



COST



Agreement Technologies

Insights from COST Action IC0801

Oxford, April 2013

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Univ. Rey Juan Carlos, Madrid, ES



Agreement Technologies

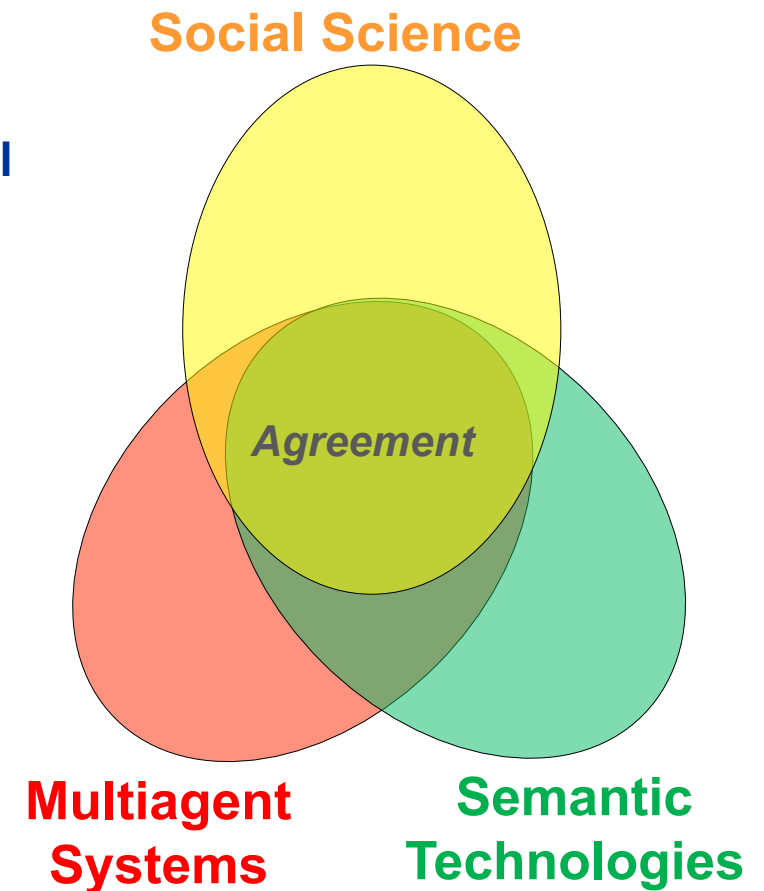
Insights from COST Action IC0801

1. Overview
2. Activities
3. Outcomes

Scientific context and objectives

Agreement Technologies Vision

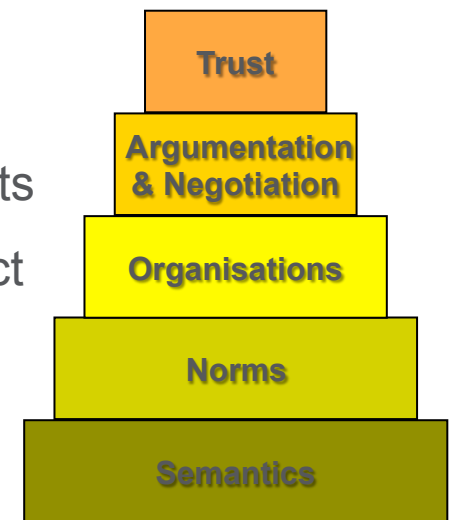
- Large-scale open distributed systems
 - Area of enormous **social and economic potential**
 - **Paradigm Shift**: beyond the client-server architectures...
- Vision:
 - Next-generation **open distributed systems**, where interactions between computational **agents** are based on the concept of **agreement**.
 - ✓ **normative context**: rules of the game
 - ✓ first **establishment**, then enactment of **agreements**



Scientific context and objectives

AT strands of research

- Fundamental and applied research:
 - **Semantics**: Semantic mismatches & alignment of ontologies
 - **Norms**: Specify and verify constraints on agreement
 - **Organisations**: Structure the processes of reaching agreements
 - **Argumentation & Negotiation**: Reach agreements that respect the constraints imposed by norms and organisations
 - **Trust**: Summarise the history of agreements and agreement executions in order to build long-term relation
- **Interdisciplinary** research:
 - Solid conceptual foundations: **robust understanding** of the notion of agreement and agreement processes



Scientific context and objectives

Mission of the COST Action

-  Action IC0801 on “Agreement Technologies”

– Overall mission:

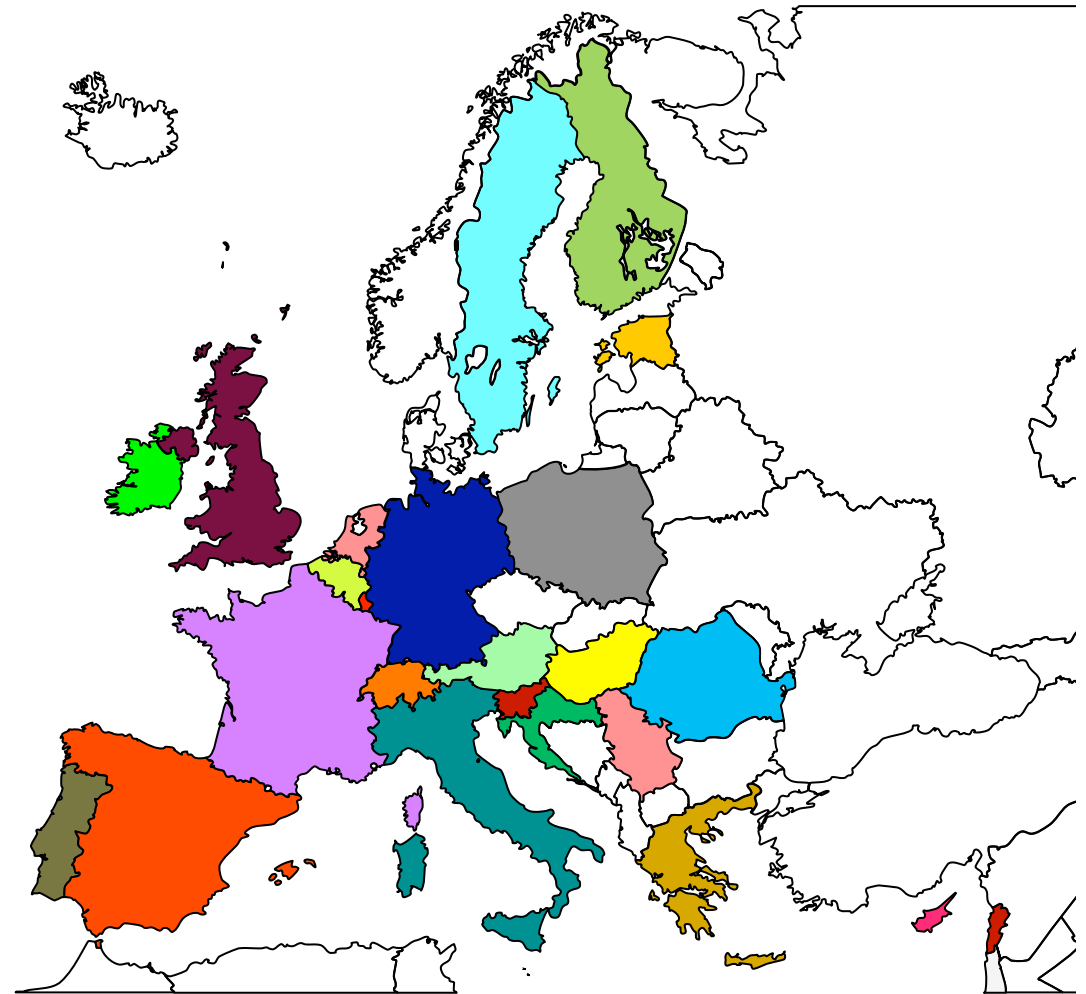
*“ to support and promote the **harmonization** of nationally-funded **high-quality research** towards a new paradigm for next generation distributed systems based on the notion of agreement between computational agents...”*

