

Master Thesis

**SDN based Network Management in Emulated environment**

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Statement

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Date, signature of the student

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# Introduction

Dr. Martin Casado developed an architecture to separate control and forwarding functions of networking de-vices, migrating control to a centralized policy server. This architecture evolved to what is now known as Software Defined Networking (SDN) today. One of the first challenges was the need for a common South Bound Interface (SBI) protocol between the SDN Controller and the forwarding networking device. OpenFlow developed by the Open Networking Foundation (ONF) and is used over a secure channel (Transport Layer Security (TLS) over Transmission Control Protocol (TCP) port 6633 and 6653) to modify the group and flow tables in a OpenFlow networking device. OpenFlow has evolved to version 1.5.1.

Graphical user interface, application

Description automatically generated

## Mininet

## GNS3

# Theoretical Background

# Requirements Analysis

The requirement analysis asks for the “what”, not for the “how”! Die Anforderungsanalyse fragt nach dem „was“, nicht nach dem „wie“.

## General Objectives / Generelle Zielsetzung

What is to be investigated / achieved? Was soll untersucht / erreicht werden?

General structure of the system / Genereller Aufbau des Systems

Initial state / Istzustand, Ausgangszustand

Previous work / Vorhergehende Arbeiten

Description of the work environment / Umfeldbeschreibung

* Existing hardware and software infrastructure, general conditions / Vorhandene Hardware- und Software-Infrastruktur, Rahmenbedingungen
* …

Example / Beispiel:

In this work, a software has to be developed that enables the copying of files from a client to a server and vice versa. The software shall therefore consist of a client component and a server component. With the client component, the files are uploaded, downloaded, and manipulated on the server. The server component offers a web interface to allow the administrator a remote configuration of the server. The server shall support a multi-client communication.

* Research possible open-source SDN controllers to implement.
* Research alternative configuration methods with the goal of finding the best possible method to configure and manage the network through Network Controller.
* How to provide different paths in the network with different QoS properties?
* Algorithms that are responsible for the optimization of the paths.

When a service is accessible at multiple times, how to choose the best one

# Realization

## With Mininet

## With GNS3

## Installation Problem faced

## Use Cases

### Multiple Controllers

### IPv6

# Summary and Perspectives

# Abbreviations

**0**

…

**3**

3GPP Third Generation Partnership Project

…

**A**

…

**H**

**N**

NBI Northbound Interface

NetConf Network Configuration Protocol

**O**

ONF Open Networking Foundation

ODL OpenDaylight

ONOS Open Network Operating System

**S**

SBI Southbound Interface

SDN Software Defined Network

…

**Z**

…

# References

# Appendix