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Towards a Service-Oriented Architecture for Mobile Information Systems

MOBIS 2004

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Overview

- | Motivation
- | Building Blocks of SOA
- | Requirements for Mobile SOM
- | System Architecture of ASOMNIA
- | Sample Application
- | Summary & Conclusion

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Motivation

- | Our research is addressing mobile service-oriented middleware infrastructures
- | Especially suitable for public information systems in the area of traveller information and traveller assistance
- | Mobile SOM dealing with aspects of
 - | heterogeneity
 - | mobility
 - | adaptability
- | The result of our research and basis for the presentation is a service-oriented middleware called ASOMNIA.


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User Scenario

- | Inform and assist travellers on the way to their destination
- | Provide up-to-date information through integration of existing information infrastructure in the back-end
- | Provide ubiquitous information access on mobile devices to improve user convenience
- | Service-Oriented Middleware can be the glue





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Building Blocks of SOA

- | Service Components (services)
 - | granularity, mobility, location transparency
- | Service contracts (interfaces)
 - | public vs. published, interoperability
- | Service containers (contexts)
 - | single service container vs. multi service container
- | Service connectors (transports)
 - | communication mode, transport protocols, payload formats
- | Service discovery (registries)
 - | dynamic, hierarchical, autonomous



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Mobile SOM

- | SOA is a well-proven concept for distributed systems in the enterprise
- | SOM is especially targeted at wired networks and fixed infrastructures
- | Mobile Middleware is necessary for
 - | improved design & development processes for mobile information systems
 - | overcome the use of „stovepipe applications“ on mobile devices -> component oriented design on mobile devices
 - | Simplify and improve mobile communication
 - | Seamless integration of wired and wireless infrastructure


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Requirements for Mobile SOM (MSOM) 1/2

- | Overcome heterogeneity of mobile devices and networks
 - | Dealing with heterogeneity is a key aspect of SOM
 - | Adaptation to mobile platforms with lightweight service containers
 - | Adaptation to heterogeneous networks with adaptive service connectors
 - | Usage of interoperable service contracts
- | Integration of existing Computing Infrastructure and Computing Components
 - | Mobile device as a portal to an application or data space
 - | SOM can provide the concept of proxy services