– Objectives: research **coordination**, scientific and socio-economic **impact**

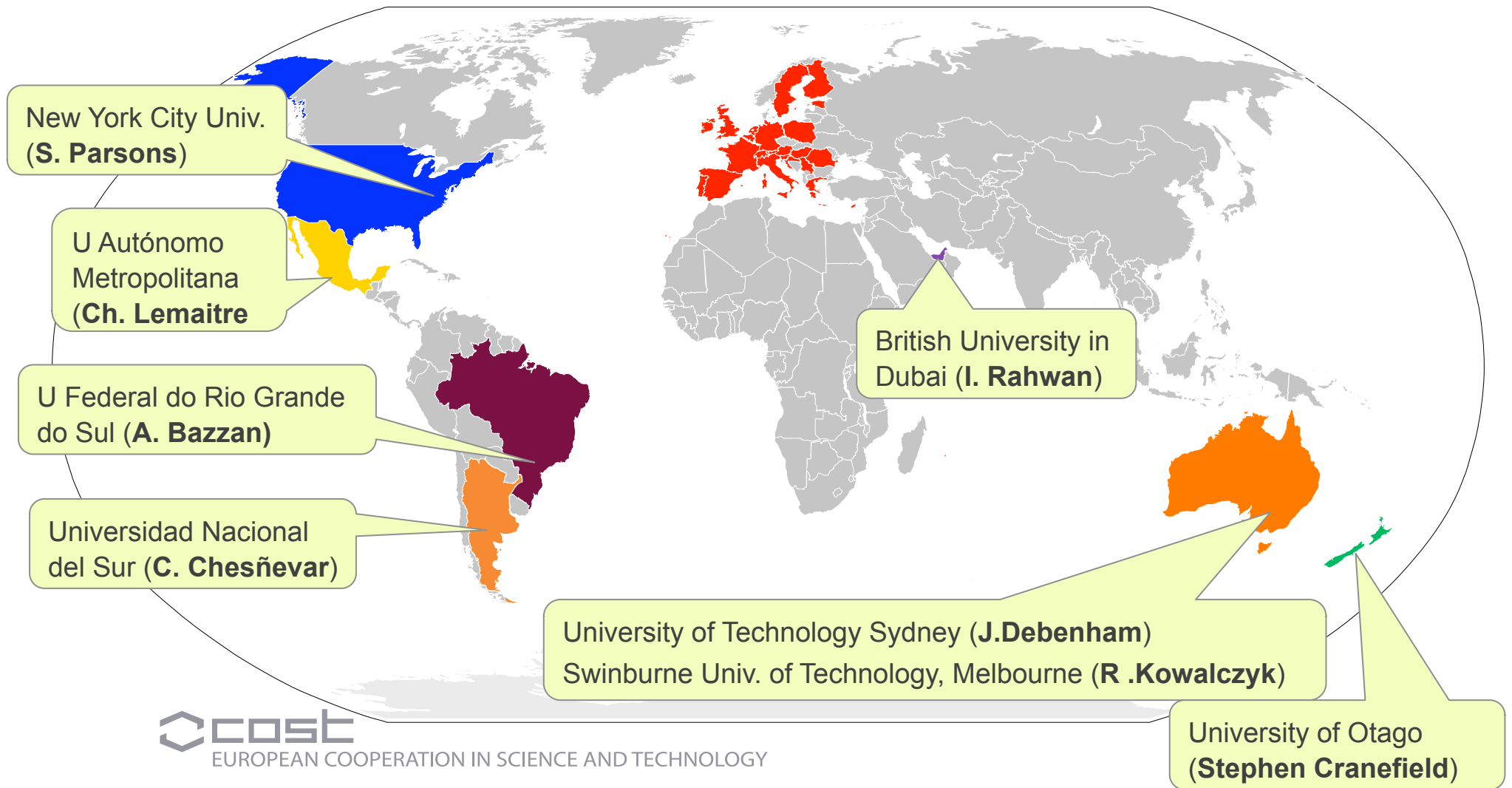


Action fiche

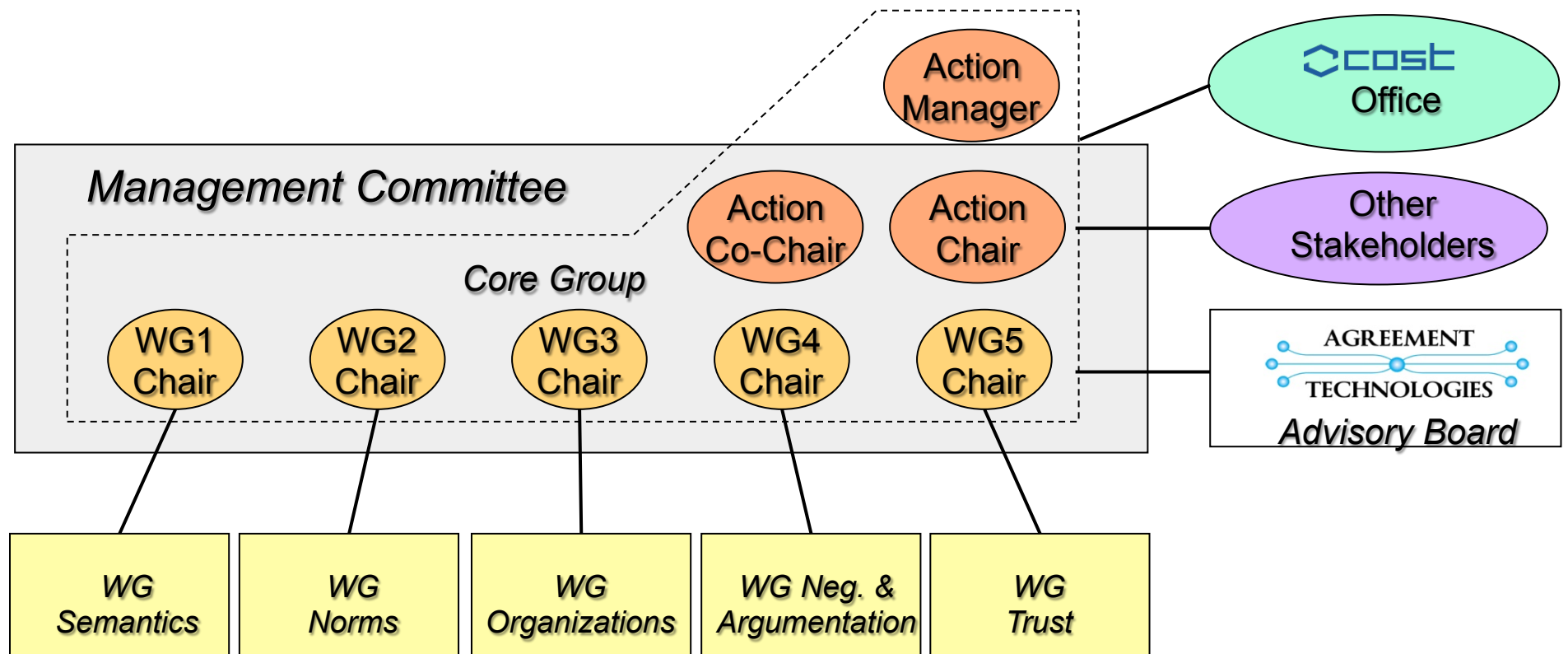
- Duration: 10/2008 - 10/2012
- Total budget: **433.281 €**
- **25** COST countries
- **8** non COST institutions
- 41 MC members
(plus 13 substitutes)
- **193** WG members



