AADLv2: an Architecture Description Language for the Analysis and Generation of Embedded Systems

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Introduction

- Goal: to model a simple radar system
- Let us suppose we have the following requirements

1. System implementation is composed by physical devices (Hardware entity): antenna + processor + memory + bus
2. and software entity: running processes and threads + operating system functionalities (scheduling) implemented in the processor that represent a part of execution platform and physical devices in the same time.
3. The main process is responsible for signals processing: general pattern: transmitter -> antenna -> receiver -> analyzer -> display
4. Analyzer is a periodic thread that compares transmitted and received signals to perform detection, localization and identification.
5.[..]
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Introduction

- Issues
  - How to model a system that conforms to requirements
  - How to validate the solution?
  - How to prototype it?
  - How to go further, down to the implementation?

- Solution, one among others
  - Use an architecture description language:
    - to model the system
    - to run various verification
    - and actually, to automatically produce the system
Outline

**Goal:** introduce model-based analysis of embedded systems using the AADLv2 Architecture Description Language

- **Part 1: Introduction to AADLv2 core (about 60’)**
  - Syntax, semantics of the language

- **Part 2: introducing a case study (about 30’)**
  - A radar illustrative case study

- **Part 3: Scheduling analysis (about 60’)**
  - Introducing real-time scheduling theory and its use with AADL

- **Part 4: code generation (about 60’)**
  - How to generate code from an AADL model and how to run it