

ACE

Autonomic Software Engineering for online Cultural Experiences

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Partners

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Project Objectives

- To develop autonomic BDI architectures for personal assistants of human agents engaging in online activities
- To develop a peer to peer autonomic electronic institution infrastructure to support the autonomous interaction of human and autonomic agents
- To embed the P2P infrastructure into mobile appliances to allow for a mobile social distributed consumption of cultural artefacts
- To develop a series of case studies with cultural institutions and build a full specification of a selected case study that we will develop into a working prototype

This talk's menu

- P2P Electronic Institutions
- Autonomic agents
- Cultural experiences
- Demo
- Shared Experiences

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Need for Institutions

Reaching **agreements** among individuals require that individuals interact in ways that involve:

- commitment,
- delegation,
- repetition,
- liability, and
- risk.

Moreover, in open systems **negotiators** are:

Autonomous, heterogeneous, independent, not-benevolent, not-reliable, liable.

Need for Institutions

Institutions' aim is to make those interactions effective by:

- establishing and enforcing conventions (and norms),
- standardize interactions (fixing semantics),
- allocate risks,
- establish safeguards, and
- guarantee that certain intended actions actually take place and unwanted situations are prevented.

These functions have been the basis for the development of many traditional institutions.

eInstitutions to settle agreements

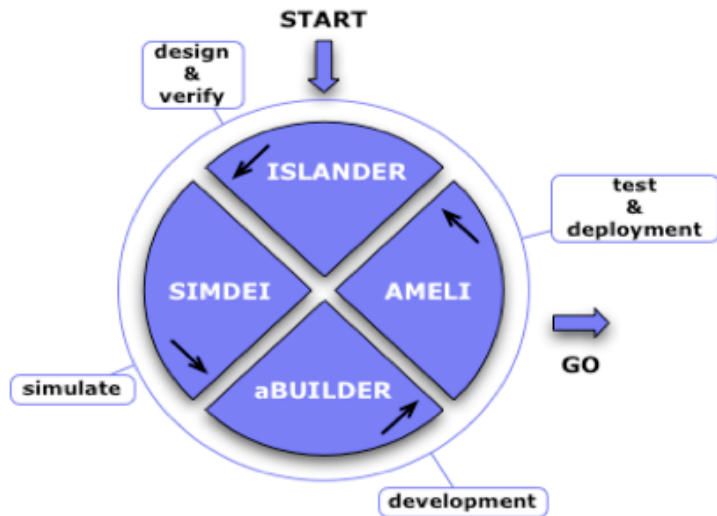
Electronic Institutions may help in setting the rules for agreement making.

Electronic institutions development can be divided into two basic steps:

- Formal specification of institutional rules: constraints, semantics, workflow, role flow policy, etc.
- Execution via an infrastructure that mediates agent interactions while enforcing the institutional rules.

The formal specification focuses on **macro-level** (rules) aspects of agents, not in their micro-level (players) aspects.

eInstitutions toolbox (<http://e-institutions.iiia.csic.es>)



eInstitution main concepts (supported by AMELI)

- Roles (internal and external) as patterns of behaviours. Agents can play multiple roles at the same time. Agents can change their roles.
- Strong dialogical stance
- Scenes as persistent interaction spaces with a FSM for interaction with constraints and procedures. Similar to an ambient.
- Agents flow (synchronise, split, choose) between scenes according to specified paths.
- Declarative norms establish obligations. Good/bad behaviour is regimented, reaction to inaction is programable.

ISLANDER

Menu Toolbar Graph Editor Toolbar Graph Editor Tab Graph Editor

The screenshot displays the ISLANDER software interface. The top menu bar includes File, Insert, View, Graph, and Help. The left sidebar shows the Project Structure Panel with a tree view of the project hierarchy, including entities like MarketPS, Balancing, and DialogicalFramework. The main workspace shows a state transition graph for the NegotiationProtocol. The graph includes nodes W0, W1, W2, W3, W4, W5, and W6, each with associated roles (SystemOperator, Consumer, Producer). Transitions are labeled with actions like start, request, refuse, accept, timeout, and close. The bottom right panel shows the Verification Message Panel with a list of messages and an Inspect Panel for viewing the details of a selected message.

Project Structure Panel Verification Message Panel Inspect Panel

Scene type: NegotiationProtocol.