Non-COST Participation

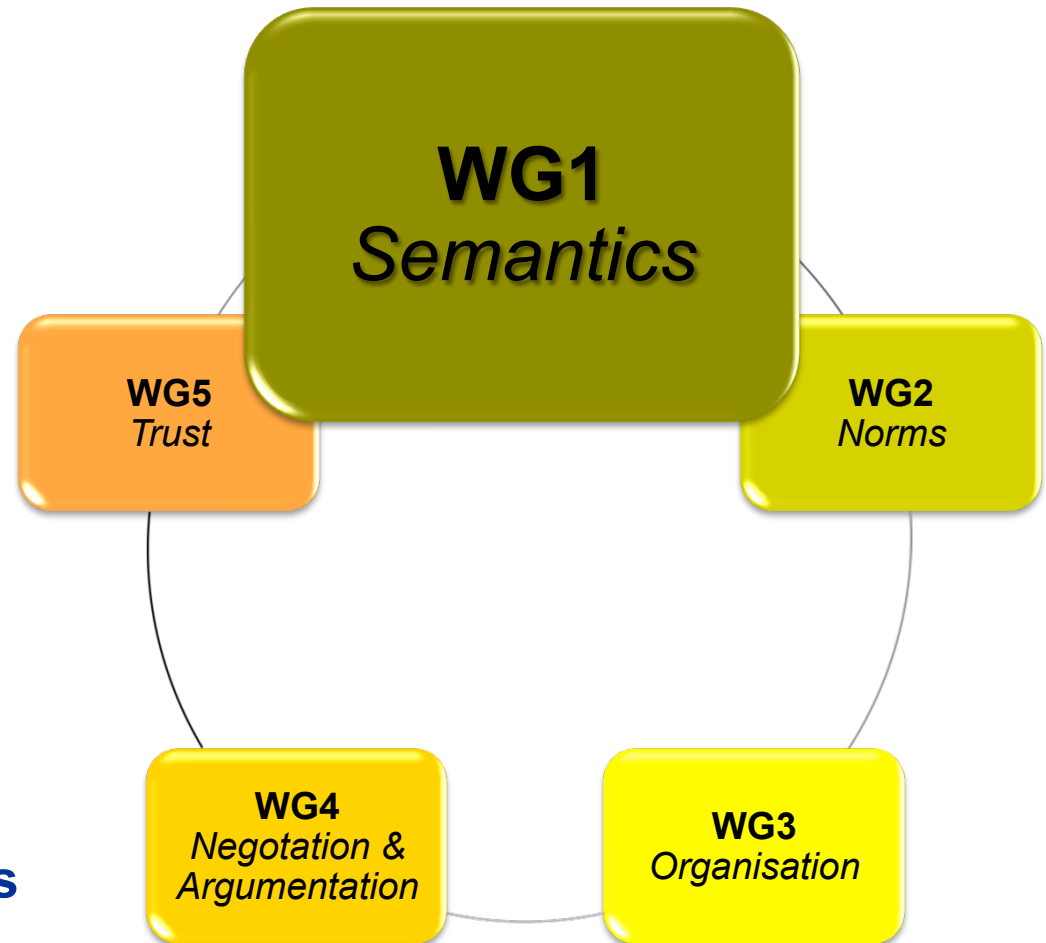


Management Structure



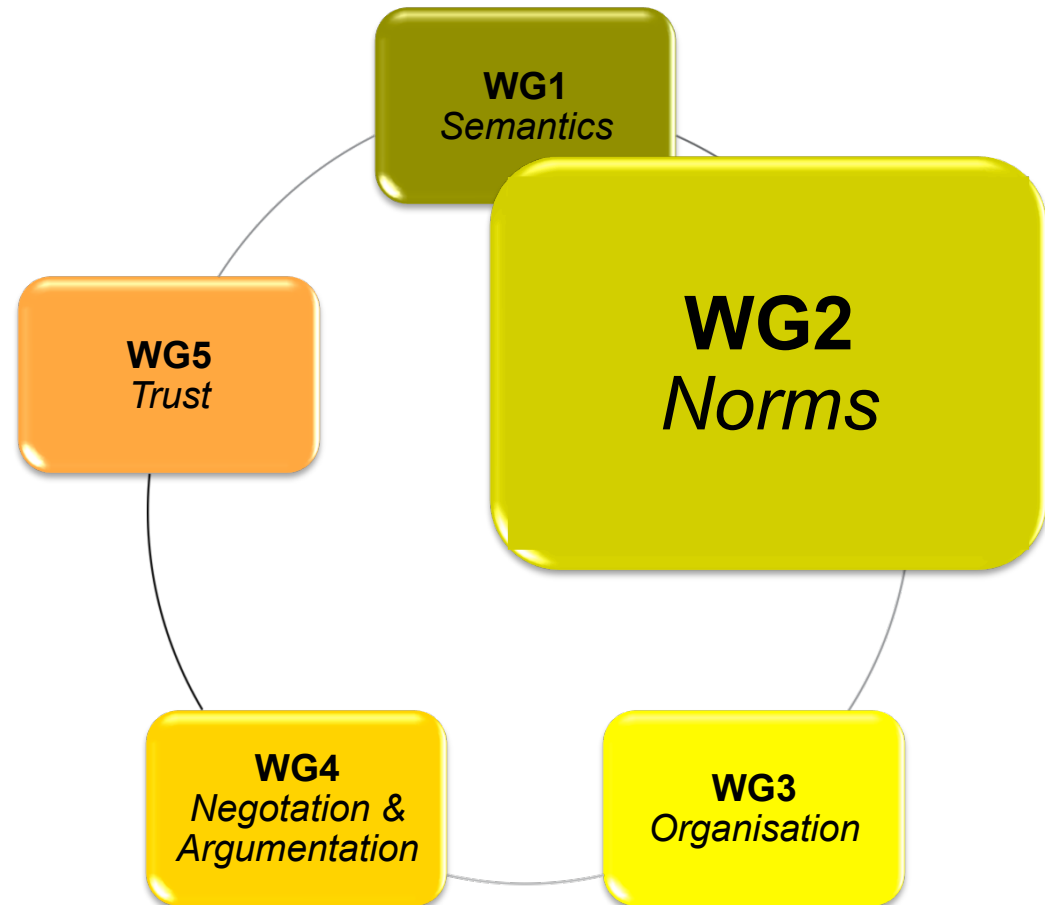
Working groups

- Semantic alignment:
 - to study semantic **alignment protocols** and algorithms,
 - to enhance them to cater for agreement relevant information (e.g. trust, provenance, argumentation, etc.)
- Large-scale, open, distributed settings:
 - **Integration** of ontologies
 - **Querying** over distributed ontologies involving mapping rules and alignments
- Alignment with Semantic Web **standards**



