

1. Problem Statement:

Configuring network switches is essential for network segmentation, managing traffic flow, and decreasing risk to security. The task is complex, time-consuming, requires specialized expertise, and is prone to human error. Our solution, NetCommand, addresses this challenge with an affordable, user-friendly web application that streamlines switch configuration through a guided interface and a mobile-accessible terminal.

1.1 Need Statement:

According to the 2023 Uptime Institute Data Center Resiliency Survey, misconfigurations and change management failures account for 45% of major network-related outages [1]. With 33.1 million small businesses in the U.S. relying on stable networks for operations like telephony, video conferencing, and multimedia, minimizing errors is critical. However, IT budgets are tight—only 9% is allocated to security, and 60% of organizations plan further cuts [2]. To address this, an efficient, accessible solution is needed to simplify switch configuration, reduce human error, and help IT teams manage growing network demands without requiring extensive expertise or additional resources.

1.2 Objective Statement:

This project aims to develop a web application that simplifies network switch configuration through an intuitive interface, eliminating the need for IT professionals to carry laptops in data centers. The application will minimize errors, streamline configurations, and enhance accessibility by enabling secure, remote switch management via a mobile-friendly terminal.

1.3 Background and Related Work:

NetCommand revolutionizes switch management by providing mobile terminal access and an easy-to-use interface. Traditionally, network administrators rely on SSH clients resembling PuTTY, requiring them to manually input complex commands while carrying bulky laptops. According to ECU Online Programs, network administrators are responsible for maintaining reliable systems, often under high workloads [3]. Enterprise solutions such as Cisco DNA Center and SolarWinds offer powerful features but come with high costs and require specialized expertise. While IT generalists receive training on such tools, they often lack advanced networking skills [4]. NetCommand offers a simpler, more cost-effective alternative, allowing users to execute pre-configured actions or input commands directly. Designed for IT administrators, network engineers, and field technicians, it provides quick access, vendor compatibility, and a robust tech stack with SSH encryption, MFA, and mobile frameworks for secure and efficient network management.

References

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