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2024 ACCESS Student Training and Engagement Program (STEP-2) Final Student Report

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Work and Experiences with AtlanticWave-SDX
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During my summer internship with the AtlanticWave-SDX project through the ACCESS Student Training and Engagement Program, I worked to develop a Python library aimed at simplifying network configuration and management for researchers and educators. The AtlanticWave-SDX initiative is dedicated to enhancing the efficiency of data transmission between research and educational institutions across the Americas and South Africa, and I feel that my contributions have been an important addition to this mission.

My primary responsibility involved developing a Python library for use in Jupyter Notebooks and the FABRIC testbed. This library abstracts the complexities of network setup, allowing users to configure and manage networks with minimal effort. For example, a researcher setting up an experiment that requires substantial data transfer can now use this library to configure their network parameters efficiently, focusing more on their scientific work rather than the technical intricacies of network management.

To achieve this, I needed to familiarize myself with software-defined networking (SDN) concepts as well as work through refresher tutorials on Test Driven Development (TDD), Object Oriented Programming (OOP), and best Pythonic practices. I started with a blank screen and wrote code for the SDXClient class, which includes methods for creating, updating, retrieving, and deleting Layer 2 Virtual Private Networks (L2VPNs). This involved understanding the API specifications and implementing methods to interact with the API seamlessly. One of the key challenges was ensuring that the library was both user-friendly and robust, capable of handling various network configurations and scenarios.

A notable aspect of my work was incorporating Python unit testing and the requests_mock library to simulate API responses for testing purposes, given that the actual API was not yet available. This approach allowed me to develop and validate the library's functionality in a controlled environment, ensuring that it would perform reliably once integrated with the live API.

Throughout this process, I honed my skills in TDD, OOP, and unit testing. These methodologies ensured that the code was well-structured, maintainable, and thoroughly tested. Additionally, I gained proficiency in using Git for version control, which was essential for collaborating with other team members and managing code updates efficiently.

Beyond technical skills, this project provided invaluable experience in working remotely as part of a team. Regular virtual meetings and effective communication were crucial to align

with project goals and deliverables. The collaborative nature of the project enhanced my ability to adapt to different working styles.

Influence on Future Study and Work

This internship has profoundly influenced my perspective on future studies and career aspirations. The hands-on experience in developing and deploying advanced networking solutions has increased my interest in the field of software-defined networking and cyberinfrastructure. The opportunity to work on a project that directly supports scientific research and collaboration has been particularly inspiring, highlighting the real-world impact of technological advancements.

Firstly, this experience has further motivated me to pursue further studies in computer science and networking. I look forward to delving deeper into SDN, network security, and large-scale data management as a part of my future studies. The knowledge and skills gained during this internship will serve as a strong foundation for advanced academic pursuits, enabling me to explore these areas with a solid understanding of practical applications.

Professionally, the skills and experiences from this internship have equipped me with a competitive edge in the job market. The ability to develop user-friendly, robust software solutions is highly valued, and my experience with the AtlanticWave-SDX project showcases my capability to contribute to cutting-edge technological initiatives. Additionally, the collaborative nature of the project has prepared me to work effectively in diverse teams, a crucial skill in today's interconnected and rapidly evolving tech industry.

Furthermore, the professional connections and insights gained from interacting with experts in the field have been invaluable. These relationships have opened doors to potential future collaborations and mentorship opportunities, providing guidance and support as I navigate my career path.

My internship with AtlanticWave-SDX has been a transformative experience, enriching my technical expertise and professional skills. It has served to increase my passion for advancing scientific research through innovative networking solutions and has laid a strong foundation for my future studies and career. As I move forward, I am excited to leverage this experience to contribute to the ever-evolving field of networking and cyberinfrastructure, driving progress and innovation in research and education.

I would like to take this opportunity to say thank you for supporting my journey this summer. I cannot appropriately express the benefit that it has had for my growth as a student and as a professional.