The Semantic Technology Institute International

Mission, Objectives, and Organization
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• Mission and Status

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Overview

• The mission of **Semantic Technology Institute International** is to establish **semantics** as a core pillar of modern computer science.

• STI is an **association** of interested academic, industrial and governmental institutes.

• STI provides **services** to facilitate **research**, **education**, and **commercialization** activities around semantic technologies beyond the boundaries of individual institutions or projects.

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The STI Services

- Roadmapping
- Education, technology transfer, commercialization
- Technology standardisation, reference architectures, testbeds, challenges
- RESEARCH
- REALIZATION

STI Services
History and Status

- Founded in April 2007
- Legal status:
  non-profit association (registered in Austria)

- Key Personnel
  - Dipl. Ing. Alexander Wahler (CEO)
  - Univ.-Prof. Dr. Dieter Fensel (President)

- Members (March 2008): 27

- Website: [www.sti2.org](http://www.sti2.org)

- Location: Amerlingstrasse 19/35
  A-1060 Vienna, Austria
Semantic Technologies
What are Semantic Technologies?

- Semantic Technologies are about
  - Formal and meaningful description of data, protocols, and processes
  - Ontologies as explicit and shared knowledge models

- Benefits
  - Meaning-preserving information processing
  - Handling of Heterogeneities
  - Facilitate Interoperability and Automation

- Roots in Artificial Intelligence research
- recent research and developments around the Semantic Web
Role in Future IT

• Semantic Technologies will become a pillar of future IT Systems in order to facilitate
  – Meaning-preserving information processing
  – Interoperability between systems and organizations
  – Higher degree of Automation

• Suitable technical solutions need to properly deal with the properties of Web-based applications
  – Openness
  – Heterogeneity
  – Distributedness
  – Scalability
Recent Developments

Dynamic Web Services
- UDDI, WSDL, SOAP

Semantic Web Services
- OWL-S, WSMO, SAWSDL

Static WWW
- URI, HTML, HTTP

Semantic Web
- XML, RDF, OWL

Syntactic vs. Semantic

Semantic Web Layer Cake

Status of Standardization (W3C Recommendations)

- RDF Core
- RDF Schema
- DLP bit of OWL/RULE
- OWL
- Rules
- Logic framework
- Proof
- Signature
- Encryption
- Trust

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## Semantic Web Technologies

### Ontology Management
- Protégé ([protege.stanford.edu](http://protege.stanford.edu))
- OntoStudio ([www.ontoprise.de](http://www.ontoprise.de))
- WSMO Studio ([www.wsmostudio.org](http://www.wsmostudio.org))
- Altova SemanticWorks® ([www.altova.com](http://www.altova.com))
- IBM Ontology IDE ([www.alphaworks.ibm.com](http://www.alphaworks.ibm.com))
- WSMT ([wsmt.sourceforge.net](http://wsmt.sourceforge.net))

### Repositories
- Sesame ([www.openrdf.org](http://www.openrdf.org))
- Oracle 11g RDF database ([www.oracle.com](http://www.oracle.com))
- Jena (HP Labs) ([jena.sourceforge.net](http://jena.sourceforge.net))
- AllegroGraph ([agraph.franz.com](http://agraph.franz.com))
- OWLIM Semantic Repository ([www.ontotext.com/owlim](http://www.ontotext.com/owlim))
- SPARQL engines ([esw.w3.org/topic/SparqlImplementations](http://esw.w3.org/topic/SparqlImplementations))
- YARS ([sw.deri.org/2004/06/yars/](http://sw.deri.org/2004/06/yars/))

### Reasoning Engines
- Racer, FaCT, Pellet (OWL-DL) ([ontoworld.org/wiki/Category:Reasoner](http://ontoworld.org/wiki/Category:Reasoner))
- Flora 2 (F-Logic) ([flora.sourceforge.net](http://flora.sourceforge.net))
- IRIS (WSML) ([iris-reasoner.org](http://iris-reasoner.org))
- KAON2 (OWL-DL, WSML) ([kaon2.semanticweb.org](http://kaon2.semanticweb.org))
Web 2.0

