

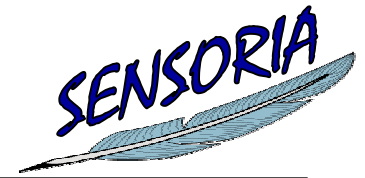
SENSORIA

Software Engineering for Service-Oriented Overlay Computers

Computing is becoming a utility and software a service. [. . .] applications will no longer be a big chunk of software that runs on a computer but a combination of web services; and the platform for which developers write their programs will no longer be the operating system, but application servers. [The Economist, May2003]

- Selling services has become the biggest growth business in the IT industry
 - changes the economics of IT industry and
 - influences the e-Society as a whole
- Today, services are being delivered through the
Web, Personal Digital Assistants, mobile phones...
- Tomorrow, they will be delivered on all kinds of
global computers

Services as Global Computers



- **Service**

autonomous, platform-independent computational entity
that can be
described, published, categorised, discovered

- **Services** can be **dynamically assembled** for developing
massively distributed, interoperable, evolvable systems
and applications.

State of Art

■ Service-Oriented Computing

- addressed by IT industry only in an ad-hoc and undisciplined way
- applications have the ability to “talk” to each other but they do not “understand” what they are talking about
e.g. WSDL only syntactic, BPEL4WS not expressive enough
- Formal approaches
 - Z, TLA too static, process calculi promising
 - but no uniform framework for SO Design

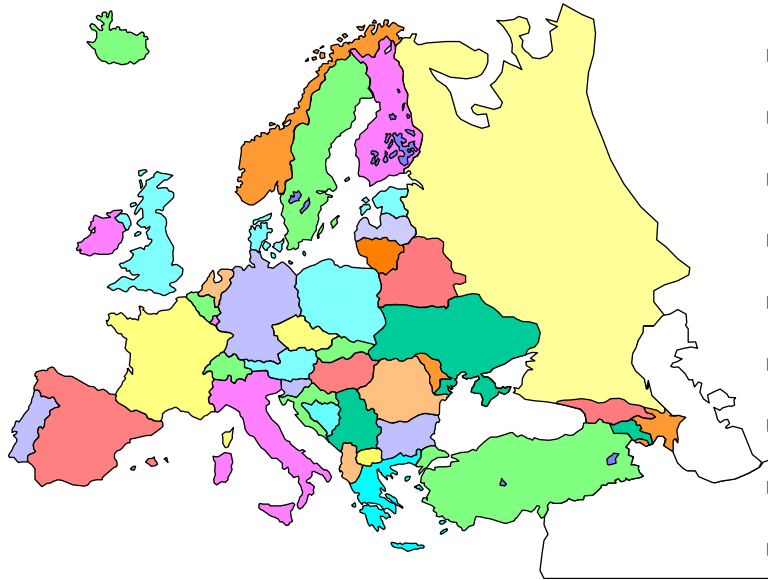
■ Web service standards

- weakly defined (mainly syntactic, poor semantic foundation, incoherent)
- next round of standards development: rectification of shortcomings

Aim of SENSORIA

- Novel comprehensive approach to **Engineering of software systems for Service-Oriented Overlay Computers** integrating
 - foundational theories, techniques, and methods and
 - pragmatic software engineering

- **Application areas**
 - e-business,
 - automotive systems,
 - e-learning
 - telecommunications



