**Thesis Structure**

Work-Title Performance Modeling of Control Plane Based Real-Time Packet Communication for the Future Internet

Structure:

Front Page

Abstract English and German

Acknowledgements

Table of Content

List of Figures and Tables

List of Acronymous

List of Mathematical Symbols

1. Introduction (5-6 pages)
   1. Background Knowledge
2. Briefly introduce the subject area: Future Internet, Queueing System, distribution function, other related research.
3. The concepts will be involved in thesis: Future Internet, Real-Time requirement, Cloud Support, MPLS, Virtualization Techniques, Optical/Electrical Communication buffer scheme.
   1. Motivation
4. Due to the agile deployment of centralization, the future internet will benefit from SDN scenario, which will introduce a different signaling process comparing to nowadays’ network system
5. Because of the requirement of real-time communication (<50ms), the delay of the packet forwarding process should be optimized, (for instance the waiting time in 3-shake-hand).
6. Current researches are more likely to measure a lots of packets transmission time to get a mean delay time under different situations, while we would like to numerically derivate the distribution function of the delay time, which can be a general expression and can be applied to most situations with different parameters.
   1. Main Structure

Overview of chapter content

1. Future Internet
   1. Software Defined Network
      1. Architecture of SDN
2. Short history and current state.
3. General scheme, the decouple of Control and Data Plane, the concept of centralization.
4. Briefly introduce communication scheme between different planes and the protocols (OpenFlow, Northbound and Southbound, etc.)
   * 1. Future application of SDN
5. Advantages compared to the traditional network structure
6. Problem faced before widely deployed
   1. Efficient packet forwarding
      1. Packet Flow Path
      2. Network Function Virtualization

Discuss about the reason to set up Flow Path, combined with the no buffer scenario for Optical Comm;

Introduce the NFV concept and MPLS, which is used to establish the virtual channel for flow.

Discuss about the waiting delay in communication and the real-time requirement.

* 1. Cloud support

Mainly about the DB support for controller.

1. Modeling
   1. Modeling the path establishment processing

Explain the general signaling communication architecture(amongst Data-Control-DB) we are going to analyze, and Signaling Time Diagram.

* 1. Modeling by Task Graphs

Apply the task representation to the general model, and introduce queueing system to describe the sub system of each abstracted task. Then introduce the Task Graph Reduction method.

* 1. Modeling Parameter

Explain the parameter assumption for tasks and input, may combined with QoS etc.

1. Performance Analysis
   1. Mathematical performance analysis

Mainly about the mathematical derivation of 1st and 2nd moment of task’s sub model (M/G/1)

Derivation of Task Graph Reduction applied on the general model to get the final virtual task node.

Briefly explain the code implement

* 1. Simulation Techniques

Briefly introduce the SimLib

Explain how the model been map into Simulation system and the code implement.

1. Results

Compare the results from analytical implement and simulation

1. Conclusion

Summary the result, discuss the positive and negative part.

Appendix

References