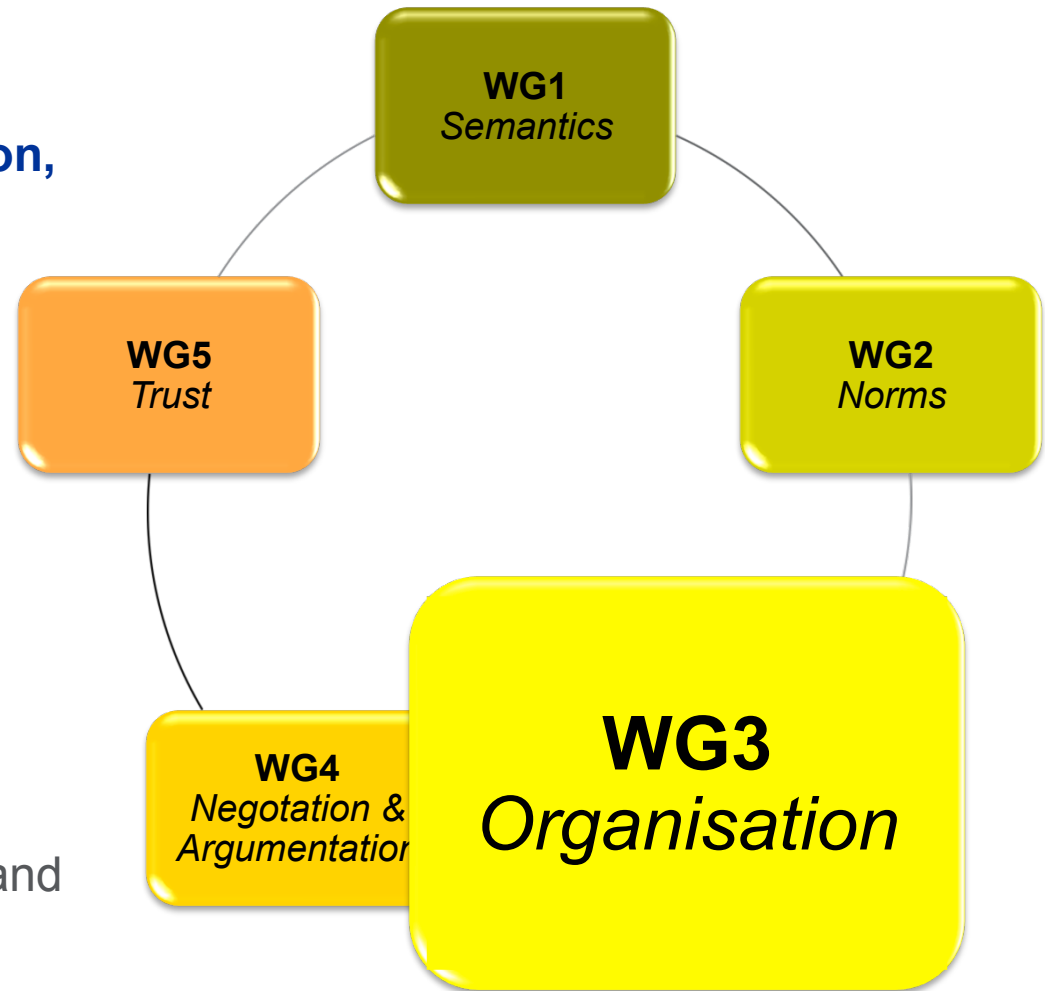
Working groups

- Norms and normative systems:
 - to interpret and **instantiate** norms to specific situations, possibly resolving **conflicts** between norms
 - to study the **convergence** on and **spreading** of norms
 - to study norm transgression as a motor for the **evolution** of norms
- Special attention devoted to the role played by **methodologies** and **tools**
 - experiments, formal & simulation models



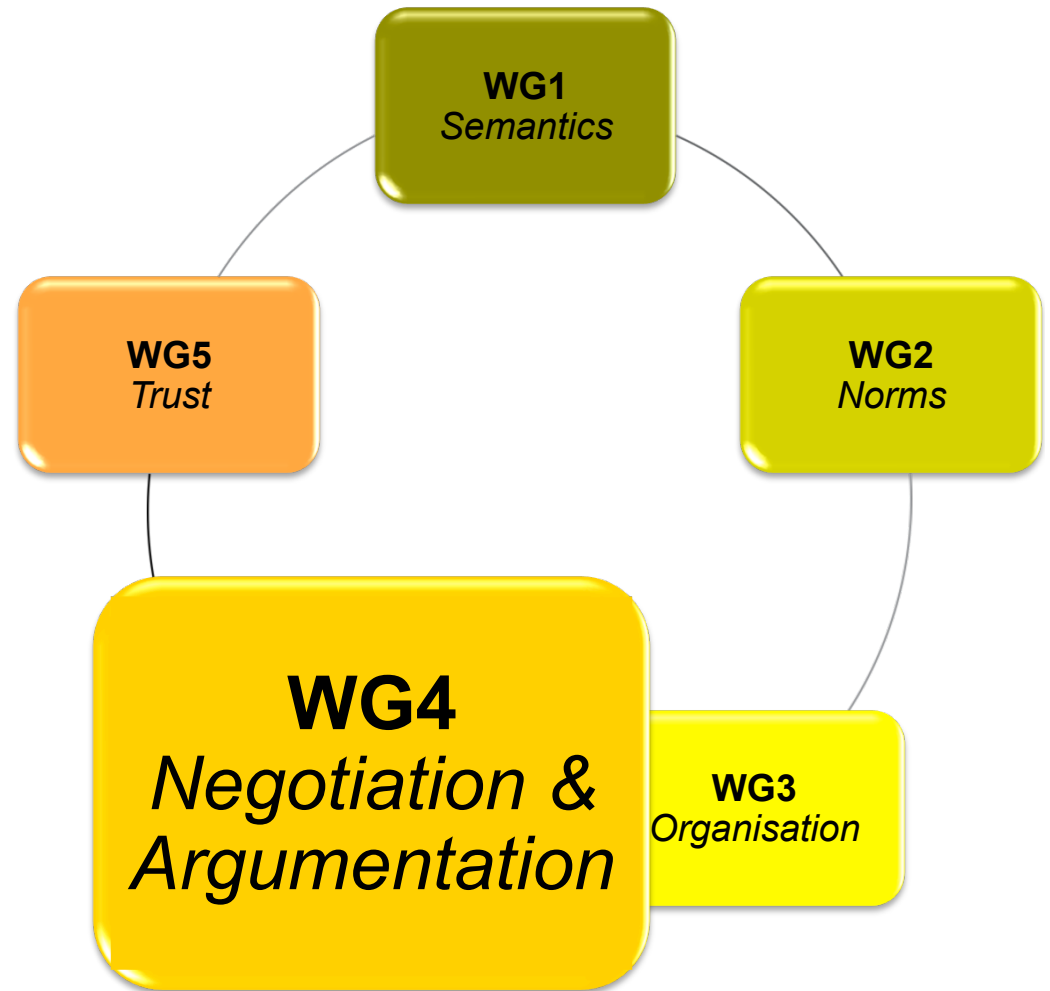
Working groups

- Organisational Teamwork
 - to exploit organisational information in the processes of **team formation, cooperation, and dissolution**
 - to study the effect of organisational **regulation** on the quality and flexibility of teamwork
- Organisational Change
 - to design mechanisms for the **adaptation** and **evolution** of organisations
- Design and execution of organisations
 - to advance on effective design **methods** and **tools** as well as execution **frameworks**



