

In-Network Compute Infrastructures for Future Automotive Systems

Topic Description

The Compute Infrastructure is becoming more generic and flexible to accommodate the execution of heterogeneous computations with the help of virtualization technologies. One does not require computation specific hardware configuration anymore, instead the computation is packaged along with its dependencies such that it can be offloaded over hardware with just enough memory and processing capability. Parallely, the Communication Networks are becoming more programmable and intelligent with the help of Software Defined Networking, Programmable Data Planes such as P4, etc. In Network Computation is progressing towards bringing the compute and network technologies together to enable joint optimization by moving computations closer to the service requester instead of overprovisioning the infrastructure at the edge or cloud.

Thesis Tasks

- You explore in-network computing technologies (e.g., P4, Compute-First Networking, Named-Function Networking, etc.) for its deployment in automotive systems.
- You design and develop an in-network computing framework to optimize the resource utilization with the help of innovative orchestration solutions and implement the use-case(s) using state-of-the-art technologies.
- An opportunity to have a hands-on experience on both hardware and simulation implementation and evaluation.
- You critically evaluate the developed concepts with respect to performance gain against state-of-the-art methods.
- Finally, yet importantly, you document and present the results in the form of a Master's Thesis.
- Renumeration for the duration of Thesis is an option that can be availed if working from Bosch.

Qualifications

- **Education:** Master studies in the field of computer sciences with focus on distributed systems or comparable.
- **Personality and Working Practice:** structured and analytical
- **Experience:** hands-on experience of cloud and virtualization/containerization technologies like Docker, Kubernetes, etc. as well as hand-on experience in network simulations (using ns3, Omnet++ etc.)
- **Knowledge:** proficient in computer networks, distributed systems architectures and adept in OO-Programming skills in C++, Python or Java.
- **Languages:** fluent in English (reading as well as writing).

Contact

If you're interested in working on this topic, please send you current CV, transcript, a description of your experience with C++, Network Simulators and, if available, code-samples to:

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