

Implementation of XVSM for the iOS platform

Masterstudium:
Medizinische Informatik

Gerald, Grötz

Technische Universität Wien
Arbeitsbereiche am Institut für Computersprachen
Arbeitsbereich: Programmiersprachen und Übersetzer
Betreuerin: Ao.Univ.-Prof. Dr. Dipl.-Ing. eva Kühn

Motivation

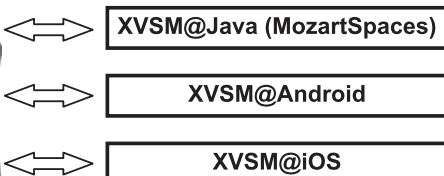
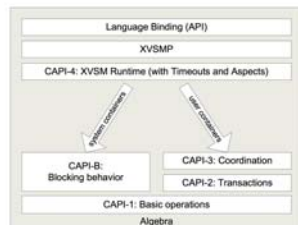
- ▶ Mobile computing gain more and more influence
- ▶ Application complexity increases and therefore need assistance for developers (Middleware)
- ▶ XVSM based on Space Based Computing paradigm offers a data space for communication and collaboration
- ▶ Java implementation (MozartSpaces) not runnable on iOS

Goals

- ▶ Fully compatible implementation with MozartSpaces for the iOS platform concerning:
 - Operations, coordination and transactions
 - Runtime model, communication protocol and API semantics
 - Semantics of aspects
 - Persistency operations

Background

- ▶ XVSM - formal definition
 - Layered structure
- ▶ Cross platform
- ▶ Mobile environment
 - Limited resources
 - Background processing
- ▶ Heterogenous communication
→ XML serialization
- ▶ Decided to port MozartSpaces using Objective C



Usage Scenarios

- ▶ Intra-App communication
 - Between threads
 - ▶ Inter-App communication
 - Between processes
 - ▶ Remote communication
 - WLAN
 - Cellular network
- Coordination
Persistency
Transaction
Aspects
...

Implementation

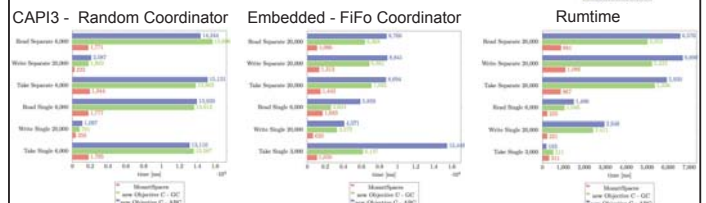
- ▶ Serialization of object graphs
 - Java
 - Objective C
- ▶ OS X and iOS implementations
- ▶ Translation of Runtime Exceptions to ObjC exceptions
- ▶ Translation of Exceptions to NSError objects
- ▶ Build environment (Make and XCode)
- ▶ Little external dependencies
- ▶ Application Szenario
- ▶ GCD usage
- ▶ Same API:



```
Capi capi = new Capi(core);
vs.
XMCapi *capi = [XMCapi capiWithCore:core];
```

Evaluation & Results

- ▶ Compatibility using XML serialization evaluated using integration tests
- ▶ Performance tests
 - Different coordinators
 - CAPI3
 - Embedded space
 - Runtime
 - Scalability



Conclusion and Future Work

- ▶ Proof of concept using Objective C
- ▶ Compatible with MozartSpaces using XML serializer
- ▶ Performance similar to MozartSpaces
- ▶ Future work
 - Feature and performance enhancements
 - Implementation of Multi-Platform version (e.g. C#) to operate on one code base