Specification Properties Description

Name: NegotiationProtocol

Dialogical framework: dialogicalFramework

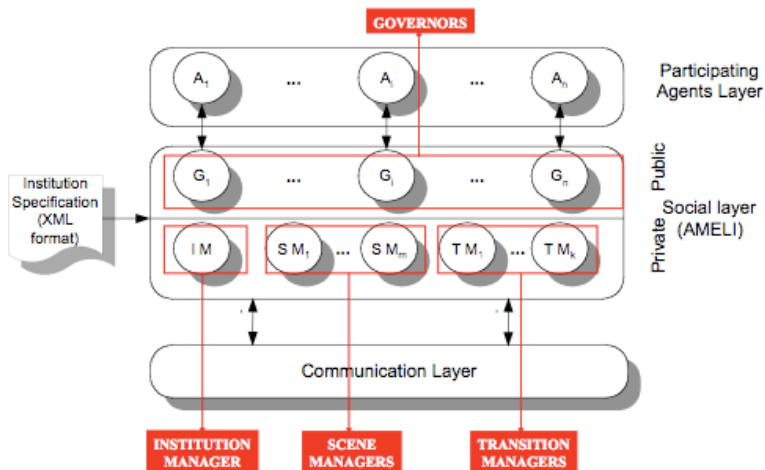
Minimum	Role	Maximum
1	SystemOperator	1
	Consumer	1000
	Producer	1000

Buttons: Add, Remove, Up, Down, Sort, Apply

Verification messages:

- Starting the verification process
- Scene 'NegotiationProtocol': 'state' is inaccessible from the initial state. [426]
- Scene 'NegotiationProtocol': 'state' cannot access any final state. [428]
- End of verification process

AMELI



3D Electronic Institutions

- Combination of regulated environments (eInstitutions) and un-regulated environments (Virtual Worlds)



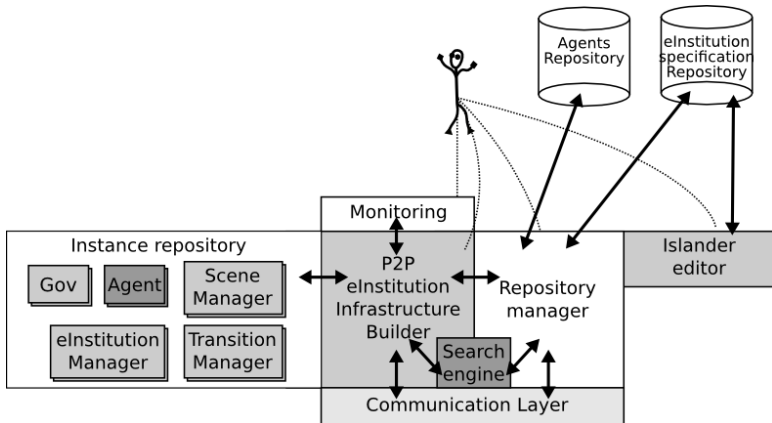
P2P infrastructure

- avoid centralised monitoring and validation
- facilitate sharing knowledge units,
- search for components, and
- support the enactment of eInstitution executions transparently to a human/agent user.

P2P eInstitutions

- Repository of eInstitution specification components:
Ontologies, norms, scenes, ...
- Repository of institutional agents
- Repository of agents
- Search utility
- Execution support to enact institutions
- research questions on: time-outs, synchronisation

P2P Architecture



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Objectives

- Argumentation-based agent architecture
- BDI mental model
- Argumentation-based negotiation

Autonomic Agents

- An **autonomic agent** is a computer system that is capable of autonomous and intelligent action. It has a model of itself and of others and shows self-* properties.
- An agent should have some **reasoning** capabilities
 - Reasoning about its *beliefs, desires, intentions* and *experiences*
 - Analyzing the *opinion* of a group of agents
- An agent should be able to **interact** with other agents
 - *Negotiating* with other agents
 - *Arguing* in order to make other agents revise their beliefs/desires

Internal reasoning

- An agent has **beliefs**, **desires**, **experiences** and **intentions**
- **Questions:**
 - How to represent each notion?
 - What are the interactions between them?
 - How to reason about them?
- **Some solutions:** XBDI logics, Argumentation logics

