

ACE

Autonomic Software Engineering for online Cultural Experiences

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IIIA-CSIC

Partners

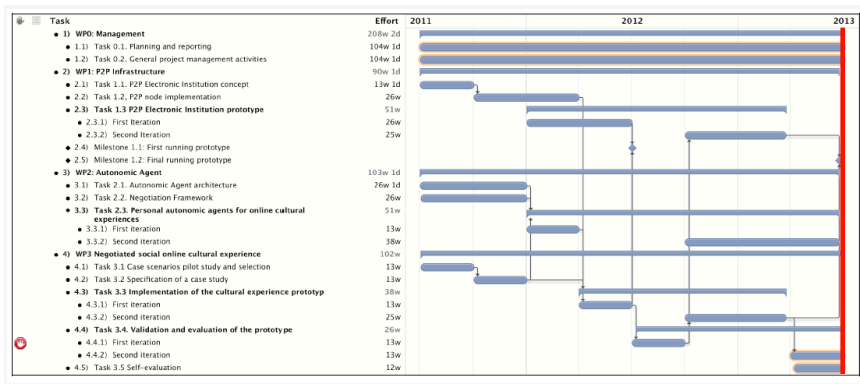
Partner	City	PI
IIIA-CSIC	Barcelona	Carles Sierra
Goldsmiths, U. London	London	Mard d'Inverno
IRIT, CNRS	Toulouse	Leila Amgoud

Other Researchers: Nardine Osman, Henri Prade, Matthew Yee-King, Dave de Jonge, Roberto Confalonieri, Katina Hazelden, Bruno Rosell.

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

GANTT



Deliverables



Autonomic software engineering for online Cultural Experiences

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deliverables

By admin - Posted on July 31st, 2012

WP 0: Management

D0.1	Project Report	M12, M24
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WP 1: P2P Electronic Institution

D1.1	P2P Institution node architecture	M6
D1.2	Running P2P node	M6, M12, M24
D1.3	P2P Electronic Institution prototype	M12, M24

WP 2: Autonomic Agents

D2.1	An autonomic Agent Architecture	M6
D2.2	An argumentation-based Negotiation Framework	M6
D2.3	Personal autonomic agent	M12, M24

WP 3: Negotiated social online cultural experiences

D3.1	Set of case studies of how autonomic agents could be applied to enrich/enable social online experiences	M3
D3.2	A full specification jointly written with a London cultural institution of the functionality of a system to enable online social experiences	M6 I, M6 II
D3.3	First implementation of the cultural experience prototype	M12 I, M12 II
D3.4	A complete validation and evaluation of prototype	M21
D3.5	Self-evaluation document in working in a multi-disciplinary cultural context especially with respect to potential role of autonomic agents	M24

user menu

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activities

- Kick-off meeting
- Agenda - Meeting Dubrovnik (14-10-2012)
- Decisions Management meeting October 2012
- Decisions Management meeting February 2013
- Agenda - Meeting Barcelona (June 6-7 2013)

members



Goldsmiths
UNIVERSITY OF LONDON



Last Year's work

- P2P Electronic Institutions
- Autonomic agents
- Cultural experiences
- Results

Last Year's work

- **P2P Electronic Institutions**
- Autonomic agents
- Cultural experiences
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WP1 objectives

- Develop a P2P Electronic Institution infrastructure
- Embed the P2P autonomic electronic institution infrastructure in mobile devices
- Make the software available as open source

T1.1: P2P Electronic Institution Concept

- Completed; see deliverable D1.1.
- New component introduced in the EI concept: Device Manager
- Network architecture based on Freepastry

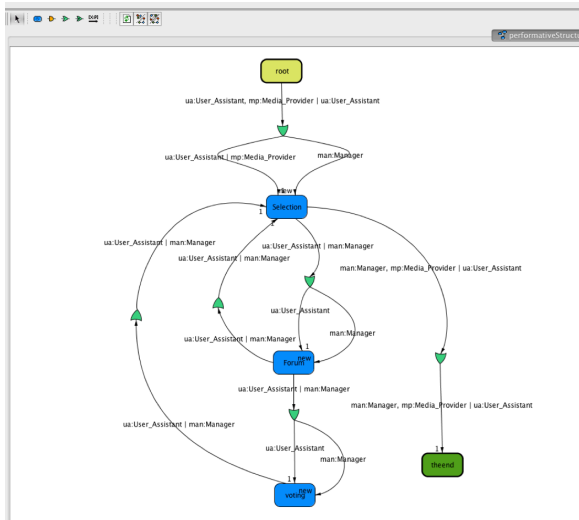
T1.2: P2P Node Implementation

- Completed; see deliverable D1.2. Two software versions.
- Distributed search for content.
- Specific for the WeCurate application.

