# Executive Summary

Configuring network switches is a critical but complex task essential for segmenting networks, managing traffic flow, and ensuring security. However, this process is often time-consuming, error-prone, and presents challenges that small IT teams and field technicians may struggle to meet, especially under certain time and budget constraints. NetCommand addresses these issues with a user-friendly, cost-effective network management product that simplifies switch configuration through a guided user interface and mobile-accessible terminal. Designed for IT administrators, network engineers, and on-site technicians, the platform mitigates human error and removes the need to carry bulky equipment and cables around data centers by supporting single-connect USB-C connection as well as automated configuration templates.
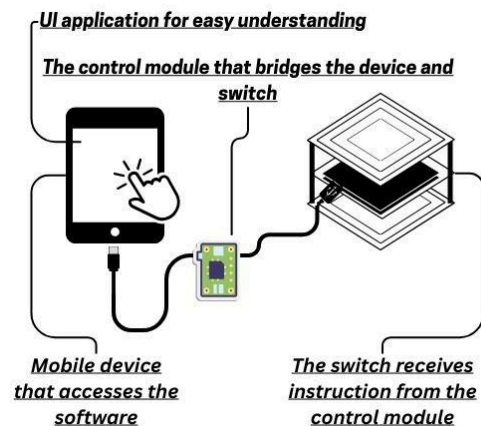
NetCommand is developed to meet strict functional and performance criteria. The system has a web-based UI for VLAN and port configuration, secure communication using diffie-hellman group encryption, and an optional multi-factor authentication. Using Ansible playbooks will reduce human error and accelerate deployment. The system is hosted offline and is accessed through a USB-C connection to a Raspberry Pi making it reliable. NetCommand's features are delivered within strict constraints, including a $1,000 budget, a two-semester deadline, and physical rack-mount dimensions. It also falls in line with industry standards for remote device access, communication, and network safety.

NetCommand makes use of the Raspberry Pi 4 because of its processing power, connectivity, and energy efficiency. The Raspberry Pi runs a Flask backend, React frontend, pySerial communication, and Ansible simultaneously. It supports SSH and Serial protocols, allowing real-time terminal access. The system uses a 32GB SanDisk microSD card for fast and reliable storage, and Cat5e Ethernet cables to ensure stable SSH communication. Power is provided by a 5V 3A USB-C adapter, delivering consistent performance in this setup.It also includes a USB-to-RJ45 console cable for serial access to the switch.

Future improvements to NetCommand focus on expanding features and optimizing usability. Planned enhancements include a patch panel for neater cable management and a cooling fan. The user interface will add more quick-configuration options. A network summary feature is also under development, allowing users to generate visual topology maps of devices connected to their switches. These updates will make NetCommand a more accessible and innovative solution for modern network infrastructure management.