

Java and Real Time

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PersonalJava/EmbeddedJava Group

Sun Microsystems

Sun's Vision for Real-Time

- “Real-Time” means different things to different people
 - Very Small Devices (cellphones, ...)
 - Highly Embedded Systems
 - Dynamically Extensible Systems (Spacecraft, ...)
 - Control Systems (factory automation)
 - Distributed Control (battlefield management, ...)
 - Multimedia Servers

Scope of Real-Time Extensions

- RTOS, EmbeddedJava devices
- Control Systems (factory automation)
- Distributed Control (battlefield management, ...)
- Multimedia Servers

Sun and NIST

- Lisa Carnahan: NIST sponsored a *requirements working group*
- Many different viewpoints
- Difficult to forge a meaningful consensus
 - too many people
 - conflicting agendas
 - radically different backgrounds

The Real-Time Expert Group

- James Gosling is Sun's representative
- My role
- Early release of spec draft is prohibited

Relationship with the RTJWG

Standardization Perspectives

- Not my area of expertise
- Talk to ken.urquhart@eng.sun.com
- The RTEG is developing a “Specification for Real-Time Extensions to the Java™ Platform.”
 - Behavioral Specification
 - Conformance Test Suite
 - Reference Implementation

Technical Elements

- Memory Management
 - Immortal Objects (et limitations, voir chaines)
 - Real-time Garbage Collection
 - Incremental Collection
 - Headroom
 - Generational
- Synchronization and Priority Inversion

Technical Elements, Cont.

- Asynchronous External Events
 - Callbacks
 - Interrupt Handlers
 - Hardware Control
- Asynchronous Thread Notification
- Class Initialization
 - JIT compilers
 - Static Compilers

Technical Elements, Cont.

- # of Thread Priority Levels
- Scheduling: FPP, EDF, etc.
- Wall Clock

DoS and real-time

```
static Runnable r = new Runnable() {  
    public void run() {  
        try { for (;;) {}  
        } finally {  
            new Thread(r).start();  
            new Thread(r).start();  
        } } };  
new Thread(r).start();
```

Contacts

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