SCIENCESPRINGDAY

FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

DEPARTAMENTO DE INFORMÁTICA

Transactional Memory Verification

COMPUTER SYSTEMS / CR4 Team

CENTER FOR INFORMATICS AND INFORMATION TECHNOLOGIES

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Currently working on compiler and runtime support for software transactional memory using automatic verification techniques.

Objectives

- Improving resource utilization in modern multi-core computers
- Providing software developers with new techniques and tools for parallel and distributed computing
- Enabling High-Performance Computing for a broader community of researchers and industry
- Improving the productivity of applications deployed in the Cloud

Methodology

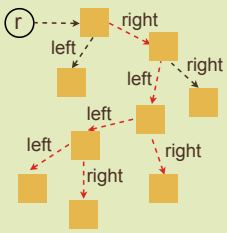
- Use Transactional Memory Paradigm
- Advance the state-of-the-art in transactional memories
- Development of mathematical models and computational prototypes
- Validation process includes running experimental tests
- Evaluation includes comparison with similar state-of-the-art approaches

Expected Results

- Contribute to more efficient computing
- Bring parallel programming to the masses
- Advance the state-of-the-art in transactional memories
- Prototype that allows to scale applications to computer clusters and/or the Cloud

Heap Program Verification

Tree-based Data Structures



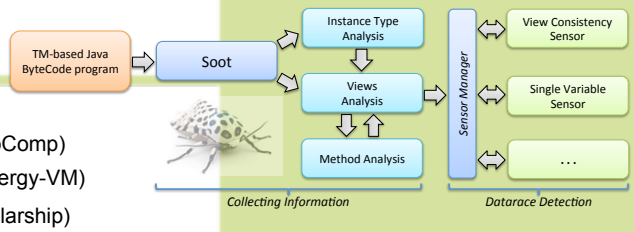
Separation Logic Representation

```
tree(r) <=> r = nil /\
  E l',r'. r -> [left:l',right:r']
    * tree(l') * tree(r')
```

Heap Path Expressions

```
r.right.left.(left | right)*
```

Atomicity Violations Detection



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