Master Thesis –
Holistic View on Alternative Programming Languages for RAN Applications in Embedded and Cloud Deployments

Background
Mobile networks are used all over the world and are the corner stone for the networked society, where everything shall be connected. To support the vast amount and diversity of data expected in future networks, Ericsson are developing products to drive and support the networked society. The subjects for Master Thesis are defined to investigate and develop algorithms, architecture, tools etc. to support huge increase of speech, data and massive IoT for Radio Access Networks.

Thesis Description
C++ is undoubtedly one of the most used programming languages for embedded applications and Ericsson is no exception and the main reason is performance. There are many studies comparing different aspects such as development efficiency vs CPU and memory for popular programming languages like RUST, GO and C++ such as: https://benchmarksgame-team.pages.debian.net/benchmarksgame/fastest/rust-gpp.html These kind of comparisons have a limited value for an RAN application which by nature is very heavy on messaging between multiple services. Another aspect that is often overlooked is how easy the system is to observe and troubleshoot when needed.

The purpose of this thesis work is to study key RAN fundamental characteristics for cloud and embedded deployments. The second part is to create a benchmark for a typical high intensity RAN use-case using C++ with boost fibers and one or more competing programming languages.

- Performance – CPU, Memory usage
- Development Efficiency – Code, Test & feedback loops (Very subjective and personal)
- Scalability – Micro service deployment in K8S cluster as well as bare metal embedded arm (like RPI4)
- Observability – Profiling, performance counters
- Troubleshooting – Crash dump analysis, possibility for additional user defined hooks, trace & error

The thesis will be concluded with a result presentation for the Ericsson team.

Contact Persons
Johan Wibeck
+46 730 436522
johan.wibeck@ericsson.com

Christer Lindell
+46 730 435533
christer.lindell@ericsson.com
Qualifications
This project aims at students in electrical engineering, computer science, computer engineering or similar.

Extent
1-2 students, 30hp each

Location
Ericsson AB Mjärdevi, Linköping

Preferred Starting Date
Spring 2021

Contact Persons
Johan Wibeck
+46 730 436522
johan.wibeck@ericsson.com

Christer Lindell
+46 730 435533
christer.lindell@ericsson.com