

Path-aware application optimization

Project Proposal

Introduction

Interests and learned topics

Endhost routing optimization in path-aware networks, software requirements engineering, traffic engineering from the application perspective, optimization problems in computer networks.

The project leverages the path-aware property of the SCION network architecture [1].

Project description

In this project, you will be able to engage in a project that can make a real impact in industry. You will have the opportunity of working out the functional requirements with respect to network connectivity for a set of highly critical applications. You will conduct a thorough analysis of the mobile application to define their optimization targets taking into account various aspects of the network environment. The analysis will consist on both theoretical and practical evaluation of the given set of applications. These metrics will be of critical importance since they will be fed into a path selection algorithm with the goal of achieving highly secure and optimal or close to optimal performance in a path-aware network.

Work packages

The following tasks have to be completed in this project.

Phase 0: Register project and setup environment, familiarize yourself with the SCION architecture.

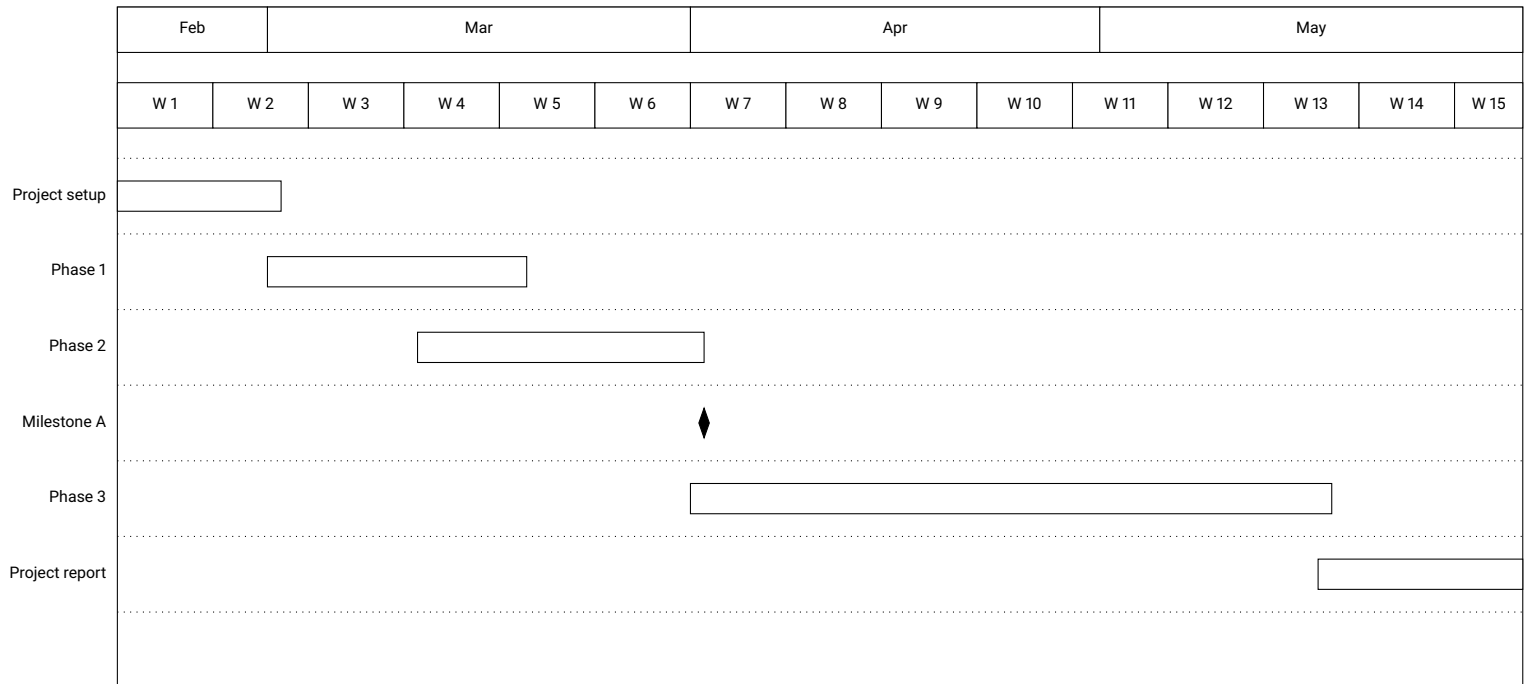
Phase 1: Realize the functional requirements and carry out an exhaustive literature review.

Phase 2: Define the optimization targets base on a theoretical analysis.

Phase 3: Tune in the metrics based on practical evaluations in different network environments.

Phase 4: Hand in project report.

Timeline



Requirements

- Foundations in software engineering
- Foundations in networking and security
- Foundations algorithms and optimization problems
- Experience with Android, Android emulators, Unix-like systems and network tools is desired but not mandatory.

Contact

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Organization

The student and the advisor will hold weekly meetings. During each weekly meeting, the student will briefly describe the work completed during the week and outline the work to be completed during the next week. The advisor will, if necessary, assist the student in identifying potential future issues and discuss current issues. Pressing complications arising between two meetings will be promptly discussed. The advisor will assist the student towards completing any agreed-upon milestones.

Grading Scheme

Grade	Description
6.0	Design and implementation, as well as report are candidates for submission to an academic conference or workshop.
5.5	Project quality significantly exceeds expectations.
5.0	Project meets expectations.
4.5	Project partially meets expectations and has minor deficits.
4.0	Project meets minimum quality requirements but has major deficits and is clearly below expectations.

References

- [1] The Complete Guide to SCION. From Design Principles to Formal Verification. Laurent Chuat, Markus Legner, David Basin, David Hausheer, Samuel Hitz, Peter Müller, and Adrian Perrig. Publisher: Springer International Publishing AG, 2022.