Towards a Software Architecture for Device Management in Instrumented Environments

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Project FLUIDUM:
www.fluidum.org

FLUIDUM

- Flexible User Interfaces for Distributed Ubiquitous Machinery
- Building instrumented environments in three different scales (desk-, room-, and building-level)
- No hardware on the user!
- Prototyping new User Interfaces
- Creating new interaction metaphors
My thesis

- Providing software infrastructure for FLUIDUM project
- Focus on hardware orchestration
- Dynamic plug and play of devices
- Research on device communication
- Scalability for the different instances of FLUIDUM instrumented environment
- Goal: software toolkit that enables rapid prototyping of applications

Device Modelling

- No hierarchical device model
- Properties designed as remotely accessible APIs
- Device described as a list of its features

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<th>DEVICE Parameters</th>
<th>PROPERTY API</th>
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<td>Device Handle</td>
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<th>CAMERA Parameters</th>
<th>PROPERTY API</th>
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<td>Device Handle</td>
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• Central server provides yellow page service
• Devices plug into / unplug from that server
• Services plug into / unplug from that server
• Server provides matchmaking mechanism between services and devices
INTEGRATION (1)

- Communication with related projects via blackboard (JavaSpace)

INTEGRATION (2)

- Exchange of information, queries and answers

![Diagram showing a pool with service references and a development manager.]
Benefits

- Uniform access to devices with similar functionality
- Dynamic plugging and unplugging of devices and services
- Rapid prototyping

Research questions

- Centralized design as bottleneck ( -> experiments with P2P and other approaches)
- Reliable recognition of device disconnection
- Resource management
- Inclusions of future devices
- Dealing with virtual (secondary) devices and properties
Thank you for listening.

Any questions?