Opinion analysis

- Agents express **opinions** about an **object** by assigning **values** to some **features**
 - *Example:* This digital camera is acceptable since it has good resolution, good battery life, but is not easy to use
 - Object: digital camera
 - (Feature, Value): (Resolution, Good), (Battery life, Good), (Use, Bad)
- Each pair (Feature, Value) is an **argument** PRO or CON the object
- How to aggregate the opinions of the agents?
 - *Example:* to reject anything that is rejected by at least one agent and to take the union of what is favored by the agents (if compatible with what is rejected)

Interactions of an agent

- **Negotiation** is a process in which agents having different **interests** try to find a **compromise** on an object
- O = the set of all possible values of the negotiation object.
The compromise is an element of O
- Each agent has a **preference** relation $\geq$ on O
 - (Beliefs, Desires, Experiences) $\implies \geq \subseteq O \times O$
- **Questions:**
 - How to reach the best compromise?
 - How to exchange arguments in order to influence the preference relation of others
- **Solution:** Argumentation-based negotiation models

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Objectives

- Case study selection and specification
- Cultural experience prototype
- Validation of the prototype

WP3: Cultural exp.

Table: visitor numbers of Government funded institutions in London.

Institution	Visitors in July 2011
BRITISH MUSEUM	663,409
TATE LONDON (Britain and Modern)	630,110
NATIONAL GALLERY	542,000
NATIONAL MUSEUM OF SCIENCE AND INDUSTRY (NMSI)	477,280
NATURAL HISTORY MUSEUM (NHM)	467,542
VICTORIA AND ALBERT (V&A)	341,051
NATIONAL MARITIME MUSEUM	216,323
NATIONAL PORTRAIT GALLERY	213,201
IMPERIAL WAR MUSEUM LONDON	103,052
HORNIMAN MUSEUM	48,131

NATURAL HISTORY MUSEUM (NHM)

- 467,542 visitors in July 2011
- 50,000 image archive
- Excellent picture search, with related words
- <http://piclib.nhm.ac.uk/>

NHM: picture search

Search box:

Picture Library Browse collections | Our services | Your account Contact us: call +44 (0)20 7942 6376 or email us

Search Within ResultsPage [40] Pop Preview Search History Last 20 Searches...

☐ Photographs ☐ Illustrations ☐ Portraits ☐ Archive ☐ Fossils ☐ Specimens ☐ SEM ☒ Color ☒ BW

Search results:

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spider Search Within ResultsPage [30] Pop Preview Search History Last 20 Searches...

☐ Photographs ☐ Illustrations ☐ Portraits ☐ Archive ☐ Fossils ☐ Specimens ☐ SEM ☒ Color ☒ BW

your search for Spider returned 301 results

Page 1 of 7 Regular Go to page: 1



Rights Managed
92748
Animals in a forest scene



Rights Managed
956875
Michael Roberts spider illustrations, plate 4



Rights Managed
956875
Spider illustrations (plate 13)



Rights Managed
956875
Spider illustrations (plate 18)



Rights Managed
956875
Spider illustrations (plate 7)



Detail page:

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You are here: Home > Business Centre > Picture Library > Search Results

spider Search Within ResultsPage [30] Pop Preview Search History Last 20 Searches...

☐ Photographs ☐ Illustrations ☐ Portraits ☐ Archive ☐ Fossils ☐ Specimens ☐ SEM ☒ Color ☒ BW

Return to search results Next

Title: Animals in a forest scene
Image reference: 012748

Description:
Collection: Animals
Category: Reptiles and Amphibians
© The Natural History Museum, London

Related keywords:

☐ animal	☐ illustration	☐ spiral
☐ arachnid	☐ insect	☐ squamata
☐ aves	☐ lizard	☐ thesaurus
☐ biodiverse	☐ nature	☐ tree
☐ biodiversity	☐ plate	☐ tropical
☐ bird	☐ reptile	☐ various
☐ drawing	☐ scene	☐ vegetation
☐ engraving	☐ seba, albertus (1665-1736)	☐ watercolour
☐ forest	☐ serpentes	☐ wild
☐ fruit	☐ snake	☐ wildlife
☐ habitat	☐ spider	

Search selected 0

Toolbox

- Print version
- Email this page

Image specifications

Web resolution 457.03 KB 72 dpi (312x500 pixels)	Request a quote
Low resolution 1028.66 KB 72 dpi (454x742 pixels)	Request a quote
High resolution ~27.2 MB 300 dpi ~(2438x3902 pixels)	Request a quote

