Training

ANSAwise - The ODP Enterprise Model [Eurocontrol]

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Abstract

This module of the ANSAwise training course programme describes the ODP Enterprise viewpoint, shows some examples of enterprise modelling in action, and explains the agent-activity-resource technique for enterprise modelling.
Enterprise Modelling for Distributed Systems
In this session

- Explain the concepts in the ODP Enterprise viewpoint
- Show examples of enterprise modelling in action
- Explain a simple technique of enterprise modelling
A scenario - enterprise viewpoint for urban planning

- The local authority for Newtown wants to encourage new housing and high-technology industry to move in

- The authority decides to provide electronic access to its Planning and Land Registry Functions

- The leading architects in the town (Arch Ltd) develop interactive design conferencing services with their clients

- The local authority out-sources management of its telecommunications services to Teleco plc
Who are the stakeholders?

- **Service providers**
- **Service users**
- **Regulatory authorities**
- ... potentially, every organization in the value chain of service provision
- *Often, start by concentrating on*
  - a particular business activity (group of services)
  - as seen by a particular stakeholder
  - in a particular scenario
What is enterprise modelling?

• *The Enterprise is concerned with purpose...*
  - why do we provide the services we do? What are they really for?

• “*The Enterprise viewpoint is concerned with social, managerial, financial, and legal policy issues”...*
  - ... more simply: people, targets, money, agreements,...

• *Enterprise modelling allows you to describe an organization and its systems...*
  - ... to explore alternatives
  - ... to match your understanding against stakeholders’ perceptions

• *This description is an enterprise specification*
Enterprise specification

- An enterprise specification answers these questions
  - What service is being provided?
  - Who is it provided to?
  - Under what circumstances is it provided?
  - What obligations and liabilities are incurred by service provision and use?
Some enterprise specification concerns

- **Remuneration**
  - how and when is payment made?

- **Availability**
  - when is the service to be introduced?
  - during what times is the service available?
  - when is the service to be phased out?

- **Security**

- **Quality of service**
A larger-scale example

- A UK organization using ANSA
  - £100 billion turnover
  - £1.4 billion budget
  - 67,000 staff
  - 1000 offices
  - 30 million ‘customers’

- In this organization, the enterprise modelling focuses on process analysis, security, and system management

- The aim is to control cost, risk, and timescale
Enterprise specification in ODP

- **An enterprise specification is concerned with**
  - purpose
  - scope (or boundary)
  - policies

- **As we shall see, enterprise specifications have a legalistic flavour**
ODP enterprise modelling

- The ODP Reference Model standardizes
  - the content of the enterprise specification (‘Enterprise language’)
  - validity rules (‘structuring rules’)

- It does not standardize
  - the form of the enterprise specification (a way of writing it down; a notation as text or diagrams)
  - the process of enterprise specification (a particular modelling method)
“Enterprise language?”

- What the ODP Reference Model calls “Enterprise language” is really a carefully chosen set of concepts

  - it is not a specification language, nor an interface definition language with its own syntax

  - so there is no ODP “Enterprise Language Reference Manual”

- To write down an enterprise specification, you need to devise your own notation for these concepts (text, diagrams, or both)
Techniques for enterprise modelling

- It could be cumbersome to write an enterprise specification
- Consider simple techniques (rather than a entire modelling method)
- Here is the agent-activity-resource (AAR) technique

Both the technique and the notation are our own
- they are not standardized
Using the AAR technique

- There are six kinds of relationships....