T1.3: Electronic Institution Prototype

- Completed; see deliverable D1.3.
- The Horniman Museum was chosen for the WeCurate case study and an electronic institution specified for it.

T1.3: Electronic Institution Prototype



Last Year's work

- P2P Electronic Institutions
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WP2 Objectives

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

T2.1: Autonomic Agent architecture

- Interfacing users to the system
- Storing the likes and dislikes as preferences
- Merging users' tags (Group preference defined)
- Selecting subsequent images
- Architecture completed; see deliverable D2.1
- Model was implemented and presented at AT'12

T2.2: Negotiation Framework

- Arguments are supports for an overall image opinion as pairs $\langle tag, value \rangle$
- Arguments change dynamically, sometimes via private negotiations
- Work completed; see deliverable D2.2
- Work presented at MDAI'12

T2.2: Negotiation Framework



Figure 2: WeCurate interface.

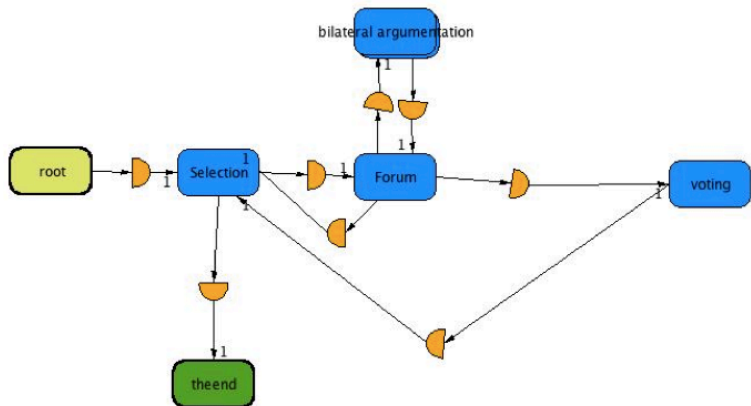
T2.3: Personal autonomic agents for cultural experiences

- Largest development effort
- P2P EI connected with autonomic agents
- Work completed; see deliverable D2.3
- The model was implemented

T2.3: Personal autonomic agents for cultural experiences

- incarnate WeCurate users by storing their actions and arguments
- enact the curation workflow and the scenes
- support social interactions by means of agent-to-agent protocols
- take collective decisions to drive the curation workflow
- support argument-based multiple criteria decision making

T2.3: Personal autonomic agents for cultural experiences



Last Year's work

- P2P Electronic Institutions
- Autonomic agents
- **Cultural experiences**
- Results

WP3 objectives

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

T3.1: Case scenarios pilot study and Selection

- Completed; see deliverable D3.1.
- The Horniman Museum was chosen for the WeCurate case study.

T3.2: Case Study Specification

- Completed; see deliverable D3.2.
- Work was presented at AT 2012 Croatia.
- The case study was based around a public installation at the Horniman museum which took place in November 2012.
- A follow up case study was also developed for an exhibition that ran concurrently at 4 sites, 2 on campus at Goldsmiths and 2 off campus in Lewisham.

T3.3: Implementation of the Cultural Experience Prototype

- Completed; see deliverable D3.3a and D3.3b.
- Work presented at AAMAS 2013.



A set of small navigation icons typically found in Beamer presentations, including symbols for back, forward, search, and other slide controls.

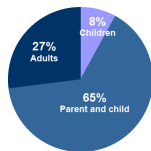
T3.4: Validation and evaluation of the prototype

WeCurate was installed as a multiuser museum interactive, and was used by visitors in groups of up to four people. Multiple sources of qualitative and quantitative data were collected:

- An automatic log of all participants actions (92 sessions)
- Observations based on field notes (37 sessions)
- Questionnaires (48 collected)

The analysis of the data concentrated on the distinct interactive behaviours of different social groups.

T3.4: Validation and evaluation of the prototype



High variation of engagement:

- Time: mean 5mins 38secs (+/- 4mins 25secs)
- Images viewed: mean 4.4 (+/- 4.1)

Social groups: 83% familiar with the group (46% family) reflecting the public's everyday habits in cultural institutions. Key findings showed evidence of collective decision making and negotiation:

- Parent and child: scaffolded experience
- Adult groups: playful engagement and interdependent behaviours

T3.4: Validation and evaluation of the prototype

Strong evidence for the social group's influence over individual's decision making, made available via the WeCurate system:

- Participants felt they were able to communicate their preferences and had an awareness of the group's intentions and opinions - 87% of participant were aware of others' action via the synchronised view.
- The social group had an influence on individual's decision making, as 42% reported changing their decision as a consequence of seeing (a representation of) other's actions.
- Effectiveness of the agents - 75% of participants voted on the images they preferred.

