

MASTER INTERNSHIP

Department of Complex Systems Engineering

Supervisor

Arnaud Dion

Xavier Thirioux

Ahlem Mifdaoui

Location Toulouse, campus SUPAERO

Mél. : arnaud.dion@isae-sup aero.fr

xavier.thirioux@isae-sup aero.fr

ahlem.mifdaoui@isae-sup aero.fr

INTERNSHIP DESCRIPTION

Domain :

MODELING, VERIFICATION

Title :

**MODELING AND VERIFICATION OF ROUTING RULES OF AN
ETHERNET SWITCH**

Context:

The department of complex system engineering of ISAE-SUPAERO is developing a new network aimed at ensuring reliability, low jitter and latencies, without the need for synchronization or complex network planning[1]. This network, called Factoring, is Time Sensitive Network compliant[2] at 1Gbit/s, based on an interface called T-Factoring or T for short, that allows any Ethernet-compliant equipment to exchange data via the network. Several articles and patents have already been filed for this project.

Objectives:

in order to meet the objectives of reliability and low latency, each T interface have to implement a set of routing rules. These rules have to ensure the delivery of the message to the proper destination, even in the presence of a failure. The purpose of this internship is to model the existing set of rules on an appropriate framework in order to verify the behavior and coverage of these rules, and to propose improvements.

Tasks:

To successfully complete this project, the intern will have to, with the support of the project team, carry out the following tasks:

- Analysis of the set of rules
- Proposition of a framework for the modeling and verification
- Modeling the rules
- Verification and validation of the rules for realistic use cases
- Proposition of new rules or simplification of the existing set
- Writing a technical report.

References:

[1] A. Mifdaoui, J. Lacan, A. Dion, F. Frances and P. Leroy, "FactoRing: Asynchronous TSN-compliant Network with low bounded Jitters for Industry 4.0," 2021 26th IEEE International Conference on Emerging Technologies and Factory Automation (ETFA), Vasteras, Sweden, 2021, pp. 1-8, doi: 10.1109/ETFA45728.2021.9613631

[2] IEEE, "802.1Q - IEEE Standard for Local and Metropolitan Area Networks-Bridges and Bridged Networks" https://standards.ieee.org/standard/802_1Q-2018.html, 2018

Application: please send us by email a curriculum vitae.

Application deadline: February 15th, 2024

Location: ISAE, Campus SUPAERO (Toulouse, France)

Duration: 5 months, starting March or April, 2024

APPLICANT PROFILE

Knowledge and required level: M2 level, knowledge on verification, modeling