- **Web 2.0 is**
  - interactive – user-driven – collaborative
  - From **Consumers** to **Prosumers** on the Web
  - New **Technologies**: Wikis, Blogs, Tagging

- **Meta-data created by users**

![Web 2.0 Logos](image-url)
Semantic Web Services

• Aim & Approach
  
  **automate the Web Service Usage Cycle** in SOA Systems by
  
  1. rich, formal annotation of Web Services
  2. inference-based techniques for automated discovery, composition, mediation, execution of Web Services

• Overcome **deficiencies** of initial Web service technology stack (WSDL, SOAP, UDDI) that limits the detection and integration of Web services by clients to manual inspection

• Integration with the Semantic Web
  
  – Using **ontologies** as underlying knowledge models
  – Enable **semantic interoperability**
SWS Approach

a) Web Service Description Structure

b) Semantic Web Service Description Structure

Web Service

Functionality

Non-functional

Ontology

Aggregation

Implemention

Interface

XML

(not of interest in Web Service Description)

(not of interest in Web Service Description)
SWS Techniques

Request

- if: successful
  - submission
- else: not solvable
  - matchmaking with all WS

Discoverer

- uses
- if: usable
  - Selection & Ranking
- else: try other WS

Selection & Ranking

- uses
- if: composition possible
  - Composer

Composer

- uses
- if: compatible
  - Behavioral Conformance
- else: try other WS

Behavioral Conformance

- uses
- if: execution error
  - Executor

Executor

- uses
- if: usable
  - Data Mediator

Data Mediator

- Process Mediator

Process Mediator

Service Repository

- information lookup for particular service
- composition (executable)

Mediator

- uses
- if: execution error
  - Executor

Repository

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SWS Frameworks

WSMO
comprehensive framework for Semantic SOA

OWL-S
upper-level ontology for describing Web services

SAWSDL / WSDL-S
semantic annotation of WSDL descriptions
Future Challenges
and the Role of
STI International
State of Affairs

• There is a significant amount of research results and technology developments on semantic technologies

• … BUT:
  – Still many open research issues
  – Mostly academic solutions (not ready for the market)
  – Too less commercial adaptation
  – Too few killer applications
  – …

• Thus, it is necessary to
  – **coordinate** and **integrate** future research
  – **Standardize** technology developments
  – force **industrial adaptation** and exploitation

=> **STI International addresses these challenges**
Challenge 1: Future Research

- **Future Research Issues include**
  - Scalable reasoning techniques for the Semantic Web
  - Integrated ontology engineering technologies
  - Knowledge acquisition and automated semantic annotation of data and services
  - Scalable and workable SWS technologies
  - ...

- **STI International supports this by**
  - Defining common research roadmaps
  - Coordinating cross-project working groups
Challenge 2: Technology Development

• **The Development of Semantic Technologies requires**
  – Integrated, adoptable, and extensible software architectures
  – Use case scenarios for testing, demonstration, and evaluation
  – Platforms for demonstrating benefits to outer world
  – Legal framework for IPRs and usage by third parties

• **STI International supports this by**
  – Providing an *open-source integrated reference architecture*
  – Defining **test-beds and challenges** for testing, demonstration, evaluation, and comparison of technology developments

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Challenge 3: Standardization & Commercialization

• Critical Success Factors are
  – **Standardization of Technologies** by renowned standardization bodies (W3C, OASIS, OMG)
    The work in standardization bodies is usually cumbersome
    => *good preparation is required*
  – **Commercial Adaptation** of semantic technologies
    => *requires ready-to-market solutions and industrial cooperation*

• STI International supports this by
  – **Coordinating standardization** activities among members
  – Coordinating **pre-standardization work**
  – **Establishing a network** and coordinate cooperation projects
    with the international industry (IT vendors and Users)
Challenge 4: Education & Dissemination