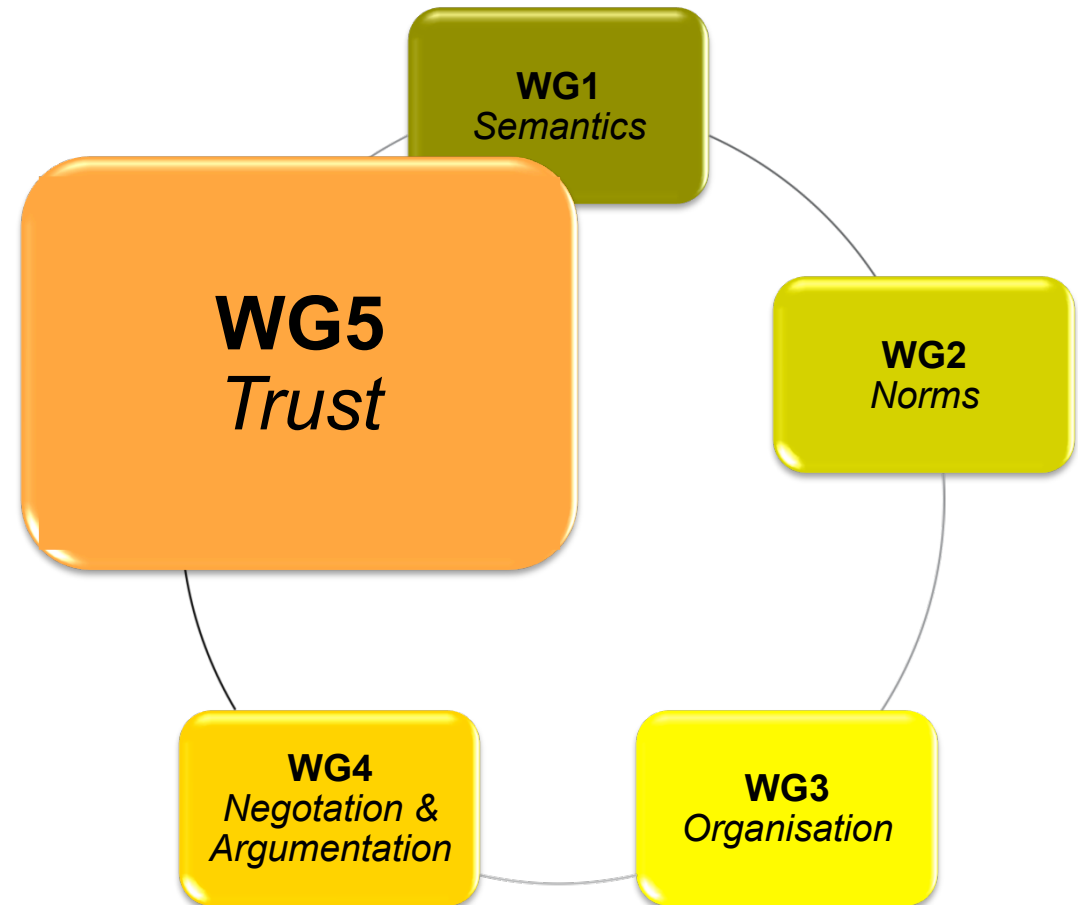
Working groups

- Use argumentation techniques
 - to inform human reasoning and to assist **machine** reasoning
- Argumentation in negotiation:
 - to look into frameworks that **integrate** argumentation in negotiation, so as to
 - supply the negotiating parties with additional information and
 - help them convince each other by adequate arguments.



Working groups

- Advanced trust mechanisms:
 - **Scalability**: how to develop trust mechanisms based on other agents' opinions that scale on large societies
 - **Semantics**: how to deal with erroneous behaviour that may be caused by misunderstandings
 - **Similarity**: how to use 'similar' cases when exact past experiences for an agreement under discussion is scarce
- Balance between norms and trust:
 - The more norms can be enforced, the less need to rely on trust measures, but norm enforcement has an associated **cost**





Agreement Technologies

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1. Overview

2. Activities

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Meetings

Joint Working Group Workshops

- Main instrument for **research coordination**
- Funded by the Action: **co-located** with MC meeting and related conference
- 8 Editions:
 1. **Budapest**, HU (May 2009) @ AAMAS-2009 – Parallel sessions of WGs
 2. **Ayia Napa**, CY (Dec 2009) @ EUMAS-2009 – **Cross-WG** panels
 3. **Heraklion**, GR (Jun 2010) @ ESWC-2010 – Special Theme: **Semantics**
 4. **Paris**, FR (Dec 2010) @ EUMAS-2010 – Special Theme: **Trust**
 5. **Barcelona**, ES (Jul 2011) @ IJCAI-2011 – Special Theme: **AT tools & applications**
 6. **Maastricht**, NL (Nov 2011) @ EUMAS-2011 – Session on **Environments for AT**
 7. **Valencia**, ES (Jun 2012) @ AAMAS-2012 – Special Theme: **Environments for AT**
 8. **Dubrovnik**, HR (Oct 2012) @ AT-2012 – merged with the **AT conference** sessions
- Community Session:
 - ✓ discuss **needs** of / **opportunities** for Action members (and in particular **ESRs**)



Meetings

Other Workshops

- 30 other workshops
 - ✓ **Interdisciplinary** workshops
 - WG-specific or cross-WG foundational topics
 - Usually co-funding of travel and/or organisational costs
 - ✓ **Dissemination** events:
 - Action members give presentations at related events
 - Raising awareness of the Action / conveying action results
 - Usually funding of travel costs of 1-2 action members
 - ✓ Events with **Action label**:
 - Workshop aligned with the Action's aims and scope
 - Organisers may use the Action logo; link on the Action web site
 - No funding involved



