SuMMIT - An Architecture for Mobile Devices to Coordinate the Execution of Applications in Grid Environments

Vinicius da Cunha Martins Borges
Anubis Graciela Moraes Rossetto
Julio Silva Dias
Mario Antonio Ribeiro Dantas
vcunha, anubis, jdias, mario@inf.ufsc.br
Guide

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- Related Works
- SuMMIT Architecture
- Experimental Results
- Conclusions
- Future Works
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Introduction (1/2)

- Limitations of mobile devices impose great difficulties to provide to users an option for solve complex problems (Solution: Mobile Grid);

- The majority of researches only allow submission and monitoring of one task per time from device;

- Considering their limitations, these devices are more susceptible to disconnections;

- Disconnections: fault $\rightarrow$ error $\rightarrow$ failure.
Introduction (2/2)

4 Jobs for resolution problem

Services of Jobs Submission and Monitoring

Network

Organization C

Grid resources

Org E

Org B

Org A

Org D

Grid

Grid node
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## Related Works

<table>
<thead>
<tr>
<th></th>
<th>Saving Usage of Battery</th>
<th>Disconnection</th>
<th>Workflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shi et al. 2006</td>
<td>NO</td>
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<tr>
<td>Sajjad et al. 2005</td>
<td>NO</td>
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<td>Grabowski et al. 2006</td>
<td>NO</td>
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<td>Brooke and Parkin 2005</td>
<td>NO</td>
<td>NO</td>
<td>Yes</td>
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<tr>
<td>Hummel et al. 2006</td>
<td>NO</td>
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<td>Yes</td>
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SuMMIT Architecture (1/7)
SuMMIT – Workflow Manager (2/7)
SuMMIT – Agent (4/7)
SuMMIT – Agent (5/7)

1. Observe Mobile Device
   - Yes: Mobile device connected?
   - No: Analyze XML/user option

2. Adapt Workflow
   - Abort Execution
   - Continue Execution
   - Stop for after restart
SuMMIT – Mobile GUI (6/7)

DAG

Petri Net

Simplification

NO-DAG

Expressive
SuMMIT – Mobile GUI (7/7)

Monitoring Interface
Experimental Results

Battery Usage

Mean Usage of Battery (%)

mean number of application executions

SuMMIT
Other

Mario Antonio Ribeiro Dantas
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Conclusions

- SuMMIT provides a more coordinated and automated way for executing applications in the mobile grid;

- It also provides an adjustment facility for the execution of the tasks flow, matching requirements of submitted application and options defined by a user;

- Consume less battery energy of mobile devices for submission and monitoring applications.
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Future Works

- SSL (*Secure Socket Layer*);

- Develop a more flexible and incremental selector engine to choose grid resources;

- Provides an *time interval* for verification of the disconnection state and for monitoring workflow in a more *dynamic* fashion, considering input parameters, e.g., *battery lifetime* and/or *traffic volume* in the wireless network;
Questions
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