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Training

ANSAwise - Enterprise Modelling for Distributed Systems

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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.

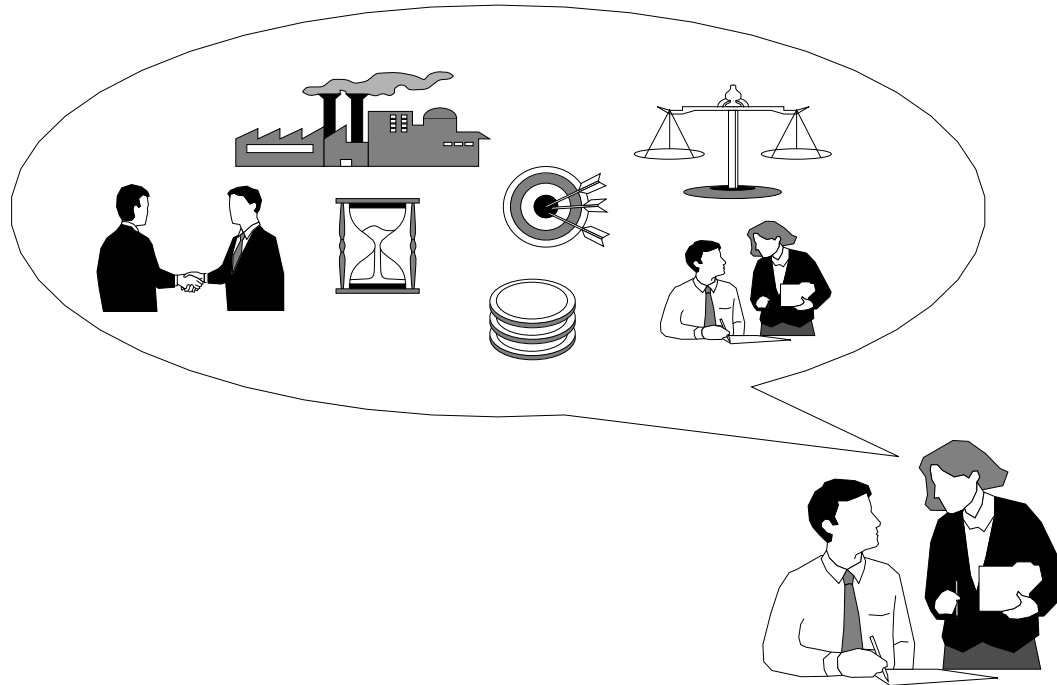
APM.1313.02

Approved
Briefing Note

24th October 1994

Distribution:
Supersedes:
Superseded by:

