SCIENCE SPRING DAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

DEPARTAMENTO DE INFORMÁTICA

Replicated Components

COMPUTER SYSTEMS

CENTER FOR INFORMATICS AND INFORMATION TECHNOLOGIES

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Currently working on RepComp project

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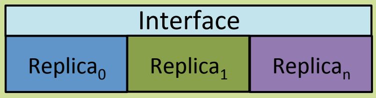
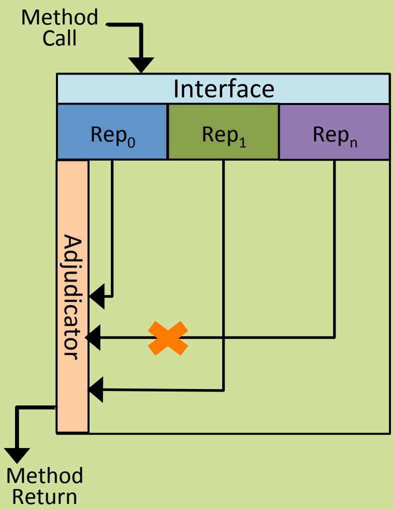
Objectives

- **The increasing complexity of software has led developers to (re)use third party libraries and components**
  - Such components contribute to an increase in software bugs
- **Macro-Components provide an easy to deploy mechanism for detecting and preventing bug occurrences**
  - By simply replacing standard components with their Macro-Component siblings
- **Provide increased fault-tolerance to everyday applications with minimum development time and cost**



Methodology

- **Macro-Components are software components that provide increased fault-tolerance**
  - Include diverse component replicas of the same specification
- **Leverage on the computational power of multicore processors**
  - Concurrently executing methods on all replicas
- **Faults are detected by comparing results and states of the internal replicas, thus identifying possible divergences**
  - Majority defines the correct result/state
  - Diverging replicas are marked for recovery based on healthy ones



Expected Results

- **Offer practical framework for developing Macro-Components**
- **Easy deployment of fault-tolerant components by simply replacing standard components with their Macro-Component siblings**
- **Provide increased fault tolerance without compromising application performance**
- **Macro-Components can also offer performance improvements, over their standard siblings, when configured with homogeneous replicas**

- Replicated software components for improved performance. In: Proc. InForum'10
- Improving Application Fault-Tolerance with Diverse Component Replication. In WTM, 2012
- Scaling Database Engines on Multicores. Submitted to Euro-Par 2013

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