**Thesis Proposal: SDN-based network management in emulated environment**

Introduction

In this virtualization era, every system is moving towards virtualized machines. For networking it would mean spinning up the virtualized versions of traditional network devices allowing for more efficient routing, programmable networks and easier network configuration changes. Software-Defined Networking (SDN) is an approach to networking that uses software-based controllers or application programming interfaces (APIs) to communicate with underlying hardware infrastructure and direct traffic on a network. This method is different from that of traditional networks, which use dedicated hardware devices like Routers and Switches to control network traffic. SDN can create and control a virtual network or also control a traditional hardware via software. Because the control plane is software-based, SDN is much more flexible than traditional networking. It allows administrators to control and manage the network from a centralized user interface, without adding more hardware. Below figure shows the tentative network architecture with SDN controller.

A diagram of a solar system

Description automatically generated with low confidence

Problem Definition

Due to advances in the Internet and Information-Centric Technology, the configuration and management of mobile, social networking, multimedia becomes highly complex and time-consuming. SDN is a new technology that is used to manage the network configuration and its services. To overcome the limitations of current networking and to improve competence to provide significant business value to many enterprises and campus Networks for their network management. SDN may be preferable over current network and also SDN introduces new possibilities for network management and configuration methods.

Possible Tasks

* Creating a network with different network devices in the emulation software.
* Using SDN controller to manage the network configurations and different services.
* The used SDN controller must be able to run on a separate machine.
* Creating and distributing the network configurations for network devices.
* Creating different paths through the network based on QoS requirements.
* Creating Security aspects for the customer networks.
* Providing services and user groups that have different requirements.
* Evaluating advantages of network with SDN controller over traditional network.
* Analyzing the possible limitations of the network.

Associated Research Questions

* Literature review.
* 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 optimisation of the paths.

• Creating a software-defined networking based network in the emulation software with different QoS requirements

• The network has to provide different paths with different physical properties (e.g. delay, bandwidth) and also wireless links.

• The network should provide services and user groups that have different QoS requirements

• SDN controller should ensure the QoS by optimising the forwarding decisions of the switches

• Creating different paths through the network based on link utilisation and QoS requirements

• Focus on algorithms that are responsible for the optimisation of the paths

• The used SDN controller must be able to support the creation of complex algorithms and should run on a separate machine.

SDN is a new technology that is used to manage the network configuration and its services.

Network slicing leverages SDN to create multiple end-to-end virtual networks over a common infrastructure. Each virtual network created is logically isolated and can be dedicated to serve different types of services with diverse requirements.

Creating a network with different network devices in the emulation software.

Using SDN controller to manage the network configurations and its services.

Our aim is to identify limitations of current networking technologies and how software-defined networks (SDN) could reduce cost, and improve competence to provide significant business value to many enterprises and campus Networks for their network management . These outcomes can lead to increased market potential for contenders which identify favorable solutions to existing networking constraints. We pursue to identify solutions in this paper to enable possible customers to assess that SDN may be preferable over Current network and also SDN introduces new possibilities or network management and configuration methods. In this article, we identify problems with the current state-of-the-art network configuration and management mechanisms and introduce mechanisms to improve various aspects of network management.

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