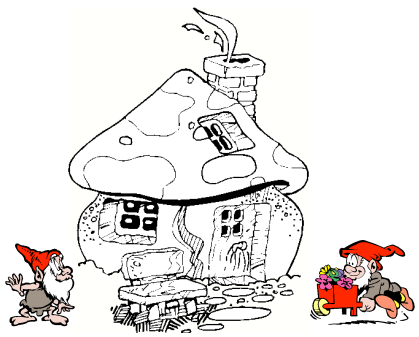
# Tutorial Enterprise Ontology



Jan L.G. Dietz

24 May 2005

ICEIS 2005

TU Delft
Delft University of Technology

# Outline

- Introduction 60 minutes
  - Enterprise Ontology
  - Systems and Models
  - Exercise: case Volley
- The Ψ-theory 60 minutes
  - Scientific roots
  - Axioms
  - Exercise: case Volley
- The DEMO methodology 90 minutes
  - The DEMO models
  - Exercise: case Volley

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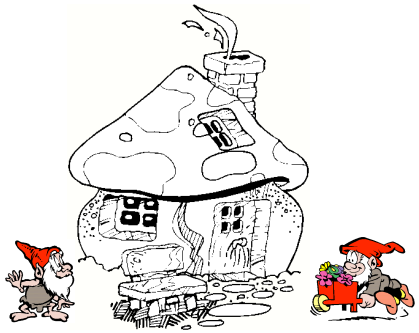
# Tutorial Enterprise Ontology

## Introduction



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# What is ontology?

- As a branch of philosophy, ontology investigates and explains the nature and essential properties and relations of all beings, as such, or the principles and causes of being. Otherwise said, ontology is the metaphysical study of the nature of being and existence.
- As a modern concept in Computer Science (Artificial Intelligence), an ontology is a formal and explicit specification of a shared conceptualisation among a community of people (ánd agents) of a common area of interest.

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## What is enterprise ontology?

- The ontology (or ontological model) of an enterprise is defined as an understanding of its *operation*, that is completely independent of the realization and the implementation of the enterprise.

- In particular, an enterprise ontology should satisfy the next quality requirements ($C_4E$):
  - **Coherent**
  - **Comprehensive**
  - **Consistent**
  - **Concise**
  - **Essential**

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## Why is enterprise ontology needed?

- An enterprise ontology provides the necessary common understanding of the *operation* of an enterprise to all stakeholders. In particular the next groups of stakeholders do need it:
  - **Managers**; managing has become too complex for relying only or mainly on function oriented knowledge.
  - **Designers**; for (re)designing and (re)engineering the organisation of an enterprise, an explicit specification of the business processes is needed that is independent on their implementation.
  - **Users**; why should the operation of an enterprise be fully opaque to its users? An enterprise ontology would provide the users the transparency they need too!

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## The problem

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## The solution

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## What is a system?

- A system is a set of elements that are related to each other (?)
- The distinctive difference between system and aggregate is that a system has *emergent behaviour*.
- Like any kind of things, a system is defined by its properties. A thing is either a system or not. It makes no sense to consider something as a system if it is not a system.
- An important property of a system is the *category* (or categories) to which it belongs (physical, chemical, mechanical etc.) If a system belongs to exactly one category, it is called homogeneous, otherwise its is called heterogeneous.

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## The teleological system concept

- Is about the *function* and *behavior* of a system
- Reflects the *purpose* of a system
- Is the *dominant* system concept in both the *natural* and the *social sciences*
- Is perfectly adequate for *using* and *controlling* systems
- Has the *black-box model* as the corresponding kind of model

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## The ontological system concept

- Is about the *construction* and *operation* of a system
- Is *indifferent* to the *purpose* of a system
- Is the *dominant* system concept in the *engineering sciences*
- Is perfectly adequate for *building* and *changing* systems
- Has the *white-box model* as the corresponding kind of model

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## The ontological system definition

- A thing is a *system* if and only if it has the next properties:
  - *Composition*: a set of elements of some category (physical, social, biological)
  - *Environment*: a set of elements of the *same* category
  - *Effect*: the elements in the composition produce things (products or services) that are delivered to the elements in the environment
  - *Structure*: a set of influence bonds among the elements in the composition and between these and the elements in the environment

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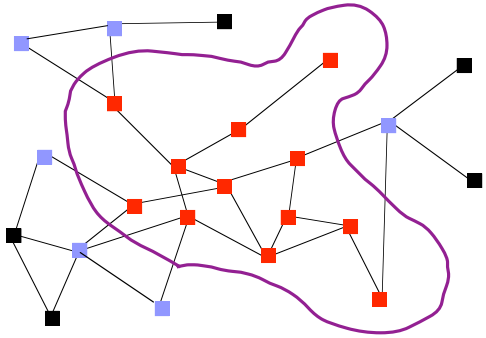
## Depiction of the construction of a system

construction = composition + environment + structure





## Homogeneous and heterogeneous systems

- A system is *homogeneous* if its elements belong to *one category* (e.g. physical or biological or social). The elements are called *atomic* with respect to the category.
- Homogeneous systems can be integrated in a *heterogeneous* system. This is possible if the (atomic) elements of the distinct homogeneous systems are somehow inseparably connected.
- Examples of heterogeneous systems:
  - A human being, consisting of a physical system, a chemical system, a biological system etc.
  - A car, consisting of a physical system, a chemical system, an electrical system etc.



## What is a model?

- **Representation**: e.g. a data base is said to be a model of a Universe of Discourse
- **Abstraction**: e.g. the mental model one can have of a coffee machine
- **Prototype**: some ideal or standard, e.g. a photographic model (cover girl); a model kitchen
- **Interpretation**: a model of a logical formula is any interpretation of the formula that expresses a true fact



## The definition of model

We adopt the definition of Leo Apostel (1960):

*Any subject using a system A that is neither directly nor indirectly interacting with a system B, to obtain information about the system B, is using A as a model of B*

So, the notion of model is a *role* notion: something is not a model per se, but can be used as a model

## The white-box model (1)

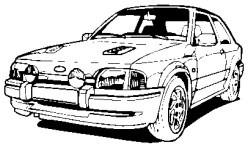
A white-box model is a (direct) *conceptualization* of a concrete system.

A white-box model shows the construction and the (constructional) behavior of a system.

Example: Niels Bohr's model of the atom.



## The white-box model (2)

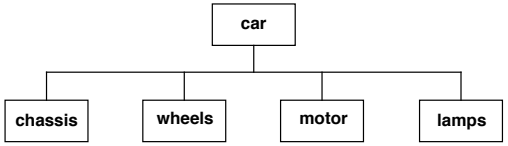


*the mechanic's perspective*

**construction** :
the components and their interaction relationships

**constructional behavior** :
the manifestation of the construction (through time)

***constructional (de)composition***






## The black-box model (1)

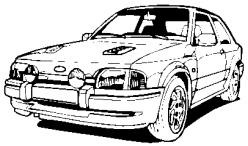
A black-box model is a *conversion* of a white-box model.

A black-box model shows the function and the (functional) behavior of a system.

Example: An economic model of an enterprise.