- The thorough adaptation of Semantic Technologies requires
  - Extensive dissemination in research, industry, and society
  - Systematic education of students, researchers, and practitioners
  - Training and educational services by experts

- STI International supports this by
  - Coordinating dissemination and marketing activities
  - Providing educational services for students and researchers
    (summer schools, tutorials, etc.)
  - Providing education and training services for industry and other interested parties (tutorials, training workshops, etc.)
  - Coordinating academic education among its members
  - Coordinating exchange programs for students and researchers

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STI International

– Organization, Services, Members –
Overview

• **Aim**: a central institution for coordinating R&D & on Semantic Technologies in Europe and beyond
  – Support successful & enduring development and adaption
  – Coordinate research, development, dissemination, standardization
  – Supportive services for members

• **STI is a non-profit organization run by its members**
  – **General Assembly**: elects President and Board Members
  – **Members**: propose new activities, voting rights
  – **Executive Board**: controls the business
  – **Advisory Board**: independent advice
  – **CEO**: responsible for the operational business

• **Members (March 2008)**:
  – Full members: 22
  – Associate members: 4
  – Members of Honor: 1
Organigram

Executive Board
- President
- Vice-Presidents (= Area Coordinators)
- CEO

Advisory Board
independent advice

Service Coordinators
control

general Assembly
(1 representative per member)
- Full Members
- Associate & Extraordinary Members (no voting rights)

elects
coordinate activities

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The Executive Board

Dr. Michael Brodie
Chair Advisory Board

Dr. John Davies
Vice President Realization

Univ.-Prof. Dr. Dieter Fensel
Vice President Strategic Affairs

Prof. Dr. John Domingue
President

Prof. Dr. Guus Schreiber
Vice President Technology

Prof. Dr. Rudi Studer
Vice President Research

Alexander Wahler
CEO

Univ.-Prof. Hannes Werthner
Vice President Members

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The Advisory Board

Dr. Michael Brodie
Verizon, US
Vice President
Chair Advisory Board

Dr. Richard Benjamins
Telefónica R+D
Advisory Board Member

Dr. Mark Greaves
Vulcan Inc., US
Advisory Board Member

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STI Services

STI addresses the emerging challenges for the future research & development by:

- Definition of **Research Roadmaps**
- Common Strategy and Coordination for **Standardization**
- Provision of open-source **Reference Architectures**
- Provision of open **Test Beds** and **Challenges**
- Joint program for **Education** in semantic technologies
- Support & Coordination of **Industrial Commercialization**
- Coordination of **Cross-Project Working Groups**
- **Coordination & Auxiliary Services** for members and associated R&D projects
The STI Service Cycle

- Roadmapping
- Education, technology transfer, commercialization
- STI Services
- Technology standardisation, reference architectures, testbeds, challenges
- Realization

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STI Research - Roadmapping

• STI International will create, maintain, and publish roadmaps as a means of planning and coordinating its activities towards the achievement of the mission.

• The service will focus on the five main areas of research in the field of semantic systems and services:
  – Ontologies and Ontology Engineering
  – Reasoning
  – Knowledge Acquisition and Sharing
  – Semantic Web Services
  – Social Networks

Prof. Dr. Fabio Ciravegna
University of Sheffield, UK
Service Coordinator

Dr. Raphael Volz
Raphael Volz Innovation Consulting GmbH, DE
Service Coordinator

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STI Technology – Standardization and Reference Architectures

• STI International will provide
  1. Support and coordination services for technology standardization
  2. Development of Reference Architectures for semantic technologies

• The aim is to
  – Establish a communication channel with W3C, OASIS and OMG
  – Provide a open, integrated, and extensible software architecture for semantic technology developments
  – Facilitating communication across the various projects and initiatives
  – Gaining leverage and impact by combining efforts

Dr. Michal Zaremba
University of Innsbruck, AT
Service Coordinator

Barry Norton
Knowledge Media Institute
Open University, UK
Service Coordinator

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STI Technology – Testbeds and Challenges

• STI International will facilitate the joint development of open, globally distributed testbeds for developing, deploying and testing Semantic Web technologies and Semantic Web Services at global scale.