Enterprise Modelling for Distributed Systems





In this session

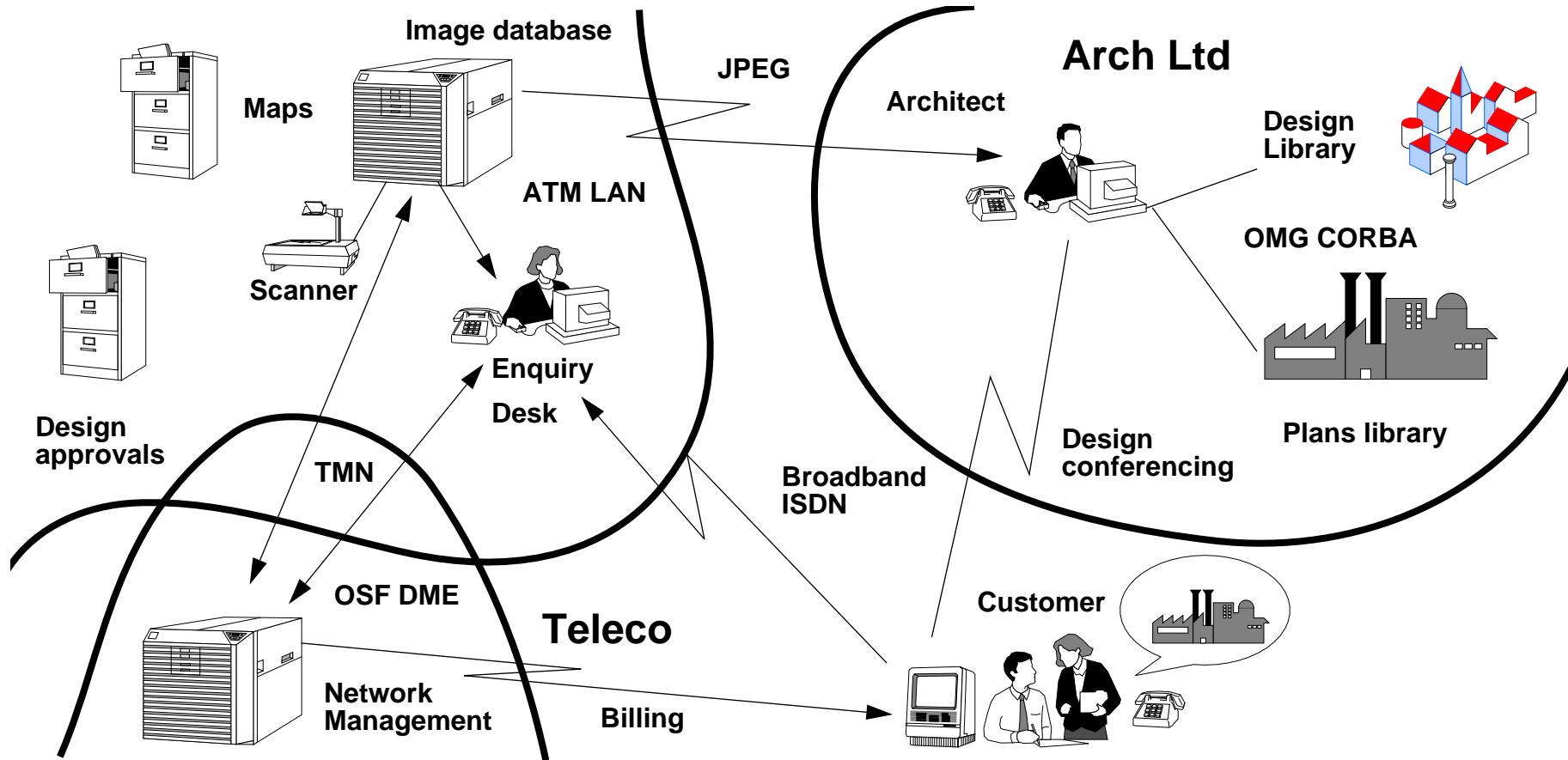
- *Explain the concepts in the ODP Enterprise viewpoint*
- *Show examples of enterprise modelling in action*
- *Explain a simple technique of enterprise modelling*



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**

Newtown - Basis for Enterprise viewpoint





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)***

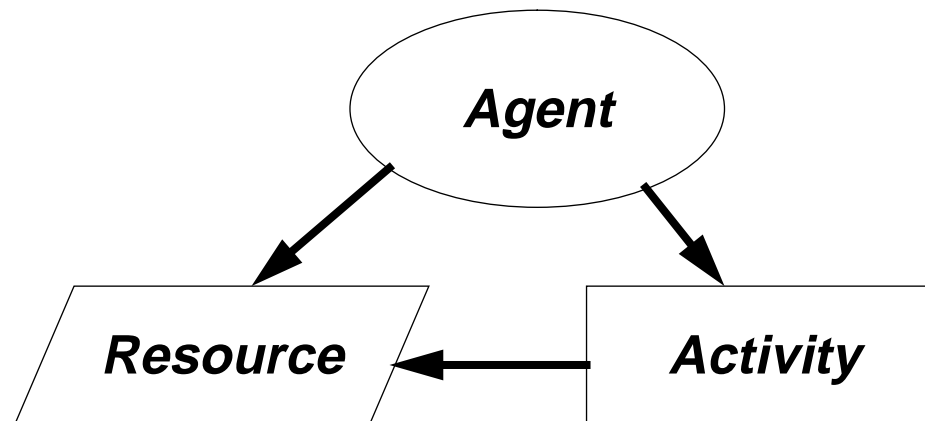


“Enterprise language?”