## The black-box model (2)

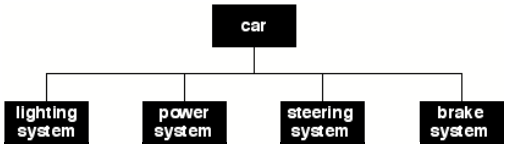


*the driver's perspective*

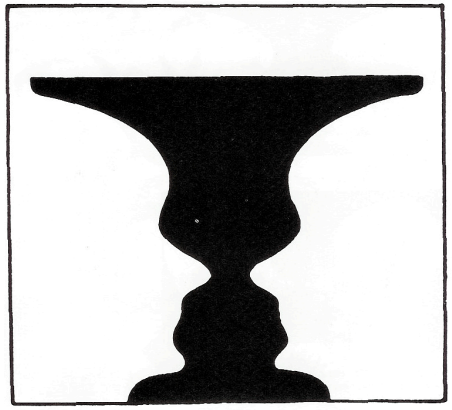
**function** :
(mathematical) relationship between input and output

**functional behavior** :
the manifestation of the function (through) time

***functional (de)composition***



## A vase or two faces? [Rubin]





## Business and organization

By the ***business*** of an enterprise is understood the *functional* perspective on the enterprise. It is characterized by the products and services that are delivered to the environment.

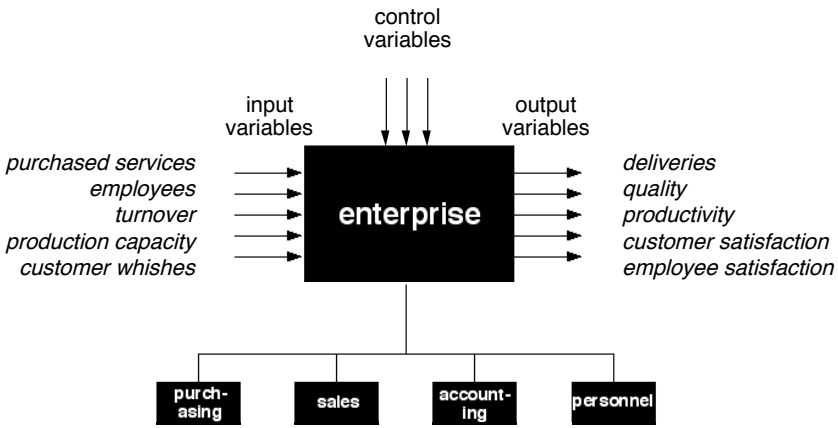
A *business model* of an enterprise is a *black-box model* type of model

By the ***organization*** of an enterprise is understood the *constructional* perspective on the enterprise. It is characterized by the processes in which the products and services are brought about.

An *organization model* of an enterprise is a *white-box* type of model

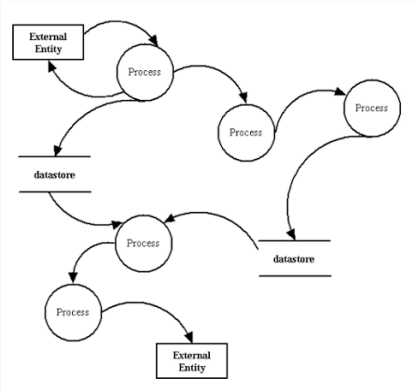


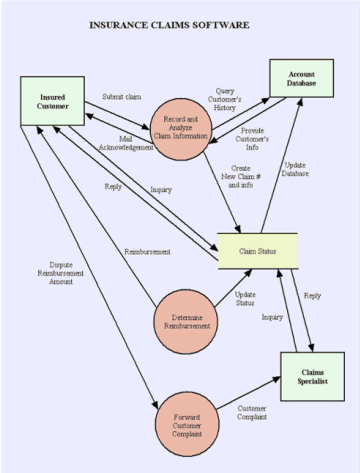
## Black-box model of an enterprise



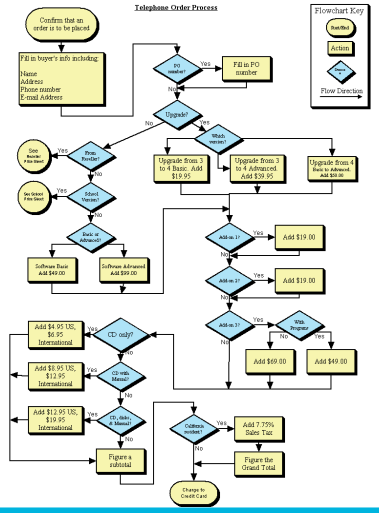


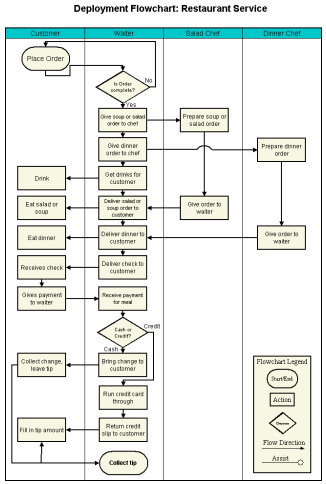

## Process modeling: Flow Models



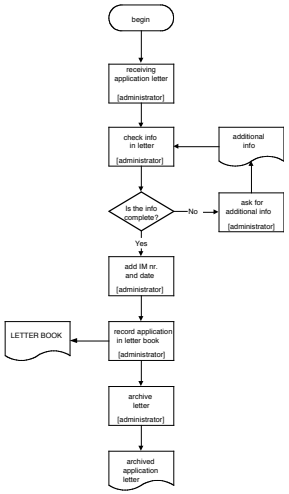
# Process modeling: Flow Charts



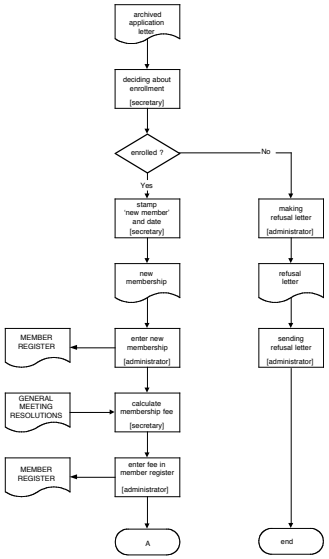



# Volley: FC 1



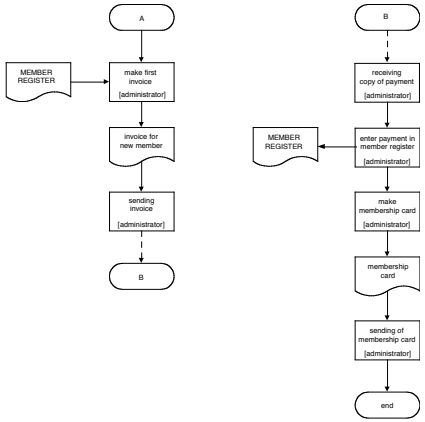



# Volley: FC 2






# Volley: FC 3



## Process Flow Charts: persistent problems

How to manage the overwhelming multitude?

How to cluster or decompose?

How to distinguish the more important from the less important?

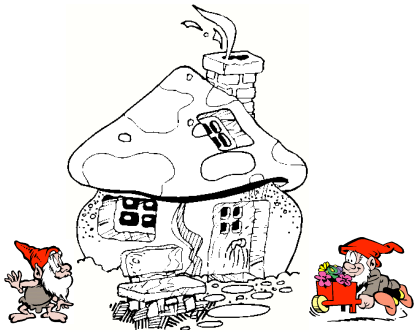
How to determine whether everything is necessary?