Related keywords:

Related keywords:

- | | | |
|---------------------------------------|---|--------------------------------------|
| ☐ animal | ☐ illustration | ☐ spiral |
| ☐ arachnid | ☐ insect | ☐ squamata |
| ☐ aves | ☐ lizard | ☐ thesaurus |
| ☐ biodiverse | ☐ nature | ☐ tree |
| ☐ biodiversity | ☐ plate | ☐ tropical |
| ☐ bird | ☐ reptile | ☐ various |
| ☐ drawing | ☐ scene | ☐ vegetation |
| ☐ engraving | ☐ seba, albertus (1665-1736) | ☐ watercolour |
| ☐ forest | ☐ serpentes | ☐ wild |
| ☐ fruit | ☐ snake | ☐ wildlife |
| ☐ habitat | ☐ spider | |

Search selected 0

HORNIMAN MUSEUM

- 48,131 visitors in July 2011
- large image archive
- Excellent picture search, with related words
- User tagging, tag clouds
- <http://www.horniman.ac.uk/collections/search-for-objects>

HORNIMAN: picture search

Search box:

HORNIMAN MUSEUM & GARDENS Collections

HOME
VISIT • WHAT'S ON
CONTACT

COLLECTIONS
Browse Search Tag

Explore our
introduction

Browse our
introduction

Search for objects

Highlights

Tag an object

About the collections

Conservation

Research and
Feedback

Shared Collections

LEARN
Discover, discover, discover

GET INVOLVED
Help, help, help

ABOUT
History, information, jobs

Search for objects

YOUR CRITERIA

Keyword
Keyword [Less options](#)

Collections

☐ All Collections
☐ Anthropology
☐ Aquarium
☐ Archives
☐ Gardens
☐ Musical Instruments
☐ Natural History
☐ Handling Collection

Object name

☐ Include dependents

Place

☐ All ☐ Male ☐ Collect

People

☐ Include dependents

☐ All ☐ Master ☐ Collector

Located in

☐ All Locations
☐ African Mantis
☐ Aquarium
☐ Cemetery Gallery
☐ Hands on Base
☐ Music Gallery
☐ Natural History
☐ Nature Base
☐ Gardens

Object number

From (YYYY) To (YYYY)

Classification (musical instruments)

☐ Include dependents

Material / technique / specimen form

☐ Include dependents

Culture

☐ Include dependents

YOUR BROWSE OPTIONS

Show only

☒ objects on display
☐ objects with images
☐ highlighted objects
☐ objects which I can handle
☐ living specimen

Sort

☐ by relevance
☐ by date
☐ alphabetically

[Build](#) [Reset all](#)

Detail page:

couénophone

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Place [Europe](#) • [France](#) • [Paris](#)

Materials [Soldering](#) • [German silver](#) • [Copper](#) • [Silver](#)

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Description **Details**

Couénophone or goofus sax. A free med instrument with a brass body, nickel silver touchpieces and detachable mouthpiece. Twenty six keys arranged in two rows in the manner of a piano keyboard. Two thumbrests on the back. Integrated crook sets mouthpiece at a ninety degree angle to the body. No bell flare. Lower end of instrument stamped: "COUÉNOPHONY" BREVETES S.G.D.G. PARIS/France

YOUR TAGS

Enter your tag [Add](#)

Login with Facebook to edit your tags and post on your wall.

[Login with Facebook](#)

Search results:

sarusophone
2004.1132

octavin
14.S.47/261

couénophone
2004.1162

User tag cloud search

ALL TAGS

1976.85 Asian Benjamin Franklin Bronze Christmas David De Flora Kerkhof Pal Bass Harry Potter I love

Imperial Institute Inch Kinono LOL Queen Victoria Speechless Touchscreen adorable amazing animal cruelty artistic badge long clever clothes colourful cuddly cute delicate detailed different dragon egg extract eye protection fabulous face fascinating famous far favourite fossil fully french fun funny geography gold green grass handle handi handling hard hardy heart important impressive interesting ironic island jangle low lovely meek musical new-year celebrations and smile pattern playing poster pretty prophesy rabbit rabbit rustic sad scary science sharp shiny soaring speedily status summary tea thing by tragedy triangles unusual want to own weird well made wellish well wonderful wondrous wondrous wood yarn

of 99 items

View [20](#) items per page on [10](#) pages

helmut maska
On Display
Highlight
1908-191

synthesizer
On Display
Highlight
1905-1906

neck ring

headress

Evaluation of institutional image archives

Table: The scores achieved by the institutions according to the metric of footfall and various features of their public, online archives.

