Agents in many disguises

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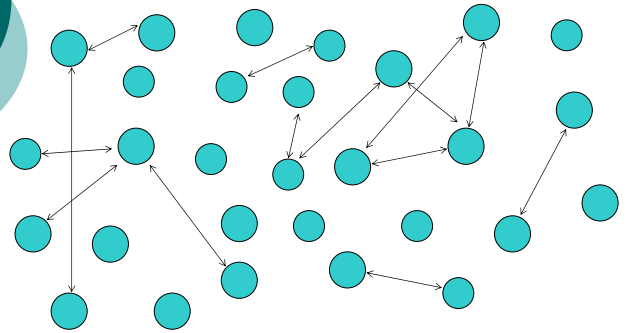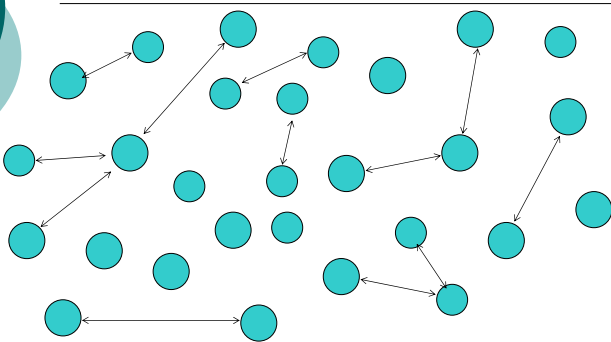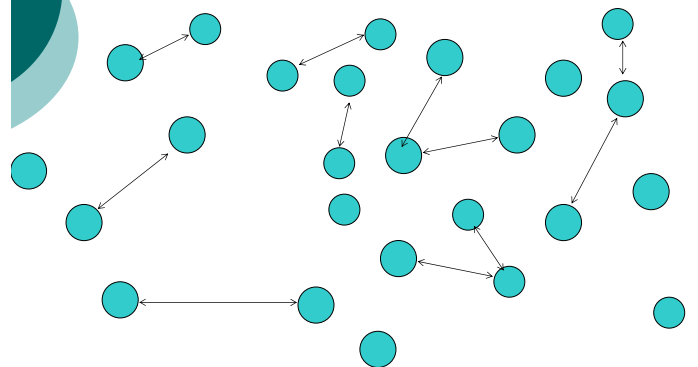
`http://www.iids.org/`

The world is dynamic, distributed and connected
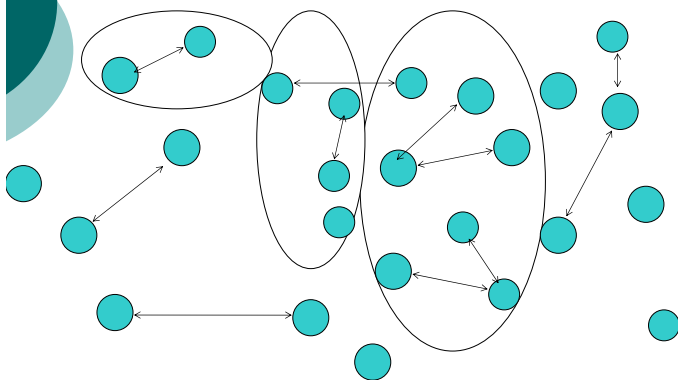