- *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

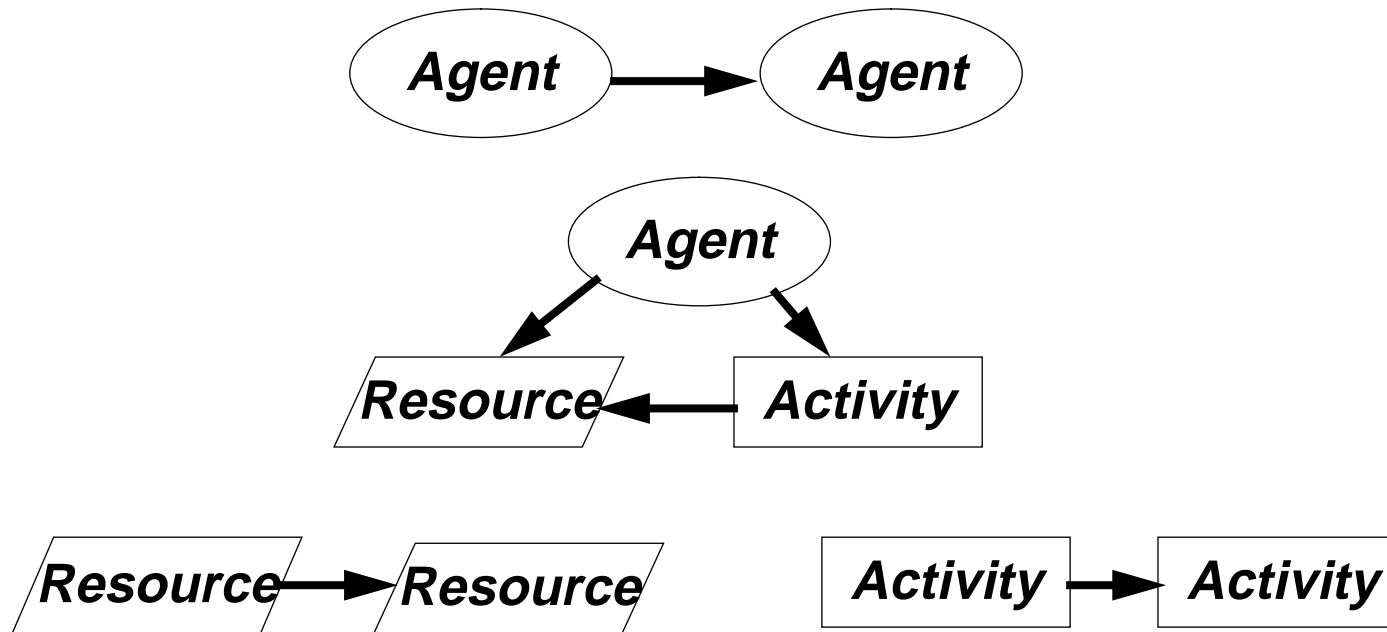
- *It could be cumbersome to write an enterprise specification*
- *Consider simple techniques (rather than a entire modelling method)*
- *Here is the agent-activity-resource (AAR) technique*