Training

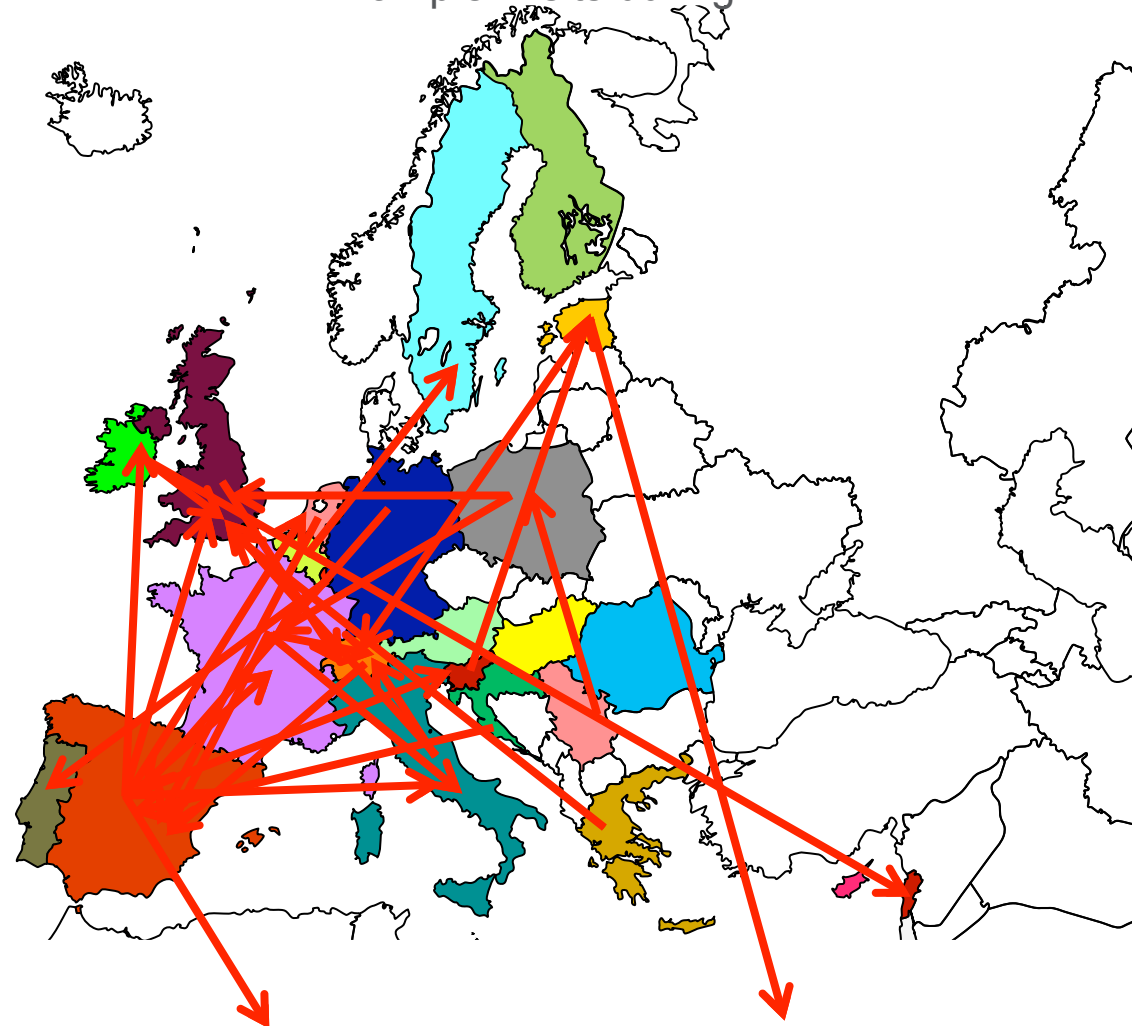
- AT days/slots at **training schools**:
 - ✓ **6 editions**: co-location with *EASSS*, *DALT*, *RW*, *SEEMAS*
 - ✓ Participation of Action members as both **students** and **lecturers**
 - ✓ More than **400 students** participating in the schools (all in all)
- Workshops geared at ESRs (e.g. LAF)
- Promotion of ESRs participation in the Action's visits programme (STSMs)

Short-term Scientific Missions

Example: visits during YR4

STSMs (senior and ESR):

- Number: **94**
- Avg. cost: **1.470 €**
- Avg. duration: **30** days
- ESR: **84** %
- Female: **31** %
- RSTSMs: **6**
- Origins: **19**
- Destinations: **17**



Dissemination Promotional material

cost Action IC0801
Agreement Technologies 2008 - 2012

Participating countries: BE, CH, CY, DE, EE, ES, FI, FR, GB, GR, HR, HU, IL, IT, LU, LT, NL, PL, PT, RO, SE, SI

Non-COST institutions from: Argentina, Australia, Brazil, Mexico, UAE, USA

Chair: Sasha Ossowski (sasha.ossowski@upf.es)
Co-Chair: Vicent Bost (vbost@bac.upv.es)

Working Group 1: Semantics
This WG shall explore novel ways of semantic alignment of ontologies taking into account the current integration with the agents involved in it. It shall study the logical relations between ontologies, knowledgebases, sets of non-monotonic rules for any integrated combination of theory that are relevant for aligning and mapping theories in reasoning-preserving ways.

Working Group 2: Norms
The WG tackles the problem of how to specify normative systems so that they may be properly implemented and their reason about them. Reasoning about the system is necessary for the designer of the system to assure that it has adequate properties and for the degree of those agents whose interests will be regulated by rules that they conform to the rules. Reasoning about the normative system may also be necessary at run-time because complex/multiagent systems usually need dynamic regulations.

Working Group 3: Organizations
The WG addresses the issues of how cooperation to specify how to solve a complex task is often by a number of agents in a distributed way. The agents participating in an organization are working together and are based on the solution of a particular task within the scope of the organizational objectives. The particular organization of the group of agents will thus be an answer to the complexity of the problem.

Working Group 4: Argumentation & Negotiation
The WG investigates decision-making processes so as to develop a variety of agreement management methods to try and reach satisfactory agreements, good enough with respect to the needs and requirements of agents. The WG helps help frameworks that integrate argumentation in negotiation, so as to satisfy the negotiating parties with additional information and help them convince each other by adequate arguments.

Working Group 5: Trust
Trust is a critical component of any agreement process. When there is uncertainty about the behaviour of the signatories of an agreement trust is essential. Trust helps to reduce the complexity of relations that have to be taken in the presence of many agents. The WG departs from traditional approaches to security management in several ways, as trust can be built based on a range of diverse kinds of evidence, when having different strength and reliability.

Mission:
The overall mission of the Action is to support and promote the harmonisation of nationally-funded high-quality research towards a new paradigm for next-generation distributed systems based on the notion of agreement between computational agents.

Objectives:
Joint Research: to promote innovative and pragmatic joint research across the community fractions related to Agreement Technologies in different COST member states, and worldwide;
Interdisciplinary Research: to promote interdisciplinary research in the field of Agreement Technologies aimed at a robust understanding of the notion of agreement among computational entities.
Early integration of young researchers: to promote a rapid integration and sustained involvement of early-stage researchers in the community building process.
Capacity Building: to promote high-quality training in all aspects related to the Agreement Technologies paradigm.
Awareness: to raise awareness of the emerging field of Agreement Technologies among the target groups of the Action.
Early Adoption: to encourage the early adoption of Agreement Technologies and applications in industry.

Main Achievement:
Over the first few months of the Action lifetime, it has successfully raised its profile among its target communities in the field of Multilog, Database, Game, Technology, and Social Sciences.

Action Poster

cost Action IC0801
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Journal Ads

AGREEMENT TECHNOLOGIES

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Action Logos

cost Action IC0801
Agreement Technologies 2008 - 2012

Participating countries: BE, CH, CY, DE, EE, ES, FI, FR, GB, GR, HR, HU, IL, IT, LU, LT, NL, PL, PT, RO, SE, SI