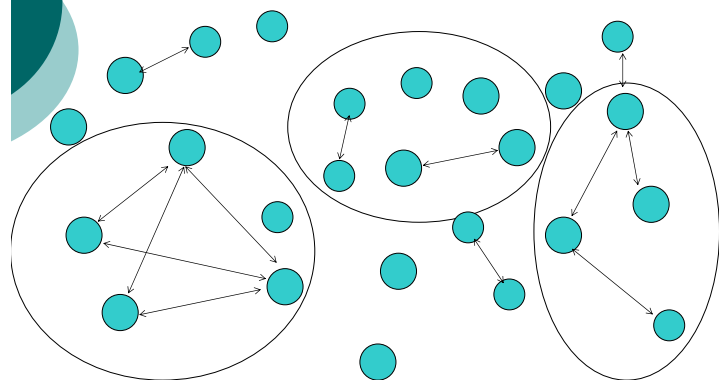## In time, space and tasks

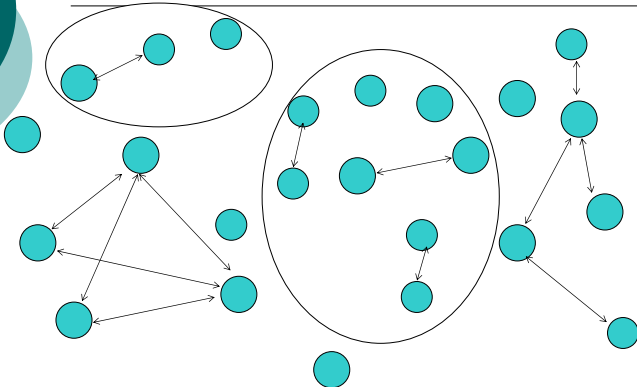## Systems and connections come and go

Configurations change

Configurations change

New configurations emerge

Including *virtual organisations* of human and automated systems
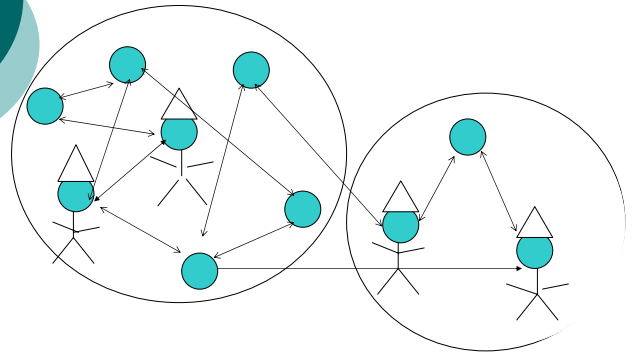
autonomous adaptive systems

p2p systems,

embedded self-configuring systems

autonomic computing systems

agents ……

Is there really a difference?

Agents are….

autonomous

pro-active

can interact with their environment

can communicate with other agents

may be able to reason/learn

may be mobile

All require some level of knowledge of

characteristics of their 'owner',
their own tasks & reasoning
other systems' characteristics & roles

division of responsibility/liability
of trust relationships
of interaction design/negotiation

What do they have in common?

The way they are perceived by the user ...

ECP.NL – guidelines for autonomous systems

(1) Identifiability of autonomous systems

(2) Transparency – system and responsibilities

(3) Integrity - process, data, and migration

(4) Integrity – platform

(5) Confidentiality of information

(6) Trustworthiness of systems

(7) Availability and continuity

An example

The Courts of Amsterdam and Rotterdam:
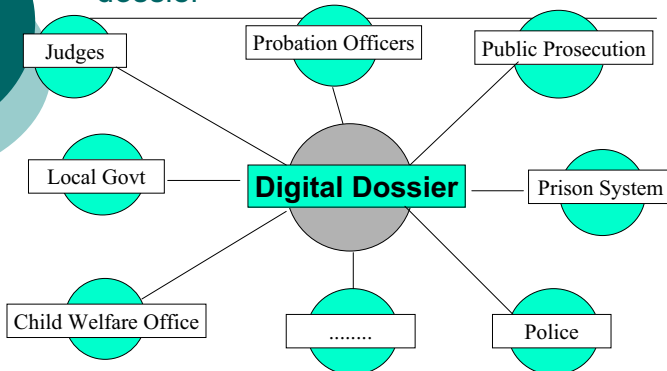
Well-regulated semi-open environment

Criminal Courts and the digital dossier

The digital dossier is:

- designed to supports judges, the public prosecutor and attorneys

- uses information acquired from different distributed sources

- including notes made by users

Distributed sources of info in digital dossier

Judges · Probation Officers · Public Prosecution · Local Govt · **Digital Dossier** · Prison System · Child Welfare Office · .... · Police

Distributed sources of multimedia info

Each autonomous source of information has its **own policies wrt**

Information sharing

within organisation

outside organisation

Digital dossier

Completeness and consistency
  of information across sources
  is **mandatory**
  (EVRM Article 5 & 6)

The aim of this project

Given physically distributed environments of
  heterogeneous entities/institutes/organisations

requiring different levels of accessibility,
authorisation, authentication

Challenge in this domain

To explore the feasibility of a fully distributed system

To support users based on knowledge of user preferences,

  to support information sharing between users and

  to improve the efficiency of current practice

The design chosen in this project

Each autonomous system is responsible for the
  retrieval of relevant information (authorization and
  authentication), processing and presentation to its
  user. Different levels of knowledge will be
  distinguished.

One of the elements for which reasoning is needed
  is reasoning about ….

The role of trust

Trust ….

Trust is
  time and situation dependent...

Trust …

Identity and integrity of all parties involved

Integrity of messages

        agents

        data

        hosts/agent platforms

Security measures help but do not always suffice

Trust based on beliefs

Castelfranchi and Falcone distinguish :
- Competence belief (ability)
- Disposition belief (inclination)
- Dependence belief (added-value)
- Fulfillment belief (contribution)
- Willingness belief (intention)
- Persistence belief (reliability)
- Self-confidence (strength)
- …...

Trust Models

- Strict hierarchical
  - Bell-La-Padula
    - Top-Secret, Secret, …, everybody
  - well researched

- Distributed trust in open environments
  - anonymous accreditation using certificates (Mass & Shehory)

- Transitive Trust (PGP)

To specifically reason about trust

- Requires
  - knowledge of situation & trust in other participants
  - knowledge of participants
  - shared models of domain
  - shared ontologies
  - shared knowledge of design process
  - knowledge of different viewpoints
  - strategies for coordinating different viewpoints
  - ....