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

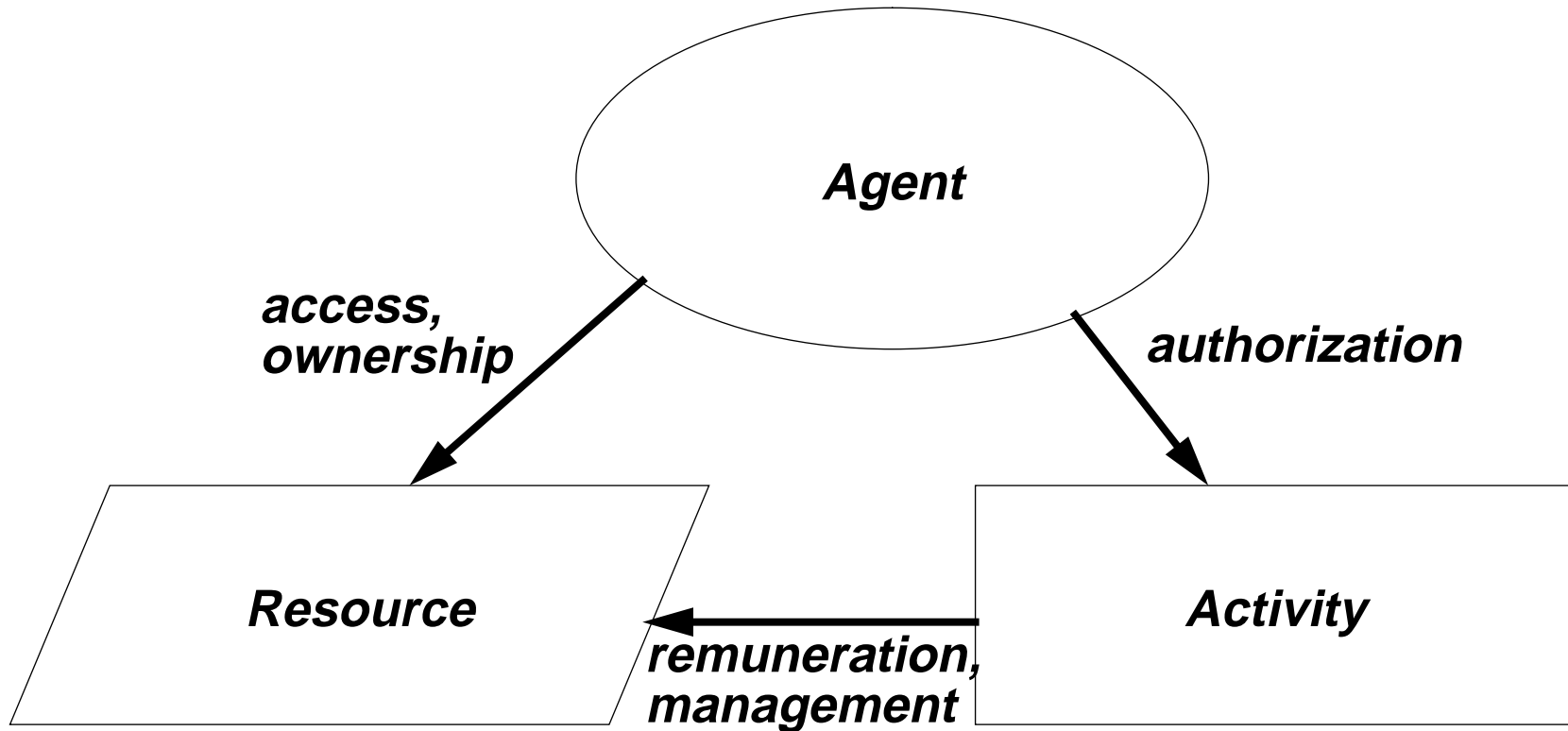
Using the AAR technique

- *There are six kinds of relationships....*



- *... each has a different meaning*

The AAR relationships



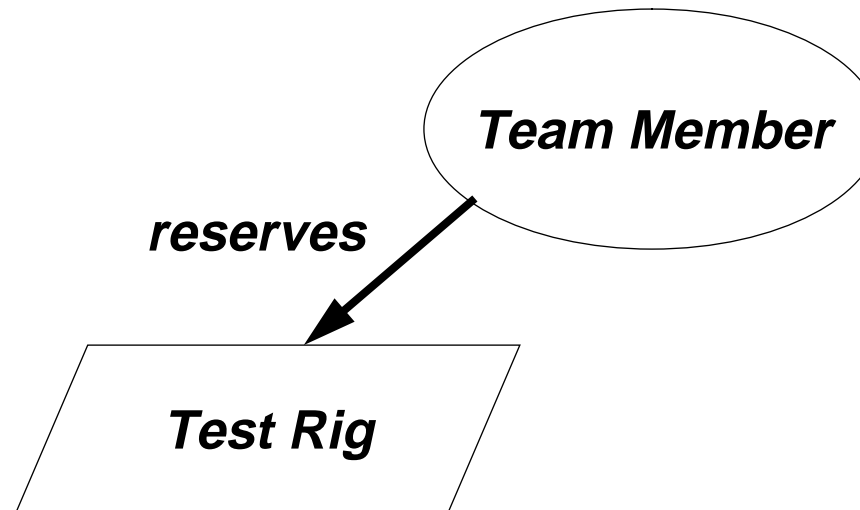
Agent-Agent relationships

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



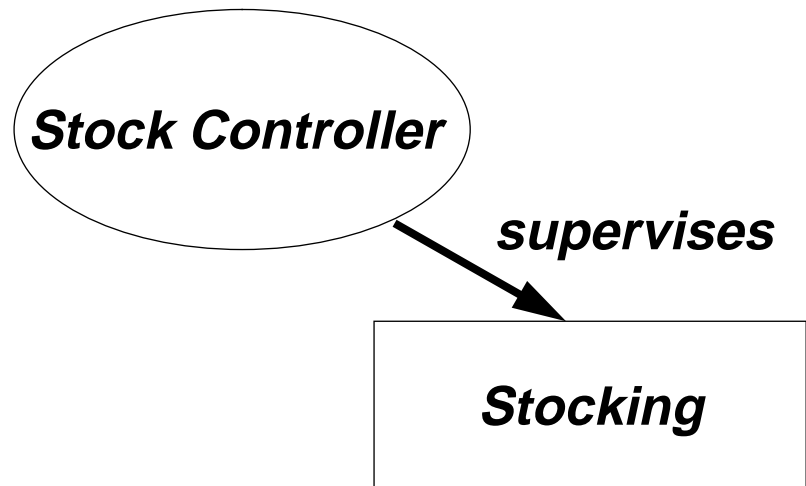
Agent-Resource relationships

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



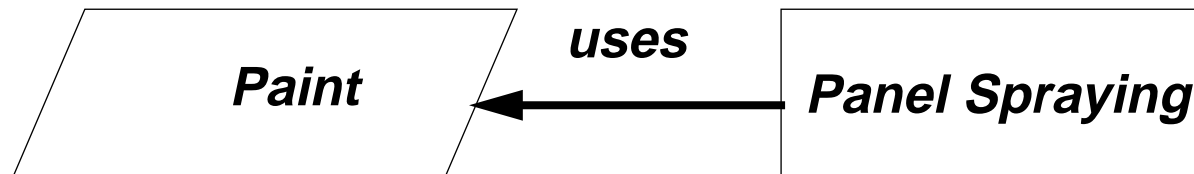
Agent-Activity relationships

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



Activity-Resource relationships

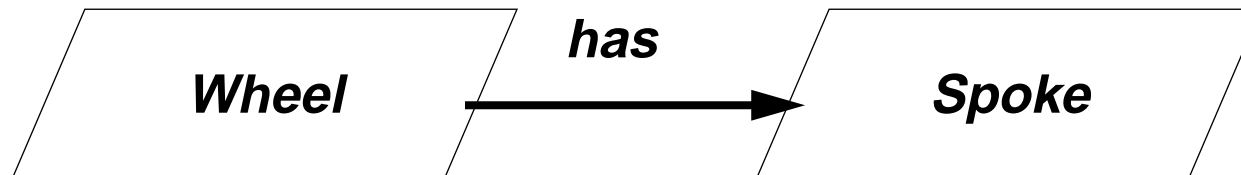
- *These represent transformations*
 - for example, creation, destruction, and consumption





Resource-Resource relationships

- *These represent formations*
 - *for example, containment*



Activity-Activity relationships

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