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AGREEMENT TECHNOLOGIES

Action IC0801

www.agreement-technologies.eu

Action Flyer

Agreement Technologies

cost Action IC0801

Presenter

Institution

<http://www.agreement-technologies.eu>

Action Presentation



Liaison

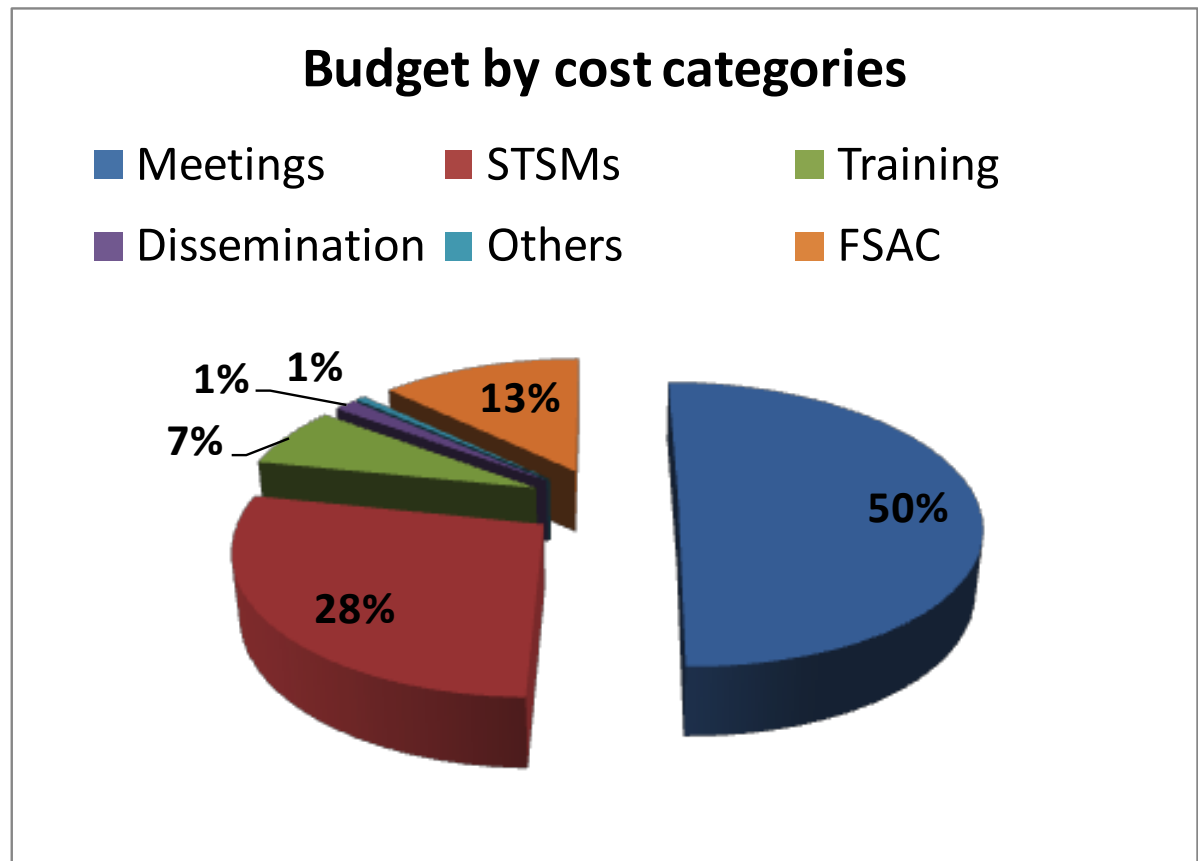
- **COST Actions:**
 - **IC0602** (*Algorithmic Decision Theory*) and **IC0702** (*Combining Soft Computing Technology and Statistical Methods to Improve Data Analysis Solutions*)
 - Joint **announcement** of activities, exchange of **lecturers** at training schools and **presentations** at MC meetings / WG workshops
- **COST Exploratory Workshop** with related COST Actions:
 - Held on Nov 25th, 2010, at the **COST office** in Brussels
 - Actions active in the field of “Decision Sciences and Technology”
 - Representatives from COST office and Europ. Commission (DG INFSO, DIGIT)
- **FP7 projects:** sessions/panels with *LiquidPub*, *SINTELNET*, ...

Coordination and Management

Action Budget

Total Budget:

433.281 €





Coordination and Management

Scientific Coordination

- **MC meetings:**
 1. Brussels, BE (Oct 2008)
 2. Budapest, HR (May 2009)
 3. Ayia Napa, CY (Dec 2009)
 4. Heraklion, GR (June 2010)
 5. Paris, FR (Dec 2010)
 6. Barcelona, ES (Jul 2011)
 7. Maastricht, NL (Nov 2011)
 8. Valencia, ES (Jun 2012)
 9. Dubrovnik, HR (Oct 2012)
- Urgent decisions (budget revisions etc.) through MC **email vote**
- **CG** for day-to-day coordination
 - ✓ CG Meeting, Bath, UK (Dec 2008)
 - ✓ CG audio-conferences
 - ✓ Coordination by email
- The yearly **budgets** were **spent entirely** “up to the last cent”
- Timely financial and scientific reporting

AT Industry Days

- Implemented in the framework of a **national** project on AT



“Discovering Agreement Technologies”

Researchers present AT research lines and demonstrators to industry



“Solving Companies’ Challenges”

Researchers propose and implement solutions to industrial challenges



“Towards AT Spin-Off Companies”

Industry and business school oversee researchers’ innovation proposals



Agreement Technologies

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Results

Action web site

- Main portal for AT community
- Updated **archive of activities**
 - ✓ workshops, schools, STSMs, etc.
 - ✓ activity descriptions and reports
- **Sub-websites** for each WG
- Resources
 - ✓ Software and information **repositories**
 - ✓ Dissemination material
- Wiki functionality for Action members
- Private area for MC: meeting minutes etc.

WGI Semantics - COST Action IC0801 - Mozilla Firefox

Archivo Editar Ver Historial Marcadores Herramientas Ayuda

http://www.agreement-technologies.eu/wgi

Más visitados Comenzar a usar Firefox Últimas noticias Gente ANECA Academia Centro para las Tecnol... GIA eGroupWare [Entr... The Ninth Internationa...

WGI Semantics - COST Action IC0801

AGREEMENT TECHNOLOGIES COST Action IC0801

The Action Activities Resources Management Joining us Private Area

WGI, Semantics

Semantics is a central issue in Agreement Technologies.

Goals:

This WG shall explore novel ways of semantic alignment of ontologies taking into account the current interaction state that agents are involved in. It shall study the logical relations between ontologies, knowledge-bases, sets of non-monotonic rules (or any integrated combination of these) that are relevant for aligning and merging theories in meaning-preserving ways. In particular, the WG shall look into how far policies and measures of trust can be used to decide which alignments and mappings between heterogeneous formats to apply, assuming that data, alignments, as well as trust-relevant meta-data is published and reusable by agents on the Web. Such published alignments shall allow combinations of knowledge bases based on static mapping rules, dynamic service calls and allow partial revocations of data published by other agents. The WG will examine mathematical theories of information and information flow to describe the alignment of agent terminologies, as well as reasoning techniques to reuse and adapt previous alignments to new interactions. The WG shall explore semantic-alignment protocols and algorithms interweaving alignment and negotiation in cooperation with WG 4 and 5 so as to analyse and design basic resource management mechanisms for locating adequate services in open, large-scale, decentralized systems. In the spirit of the Semantic Web and Semantic Web Services initiatives, the WG will to this end further investigate how existing standardization efforts can be enhanced to cater for agreement relevant information. Particularly, this WG will address the following challenges around semantic alignment for agreement technologies:

- **Integration of Ontologies and nonmonotonic Rules:** Nonmonotonicity seems inevitable for ontological agreement between agents in order to deal with consistent, but closed subsets of ontologies in open environments which would otherwise involve logically inconsistent superfluous ontological information.
- **Querying over distributed ontologies involving mappings rules and alignments:** Queries for data, grounded in distributedly published ontologies and mapping/alignment rules, impose new challenges. The WG will carefully explore the right tradeoffs between expressivity and efficiency for ontology, mapping and query languages.
- **Alignment with existing Semantic Web standards:** The WG will investigate how existing standardization efforts in the area such as RDF, RIF, SPARQL and SA-WSDL can be enhanced to cater for agreement relevant information such as trust, provenance and policies and how this additions can be exploited for open, distributed access to heterogeneous data and service. For instance, the enhancement of current standards for Digital Rights Management (DRM) and Software Licensing by semantic annotations which enable automatic agreement on licence terms falls in this category.

