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FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

DEPARTAMENTO DE INFORMÁTICA

Intermediate Languages for Concurrency

SOFTWARE SYSTEMS / PLASTIC Team

CENTER FOR INFORMATICS AND INFORMATION TECHNOLOGIES

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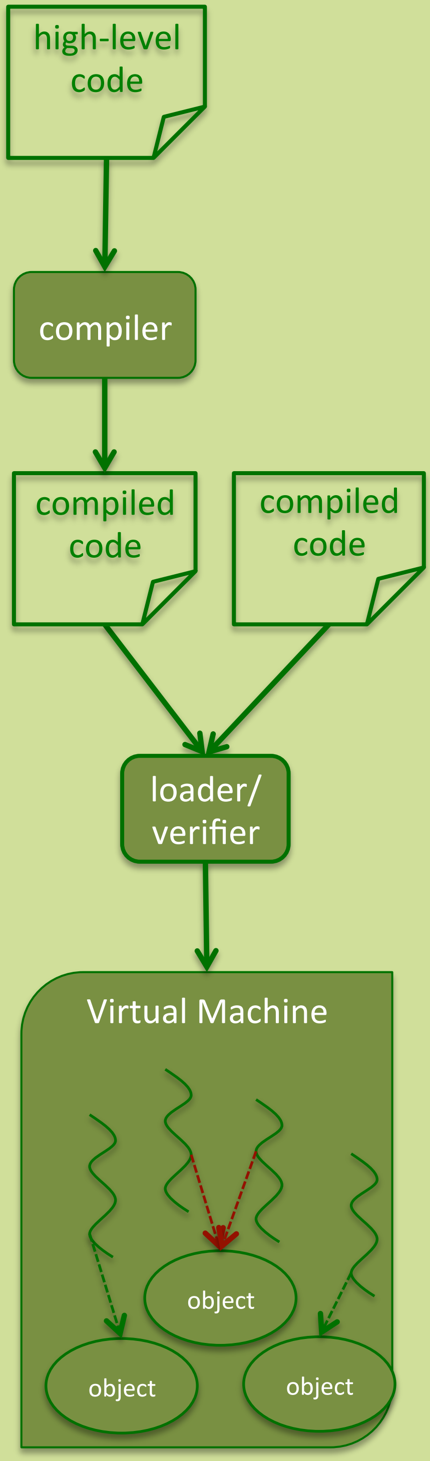
Research focus on typed intermediate languages and concurrency analysis

Objectives

Type systems are logic based verification tools, used to minimize execution errors in Software Systems. By preserving type information during the compilation process, type systems can also be used in verifiers to check **compiled code** at loading time.

Multiple core processors allow more efficient and more responsive software systems to be built. They also make the programming task more difficult due to possible "bad" **interferences** between execution **threads**.

We aim at developing a **type system** for a **concurrent intermediate language**, that ensures that a compiled concurrent program can be safely loaded into a virtual machine, and executed using the machine's resources appropriately.



Methodology

To develop **logics** and **type systems** for **machine languages**, to verify which data operations may be executed in parallel, to maximize performance and flexibility, and which operations must be executed sequentially, to prevent data corruption.

To follow the **Proof-Carrying Code** model, annotating compiled code with enough information to check that it complies to pre-established safety policies before running.

To use **behavioral types** to express how shared objects can be used safely by multiple threads, without compromising the program's correction and machine's resources.

Expected Results

- Intermediate languages with support for multithreaded programs
- A behavioral separation type system to detect undesired thread interferences
- Correctness results for the type system and concurrent properties
- A certified compiler tool-chain for behavioral separation types in a main-stream VM

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