• Challenges will offer participants the possibility to show the best of Semantic Web and Semantic Web Services technologies in order to identify promising approaches and to support relevant developments.

STI INTERNATIONAL

Dr. Emanuele Della Valle
CEFRIEL, Politecnico di Milano, I
Service Coordinator

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Service Coordinator

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Universidad Politécnica de Madrid, ES
Service Coordinator

Barry Norton
Knowledge Media Institute
Open University, UK
Architecture Service Coordinator

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STI Realization – Commercialization

- STI International will facilitate the commercial exploitation of R&D results with the aim of increasing business opportunities

- STI International performs, among others, the following commercialization activities:
  - Knowledge Capitalization Structure
  - Market surveillance
  - Comprehensive offer building for proving the interest of SWS and Semantic Web in general
  - International position strategy
  - Diffusion by consolidation of dissemination plans and activities

Mathieu Daquin
Knowledge Media Institute, Open University, UK
Coordinator
• STI International will provide educational activities in the field of semantic technologies for academia and industry

• The STI educational program includes:
  – Generation of high-quality training materials for specific target communities
  – Development and maintenance of training repositories and expert databases
  – Organization of different types of training and educational events
  – Provision of different types of training
  – Set-up of joint doctoral or exchange/internship programs between research institutions and between researchers and industry and operational support for their implementation.

Dr. Elena Simperl
University of Innsbruck, AT
Service Coordinator
Membership Regulations

- STI International invites organizations from all over the world to become a contributing member

- 3 Types of Membership:
  1. **Full Members**
     - Access to STI Services (free of charge)
     - Full voting rights
     - Creation of new working groups & initiate other activities
     - Full promotional benefits
  2. **Associate Members**
     - Limited access to STI Services and Working Groups (free of charge)
     - No voting rights
     - Limited promotional benefits
  3. **Extraordinary Members**
     - Member of Honor (by invitation)
     - Sponsoring Member
     - No voting rights

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## Membership Fees

<table>
<thead>
<tr>
<th>Membership Type</th>
<th>Annual Fees</th>
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<tbody>
<tr>
<td><strong>Full Membership</strong></td>
<td><strong>For-Profit Organizations</strong></td>
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<tr>
<td></td>
<td><em>Annual Turnover</em> *<em>Membership Fees (in €)</em></td>
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<tr>
<td></td>
<td>less than € 2 million</td>
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<tr>
<td></td>
<td>more than € 2 million</td>
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<tr>
<td><strong>Non-Profit Organizations</strong></td>
<td>*Country (accord. to WB) *<em>Membership Fees (in €)</em></td>
</tr>
<tr>
<td></td>
<td>high income country</td>
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<tr>
<td></td>
<td>low/middle income country</td>
</tr>
<tr>
<td><strong>Associate Membership</strong></td>
<td>10% of full membership fee</td>
</tr>
<tr>
<td><strong>Sponsoring Membership</strong></td>
<td>sponsoring is agreed on a case-by-case basis with the applicants</td>
</tr>
<tr>
<td><strong>Member of Honor</strong></td>
<td>free</td>
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</tbody>
</table>
Membership Application

Interested organization applies for the STI International membership using the application form on the website.

STI International sends out an information pack to the applicant, including the governance document, the service bundle document and the admission letter.

Applicant decides to become a member of STI International, signs the admission letter and sends it to the STI International Office in Vienna.

The approval of the membership application is made by the president of STI International. The signed presidential letter is sent to the applicant.

After receiving the presidential letter and transferring the membership fee to the account of the association, the applicant officially becomes a member of STI International.
Full Members (November, 2008)

Total: 28

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Associate Members (November 2008)

Dr. Michael Brodie
(Member of Honor)

Total: 11 + 1

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Contact Information

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