

Thesis Topic (MA, BA)

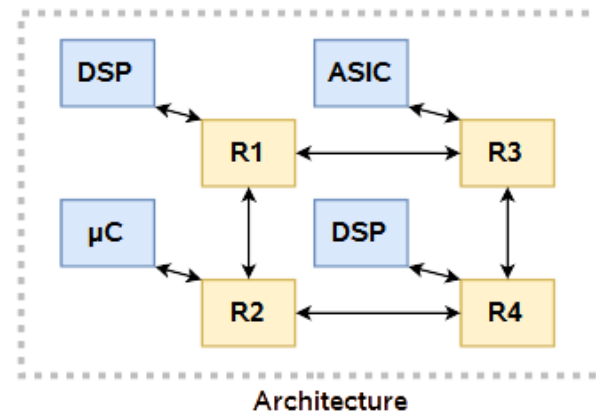
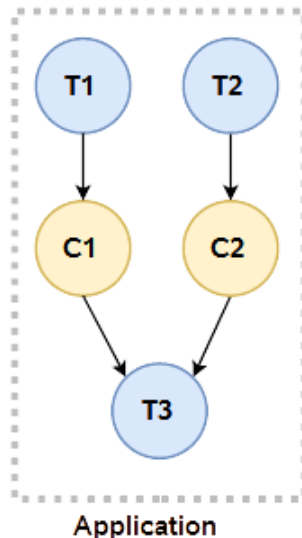
Supervisor: Luise Müller
(luise.mueller@uni-rostock.de)



A Study of Automated Application-specific Platform Generation at System Level

Fundamentals:

- Implementation of a hw / sw system requires decisions on:
 - **Allocation:** Selection of number and types of resources
 - **Binding:** Mapping of each task T to a processing unit and of each communication C to a routing path
 - **Scheduling:** Assignment of start times to each task T and communication C
- Different implementations open up a search space which is explored in order to find a valid system implementation with optimized characteristics (**Design Space Exploration = DSE**)
- Up to now, an architecture template is given on which the components of an application can be mapped



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Motivation:

- A fixed architecture can be too large or too small for a given application
- The execution of an application on different architectures might result in different performance
- Now, construction of an application-specific platform during the design process instead of using a fixed hardware template

Task:

- Familiarization with Answer Set Programming (ASP) and the existing framework
- Development of a resource library containing processing and communication devices
- Selection of number and type of resources according to the application's needs at design time
- Integration of the generative system synthesis problem into an existing framework based on ASP
- Development of synthetic and real-life benchmarks to evaluate functionality and performance

Research Questions

- How to constraint resources and topology with reasonable rules?
- What can be objectives for generating an optimal application-specific architecture?
- How to explore the topology options during the DSE?