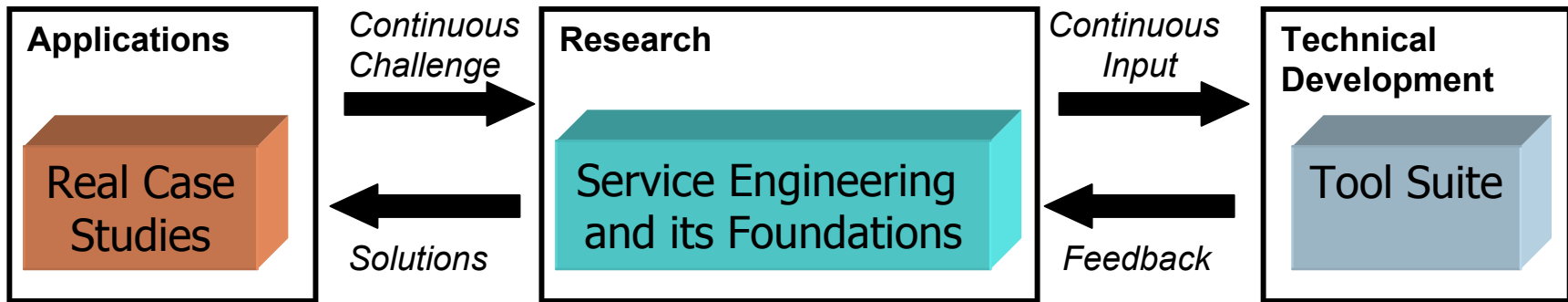
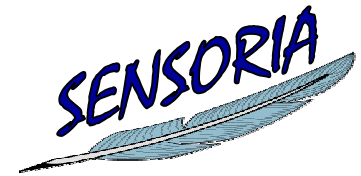
- **LMU München**
- **Università di Trento**
- **University of Leicester**
- **Warsaw University**
- **TU Denmark at Lyngby**

- **Università di Pisa**
- **Università di Firenze**
- **Università di Bologna**
- **ISTI Pisa**
- **Universidade de Lisboa**
- **University of Edinburgh**
- **ATX Software SA**
- **Telecom Italia Lab**
- **London Software Systems
(Imperial College & University
College)**
- **FAST GmbH**
- **Budapest University of
Technology and Economics**
- **S&N AG**

■ General concept of service

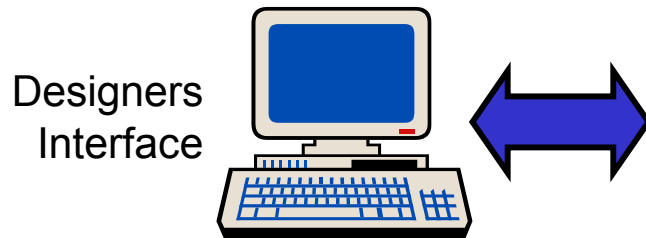
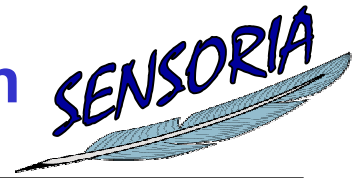
- independent from particular global computer and from any programming language;
- described in a modular way, so that security issues, quality of service measures and behavioural guarantees are preserved under composition;
- supporting dynamic, ad-hoc, “just-in-time” composition;
- part of an integrated service-oriented approach to business modelling

General Approach



- **Research on**
 - Service Engineering and its foundations
- **Tool suite**
 - New SOC language primitives
 - Analysis and CASE tools
- **Case studies**
 - guide research
 - show applicability of research results