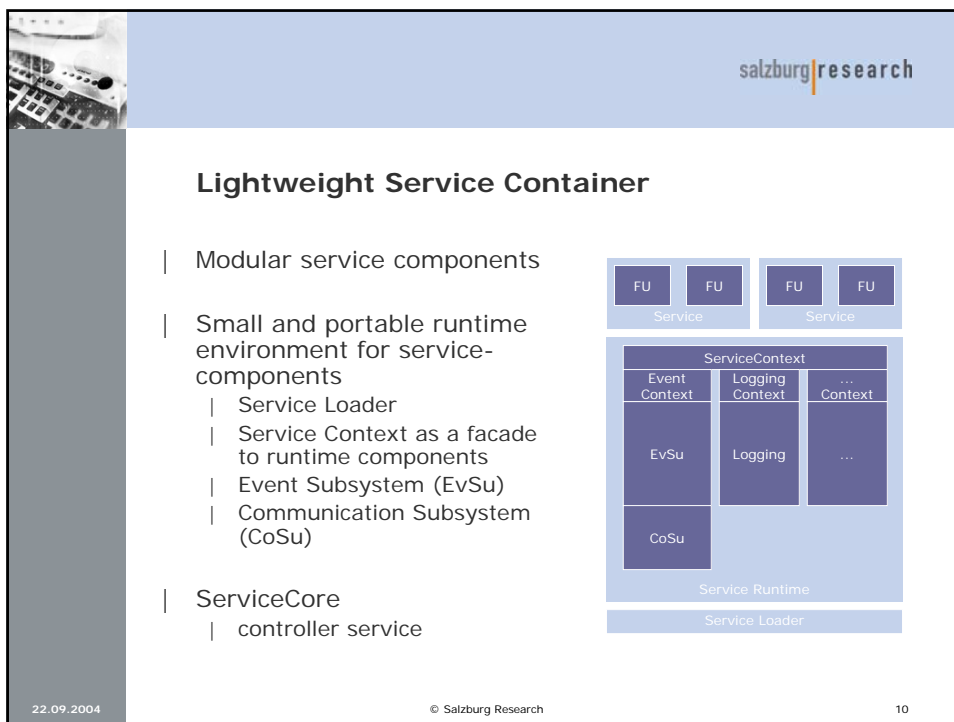
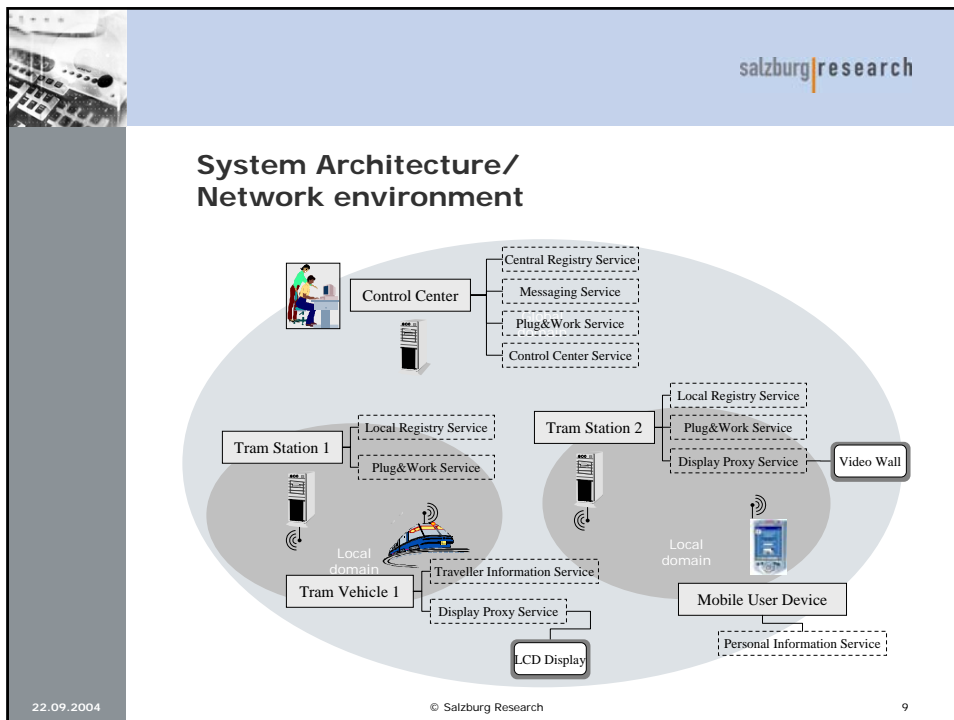
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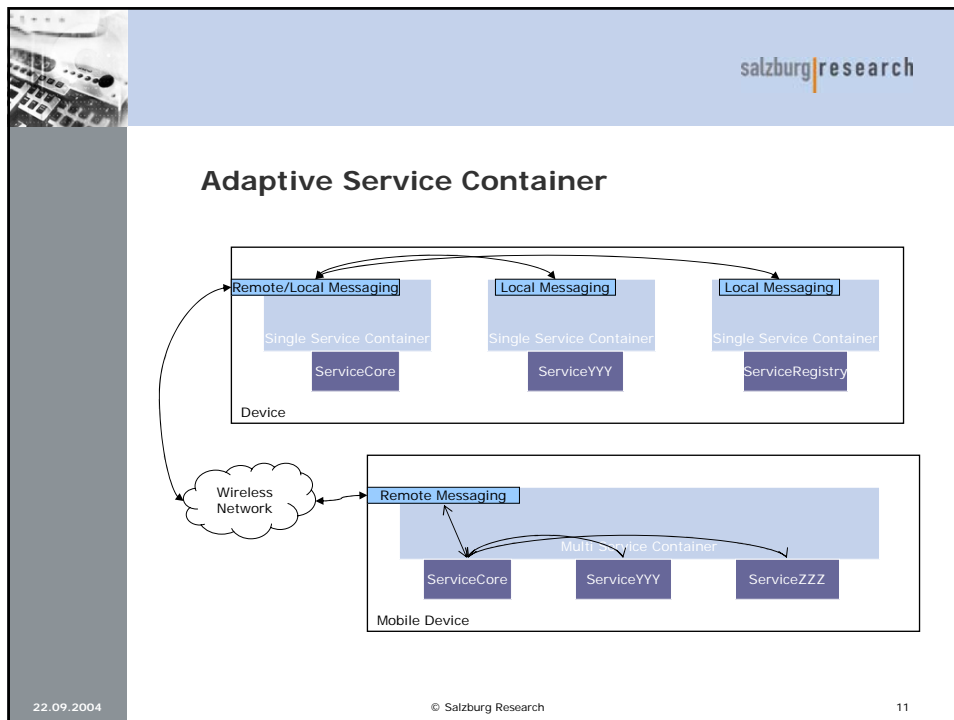


