODP for Enterprise Architecture

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www.cuml.org
Summary

Some concepts apparently missing from UML:

Joint action
Dependability
Configuration state machine
Signal
Flow
Joint action

Every UML action is the action of a single object.

UML behavior specifications show interactions of several objects, but each behavior specification must be attached to a specific object.
Dependability

Dependability [2-13.5]
  • Failure
  • Error
  • Fault

Failure transparency [3-16.2]

www.cuml.org/ RM-ODP/ Part2/ 13.html #13.5
www.cuml.org/ RM-ODP/ Part3/ 16.html #16.2
Configuration state machine

UML state machine wants to be connected to a classifier or a behavioral feature of a classifier.

There is no straightforward way to use a state machine as part of the specification of a configuration of objects.
3-7.2.2 Interaction rules ... The participants in an ... operation can have an inconsistent view of an interaction at different times, especially when failures have occurred. In contrast..., there is no concept of partial failure of a signal -- a signal either succeeds or fails identically for both participants in the interaction.
Flow

3-7.1.5 Flow: An abstraction of a sequence of interactions, resulting in conveyance of information from a producer object to a consumer object.
Summary

Some concepts apparently missing from ODP:

Association
Signal
Association

Neither association nor relationship appear as an ODP concept. However, the reference model makes frequent use of the term, relationship.

The ODP concept of relationship is captured by the General Relationship Model [X.725 | IS 10165-7] [www.cuml.org/GRM](http://www.cuml.org/GRM)

ODP relationship includes association and other UML relationships.
Signal

ODP does not have a concept that corresponds closely to UML signal.

When we get to the computational viewpoint, we will see how the equivalent capability is provided in two different ways.
A relaxed attitude

At this time, the best approach to using UML to prepare an integration specification may be to have a relaxed attitude to UML restrictions.

This is the approach that has been taken by many UML modeling tool vendors, who permit drawings that violate UML restrictions.
ISO/ IEC & ITU

The joint technical committee of ISO and IEC is considering a proposed new work item to prepare a standard UML profile for ODP modeling.

At the time of preparation of these slides, I do not have the alphabet soup that identifies the proposed new work item. I’m sure most of you are not interested. Those who are, please e-mail me. mailto:joaquin@acm.org
Quick ODP overview

For the text of RM-ODP, see

www.cuml.org/RM-ODP
Some important ODP concepts

Viewpoint
Viewpoint correspondence
Distribution transparency
ODP function
2-3.2.7 Viewpoint (on a system): a form of abstraction achieved using a selected set of architectural concepts and structuring rules, in order to focus on particular concerns within a system.
Viewpoints

Enterprise
Information
Computational Engineering
Technology
Viewpoint

Enterprise Viewpoint

Information Viewpoint

Technology Viewpoint

Engineering Viewpoint

Computational Viewpoint

The System
Viewpoint Correspondence

Enterprise Viewpoint

Computational Viewpoint

Information Viewpoint

Technology Viewpoint

Engineering Viewpoint

→ correspondence
Transparencies

Access transparency
Failure transparency
Location transparency
Relocation transparency
Migration transparency
Persistence transparency
Replication transparency
Transaction transparency
Functions

Management functions
  Node, object, cluster, and capsule management

Coordination functions
  Event notification, checkpointing and recovery, deactivation and reactivation, group, replication, migration, engineering interface reference tracking, transaction

Repository functions
  Storage, information organization, relocation, type, trading

Security functions
  Access control, security audit, authentication, integrity, confidentiality, non-repudiation, key management
Two UML Models

Single system
  • One system
  • The environment of that system

Enterprise integration
  • Again one system
    composed of several parts
    — the several systems to be integrated
  • The environment of that (i.e. those) systems
Enterprise view

What we are specifying and why

A view of an ODP system and its environment that focuses on the purpose, scope and policies for that system.
Enterprise view

Purpose

Scope

Policies
Enterprise view

Purpose
- Text
- Collaboration

Scope
- System boundary in collaboration

Policies
- Constraint
- Comment
Information view

Monolithic view

A view of an ODP system and its environment that focuses on the semantics of information and information processing
Information View

Invariant Schema

Dynamic Schema

Static Schema
Information View

Invariant Schema
- Class diagram
  - Association
  - Other constraint

Dynamic Schema
- Behavior specification
- But …

Static Schema
- Object diagram
Computational view

Modular view

A view of an ODP system and its environment which enables distribution through functional decomposition of the system into objects which interact at interfaces.
Computational View

Configuration

• Object
  — Object
  — Multiobject
• Role
• Interface
• Binding object
• Interaction type
Computational View

Interaction types

- Signal
- Operation
- Flow
Computational View

Interaction types
- Signal
- Operation
- Flow

What about:
Broadcast, publish/subscribe, message, event, notification, ...
ODP Event Notification

3-13.1 Event notification function
The event notification function records and makes available event histories.

www.cuml.org/RM-ODP/Part3/13.html#13.1
Engineering view

Mechanisms for distributed interaction

A view of an ODP system and its environment that focuses on the mechanisms and functions required to support distributed interaction between objects in the system.
Engineering View

Configuration (of objects)

- Refinement Dependency «refine»
- Subsystem
Technology view

Standards to be followed

A view of an ODP system and its environment that focuses on the choice of technology in that system.
An apology

Due to the need to prepare for an ISO editing meeting and to work on UML 2 and MOF 2 submissions, I was unable to complete the drawings and notes for these slides before the deadline.

A complete set of slides and notes is at:

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