A Typical Scenario for *SENSORIA* Service Design



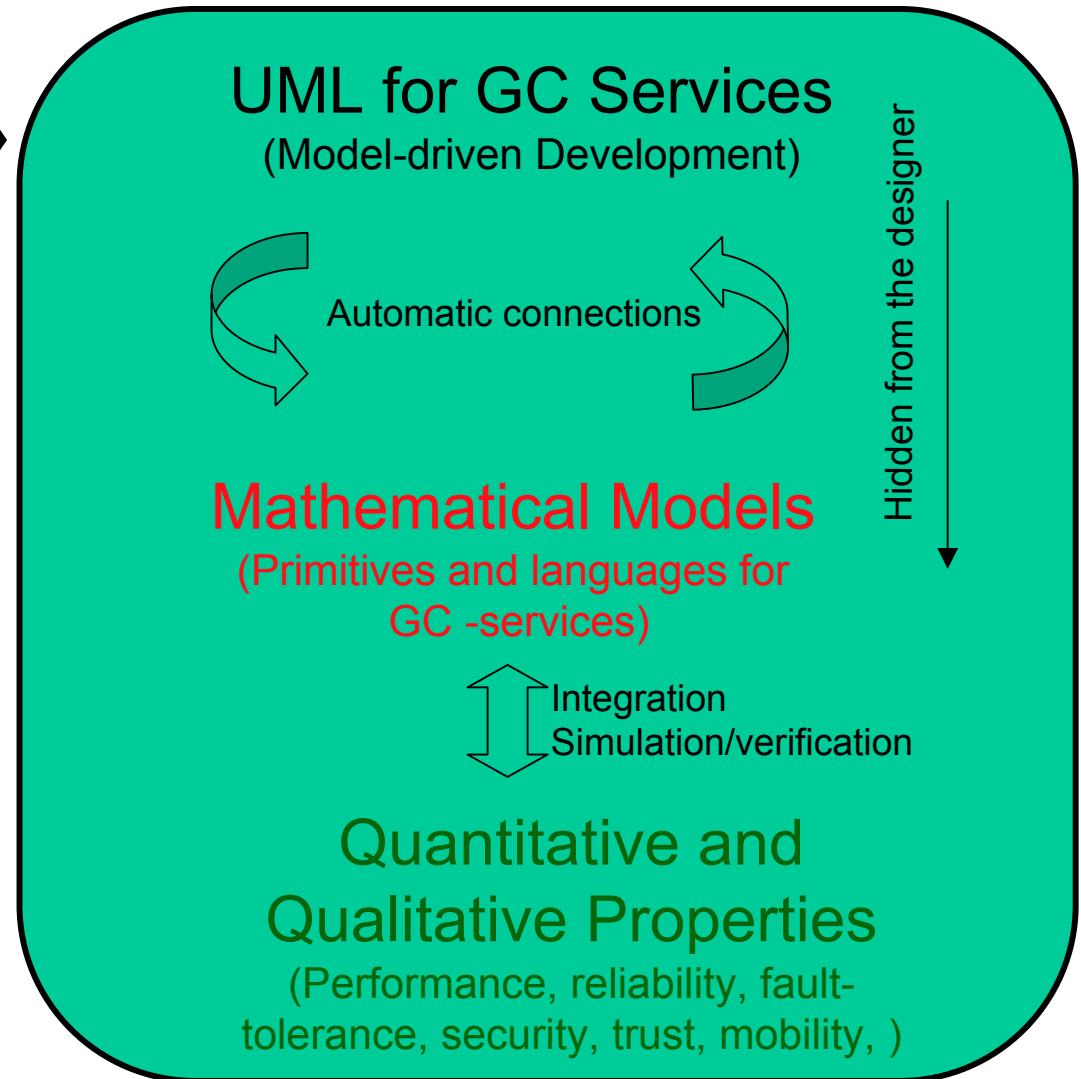
SENSORIA Development

integrates

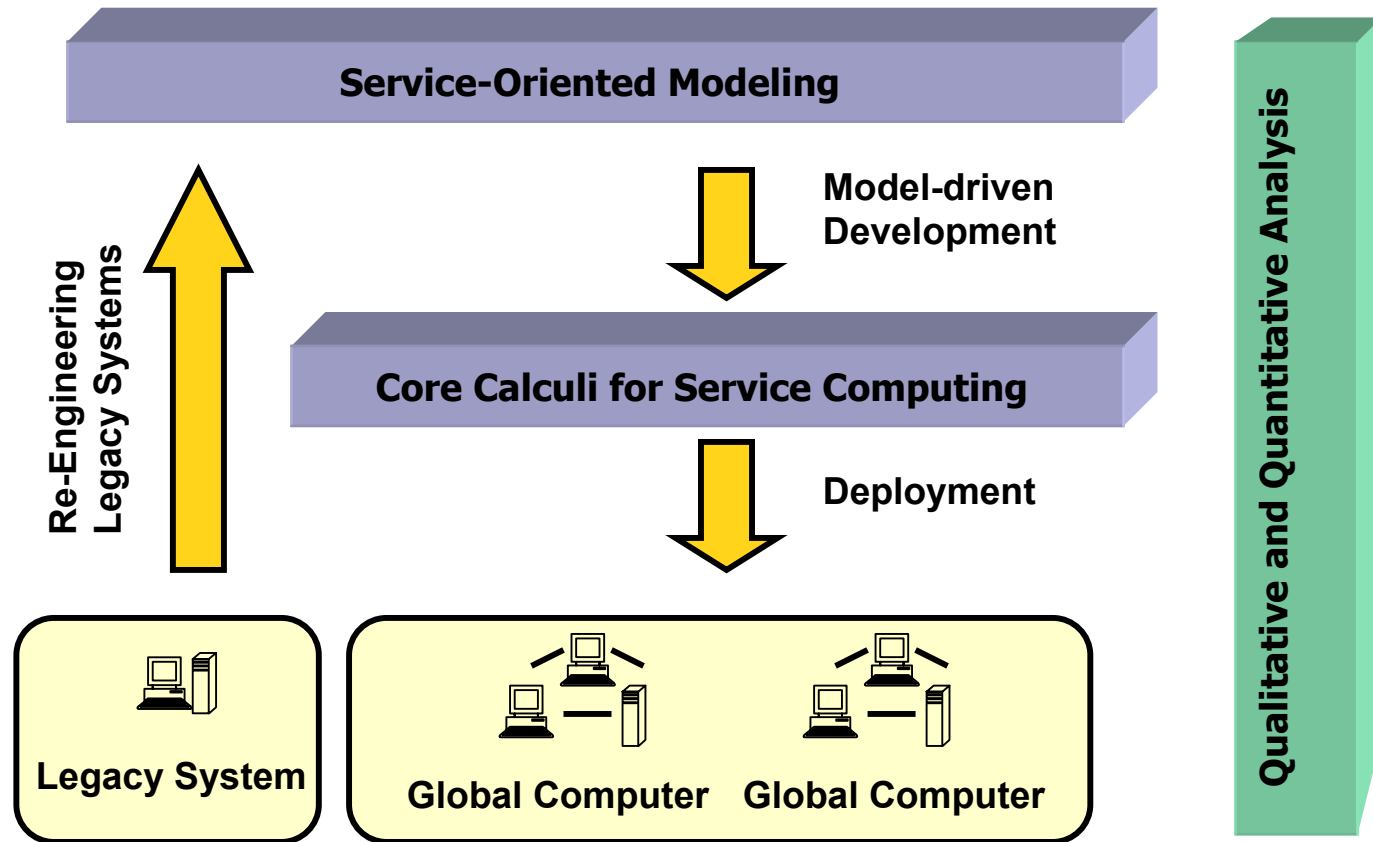
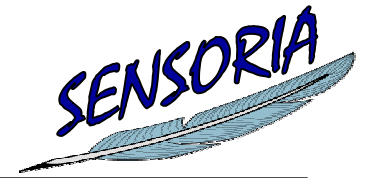
practical SW Engineering

with

math. foundations



SENSORIA Detailed Approach



■ Expected results

- language primitives for global service-oriented systems
 - modelling and programming
 - full mathematical semantics
- qualitative and quantitative analysis methods for, e.g.,
 - quality of service, security, performance and resource usage
- sound engineering methods and deployment techniques
 - forward development through model-based transformations
 - re-engineering of legacy systems

■ Based on

- experience of partners covering relevant areas
- effective collaboration of projects partners, e.g.,
 - in previous FET GC projects (AGILE, DEGAS, PROFUNDIS, MIKADO)
- continuous information flow between industrial and academic partners

- **Service-oriented computing is becoming the driving force behind innovation in IT-industry**
- **Competitiveness of European industries depends on early and successful adoption of this new paradigm**
- **SENSORIA will**
 - produce theoretical foundations and practically relevant results
 - strengthen the international position of the EU research community.