Addressing Risk Management Efforts for Cloud Services at the Technische Universität München

EUNIS 2010

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Technische Universität München

- Sole technical university in Bavaria
- 3 main locations with local administration
- 13 departments
- 24,400 students
- 437 professors
- 5,178 academic and 2,918 non academic employees [2009]
Agenda

- Cloud Computing
- Risk Management for Cloud Computing
- TUM’s efforts:
  - Policy and Organizational Risks
  - Technical Risks
  - Risks not specific to the Cloud
- Conclusion and Outlook
Cloud Computing: Something as a Service

- Software
  - Software as a Service
- Platform
  - Platform as a Service
- Infrastructure
  - Infrastructure as a Service
  - Organisation
Cloud Computing: Infrastructure as a Service
Storage as a Service
Cloud Computing: Platform as a Service

- PaaS offered by the LRZ:
  - Computing services
    - High Performance Supercomputing
    - Linux clusters
  - Virtual machines, virtual web server
  - Database as a Service
Cloud Computing: Software as a Service
Wiki as a Service
Cloud Computing: Benefits

- Reduced cost
- Near instant scalability, flexibility and provisioning
- More mobility
- Concentration on core competencies
Risk Management

Identify

- cf. ENISA

Assess

- potential severity
- probability of occurrence

Treat

- Avoidance
- Reduction
- Sharing
- Retention
Risk Management: Cloud Computing Risk Assessment
ENISA (European Network and Information Security Agency)

Categories:
1) Policy and Organizational Risks
2) Technical Risks
3) Risks not specified by the cloud
4) Legal Risks
## TUM’s approach
### 1. Policy and Organizational Risks

<table>
<thead>
<tr>
<th>Risk</th>
<th>Strategy</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of Governance</td>
<td>Risk reduction</td>
<td>Definition of inter-organisational IT Service Management processes</td>
</tr>
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TUM’s approach
1. Policy and Organizational Risks

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<td>Risk reduction</td>
<td>IT infrastructure maps</td>
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![Diagram showing various IT systems and their components]
TUM’s approach
1. Policy and Organizational Risks

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- **TUM’s approach**
- **1. Policy and Organizational Risks**

### Risk
- **Supply Chain Failure**

### Strategy
- Risk reduction

### Implementation
- IT infrastructure maps

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**Map Symbols**
- Location L
- System S
- Responsible Institution I
- Service D

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[Ciechanowicz et. al.]
### TUM’s approach: 1. Policy and Organizational Risks

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<tr>
<td>Lock-in</td>
<td>Risk retention</td>
<td>TUM part of LRZ’s governance structure</td>
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</table>

#### Diagram

- **Bavarian State Ministry of Sciences, Research and the Arts**
- **Ludwig-Maximilians-Universität München**
- **Bavarian Academy of Sciences and Humanities**
- **Technische Universität München**
- **Other Bavarian Universities**
- **Committee for Informatics**
- **Board of Directors of the Leibniz Supercomputing Centre**
  - Prof. Bode (Chairman), Prof. Bungartz, Prof. Hegering, Prof. Kranzlmüller
- **Leibniz Supercomputing Centre**
## TUM’s approach: 2. Technical Risks

<table>
<thead>
<tr>
<th>Risk</th>
<th>Strategy</th>
<th>Implementation</th>
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<tbody>
<tr>
<td>Resource exhaustion</td>
<td>Risk sharing</td>
<td>Shared responsibilities</td>
</tr>
<tr>
<td>Intercepting data in transit</td>
<td>Risk reduction</td>
<td>Secured transaction channels</td>
</tr>
<tr>
<td>Isolation failures</td>
<td>Risk retention</td>
<td>-</td>
</tr>
</tbody>
</table>
### TUM’s approach:
#### 3. Risks not specified by the cloud

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<tr>
<th>Risk</th>
<th>Strategy</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Network outages</td>
<td>Risk retention</td>
<td>No own implementation – Trust in Provider</td>
</tr>
<tr>
<td>Theft of computer equipment</td>
<td>Risk reduction</td>
<td>Access restriction at data centre</td>
</tr>
</tbody>
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CONCLUSION and OUTLOOK

- Cloud Services: IaaS, PaaS, SaaS
  - Benefits: cost savings, flexibility, ..
  - Risks: Policy and Organizational Risks, Technical Risks, Risks not specific to the Cloud, Legal Risks
  - Tool: ENISA Risk management catalogue

- University specific Cloud Services:
  - Campus Management as a Service?
  - Lab as a Service

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OUTLOOK: Lab as a Service

- Lab before:
  - Frequent changes in set-up necessary
  - Resource shortages

- Lab after
  - Whole set-up virtualized
  - No resource shortages any more

[Lindinger et. al.]
REFERENCES

Thank you for your attention!

Questions
BACKUP
Cloud Computing: Software as a Service
Exchange as a Service