Type Checking Concurrent Systems

SOFTWARE SYSTEMS / PLASTIC Team

CENTER FOR INFORMATICS AND INFORMATION TECHNOLOGIES

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PhD in Informatics
Interests:
- Programming languages
- Type systems
- The process calculi model of concurrency

Objectives

My main objective is to develop sound techniques for the analysis and deployment of correct distributed and mobile systems.

The aim is to assist the distributed software development process with techniques integrated in programming languages and interfaces so as to obtain systems that have a “good” behaviour.

Examples of the desired systems properties include: transaction completion, deadlock- freedom, secure communication, resource access control.

Methodology

The language-based analysis techniques are deployed for models of concurrent systems based on message-passing.

Founding on process calculi and formal methods, I study new programming abstractions and develop prototypal analyzers based on static and dynamic typing.

The properties enforced by the typed analysis are formally established by using the process calculi mathematical tools.

Expected Results

The feasibility of my approach will be tested by implementing the prototypes in practical tools.

The analysis tools will permit to debug concurrent programs based on message passing and to offer two options on success:
1- accept the program
2- accept a modification of the program suggested by the analyzer

I expect to integrate the tools with realistic features of concurrent systems and languages: data structures, control flow, identifiers, security primitives

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