inf105 - Fault Tolerance in Distributed Systems

Module label: Fault Tolerance in Distributed Systems
Module code: inf105
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Master's Programme Computing Science > Praktische Informatik
- Master's Programme Embedded Systems and Microrobotics > Akzentsetzungsmodule

Contact person

Module responsibility
- Oliver Theel
- Die im Modul Lehrenden

Authorized examiners
- Die im Modul Lehrenden
- Die Modulverantwortlichen

Module counseling
- Die im Modul Lehrenden

Entry requirements
This module provides knowledge of fault-tolerant distributed systems. The terminology, structure, conception, core challenges and related implementation concepts will be covered in detail.

Skills to be acquired in this module

Professional competence
The students:
- Assess what a fault-tolerant distributed system is and develop awareness of its capabilities
- Name and discuss common implementations of fault-tolerant distributed systems

Methodological competence
The students:
- Reflect the implementation challenges of a distributed system
- Are able to adapt and evolve implementation concepts of fault-tolerant distributed systems in new contexts

Social competence
The students:
- Solve problems in small teams
- Present their solutions to the members of the tutorial
- Discuss their different solutions with members of the tutorial

Self-competence
The students:
- Accept criticism
- Question their initially applied methods for problem solving
- Question their initial solutions in the light of newly learned methods

Module contents

1) Fault, Error, Failure
2) Failure semantics, Fault tolerance
3) Byzantine agreement protocols
4) Stable storage
5) Fail-stop processors
6) Atomic commit protocols
7) Classification of replication control schemes

- pessimistic vs. optimistic
- semantic vs. syntactic
- static vs. dynamic
8) Consistency notions
9) Quality criteria
10) Survey of replication control schemes
11) Design of replication control schemes
12) Unifying frameworks
13) Replication in practice

Reader's advisory

Links

<table>
<thead>
<tr>
<th>Language of instruction</th>
<th>German</th>
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<tbody>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
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<tr>
<td>Module frequency</td>
<td>jährlich</td>
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<tr>
<td>Module capacity</td>
<td>unlimited</td>
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<tr>
<td>Reference text</td>
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<td></td>
<td>Betriebssysteme 1 und 2</td>
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<tr>
<td></td>
<td>Betriebssysteme-Praktikum</td>
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<tr>
<td></td>
<td>Verteilte Betriebssysteme</td>
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</tbody>
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Modullevel
AS (Akzentsetzung / Accentuation)
Modulart
Wahlpflicht / Elective
Lern-/Lehrform / Type of program
V+S or V-Ü
Verteilte Betriebssysteme

<table>
<thead>
<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td>Final exam of module</td>
<td>End of lecture period</td>
<td>written exam or oral exam or practical work</td>
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Course type  | Comment | SWS | Frequency | Workload attendance |
-------------|---------|-----|-----------|---------------------|
Lecture      |         | 2.00| WiSe      | 28 h                |
Seminar or exercise |   | 2.00| WiSe      | 28 h                |

Total time of attendance for the module 56 h