Name	visitors Jul. 2011	footfall	new ideas	tags	search	variety	score
Tate London (Britain and Modern)	630,110	3	3	3	3	2	14
Horniman Museum	48,131	1	3	3	3	3	13
British Museum	663,409	3	2	2	3	3	13
Natural History Museum	467,542	3	2	3	3	2	13
Victoria and Albert Museum	341,051	2	2	3	3	3	13
National Museum of Science and Industry	477,280	3	3	1	1	3	11
National Maritime Museum	216,323	1	3	2	2	2	10
National Gallery	542,000	3	3	1	1	2	10
National Portrait Gallery	213,201	1	2	2	3	1	9
Imperial War Museum	103,052	1	2	1	1	2	7

- *footfall*: number of visitors to the institution (= potential impact).
- *interest*: apparent interest of the institution in invigorating their archive, e.g. are they actively developing new methods of presenting and exploiting their digital archives.
- *tags*: tags (or short descriptors) on images. Do the items in the archive have a range of different tags associated with them and how complete does the coverage of the archive appear to be?
- *search*: ability to search by tag. Is there an obvious means to search for items with a specific tag associated with them.
- *variety*: image variety. A somewhat subjective measure of the variety of images in the archive.

Representatives from London Museums in the January 2012 meeting

- Natural History Museum: Sheila Sang and Ludvig Lohse
- Horniman Museum: Adrian Murphy
- John Soane Museum: Beth Walker
- Geffrye Museum: Eleanor John

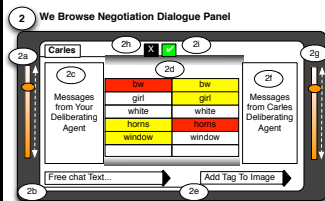
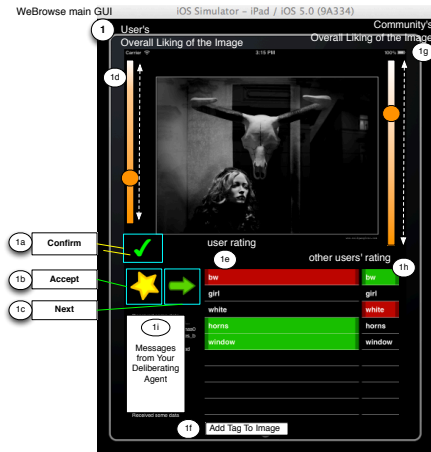
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DEMO

Social Browsing over iPads
Not yet *very* autonomic

Version 2



Version 2 newlook



Version 2 newlook



Version 2 newlook



Version 2 newlook



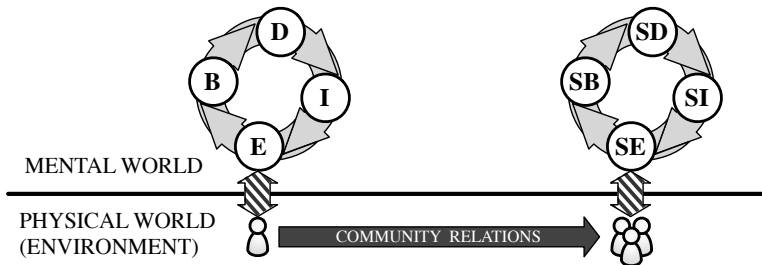
Version 2 newlook



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Shared Experiences



Community Browsing Requirements

- To manage charters
- To regulate membership
- To model interactions
- To interact with humans
- To take decisions

Some management so far

- Consorsrtium Agreement being signed right now
- Four general meetings
- 3 architects week-long meetings
- First prototype running
- Papers under review: 2 AAI, 2 (short) ECAI, 1 PAIS
- 1 paper for COMMA 2012 under preparation
- 1 Journal paper under preparation
- 1 spin-off company planned (negotiation of touristic packages)
- 2 STREP proposals based on ideas generated in ACE
- Very active team

What's next

- Finalize the platform
- Implement Version 2
- Develop the concept of Shared Experience
- Select a Museum
- Develop a prototype for the museum