How to determine whether something is missing?



# Tutorial Enterprise Ontology

## The Ψ-theory



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## The Ψ-theory

The **Ψ-theory** is a theory about the **operation of organizations**.

Ψ stands for PSI: **Performance in Social Interaction**, the paradigm on which the theory is founded.

The concept of **operation** is an engineering concept; it belongs to the technical sciences.

So, organizations are technical systems? Yes indeed, if **technical** is understood in its original meaning: the **making** of 'things'.

In order to make (and change) organizations, one needs a theory about their operation.

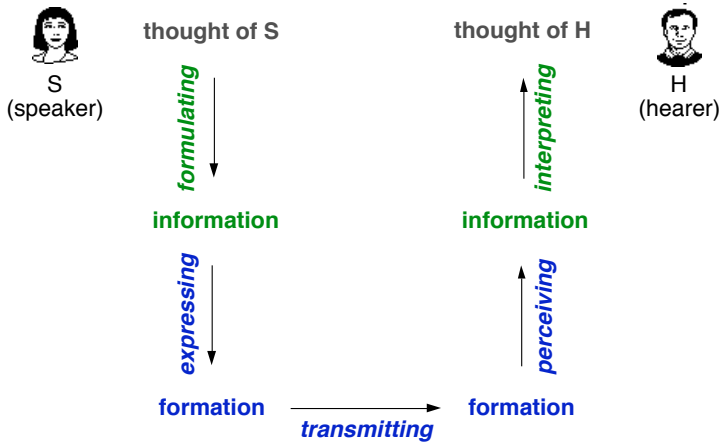


## Root 1: Semiotics

Peirce
Langefors
Stamper

| | | |
|---|---|---|
| *informa* | PRAGMATICS | *content* |
| | SEMANTICS | |
| *forma* | SYNTACTICS | *form* |
| | EMPIRICS | |

## The process of communicating






## Examples of communication/information

I'd like to have such a bouquet
Very well, sir

Here you are
Thanks



## Lesson from semiotics

COMMUN
*information*
ICATION

***information is a means for communication***



## Root 2: Speech Act Theory

Austin
Searle
Habermas

**Communication** is a form of **action**, more specifically: of social action

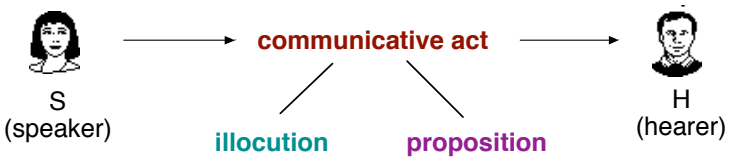
While communicating, people get involved in **commitments** vis à vis each other

As a social individual, one cannot avoid this

**Collaboration** between people (social individuals) is based on the entering into and complying with commitments.

## The communicative act

a communicative act is an intersubjective act:
the speaker and the hearer get involved in an
intersubjective (= social) relationship




*request*
*promise*
*question*
*assertion*
*.....*

*something that is or could be the case*



## Examples of communicative acts

I'd like to have such a bouquet
Very well, sir

***A1 : requests : A2 : person P has a bouquet B***
***A2 : promises : A1 : person P has a bouquet B***

Here you are
Thanks

***A2 : states : A1 : person P has a bouquet B***
***A1 : accepts : A2 : person P has a bouquet B***



## Lesson from Speech Act Theory

# COMMUN *action* ICATION

***communication is a form of social action***



## Root 3 : Systemic Ontology

Bunge
Wittgenstein

A **system** is always a system in a certain **category** (physical, chemical, biological, social etc.)

The elements of a system are **atomic** in the system category

The **structure** of a system consists of bonds between the elements

By virtue of the bonds, the **elements act upon each other** when the system is in operation

The elements are divided in two disjoint sets: the **composition** and the environment

The **environment** consists of elements that act upon or are acted upon by elements in the composition

## The ontological notion of organization

A **organization** is a system in the category of **social systems**

The (atomic) elements of are **subjects**, i.e. human beings in their role of social individual

The **structure** of an organization consists of interaction bonds between the subjects. There are bonds among the subjects in the composition, and between them and the subjects in the environment

By virtue of the bonds, the subjects **influence each other** when the organization is in operation

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## Lesson from Systemic Ontology

***communication is the thread of which organization is woven***

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## The operation axiom (1)

The subjects in an organization perform two kinds of acts: production acts or **P-acts** and coordination acts or **C-acts**.

By performing **P-acts**, the subjects contribute to bringing about the **function** of the organization.

By performing **C-acts**, the subjects enter into and comply with commitments regarding P-acts. This is the way in which **collaboration** between subjects is accomplished.

An (elementary) **actor role** is defined as the **authority** to perform **one** particular **type of P-act**. A subject in his fulfilling of an actor role is called an **actor**.

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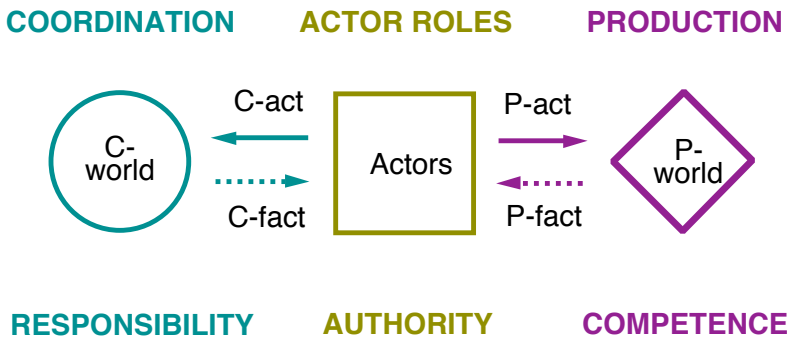
## The operation axiom (2)

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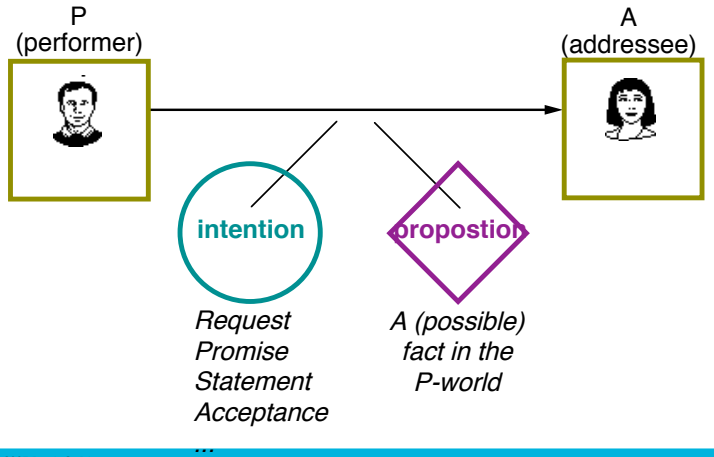
## The elementary coordination act





