

# SIMULATION OF SWITCHING FUNCTIONALITY

Software Requirements Specification Version - 0.1

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# Software Requirements Specification

## Introduction

The introduction of the software requirement specification (SRS) provides an overview of the entire software. The entire SRS with overview description purpose, scope, tools used and basic description. The aim of this document is to gather, analyze and give an in-depth insight into the complete Simulation of Switching Functionality by defining the problem statement in detail. The detailed requirements of the Simulation of Switching Functionality are provided in this document.

### Purpose

The purpose of this document is to describe the system requirements needed for the Simulation of Switching Functionality.

## Overall Description

A switch operates on the data link layer / layer 2 of the OSI model. In a local area network (LAN) using Ethernet, a switch determines where to send each incoming message frame by looking at the physical device address (or MAC address). Switches maintain tables that match each MAC address, to the port where that MAC address station is connected. If a frame arrives at a port and the destination MAC address is unknown to the switch infrastructure, then it is flooded to all ports in the switching domain.

Our simulator will implement the switch functionality. The switch will have 4 ports, where each port can be enabled or disabled based on the requirement through the command line interface. Once the port is allocated to a process, the respective port can send or receive the frames. Switch, upon receiving a frame from a port, based on the destination MAC address in the frame header, it will look up the MAC address table, and send the frame to the destined port. If the destination MAC address is not available in the MAC

1. **Specific Requirements**

### Functional Requirements

* + 1. **Ports**
       - Switch will have 4 ports to which stations can connect to.

### Port Buffer Size

* + - * Each port has a buffer size of 5 frames, upon which the port discards the incoming frames.

### Enable/Disable Port

* + - * A port can be enabled or disabled through command line interface.

### MAC Address Table

* + - * Switch should internally store a MAC address table.

### Traffic Filtering

* + - * Switch should not forward a frame out of port on which it is received.

### Unicast Frame

* + - * Switch should be able to handle a unicast frame.

### Multicast Frame

* + - * Switch should be able to handle the Multicast frame.

### Entry Removing in MAC Table

* + - * When a station is disconnected, it should remove its entry from the MAC Table.

### Station Connection

* + - * Station should be able to connect to one of the ports of the switch and can send frames.

### Accept/Discard Frames

* + - * Station should be able to accept or discard the incoming frame.

### Station Termination

* + - * When the switch is terminated, all stations should terminate.

### Non-functional Requirements

* + 1. **Directories**
       - Multi-file multi-directory solution is expected.

### Makefile

* + - * Makefile to build applications.

### Tools

* + - * Use valgrind tool on application executable to detect memory leak. Final valgrind report to be submitted in “reports” directory.

### UML Diagrams

* + - * Use case Diagram, Sequence Diagram, Class Diagram showing core functions logic.

### Testing

* + - * Use CPP Unit to automate unit testing.

### Other UML Diagrams

* + - * Any other UML diagrams developed while designing the system.

### HLD, LLD

* + - * HLD, LLD of the system

### RTM

* + - * RTM, Plan, Presentation

### Test Cases

* + - * Unit test cases and Integration test cases in UT\_IT document. Both types of test cases

i.e. sunny and rainy should be present in this document.

## Technologies and System Environment

* We are using CPP Programming, IPC Mechanisms in System Programming to develop this project within the stipulated time period
* We are working on a Linux Environment with vim editor and g++ compiler
* We are using tools like valgrind, CPP Unit for debugging, static analysis and memory leaks respectively, WINSCP for file transferring.