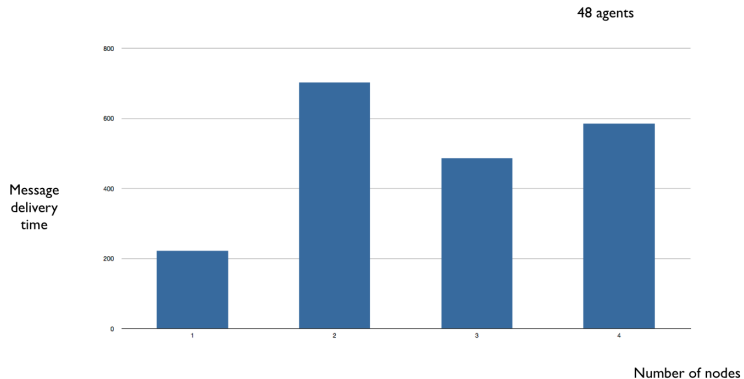
T3.5: Self-evaluation

- Completed; see deliverable D3.5.
- The self evaluation addresses the primary research questions: does the agent technology enable users to share an experience, and are they good predictors of the behaviours of groups when making collective decisions? The successes, areas for improvement, and potential for future work are discussed.

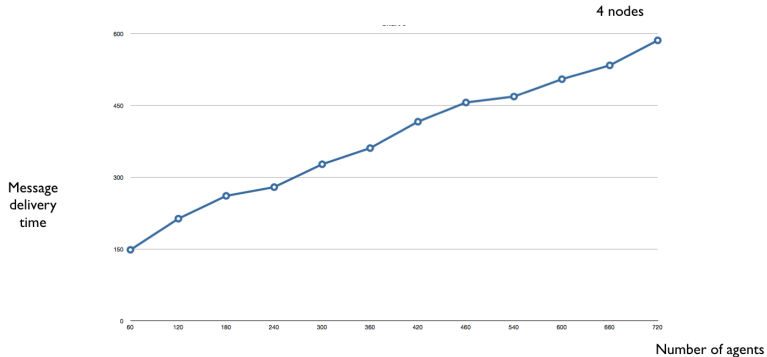
Last Year's work

- P2P Electronic Institutions
- Autonomic agents
- Cultural experiences
- **Results**

Results: Scalability



Results: Scalability



Results: Publications I



Angela Fabregues and Carles Sierra.

HANA: a Human-Aware Negotiation Architecture.

In Decision Support Systems, In press.



Nardine Osman and Carles Sierra and Fiona McNeill and Juan Pane and John Debenham.

Trust and Matching Algorithms for Selecting Suitable Agents.

In ACM Transactions on Intelligent Systems and Technology, Volume 5, Issue 1, 2014.



Nardine Osman and Mark d'Inverno and Carles Sierra and Leila Amgoud and Henri Prade and Matthew Yee-King and Roberto Confalonieri and Dave de Jonge and Katina Hazelden.

An Experience-Based BDI Logic: Motivating Shared Experiences and Intentionality.

In the 39th Annual Conference of the IEEE Industrial Electronics Society (IECON 2013), Vienna, Austria, 2013.



Mark d'Inverno; Michael Luck; Pablo Noriega; Juan A. Rodr  guez-Aguilar and Carles Sierra.

Communicating Open Systems: Extended Abstract.

In IJCAI 2013, AAAI Press, Beijing, China, 2013.



Dave de Jonge, Bruno Rosell and Carles Sierra.

Human Interactions in Electronic Institutions.

In the 2nd International Conference on Agreement Technologies, Springer, Volume 8068, Beijing, China , p.75-89, 2013.

Results: Publications II



In the 39th Annual Conference of the IEEE Industrial Electronics Society (IECON 2013), Vienna, Austria, 2013.



In AAMAS 2013, Saint Paul, Minnesota, USA, p.917-924 , 2013.



In *Electronic visualisation technologies and the Arts*, London, UK, In Press. Springer-Verlag.



In AAMAS'13: Proceedings of the 12th international joint conference on Autonomous agents and multiagent systems, Saint Paul, Minnesota, USA, In Press.



In *ACM SIGCHI Conference on Human Factors in Computing Systems 2013*, Paris, France. In Press.

Results: Publications III



Dave de Jonge and Carles Sierra.

Branch and bound for negotiations in large agreement spaces.

In Conitzer, Winikoff, Padgham, and van der Hoek, editors, *AAMAS'12: Proceedings of the 11th international joint conference on Autonomous agents and multiagent systems*, volume 3, pages 1415–1416, Valencia, Spain, 2012.