Working group chair

- Axel Polleres

Terminado



Results

Agreement Technologies Book

- **State of the Art** in Agreement Technologies
- Springer's "Law, Government & Technology" series (LGTS): **interdisciplinary** publications
- Published: **January 2013**
- Collaborative effort of **>90** Action members
- xlv, 645 pages, VII parts, 37 chapters
- Typically chapter authors from **different** Action member **countries**





Results

Agreement Technologies Book

Part I: Foundations

- Chapter 1: Agreement Technologies : A Computing perspective:**
- Chapter 2: Agreement and Relational Justice: A Perspective from Philosophy and Sociology of Law**
- Chapter 3: Agreements as the Grease (not the Glue) of Society: A Cognitive and Social Science Perspective**

Part II: Semantics

- Chapter 4: Agreement Technologies and the Semantic Web
- Chapter 5: Logical formalisms for Agreement Technologies
- Chapter 6: Reconciling heterogeneous knowledge with ontology matching
- Chapter 7: Semantics for Multi-Agent Systems
- Chapter 8: Semantic Web services in Agreement Technologies
- Chapter 9: Using ontologies to manage resources in Grid computing: Practical Aspects

Part III: Norms

- Chapter 10: Deontic Logic
- Chapter 11 : (Social) Norms and Agent-Based Simulation
- Chapter 12: Norms in Game Theory
- Chapter 13: AI and Law
- Chapter 14: Normative Agents
- Chapter 15: Norms and Trust
- Chapter 16: Norms and Argumentation

Part IV: Organisations

- Chapter 17: Describing agent organisations
- Chapter 18: Modelling Agent Institutions
- Chapter 19: Organisational Reasoning Agents
- Chapter 20: Adaptive Agent Organisations

Part V: Argumentation & Negotiation

- Chapter 21: The Added Value of Argumentation
- Chapter 22: Trends in MA Negotiation: from Bilateral Bargaining to Consensus Policies

Part VI: Trust & Reputation

- Chapter 23: A Socio-Cognitive Perspective of Trust
- Chapter 24: Qualitative Assessment Dynamics
- Chapter 25: Argumentation and Trust :
- Chapter 26: Ontology, Semantics and Reputation
- Chapter 27: Attacks and Vulnerabilities of Trust and Reputation Models
- Chapter 28: Reputation and Organisations
- Chapter 29: Building relationships with trust

Part VII: Applications

- Chapter 30: Arguing to Support Customers: the Call Centre Study Case**
- Chapter 31: Agreement Technologies for Supporting the Planning and Execution of Transports**
- Chapter 32: Agreement Negotiation in Normative and Trust-enabled Environments**
- Chapter 33: mWater: a Case Study for Modelling Virtual Markets**
- Chapter 34: An e-Government Application for Water Rights Agreements**
- Chapter 35: Coordinating Emergency Medical Assistance**
- Chapter 36: An environment to build and track agent-based business collaborations**
- Chapter 37: A Virtual Selling Agent which is Persuasive and Adaptive**

Results

Agreement Technologies Video-lectures

- “Course material” supporting the parts of the AT Book
- **Bird’s-eye view on AT**: interdisciplinary perspective on agreement
- **Technical** lectures: compile the work done in the Action’s 5 WG
- Lectures on real-world **applications** of AT:
 - ✓ Medical Emergency Management
 - ✓ Intelligent Transportation Management
 - ✓ E-Government
 - ✓ Customer Support

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Agreement Technologies 

 **Cost Action IC0801**

Applications
The Call Centre Study Case

Authors: **Stella Heras**, Jaume Jordán, Vicente Botti, Vicente Julián

<http://www.agreement-technologies.eu>



Results

International Conference series on AT

- AT Conferences to be held regularly
- **AT-2012**: 1st Int. Conf. on Agreement Technologies
 - ✓ **Dubrovnik (HR)**: October 15th-16th, 2012
 - ✓ 71 submissions, 27 full papers, 25 position papers, **80 attendees**
 - ✓ Informal proceedings as CEUR Vol. 918
 - ✓ Selected papers for Special issue of *AI Review*
 - ✓ AT stream in *AI Communications*
 - ✓ 5 additional **sponsors** (besides COST Action IC0801)



Dubrovnik, Croatia
15-16 October 2012

AT 2012
1ST INTERNATIONAL CONFERENCE ON
AGREEMENT TECHNOLOGIES

<http://at2012.tel.fer.hr>

Main Topics of Interest

- Semantic Technologies: Ontology Alignment, Policies, Coordination
- Normative Multi-Agent Systems
- Virtual Organisations and Electronic Institutions
- Argumentation and Negotiation
- Trust and Reputation
- Applications of Agreement Technologies
- Agreement Technologies Architectures, Environments and Methodologies
- Interdisciplinary Foundations of Agreement Technologies

Important Dates

Abstracts: June 20, 2012
Full papers: June 25, 2012
Notification: July 20, 2012
Camera-ready: Sept. 9, 2012

Organisation

Conference Chair
Suzana Ostroski, University Rey Juan Carlos, Spain

Programme Chairs
Francesca Toni, Imperial College London, UK
George Vouros, University of Piraeus, Greece

Local Chairs and Organisation Committee
Gordan Jezic, University of Zagreb, Croatia (local co-chair)
Mario Kusek, University of Zagreb, Croatia (local co-chair)
Marin Lujak, University Rey Juan Carlos, Spain
Tanja Grolz, University of Zagreb, CAAS Dubrovnik, Croatia

Logos: European Union, COST Action IC0801, European Science Foundation, COST Office through an EC contract, European Network for Social Intelligence, FER, and a QR code.

Results

International Conference series on AT

- **AT-2013**: 2nd Int. Conf. on Agreement Technologies
 - ✓ <http://www.ia.urjc.es/at2013/>
 - ✓ **Beijing (PRC)**: August 1st-2nd, 2013
 - ✓ Co-located with **IJCAI-2013**
 - ✓ Beijing International Conference Centre (**BICC**)
 - ✓ Proceedings as **LNCS/LNAI volume**
 - ✓ **Special issue** planned in ISI-ranked journal
 - ✓ Submission **deadline**: **April 22, 2013**

2013
第二届协议技术(AT)国际会议

2nd International Conference on Agreement Technologies

August 1-2, 2013
Beijing, China
Beijing International Convention Center BICC

MAIN TOPICS OF INTEREST

- Semantic Technologies: Ontology Alignment, Policies, Coordination
- Normative Multi-Agent Systems
- Virtual Organisations and Electronic Institutions
- Argumentation and Negotiation
- Trust and Reputation
- Application of Agreements Technologies
- Agreement Technologies Architectures, Environments and Methodologies
- Interdisciplinary Foundations of Agreement Technologies

ORGANISATION

Conference Co-chairs
Sascha Ossowski - Univ. Rey Juan Carlos, Spain
George Vournas - Univ. of Piraeus, Greece

Programme Co-chairs
Carlos Ivan Chespeira - Univ. Nac. del Sur, Argentina
Eva Onandía - Technical Univ. of Valencia, Spain

IMPORTANT DATES
Submission deadline: April 22, 2013
Acceptance Notification: May 27, 2013
Camera-ready: June 7, 2013
AT-2013 Conference: August 1-2, 2013

Co-located with IJCAI-13

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CETINA
Center for Intelligent Information Technologies

Please consider submitting a paper



Results versus Objectives

Quantitative result indicators

Activity (No.)	Year 1	Year 2	Year 3	Year 4	Total	MoU
MC/WG Meetings	2/1	2/2	1/1	4/4	9/8	5/4
STSMs	7	21	33	33	94	15
Training Schools	0	1	2	3	6	1
Workshops or Conferences	4	4+3	6+5	7+9	21+17	15
Joint Publications					190	



Action IC0801

<http://www.agreement-technologies.eu/>