

Master's Thesis

# Development of a Concept to Enable Access to Heavily Shared Resources in an MPSoC Featuring a Hybrid NoC

Enabled by ever decreasing structure sizes, modern System on Chips (SoC) integrate a large amount of different processing elements, making them Multi-Processor System on Chips (MPSoC). These processing elements require a communication infrastructure to exchange data with each other and with shared resources such as memory and I/O ports. The limited scalability of bus-based solutions has led to a paradigm shift towards Network on Chips (NoC) which allow for multiple data streams between different nodes to be exchanged in parallel.

One way of organizing the access to such a NoC is by using Time-Division Multiplexing (TDM) which allows to give service guarantees. However, in a TDM NoC the number of parallel accesses to a resource is limited which is problematic for heavily shared resources such as memory and I/O.

## Goal

The goal of this thesis is to develop a concept to enable access to heavily shared resources for critical applications using TDM traffic in a hybrid TDM and packet-switched NoC.

## Prerequisites

To successfully complete this project, you should already have the following skills and experiences:

- Good programming skills in a hardware description language i.e. (System)Verilog or VHDL
- Good knowledge of on-chip communication
- Solid Python programming skills
- At least basic knowledge of the functionality of NoCs
- Self-motivated and structured work style

## Learning Objectives

By completing this project, you will be able to

- Understand the concept of TDM NoCs
- Create and extend hardware modules in SystemVerilog
- Create tests to validate hardware modules
- Document your work in form of a scientific report and a presentation

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## Advisors

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