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

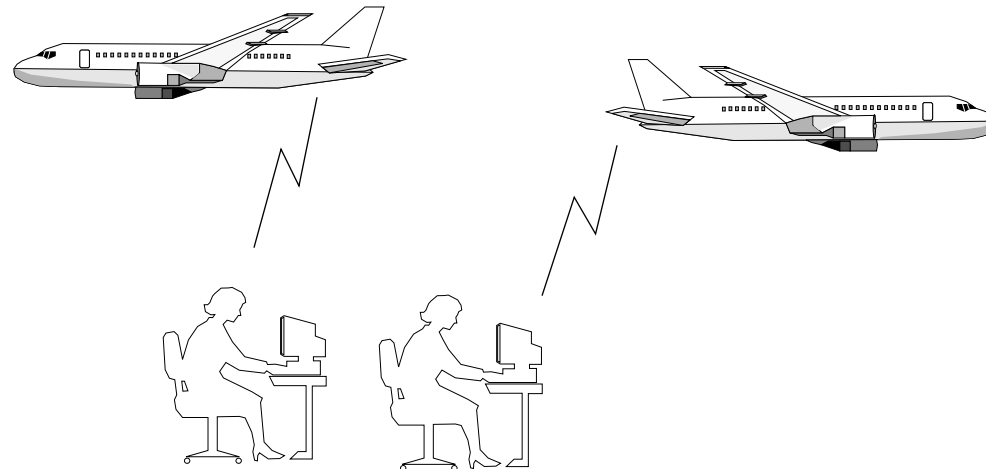
- ***Enterprise objects are grouped into communities***
 - ***a community has an objective: a common purpose***
 - ***the members of the community share this objective***
 - ***this objective is also a contract***



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

A contrasting example - air traffic control



- *This picture is misleading...*



Enterprise modelling for social context

- *...Modelling is not just about rules*
- *Air traffic control has an excellent safety record*
 - responsibility is fulfilled by team work...
 - ... multi-level checking, mutual observation, pride in the job
- *The legalistic flavour of contracts does not model well such activities*
 - good modelling techniques for social context do not yet exist
 - some believe that modelling social context is inappropriate



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 \(TR.38.00\)](#)***