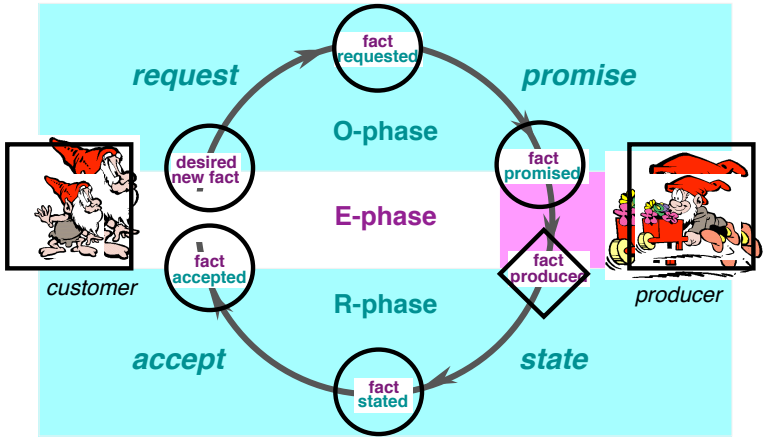

## Standard notation of a coordination act

| John | request | Mary | membership #387 has started to exist | 1/4/2002 |
|---|---|---|---|---|
| performer | intention | addressee | fact | time |

proposition



## The transaction axiom






## Example of a transaction

*Order phase*

I'd like to have such a bouquet
Very well, sir

*A1 : requests : A2 : person P has a bouquet B*
*A2 : promises : A1 : person P has a bouquet B*

*Execution phase : the actual delivery of the bouquet*

*Result phase*

Here you are
Thanks

*A2 : states : A1 : person P has a bouquet B*
*A1 : accepts : A2 : person P has a bouquet B*

## Withdrawing money anno 1950

*E = employee C = client*

| | | | |
|---|---|---|---|
| E | : | How can I help you, Mister Bean? | |
| C | : | I want to withdraw money from my account | *request* |
| E | : | Your account current, I assume? | |
| C | : | Yes | |
| E | : | How much do you want? | |
| C | : | £ 100, please | |
| | | < E fills out a form > | |
| E | : | If you sign here, please | |
| | | < C signs the form > | |
| E | : | One moment please | *promise* |
| | | < E puts banknotes in front of C > | |
| E | : | Here you are, Mister Bean | *state* |
| C | : | Thank you | *accept* |



## Withdrawing money anno 2000

*A = ATM C = client*

| | | | |
|---|---|---|---|
| A | : | 'Welcome to the ABC bank' | |
| | | 'Please insert your card' | |
| C | : | < inserts card into a slot > | |
| A | : | 'Enter your PIN please' | |
| C | : | < keys in PIN > | |
| A | : | 'Choose the amount you want to withdraw' | |
| C | : | < presses the button for £ 100 > | *request* |
| A | : | 'Take your card please' | *promise* |
| C | : | < takes card out of the slot > | |
| A | : | 'Your money is being counted' | |
| | | < A pushes banknotes through a slot > | |
| A | : | 'Take your money please' | *state* |
| C | : | < takes the banknotes from the slot > | *accept* |



## Elementary actor role

An elementary **actor role** is defined as:

the **institutional authority**

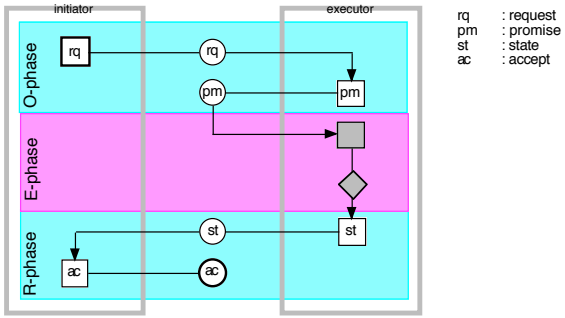
that is necessary and sufficient to be
**executor** in a particular **transaction**

An (elementary) **actor** is a **subject**, fulfilling an **actor role**

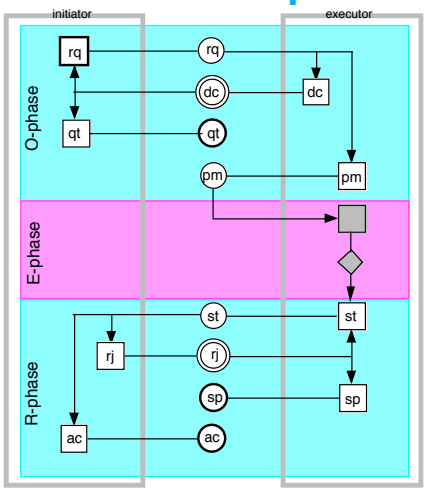
A subject may play a number of actor roles, and an actor role may be played by a number of subjects, either consecutively or simultaneously or collectively



## The basic transaction pattern



## The standard transaction pattern




rq: request
pm: promise
dc: decline
qt: quit
st: state
ac: accept
rj: reject
sp: stop



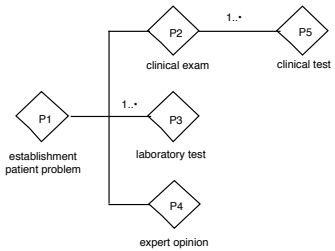
## The atoms and molecules of organizations

- **Coordination acts** are called the **atoms** of an organization because they are the units of action in which exactly *one* commitment concerning exactly *one* production fact is brought about.
- **Transactions** are called the **molecules** of an organization because:
  1. They are composed of *atoms* according to the generic transaction pattern.
  2. They are the units of action in which exactly *one* production fact is brought about.



## The composition axiom

Transactions are clustered in hierarchies or trees, according to the **product structure** (cf. Bill of Material) of the products they are dealing with.




Such a cluster of transactions is called a **business process**.



## The distinction axiom

| COORDINATION | ACTOR ROLES | PRODUCTION |
|---|---|---|
| *exposing commitment* (as performer)<br>*evoking commitment* (as addressee) | <br>***performa*** | *ontological production* (deciding, judging, manufacturing) |
| *expressing thought* (formulating)<br>*educing thought* (interpreting) | <br>***informa*** | *infological production* (reasoning, deducing, computing etc.) |
| *uttering information* (speaking, writing)<br>*perceiving information* (listening, reading) | <br>***forma*** | *datalogical production* (storing, transmitting, copying, destroying etc.) |

## The distinct human abilities - coordination

| COORDINATION | ACTOR ROLES | PRODUCTION |
|---|---|---|
| *exposing commitment* (as performer)<br>*evoking commitment* (as addressee) | ***performa*** | |
| *expressing thought* (formulating)<br>*educing thought* (interpreting) | ***informa*** | |
| *uttering information* (speaking, writing)<br>*perceiving information* (listening, reading) | ***forma*** | |

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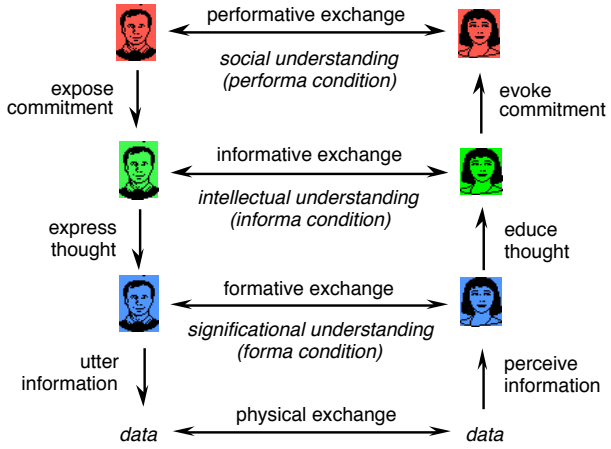
## Performing a coordination act

