Dependable Service Infrastructure

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SOA Elevator Pitch

• Service-Oriented Architecture
  – Business process changes, IT follows easily
  – Reliability through redundancy in space / time

• „Adaptive Services Grid“ project
# Assumptions vs. Reality

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<tr>
<th>Standardized atomic service access</th>
<th>WSDL, SOAP, WS-*, REST, CORBA, RMI, ...</th>
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<td>Service functionality relies on input and SLA only</td>
<td>Proprietary technology-driven session concepts</td>
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<td>Functional service redundancy</td>
<td>Physical service redundancy</td>
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<td>Homogeneous surveillance</td>
<td>Multitude of monitoring data models</td>
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Dependable Service Infrastructure

• System model
  – Service composition as distributed application
  – Stateless vs. stateful implementation
  – Logical instance vs. physical instance
  – Dynamic placement - logical instance incarnation on physical instance replicas
Challenges

- Placement computation
  - Maximizing replica count
  - Considering resource consumption
  - FFD-based heuristics (MULTBIN)
  - Reconfiguration algorithms

- State consistency
- Fault-tolerance analysis
- Unified monitoring data model
- Extension for off-loaded services (grid)
MULTBIN Heuristics

Average maximum of physical instances vs. Number of service implementations

- MULTBIN
- MULTBIN-FC
- MULTBIN-CF

ROK's visit at METRIK
Implementation
Summary and Outlook

• Service infrastructure as dedicated layer
  – Fault prediction for placement decisions
  – Dynamic grid / cloud usage
  – Programming model for dependable services

• Other activities
  – OGF standardization
  – Parallel and distributed programming (Grid-Occam project)
  – Middleware / Web service technologies

• Future – Dependable Multi-Core Systems