Agents in many disguises

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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 support 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

Distributed sources of multimedia info

Each autonomous source of information has its own policies wrt
Information sharing within organisation outside organisation
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 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)
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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!