Dynamically Adaptive FI Applications: Beyond Adaptive Services

Future Internet Assembly
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Organizers:

Andreas Metzger & Clarissa Marquezan (Paluno, University of Duisburg-Essen) & Katarzyna Wac (University of Geneva) & David Hausheer (TU Darmstadt)
Agenda

- Aim and expected outcomes
- Introduction and Motivation (15 min)
- Application Scenarios (35 min)
- Panel Discussion (1 hour)
- Wrap Up (10 min)
Aim and Outcomes

• **Aim:**
  – To identify and discuss key challenges towards dynamically adaptive Future Internet applications

• **Expected outcomes:**
  – Summary in FIA written report
  – Details on dedicated on S-Cube web portal

http://www.s-cube-network.eu/fia
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Service-oriented systems face highly dynamic changes due to
- use of globally distributed 3rd party services;
- changing requirements and user types;
- varying end-user devices & network connectivity

Difference from traditional software systems
- unprecedented level of changes;
- no guarantee that service providers fulfil SLAs;
- difficult to assess ICT infrastructure at design time

⇒ Adaptation to changes during run-time
Adaptive Services: Why?

NESSI Membership Survey Results:

![Bar chart showing rating averages for important characteristics of future Software and Services.](chart.png)

Figure 1: Important characteristics of future Software and Services
Adaptive Services: How?

Software Services & Systems Network (S-Cube)

**Goal:** Integration of research communities to address service engineering, monitoring & adaptation

[Source: FP7 project S-Cube]
Adaptive Services: How?

Service Life-Cycle Model

- Identify Adaptation Need
- Enact Adaptation
- Identify Adaptation Strategy
- Operation & Management
- Deployment & Provisioning
- Requirements Engineering
- Design
- Realization

Run-time

Design time

[Source: FP7 project S-Cube]
Adaptive FI Apps: Why?

- **IoS: Internet of Services**
  - 3rd party services
  - Changing context & requirements

- **IoT: Internet of Things**
  - Connected objects & sensors
  - Identification & measurement

- **IoC: Internet of Content**
  - Content creation & delivery

- **NoF: Networks of the Future**
  - Ubiquitous connectivity

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e.g., response to failures of devices and sensors;
resource limitations (battery, memory, CPU)

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e.g., addressing diversity of delivery requirements (age, religion, country);
changes in content availability

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e.g., switching and routing between heterogeneous technologies (optical, wireless, sensor, satellite, etc.);
changes in bandwidth and quality of connectivity
Adaptive FI Apps: How?

Relevant Characteristics (tbd)

Business and Value Networks
- Green
- Efficient
- Cheap
- Reliable
- Secure
- Traceable

Socio-Economic Layer

FI Application Layer

FI Platform Layer

[Source: FP7 project S-Cube, FI-ware, Dutch Freeband AWARENESS project]
Adaptive FI Apps: How?

Relevant Characteristics (tbd)

Human-in-the-Loop

Transport & Logistics

Distributed

Context-aware

Proactive

Reactive

Socio-Economic Layer

FI Application Layer

FI Platform Layer

Cross-Layer

Cross-Area

Autonomic

Human-in-the-Loop

Ubiquitous Broadband Connectivity

Information Integration & Processing

Service Provision & Consumption

NoF

IoT

IoC

IoS

Efficient

Cheap

Reliable

Secure

Traceable

Business and Value Networks

Green Efficient Cheap Reliable Secure Traceable

Socio-Economic Layer

[Source: FP7 project S-Cube, FI-ware, Dutch Freeband AWARENESS project]
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FI Application Scenarios

• **eHealth**
  • Katarzyna Wac & (Univ. of Geneva)
  David Hausheer (TU Darmstadt)

• **Transport & Logistics**
  • Clarissa Marquezan (Paluno, Univ. of Duisburg-Essen)

• **Media**
  • Michael Boniface (IT Innovation, Univ. of Southampton)
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Panel Discussion

• Nuria De-Lama Sanchez (Atos Origin)
  • Health applications: paradigmatic application scenarios for adaptive services

• Michael Boniface (IT Innovation)
  • Adaptability for collective experiences within the digital and real-world

• Yagil Engel (IBM Haifa Research Labs)
  • Proactive and Adaptive Event-Driven Monitoring
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University of Duisburg-Essen
http://www.paluno.eu/

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University of Geneva
http://www.unige.ch/

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