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## The distinct human abilities - production

| COORDINATION | ACTOR ROLES | PRODUCTION |
|---|---|---|
| | ***performa*** | *ontological production* (deciding, judging, manufacturing) |
| | ***informa*** | *infological production* (reasoning, deducing, computing etc.) |
| | ***forma*** | *datalogical production* (storing, transmitting, copying, destroying etc.) |

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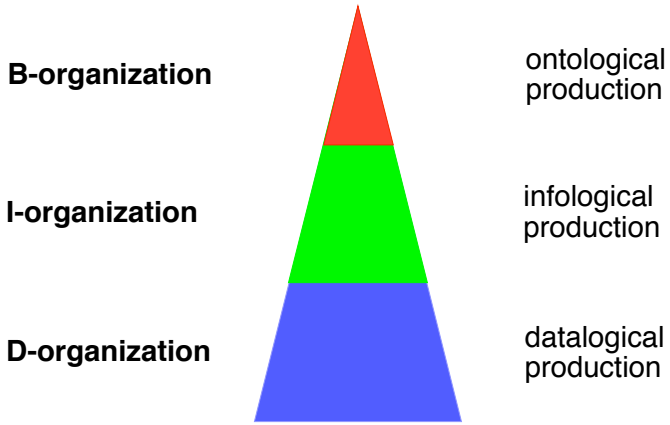
## The organization theorem

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## The aspect organizations

An organization consists of three aspect organizations:
- the **B-organization** (Business)
- the **I-organization** (Information, Intellect)
- the **D-organization** (Document, Data)

The **B-organization** consists of **B-actors** who carry through **B-transactions** . It constitutes the **essence** of an organization.

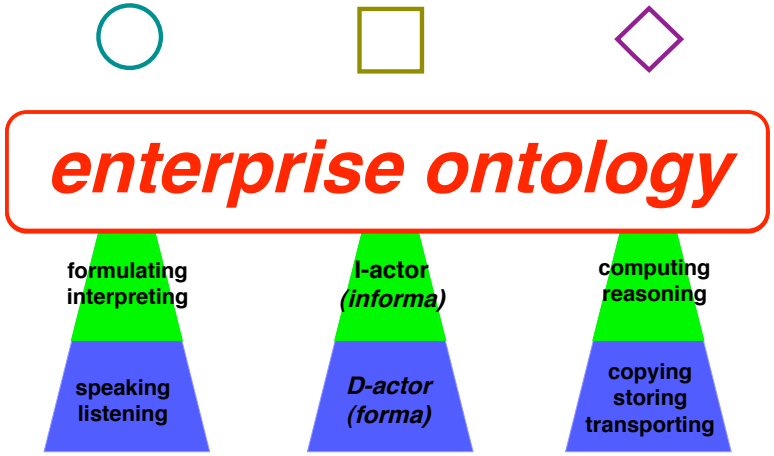
The **I-organization** consists of **I-actors** who carry through **I-transactions** . The I-organization supports the B-organization.

The **D-organization** consists of **D-actors** who carry through **D-transactions** . The D-organization supports the I-organization.

The **integration** of the three aspect organizations is established through the **unity** of the human actor.



## The notion of enterprise ontology



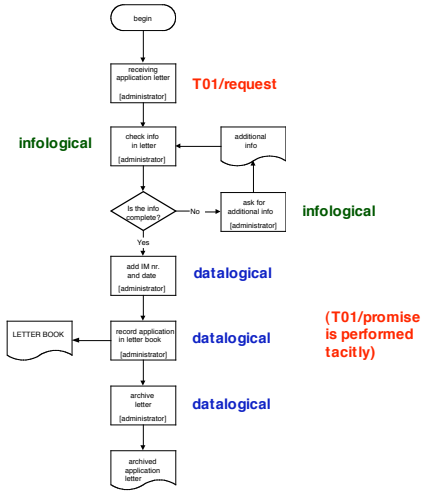



## Exercise: case Volley

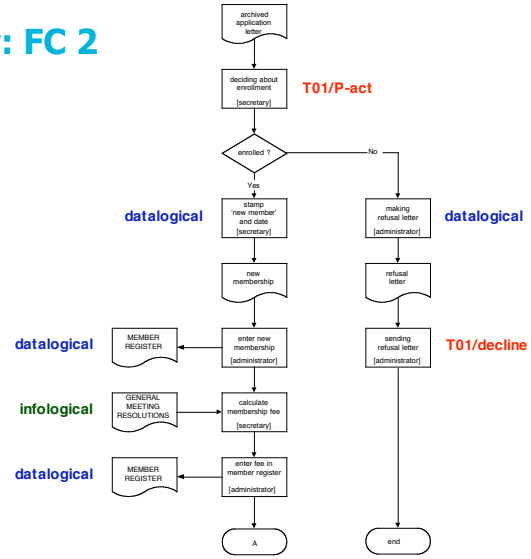
- Categorize the actions in the Flow Charts as
  - ontological
  - infological
  - datalogical
- Distinguish the ontological actions into
  - production acts
  - coordination acts



## Volley: FC 1

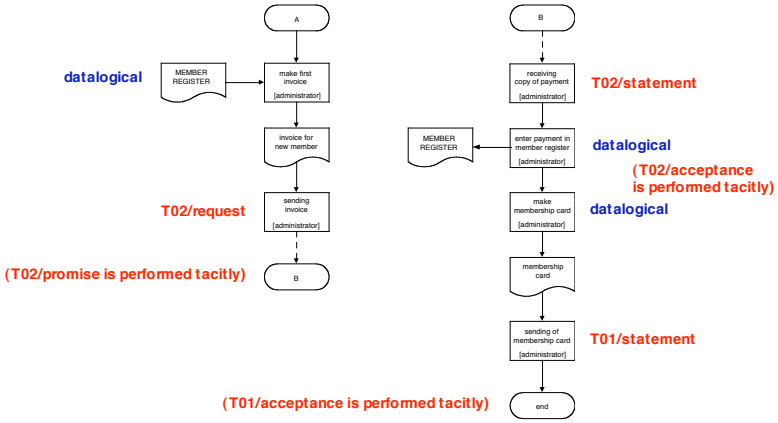


## Volley: FC 2





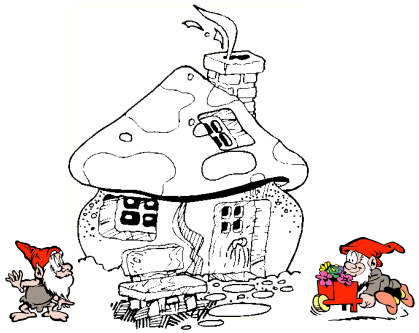

## Volley: FC 3






# Tutorial Enterprise Ontology

## The DEMO methodology



Jan L.G. Dietz 24 May 2005

ICEIS 2005

TUDelft
Delft University of Technology

## *Design & Engineering*

# DEMO®

## *Methodology for Organizations*

***essential and simple***

## What does DEMO include?

1. The OER method for extracting the ontology (essence) of an enterprise from its implementation. The method is fully based on the Ψ-theory.
2. A coherent set of ontological aspect models in which the ontology of an enterprise is expressed.
3. A consistent set of diagrams and tables in which these aspect models are represented.