- ... each has a different meaning
The AAR relationships

Agent

Resource

Activity

- access, ownership
- authorization
- remuneration, management
Agent-Agent relationships

- These represent structural roles
  - for example, delegation and authority relationships

[Diagram showing a relationship between Project Manager and Team Member with an arrow labeled 'briefs']
Agent-Resource relationships

- These represent access rights
  - for example, the right to create, destroy, or reserve a resource
Agent-Activity relationships

- These represent functional roles
  - for example, control or supervision

```
Stock Controller

supervises

Stocking
```
Activity-Resource relationships

• These represent transformations

- for example, creation, destruction, and consumption
Resource-Resource relationships

- These represent formations
  - for example, containment

![Diagram showing Wheel has Spoke relationship]
Activity-Activity relationships

- These represent interactions
  - for example, the initiation or termination of another activity

Diagram:
- Sales Enquiry → Quotation
- "triggers"
Agents

- **Individuals, organizations, and systems each control themselves**
  - they are active
  - they are autonomous
  - they are represented as agents

- **No agent can impose control over another agent**
  - the other agent can (deliberately or accidentally) behave differently
  - ... people and things do not always do what we hope!
  - ...failure is natural and expected, and must be described explicitly

- **Instead of control, there is negotiation of contracts**
Contracts

• **Interaction between agents is via contracts**
  
  “A contract is an agreement governing part of the collective behaviour of a set of objects”

• **A contract places obligations on the objects involved**

• **The specification of a contract may include:**
  
  - the roles of the objects concerned, and their associated interfaces
  - quality-of-service attributes
  - indications of durations or periods of validity
  - indications of behaviour which invalidates the contract
  - liveness and safety conditions

• **Negotiation can be automated by matching contract specifications**
Contract specifications

- As well as agents, contracts involve
  - activities: what each agent is obliged to do (and in what order)
  - resources: what they do it with

- Policies can constrain contracts
Policies

• *Policies specify bounds on intended behaviour, for example*
  - security policy: who will be offered the right to use a service
  - remuneration policy: when service users are obliged to pay
  - arbitration policy: who resolves contractual disputes

• *Policies are application-specific*
  - payment may involve a subscription charge, per-use charge, per-time-unit charge...

• *Policies can change*
  - “this month’s special offer...”
Policy specification

• *A policy is a set of rules related to a particular purpose*

• *A rule for a particular behaviour can be expressed as:*
  - an *obligation*: the behaviour is required
  - a *permission*: the behaviour is allowed
  - a *prohibition*: the behaviour is forbidden

• *In other words, rules specify rights and responsibilities*
  - permissions empower, with rights
  - obligations and prohibitions constrain, with responsibilities
Communities

- Enterprise objects are grouped into communities
  - a community has an objective: a common purpose
  - the members of the community share this objective
  - this objective is also a contract
Federation

- **A federation is a particular kind of community**
  - ... a voluntary community
- **Members of a federation have freedom**
  - ...freedom to join
  - ...freedom to leave
- **Members are still subject to their obligations**
  - joining and leaving will be governed by the community’s contract
- **Administration within a federation is co-operative (peer-to-peer)**
  - ... there is no single administrator
An exercise - air traffic control

• Model the Air Traffic Control enterprise in terms of
  - entity-entity relationships
  - federated authorities
The scope of enterprise modelling

- Enterprise modelling can deal with political and economic issues

- Social issues are a research area

- Technological issues can be dealt with by representing systems as agents
  - other aspects of technology belong in the other ODP viewpoints
Modelling your system - agents and boundaries

• **Represent your enterprise as a community**
  - identify its objective (‘corporate mission statement’)
  - it will probably be a federation (of departments or divisions)

• **Represent ‘internal customers’ as agents**

• **Represent ‘external customers’ as agents**
  - include all the stakeholders, not just customers and suppliers

• **Represent a ‘system of interest’ as an agent**
  - normally a computer system

• **Inspect the boundaries of the enterprise**
  - it may not match the boundary of your business
Modelling your system - contracts

• Identify the resources

• Identify the activities

• Specify the contracts, obligations, and responsibilities
Summary

• **Enterprise specification is a model of the purpose of an enterprise**
  - expressed as contracts between agents that are members of communities

• **The focus for enterprise modelling depends on your business needs**

• **Enterprise modelling will be much easier with tool support**

• **For more on:**
  - the Enterprise viewpoint, see *Architecture and Design Frameworks* (TR.38.00)
  - the AAR technique, also see *Architecture and Design Frameworks* (TR.38.00)