Thesis Topic (MA, BA)

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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?