(Note. Other components are not included in this tutorial)



## The OER method

(**O**rganizational **E**ssence **R**evelation)

1. The *distinction axiom* based analysis
2. The *operation axiom* based analysis
3. The 1st *transaction axiom* based synthesis
4. The *composition axiom* based analysis
5. The 2nd *transaction axiom* based synthesis
6. The *enterprise* based synthesis



## The distinction axiom based analysis

1. Mark all **Performa** things red; these include the production acts and facts in the B-organization of the enterprise, as well as the performative coordination acts in the B-organization.

2. Mark all **Informa** things green; these include the production acts and facts in the I-organization of the enterprise, as well as the informative coordination acts in the B-organization.

3. Mark all **Forma** things blue; these include the production acts and facts in the D-organization of the enterprise, as well as the formative coordination acts in the B-organization.



## DA-analysis of case VOLLEY

One can become member of the tennis club Volley by sending a letter to the club by postal mail. In that letter one has to mention: the surname and first name, the birth date, the sex, the telephone number, and the postal address (street, house number, zip code, and residence). Charles, the administrator of Volley, empties daily the mailbox and checks whether the provided information is complete. If not, he makes a telephone call to the sender in order to complete the data. If a letter is completed, Charles adds an incoming mail number and the date, enters the letter in the letter book and archives it.

Every Wednesday evening Charles takes the collected letters to Miranda, the secretary of Volley. He also takes the member register with him then. If Miranda decides that an applicant will become member of Volley, she stamps "new member" on the letter and writes the date below it. This date counts as the commencement date of the membership. She then hands the letter to Charles in order to add the new member to the member register. This is a book with numbered lines. Each new member is entered on a new line. The line number is the so-called member number, by which the new member is indicated in the administration.
Next, Miranda calculates the membership fee that the new member has to pay for the remaining part of the calendar year. She finds the annual fees, as settled by the general meeting, on a piece of paper in the drawer of her desk. Then, she asks Charles to write down the amount in the member register.
If Miranda does not allow an applicant to become member (e.g. because he or she is too young or because the maximum number of members has been reached), Charles will send a letter in which he explains why the applicant cannot (yet) become a member of Volley.

If all applications are processed, Charles takes the letters and the member register back home and prepares an invoice to all new members for the payment of the first fee. He sends these invoices by postal mail. Payments have to be performed by bank transfers.
As soon as a payment is received, Charles prints a membership card on which are mentioned: the membership number, the commencement date, the name, the birth date and the postal address. The card is sent to the new member by postal mail.

# The operation axiom based analysis

1. Consider only the **Performa things**. Divide them into **production things** (thus **P-acts** and **P-facts**) and **coordination things** (thus **C-acties** of **C-feiten**).

   Mark the production things with a ◇

   Mark the coordination things with a ○

2. Mark all **actors** yellow: persons, organizational functions, and organizational units.



# OA-analysis of case VOLLEY

One can become member of the tennis club Volley by sending a letter to the club by postal mail. In that letter one has to mention: the surname and first name, the birth date, the sex, the telephone number, and the postal address (street, house number, zip code, and residence). Charles, the administrator of Volley, empties daily the mailbox and checks whether the provided information is complete. If not, he makes a telephone call to the sender in order to complete the data. If a letter is completed, Charles adds an incoming mail number and the date, enters the letter in the letter book and archives it.

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As soon as a payment is received, Charles prints a membership card on which are mentioned: the membership number, the commencement date, the name, the birth date and the postal address. The card is sent to the new member by postal mail.



# The 1st transaction axiom based synthesis

1. Put the template of the transaction pattern over de set of 'red' P-things and C-things. In doing so, the P-things and C-things belonging to one transaction type are clustered, and thus all transaction types are identified.

2. Formulate for every identified transaction type the resulting **P-fact type**. Make a sentence that is unambiguous and that contains a minimal number of variables (preferably one). A variable is a placeholder for an entity.



# First TA-synthesis of case VOLLEY

| transaction | transaction result |
|---|---|
| T01 membership_start | PF01 *membership M has started to exist* |
| T02 membership_payment | PF02 *the first fee for membership M is paid* |
| T03 fee_settlement | PF03 *the fee for year Y is settled* |

## The composition axiom based analysis

The bringing about of a P-fact PF02 may be a condition for bringing about a P-fact PF01. In such a case PF02 is called a *component* of PF01. Likewise, T02 is called a component of T01.

On the basis of this part-of relationship, arbitrarily large tree structures may arise that are comparable to the bills-of-material (BOM) of material products.

The root of such a tree is the product or service that the organization delivers to its environment (Note that in fact these structures go across organizational boundaries).



## CA-analysis of case VOLLEY

From the description of the case Volley it appears that the existence of the P-fact PF02 (*the first fee for membership M is paid*) is a condition for bringing about the corresponding P-fact PF01 (*membership M has started to exist*). Consequently, PF02 is considered to be a component of PF01.



## The 2nd transaction axiom based synthesis

Determine for every transaction type the **actor role** that is the initiator and the **actor role** that is the executor. Use the tree structures that are the outcome of the CA based analysis. Recall that a transaction type has exactly one executor, and one or more initiators.



## Second TA-synthesis of case VOLLEY

| transaction | initiator | executor |
|---|---|---|
| T01 membership_start | A?? aspirant_member | A01 admitter |
| T02 membership_payment | A01 admitter | A02 payer |
| T03 fee_settlement | A?? board | A03 general_meeting |

## The enterprise based synthesis

In this last step the boundary of the enterprise under consideration is settled, and thus the **B-organization**.

This system boundary divides the actor roles into *internal*, *environmental*, and *external* actor roles, and the transaction types into *internal*, *interface* and *external* transaction types.

The not internal actor roles that are initiator or executor of the interface transaction types are the environmental actor roles.

The external transaction types as well as the external actor roles are disregarded. They do not belong to the enterprise.

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## The enterprise based synthesis of case Volley

| | |
|---|---|
| Internal actor roles: | A01 admitter |
| Environmental actor roles: | A?? aspirant_member |
| | A02 payer |
| External actor roles: | A?? board |
| | A03 general_meeting |
| Internal transaction types: | < none > |
| Interface transaction types: | T01 membership_start |
| | T02 membership_payment |
| External transaction types: | T03 fee_settlement |

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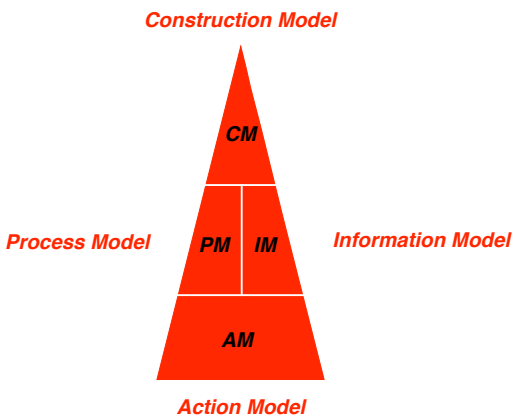
## The aspect models