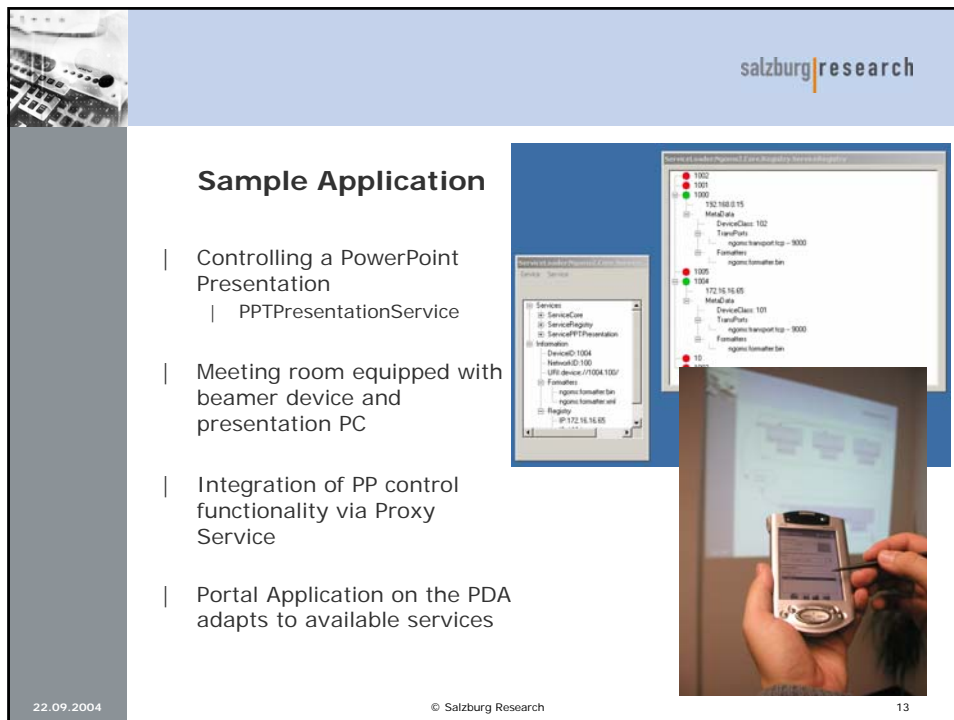
Requirements for Mobile SOM (MSOM) 2/2

- | Consider People, Places and Things
 - | Services have to be aware of users running a service,
 - | the places where a service is available and the devices running the service
- | Flexible discovery mechanisms for ad-hoc networks
 - | the dynamic nature of ad-hoc networks requires the reliable discovery of newly or sporadically available services
- | Support for adaptive communication modes
 - | Abstract communication model
 - | Different transport protocols and payload formats
 - | Depending on the available mobile network

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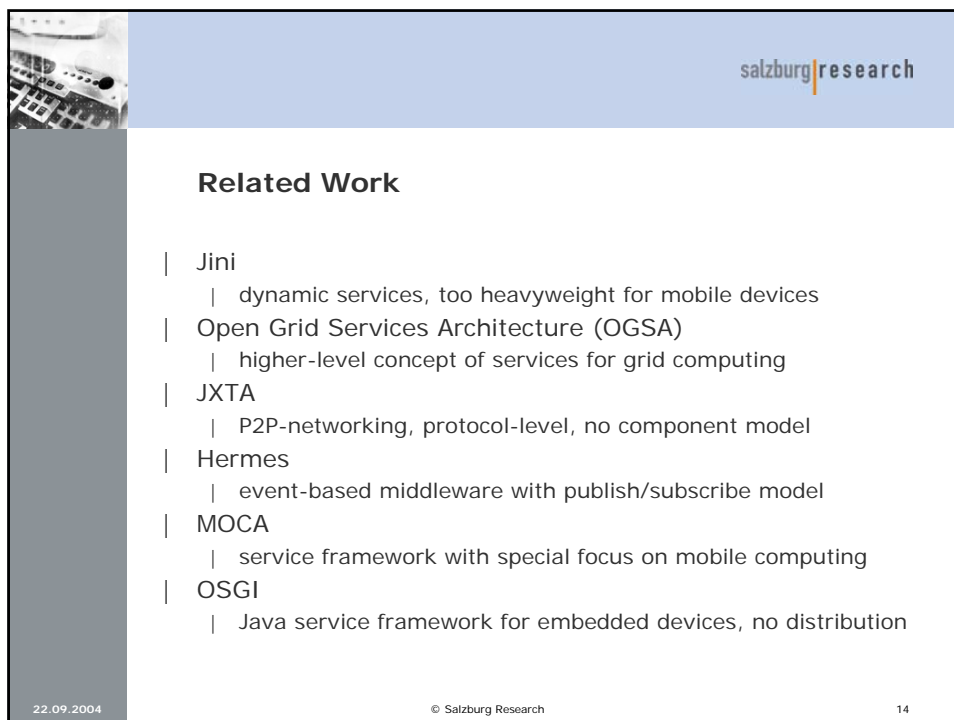
Sample Application

- | Controlling a PowerPoint Presentation
 - | PPTPresentationService
- | Meeting room equipped with beamer device and presentation PC
- | Integration of PP control functionality via Proxy Service
- | Portal Application on the PDA adapts to available services

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Related Work

- | Jini
 - | dynamic services, too heavyweight for mobile devices
- | Open Grid Services Architecture (OGSA)
 - | higher-level concept of services for grid computing
- | JXTA
 - | P2P-networking, protocol-level, no component model
- | Hermes
 - | event-based middleware with publish/subscribe model
- | MOCA
 - | service framework with special focus on mobile computing
- | OSGI
 - | Java service framework for embedded devices, no distribution

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Summary and Conclusion

- | Existing mobile middleware infrastructures do not provide the necessary assistance for different communication modes, ad-hoc networks and heterogeneous devices.
- | The concept of Mobile SOM can provide
 - | reusable software components on mobile devices
 - | higher-level infrastructure for dynamic services in ad-hoc networks
 - | seamless integration of wired and wireless infrastructure.
- | ASOMNIA can bridge the gap between pure network connectivity in mobile networks and existing information systems infrastructure.

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Thank You !

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