Trust Dilemma

Tradeoff

- Positive results of successful trust
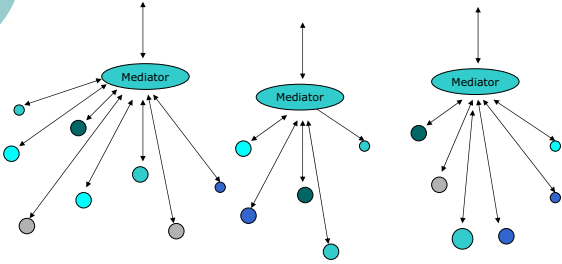- Negative results of unsuccessful trust

Impression

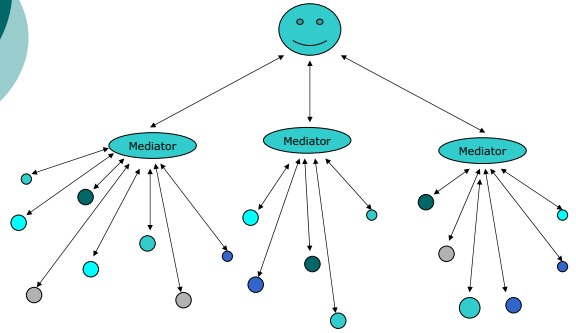Currently models based on transitive trust prevail

The question is whether this is sufficient for users to actually be willing to work with such systems.
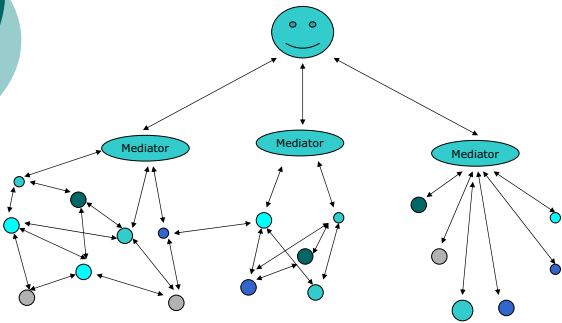
Now let's look at another example
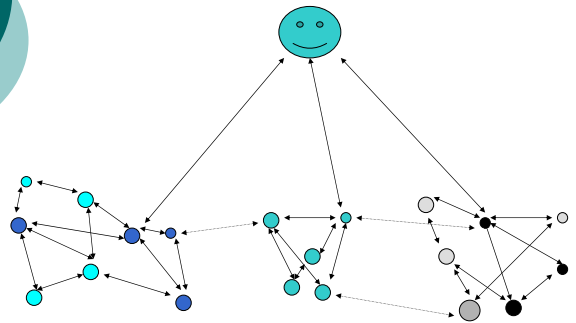
Mediated negotiation
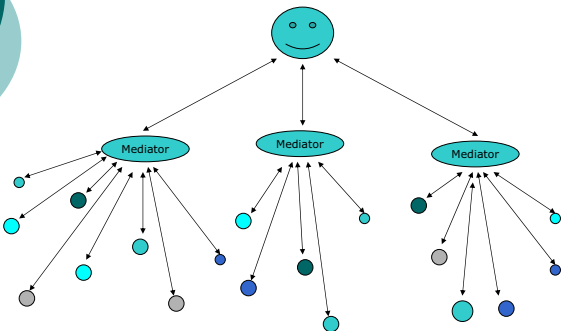

From the perspective of the user/user's agent

From the perspective of the requesting party
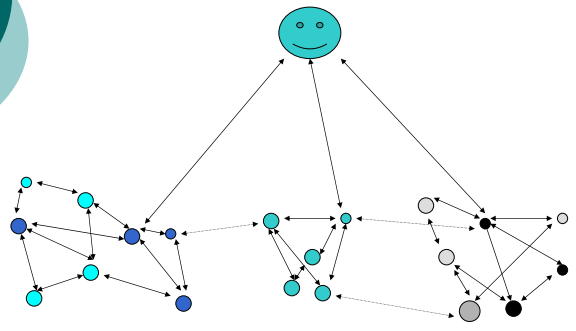

From the perspective of the user/owner (2)

From the perspective of the resources

From the perspective of the resources (2)

ECP.NL – guidelines for autonomous systems

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New technology required

Framework for
- scalable,
- interactive,
- secure,
- robust,
- interoperable
- distributed agent systems.

Agentscape Framework

- a distributed agent operating system (AOS)
- services
  - agent management
  - directory services
  - agent modification (e.g. agent factory, cloning),

designed to support large scale distributed agent applications.

Standard protocols and contracts

WSAS based negotiation may be an option ………………

One that may be supported by other technologies

New legal frame of reference

- Are agents full- fledged citizens of today's society?
- What rights do they have?
- Obligations?
- What is their legal status?
- Are all transactions in which they are involved legal? Valid?

Challenge – open systems

standards for protocols, contracts for interaction with system support (middleware).

understand the role of the users/owners/organisations in such distributed environments.

explore legal implications of different technologies.
(eg multi-media retrieval)

Thank you for your attention!

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Thank you John-Jules!