OSGiMOP
Monitoring-Oriented Programming in OSGi

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Introduction

MOP

- Behavior monitoring approach
- Software development technique
- Instrumentation of the implementation with the specification

OSGi

- Service oriented platform
- Implements a complete and dynamic component model

JavaMOP

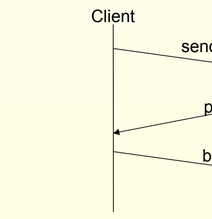
- An instantiation of MOP
- Java for declarations and event/handler actions
- Relies on AspectJ for code injection
- Logic plug-ins : FSM, ERE, CFG, PTLTL, LTL

Logos

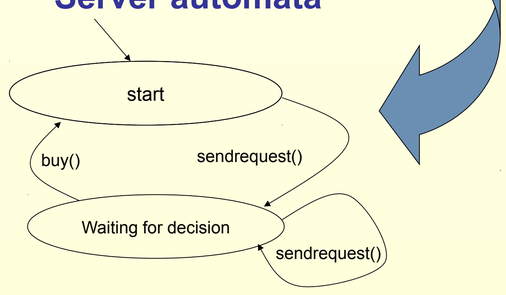
- CITI developed OSGi service
- Provide mechanisms to observe and record system calls

MOP Example

Client / Server sequence diagram



Server automata

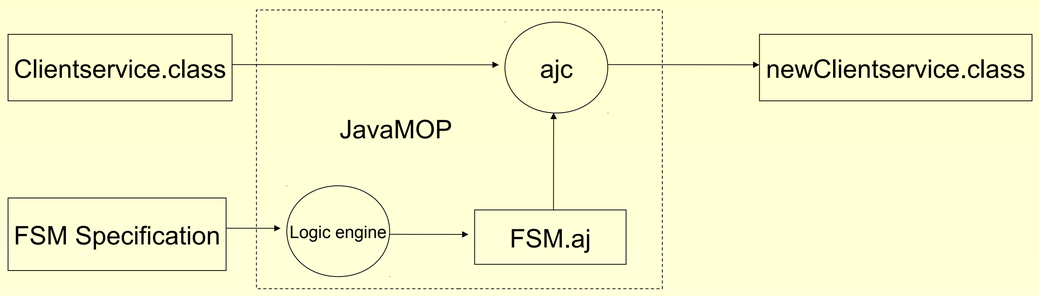


JavaMOP FSM Specification

```
package mop;
import dan.Server;
Test() {
        event sendrequest before(Server s) :
            call(* Server.sendRequest(String)) && target(s) {}
        event buyit after(Server s) :
            call(* Server.buyIt()) && target(s) {}
        fsm :
            start [
                sendrequest -> Send
            ]
            Send [
                buyit -> start
                sendrequest -> Send
            ]
        @fail {
            System.out.println("But client couldn't call buyIt method after called buyIt!");
        }
}
```

Automata Injection

Automata injection process : FSM example



AspectJ injection

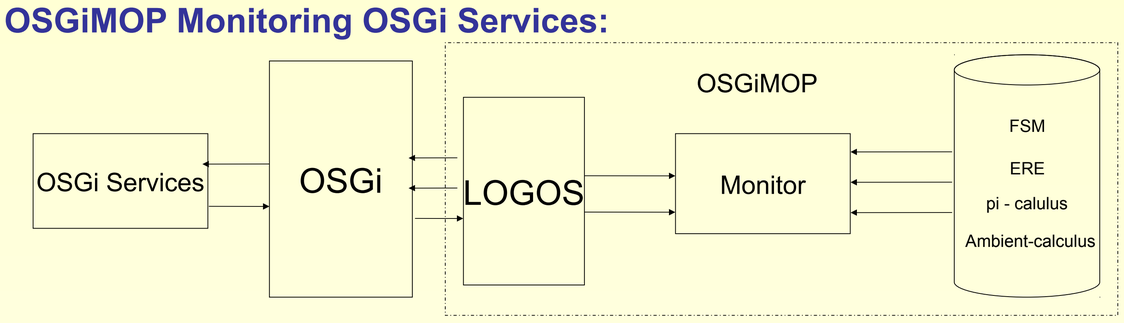
```
package mop;
import dan.Server;
Test() {
        event sendrequest before(Server s) :
            call(* Server.sendRequest(String)) && target(s) {}
        event buyit after(Server s) :
            call(* Server.buyIt()) && target(s) {}
        fsm :
            start [
                sendrequest -> Send
            ]
            Send [
                buyit -> start
                sendrequest -> Send
            ]
        @fail {
            System.out.println("But client couldn't call buyIt method after called buyIt!");
        }
}
```

OSGiMOP

What is OSGiMOP:

- Monitor for OSGi framework which dynamically checks properties
- No needs of AspectJ
- Using the existing LOGOS logging passive monitor

OSGiMOP Monitoring OSGi Services:



Advantages of OSGiMOP:

- Based on OSGi.
- Component-based development of high quality and less costly software solutions.
- Checks OSGi services conformity w.r.t their specification
- Relies on provided JavaMop plugins

Add new plug-ins:

- PI - calculus
- Ambient - calculus

Conclusions

MOP is a program behavior monitoring approach:

- Java for declarations and event/handler actions, enriched with AspectJ for event definitions.
- OSGi to monitor OSGi services.

OSGiMOP: portability, flexibility, special interest for popular Java application framework.

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