



## Services Sciences and Systems Engineering Working Group

### Scope of the working group

We are currently experiencing, in Europe and elsewhere, a fundamental shift in the structure of economies, businesses, and social communities: from a focus on information-rich organizations to a focus on services-rich businesses (profit or non-profit). With the help of IT, organizations and infrastructures are rapidly evolving into a dominating web of intertwined services that are being offered across multiple technological, societal, governmental, and business systems. Indeed, complex systems are already an integral part of our constructed world. For example, business eco-systems with thousands of businesses are networked to provide advanced finished products and services. As we come to rely increasingly on these business systems for all aspects of our lives, it would be a substantial achievement if we could claim a solid understanding as to how these can be modelled, specified, constructed, controlled, and monitored. With few exceptions, this is not possible; large systems projects fail in both public and private sectors. At the same time, these projects play expanding roles in government and commercial strategy, demanding budgets to match.

The NESSI Landscape is focussed not only on suggesting an enabling framework and technology for business services in Europe but also on the long-term development of economic, social and organizational, services across Europe. The challenge from a scientific point of view is to understand, theorize about, model, and validate complex systems and (business and IT) services in order to enable a better understanding of ecosystems (at scales ranging, for example, from blogs and wikis to global enterprises) of business and social collaboration and interactions, including their evolution and combination

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### Contacting the working group

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### Working method

- è A series of themed *technical* meetings
- è A series of *strategy / management* meetings
- è An email forum for discussion of ideas and strategy
- è The production of working papers or white papers (with a certain level of approval process)
- è The application of appropriate set of measures to ensure progress of the working group

### Outcomes

- è Ad hoc inputs for the European Commission in support of inclusion of this research domain in FP7
- è Contributions to, and establishments of, scientific and technological forums in the sciences of systems and services
- è White papers
- è **Refined inputs for the NESSI SRA** – including structuring the domain, identifying clusters of research and priorities and building a roadmap.
- è **A community of researchers and technologists** – in the sciences of systems and services
- è Development of appropriate ways to influence development of **professional skills and education**

## Scope of the working group – continued from first page

A fundamental problem in understanding, designing, and managing real-world complex systems, consisting of artifacts, services, and people, is the need to work fluidly across disciplines. Increasing academic specialization has tended to work against this, something that is often reflected in industrial research and development.

Combining disciplines as diverse as economics, psychology, mathematics, and engineering is difficult. Factors such as language, funding models, publication practices and problem sets all mitigate against the necessary mixture of disciplines coming together to improve our understanding of complex systems, their applications and their limitations.

Critical to the design and delivery of services and their associated systems and processes are privacy, security, and trust. For example, users of online financial services expect that their account balances will remain private, that their personal data will be held securely, and need to trust the bank to perform transactions promptly and accurately. While these concerns must inform all of the Working Group's activities, they are, however, a very substantial topic in their own right. We suggest that, rather than trying to address these concerns in detail within this Working Group, we should pay particular attention to any other activities within NESSI that are particularly intended to address them.

We intend that the Working Group in Services Sciences & Systems Engineering will provide a basis for NESSI to address long-term opportunities in research and delivery whilst maintaining well-grounded links to engineering and business problems. As such, we believe the working group will act as an important technical integration point for other working groups within NESSI.

Below is an illustrative (non-exhaustive) list of examples of specific topics that will fall within the interests of the Services Sciences & Systems Engineering Working Group.

- è Conceptual understandings of services and the systems and processes required for their delivery.
- è Mathematical methods for modelling services and the systems and processes required for their delivery.
- è Scientific and socio-economic methodologies and engineering tools for modelling services and the systems and processes required for their delivery.
- è Business ecosystem analysis of services
- è Methodologies for observing and measuring services.
- è Mechanisms for delivery into services and consulting businesses
- è The integration of the disciplines that contribute to the sciences of systems and services

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