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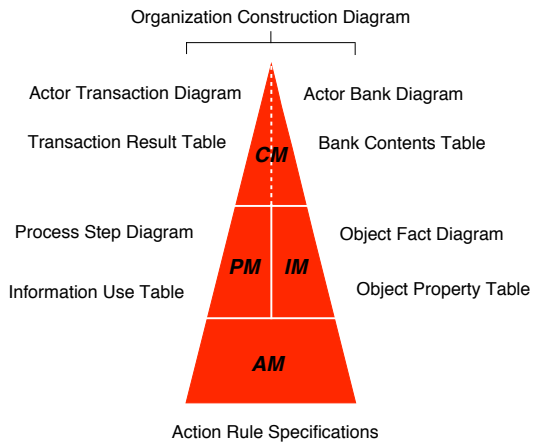
## The model representations

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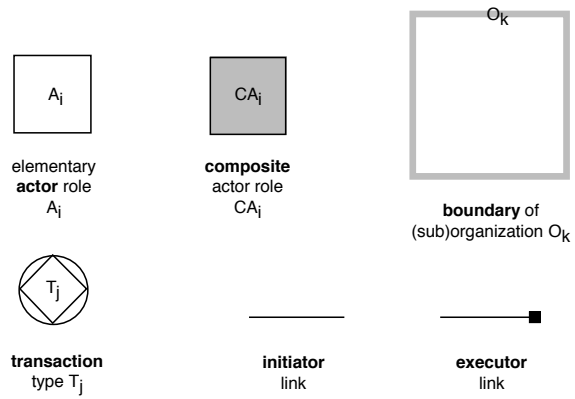
## The Construction Model (part 1)

- Specification of the active influencing relationships between the actor roles (*interaction*).
- Is expressed in the Actor Transaction Diagram (ATD) and the Transaction Result Table (TRT).
- The ATD specified the identifies transaction types, the corresponding actor roles (initiator, executor) and the system boundary.
- The TRT specifies for every transaction type the resulting production fact

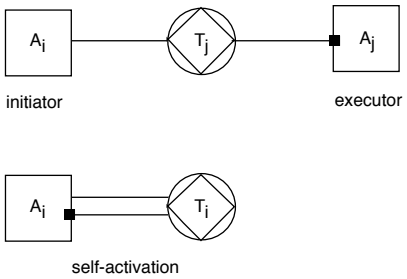


## Legend of the Actor Transaction Diagram



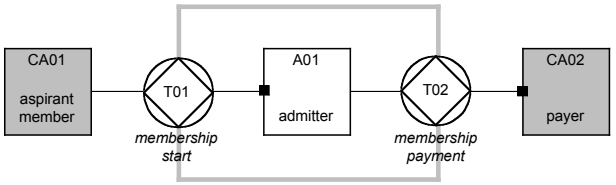



## Basic constructs in the ATD






## Volley: Actor Transaction Diagram



## Volley: Transaction Result Table

| transaction | transaction result |
|---|---|
| T01 membership_start | PF01 *membership M has started to exist* |
| T02 membership_payment | PF02 *the first fee for membership M is paid* |

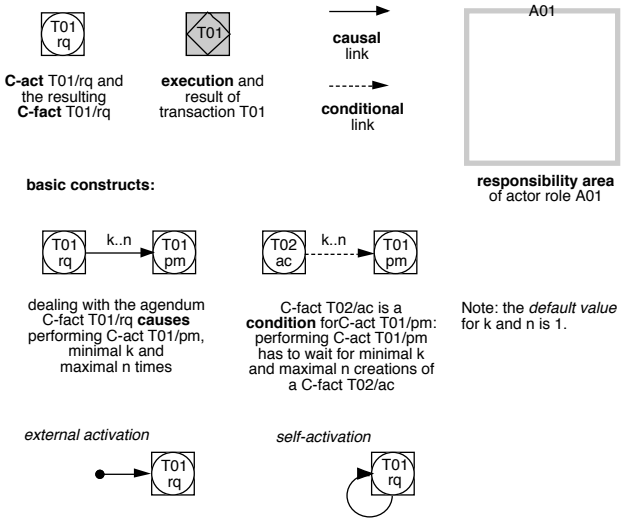


## The Process Model

- Specification of the trajectory space of the C-world, i.e. the lawful or allowed or possible sequences of C-world states, by means of the Process Step Diagram (PSD).
- In addition, for every process step the information that is used (object types and fact types) is specified in an Information Use Table (IUT).

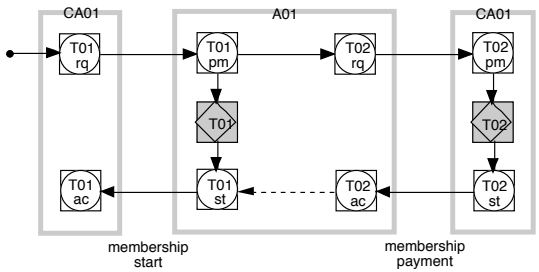


## PSD - legend






## Volley: Process Step Diagram



## Volley: Information Use Table

| fact type / object type | process step |
|---|---|
| MEMBERSHIP | T01/rq T01/pm T02/st T02/ac |
| *the member of M is P* | T01/rq |
| *membership M has started to exist* | *T01/ac* |
| *the first fee for membership M is paid* | *T02/ac* |
| minimal_age | T01/rq |
| annual_fee | T01/pm |
| maximum_number | T01/rq |
| PERSON | T01/rq |
| birth_date | T01/rq |

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## The Action Model

- For every internal actor role, there is an action rule for every agendum type which the actor role has to deal with.
- Action rules serve as a guidelines for the actors.
- Action rules may be specified formally, using a pseudo algorithmic language, or informally, using flow charts or just text instructions.

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## Volley: Action Rule Specifications

```
actor  agendum                    action rule
A01    on   requested T01 (M)     with P is member of new M
                                  do
                                      if age (P) < minimal_age(Current_Year) or
                                      number_of_members(Now) = maximum_number(Current_Year)
                                          then decline T01 (M) else promise T01 (M)
                                      fi
                                  od

A01    on   promised T01 (M)
                                  do
                                      request T02 (M) with first_fee (M)
                                      < decide to start membership M >
                                  od

A01    on   stated T02 (M)
                                  do
                                      if   < payment is acceptable >
                                           then accept T02(M) else reject T02(M)
                                      fi
                                  od

A01    on   accepted T02 (M)      do   state T01(M)    od
```

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## The Information Model

- Specification of the state space of the P-world: the object types, fact types, and existential constraints.
- Based on the ORM (Object Role Model).
- Distinction between 'real' fact types and properties (pure mathematical functions, mapping from an object type to a value scale).
- No identification schemes (name classes) are included.

