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Expertise Area: System Architecture and Networking
Location: Ericsson, High-Tech Campus Eindhoven

**Master Student Project**

**Keywords**

Software defined radio, model transformation, data flow

**Problem Description**

The work on this project will be performed at Ericsson B.V. at the High Tech Campus in Eindhoven and involves modeling and analysis of state-of-the software architecture for a software defined radio (ex. 4G LTE) mapped onto a heterogeneous multi-processor hardware platform.

Data flow is a suitable approach for modeling and analyzing event based streaming application such as software defined radio that exhibit concurrent execution of asynchronous tasks conditioned by intra and inter-iteration task dependencies. On one hand data flow can be used as a programming paradigm for modeling the functional behavior of the application. Meanwhile, data flow is also used as a timed automaton to model the execution behavior of the application for analysis purpose.

Currently we use two distinct tools to support modeling and analysis of software defined radio applications. **CALtoopia** is a tool support for the data flow based functional modeling and code generation of an application while **Heracles** is used for the platform mapping and timing analysis. CALtoopia is based on the synchronous data flow programming language CAL while Heracles uses a much more restrictive model and therefore enables predictive timing analysis.

The aim of this master’s thesis is to develop a model transformation technique for extracting restrictive timed data flow models for Heracles from the functional models written in CAL. The project involves defining the model transformation rules as well as automating the transformation process. This also involves identifying the limitations and proposing novel abstraction techniques to enable conservative timing analysis.

The goals of your project are enumerated as follows:

- Define the transformation rules from functional CAL models to timed data flow model
- Identify the limitations in the model transformation and propose conservative abstractions
- Demonstrate the automation of the model transformation including the abstractions

**References**


The student is expected to have knowledge in:

- Any functional programming language
- Embedded systems