ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich
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# PROSE: A Software Infrastructure for Dynamic Adaptation

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Cluster4

http://prose.ethz.ch

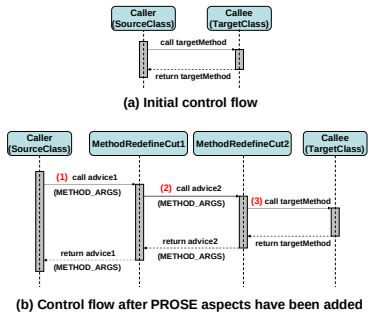
- The need for adaptability in mobile computing environments continues to expand and diversify
- Applications which execute in such environments need to adapt to changing settings they encounter during their life time
- Applications should be able to react and modify their behavior dynamically in response to changes in their execution environments

- **PROSE – a generic adaptation mechanism that addresses the following *requirements*:**
  - It supports dynamic adaptation
  - It fits with the available developing tools (introduce no new language)
  - It can be extended with new extension constructs to support a wide range of adaptations
  - It is flexible and efficient

- **Contributions:**
  - New adaptation support for dynamic AOP
  - A novel design and implementation of a weaving technique (called ***around advice***) for runtime adaptation based on Jikes RVM and Sun JVM
  - A runtime weaving mechanism based on ***dynamic bytecode instrumentation*** that supports ***method code replacement*** while an application is running

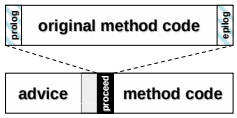
## Dynamic AOP with PROSE

### Multiple method redefinition advices

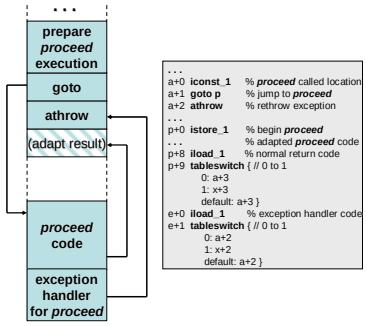



### Dynamic bytecode instrumentation

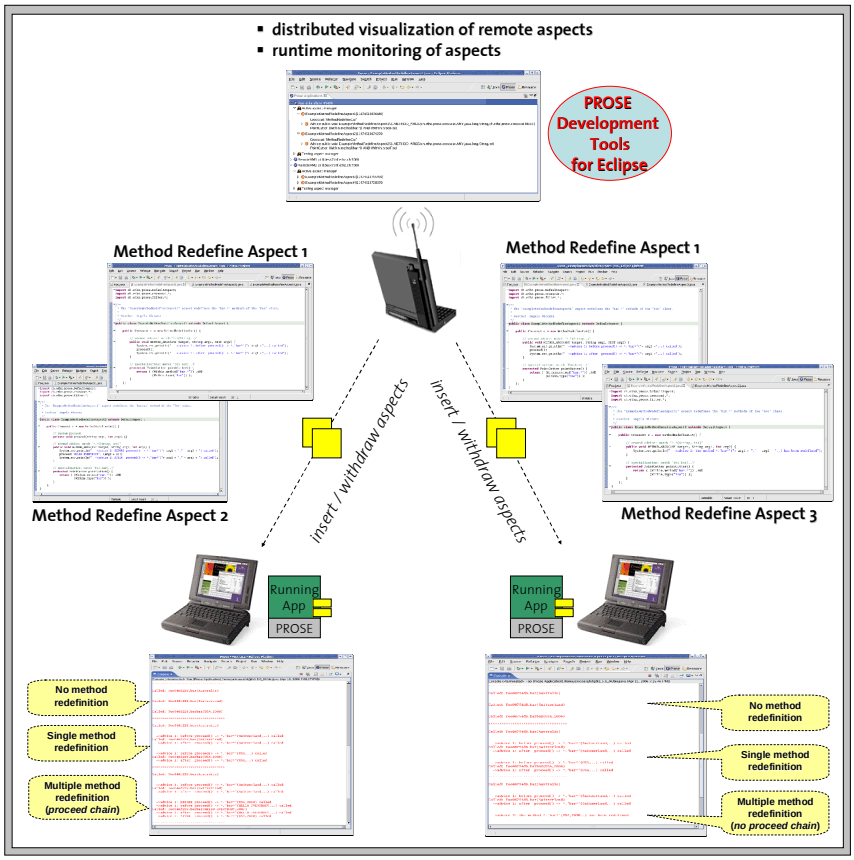
#### Single proceed inlining



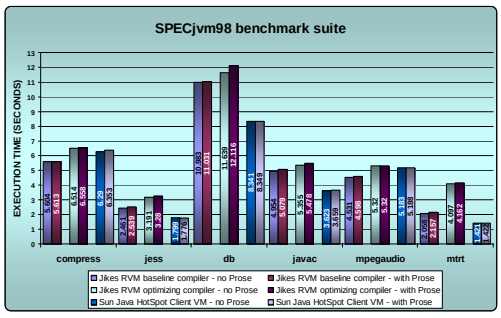

#### Multiple proceed inlining




## Adapting running applications

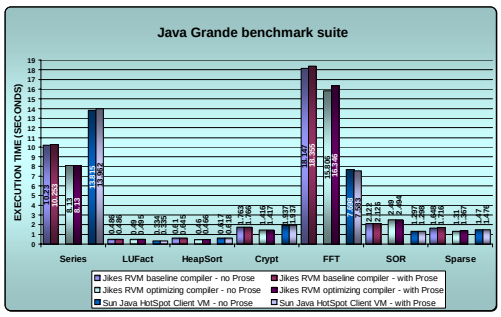



## Performance evaluation




**The relative overhead of the AOP enhanced JVM**

- Performance penalty: < 3 % overhead over non-PROSE execution using the SPECjvm98 standard benchmark




**The relative overhead of the AOP enhanced JVM**

- Performance penalty: < 2 % overhead over non-PROSE execution using the Java Grande standard benchmark

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