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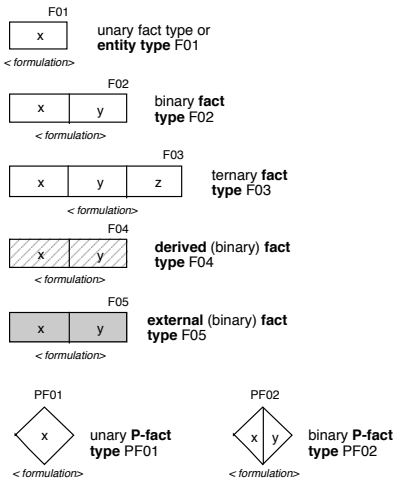
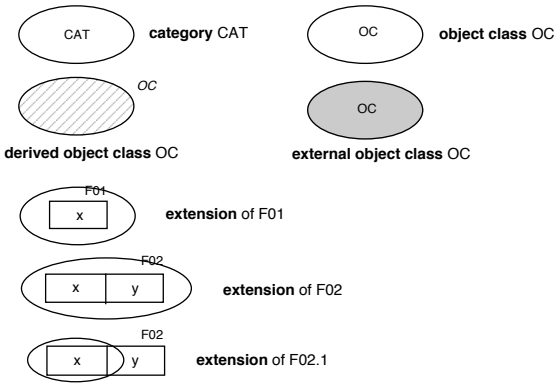
# OFD - legend (1)






# OFD - legend (2)






# OFD - legend (3)

*EXISTENTIAL LAWS*

**reference law** (domain)

**unicity law**

**dependency law**

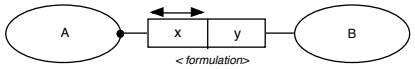
**exclusion law**

*DERIVATION DEFINITIONS*

**union** (generalization)

< derivation rule > ::=
< derived fact type > = < logical formula >

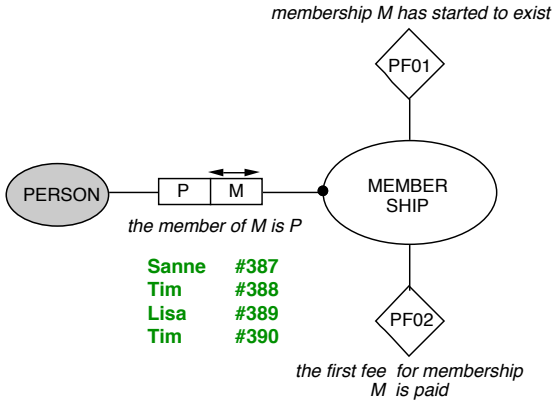
**typical construct:**




The domain of role x of fact type F is A.
The domain of role y of fact type F is B.
There is a unicity law for role x:
x can only appear once in the extension of F.
There is a dependency law for A:
for every a∈A there must be a pair <a,-> in F.



# Volley: Object Fact Diagram



## Volley: Object Property Table

| property | domain | range | scale kind | O/D |
|---|---|---|---|---|
| minimal_age | TIME | NUMBER | Absolute | O |
| annual_fee | TIME | NUMBER | Absolute | O |
| maximum_number | TIME | NUMBER | Absolute | O |
| number_of_members | TIME | NUMBER | Absolute | D |
| first_fee | MEMBERSHIP | EURO | Ratio | D |
| birth_date | PERSON | DATE | Interval | O |
| age | PERSON | NUMBER | Absolute | D |

**derivation rules:**

number_of_members (Time) = < number of persons for which there exists a membership >
first_fee (M) = ((12 - Current_Month#)/12) * annual_fee(Current_Year)
age(P) = < difference in years between birth year of P and current year >

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## The Construction Model (part 2)

- Specification of the passive influencing relationships between actor roles (*interstriction*). Interstriction is expressed as information links between actor roles and banks (P-banks and C-banks).
- Is expressed in the Actor Bank Diagram (ABD) and the Bank Contents Table (BCT).
- The ABD may also be constructed as an extension of the ATD. This constitutes the Organization Construction Diagram (OCD).

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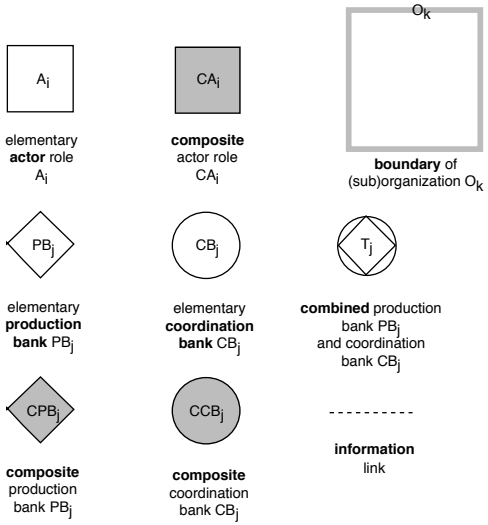
## ABD legend

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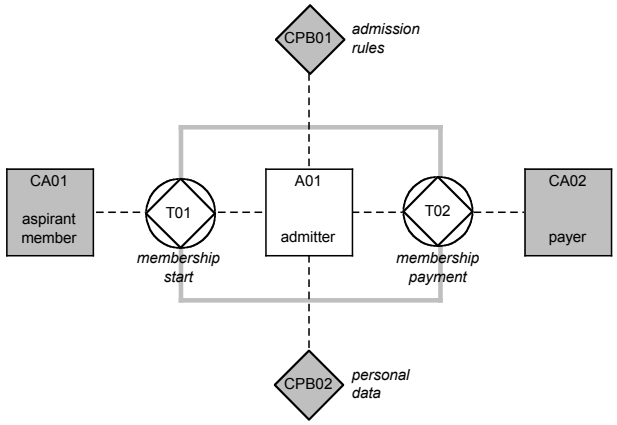
## Volley: Actor Bank Diagram

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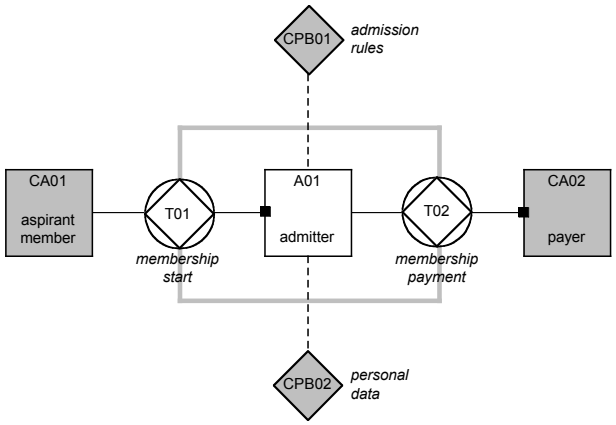
## Volley: Organization Construction Diagram






## Volley: Bank Contents Table

| bank | fact type / object type |
|---|---|
| PB01 | MEMBERSHIP |
| | *the member of M is P* |
| | *membership M has started to exist* |
| PB02 | *the first fee for membership M is paid* |
| CPB01 | minimal_age |
| | annual_fee |
| | maximum_number |
| CPB02 | PERSON |
| | birth_date |



## What benefits does DEMO offer?

- **Essential** - DEMO extracts the ontological essence of an organization from its realization and (technology dependent) implementation
- **Complete** - the generic (socionomic) pattern of the DEMO transaction warrants completeness of the ontology
- **Modular** - DEMO presents organizations as compositions of universal 'atomic' and 'molecular' building blocks
- **Coherent** - The aspect organizations (ontological, infological, datalogical) of DEMO constitute an integrated whole
- **Consistent** - The common core of the distinct aspect models of DEMO warrants consistency
- **Objective** - There is no room for alleged 'creativity'
- **Participative** - The DEMO architect is a facilitator. The work is actually done in a learning process of the business people
- **Optimal** - DEMO projects costs much less in all resources (people, time, money).



## Want to know more ?

**www.demo.nl**