# Final Year Project Proposal

**Title:** Optimized Control-data Communication Model and Controller Placement in SDN

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## Abstract

Software Defined Network (SDN) has attracted a significant attention due to its notable advantages including centralized control, simplified algorithms, efficient load balancing, eliminating middleboxes. It has been recognized that SDN can be widely applied in various network environments including enterprise networks, home and small businesses, Infrastructure-based Wireless Access Networks and data centers. It is implemented by OpenFlow, which is a protocol that enables the controllers to determine the paths of network packets flowing among switches. The flowing/routing decisions are made by controllers and then deployed to switches’ flow tables so that the forwarding can achieve wire speed if a match is found. The packets are forwarded to controllers to make a new rule if there is a mismatch.

However there are two problems arise. First, the bottleneck may be the frequent communication between control and data planes when switches are overloaded with too many flow table entries. On the other hand, if too many proactive policies are used, the capability of controllers may be undermined. Second, although the control logic is centralized in a data center network, a large quantity of controllers may be required to handle thousands of flows. Given a specific network topology, the non-optimized placement of controllers can limit the performance and scalability of network.

This paper will address these two issues and we will find out the optimized solutions for control-data communication and controller placement.

## Objectives

The research on finding the optimized solutions for control-data communication and controller placement aims to:

1. Gain deeper understanding towards network architecture and design
2. Learn network mechanism and operations in Software Defined Networks (SDN)
3. Facilitate network system performance improvement through investigating certain factors and applying optimized algorithms.

## Deliverables

A research paper will be delivered for illustrating what the problems are and how they can be solved including theoretical analysis and experimental verification.

## Environment

### Hardware

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| Processor | 2.9 GHz Intel Core i7 |
| Memory | 8 GB 1600 MHz DDR3 |
| Graphics | Intel HD Graphics 4000 1024 MB |

### Software

Mininet, a prototyping environment to virtualize the network features, running on OS X 10.9.2