Leila Amgoud, Roberto Confalonieri, Dave de Jonge, Mark d'Inverno, Katina Hazelden, Nardine Osman, Henri Prade, Carles Sierra, and Matthew Yee-King.

Sharing online cultural experiences: An argument-based approach.

In Torra et al., editor, *Modeling Decisions for Artificial Intelligence*, volume 7647, pages 282–293. LNCS, Springer, 2012.



Andrew Koster, Jordi Madrenas-Ciurana, Nardine Osman, W. Marco Schorlemmer, Jordi Sabater-Mir, Carles Sierra, Dave De Jonge, Angela Fabregues, Josep Puyol-Gruart, and Pere Garcia-Calves.

u-Help: Supporting Helpful Communities with Information Technology.

In *Proceedings of the First International Conference on Agreement Technologies*, volume 918, pages 378–392. Ceur Workshop Proceedings, Dubrovnik, Croatia, 2012.



Katina Hazelden, Matthew Yee-King, Leila Amgoud, Mark d'Inverno, Carles Sierra, Nardine Osman, Roberto Confalonieri, and Dave de Jonge.

WeCurate: Designing for synchronised browsing and social negotiation.

In *Proceedings of the First International Conference on Agreement Technologies*, volume 918, pages 168–179. Ceur Workshop Proceedings, Dubrovnik, Croatia, 2012.



In *Proceedings of The first International Conference on Agreement Technologies*, volume 918, pages 201–202. Ceur Workshop Proceedings, Dubrovnik, Croatia, 2012.



In Sascha Ossowski, Francesca Toni, and George A. Vouros, editors, *The first International Conference on Agreement Technologies*, volume 918, pages 220–230. Ceur Workshop Proceedings, Dubrovnik, Croatia, 2012.



In Workshop on Technologies for the Organisation, Adaptation and Simulation of Transportation Systems (TOASTS@SASO), page 16pp, Lyon, France, 2012.

Results: Meetings

Date	Description	Place	Attendees
08/09/11	Kick-off Meeting	Barcelona	IIIA, GC and IRIT
20-21/10/11	Technical and MGT Meeting	Barcelona	IIIA, GC and IRIT
8-10/12/11	Technical and MGT Meeting	Toulouse	IIIA, GC and IRIT
06/01/12	Technical and MGT Meeting	London	IIIA, GC and IRIT
08/02/12	Technical and MGT Meeting	Barcelona	IIIA, GC and IRIT
13-17/02/12	Technical integration	London	IIIA and GC
28-30/03/12	Shared experiences and collective intentionality	Paris	IIIA and GC
3-4/05/12	Technical and MGT Meeting	Barcelona	IIIA, GC and IRIT
28/05/12	Technical integration	London	IIIA and GC
10-12/09/12	Technical integration	London	IIIA, IRIT and GC
14/10/12	Technical and MGT meeting	Dubrovnik	IIIA, IRIT and GC
22/02/13	MGT meeting	Skype meeting	IIIA, IRIT and GC
06-07/06/13	Technical and MGT meeting	Barcelona	IIIA, IRIT and GC

Results: Spin-off company

- We are working on the incubation of a spin-off company, **SocialBrowsing**, based on the acquired *know-how* and results of ACE
- The incubation process is lead by one of the project's members and it is supported by a valorisation manager and a scientific advisor both from IIIA-CSIC
- Since agost 2013 we have taken several actions in order to create the spin-off

Results: Spin-off Actions

1 Identification of competitive advantages:

- A novel model of online and real-time collaboration
- Group decision making algorithms such as selection, multiple-criteria, polls, etc.
- Group interactions to create user and group profiles

2 Development of a business idea:

- A SaaS for the agile development of social and collaborative business applications
- We have participated in the VALORTEC 2013 Contest organised by ACC10¹

3 Development of a business plan:

- Many verticals possible (marketing, entertainment, education, tourism, etc.)
- As part of the VALORTEC Contest we have developed our first business plan focusing on marketing research

¹ The Agency for the Enterprise competitiveness of the Government of Catalonia

Results: Spin-off Actions

4 Building the founder team:

- The current project team is:
 - Roberto Confalonieri as CEO and CTO
 - Lissette Lemus to support the commercialisation and marketing
 - Carles Sierra as Scientific Advisor
- Looking to complete the team with a Software Engineer and a Sales Manager

5 Initial fund-raising:

- We have estimated a first seed round of 83.000 €
- We have presented the business plan to several local business angels

Results summary

- Consortium Agreement was signed
- Several general meetings
- 4 architects week-long meetings
- Two prototypes running
- User test completed
- All deliverables completed and publicly available
- 17 papers published
- 1 spin-off company planned
- 1 STREP project funded on call 8 based on ideas generated in ACE: PRAISE

What's next

Thanks!