SUMMER INTERNSHIP

On

MASTER SESSION FOR

SSH-CONSOLE SERVER

By:

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AGENDA

1. ABOUT CIENA
2. INTRODUCTION
3. TECHNOLOGY USED
4. PROJECT APPROACH AND IMPLEMENTATION
5. RESULT
6. CONCLUSION

ABOUT CIENA

Organization Name: Ciena India Private Limited

Industry: Telecommunications

Headquarters: 7035 Ridge Road, Hanover, Maryland 21076, United States

Ciena Corporation, an American networking systems and software company, established in 1992, is a global leader in networking systems and software, specializing in optical and routing solutions for telecommunications and data networks. Serving over 85% of the world's largest service providers, Ciena's clients include AT&T, Meta, and Verizon. Ciena India, its largest R&D facility outside North America, has been recognized as India's top optical networking company. As of October 2022, Ciena reported revenues of $3.63 billion and employs over 8,000 people, led by CEO Gary Smith.

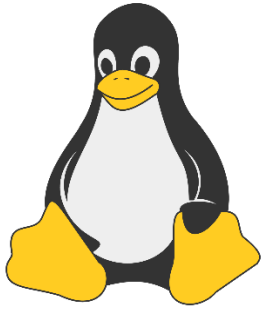
INTRODUCTION

- In today's digital era, data drives innovation and reshapes industries, with companies like Amazon, Google, Meta, and Microsoft leading in scalable cloud solutions. This data surge has fueled demand for data centers, vital for storing, processing, and transmitting information.
- **Meta, a hyperscale company and a client of Ciena**, requested them to design an **XGSPON system** for their personal data centre.
- Ciena developed multiple Optical Network Units (ONUs) within an XGSPON system, including ONU 3803-MTL. My role was to design the **Master Session for the SSH-Console Server of the 3803-MTL**, enabling operators to monitor and manage active console sessions efficiently, supporting seamless data center operations and equipment management.

TECHNOLOGY USED

Linux Operating System

- Linux is an open-source operating system, meaning it’s free to use, modify, and distribute.
- compatible with a broad range of hardware especially embedded hardware like Optical Network Units (ONU).
- built-in support for various network protocols and networking tools, making it ideal for devices like ONUs and console servers, which handle a lot of network traffic.



TECHNOLOGY USED

BASH (Bourne Again Shell)

- Bash is the default shell on most Linux distributions and is widely supported across Unix-like systems.
- syntax is simple and readable, which is helpful for scripts that require automation in networking environments.
- allows direct interaction with the operating system's command-line utilities such as netstat and netstat –tpn.
- Can be used to automate repetitive tasks such as monitoring, updating etc.

TECHNOLOGY USED

Awk

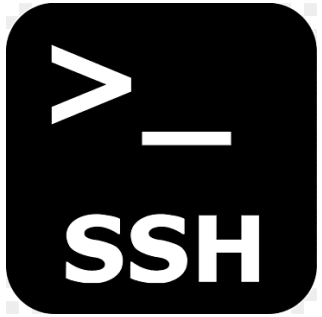
- specialized tool designed for text processing and data extraction.
- excels in searching for specific patterns within data.
- Can easily be integrated into the shell scripts.
- highly portable and available on virtually all Unix-like systems.

TECHNOLOGY USED

TigerVNC

- is designed for high-performance remote desktop sharing, making it an ideal tool for accessing and controlling remote systems.
- is cross-platform and supports multiple operating systems, including Linux.
- supports Secure Socket Layer (SSL) and Transport Layer Security (TLS) encryption, ensuring secure remote sessions.

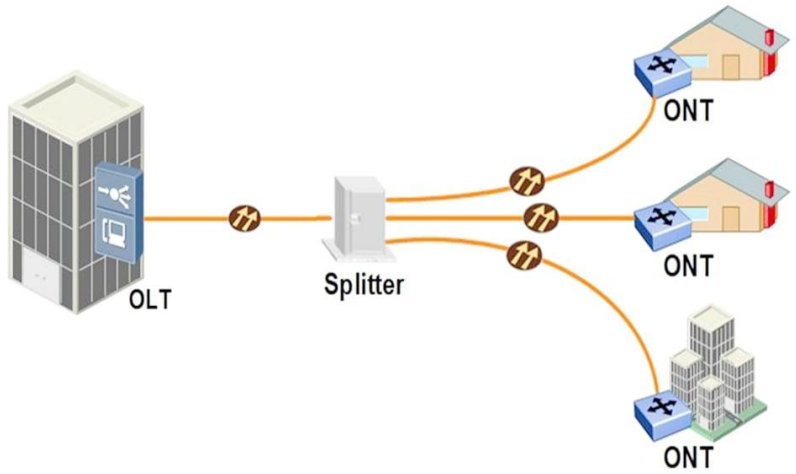
OTHER TECHNOLOGY/ PROTOCOLS USED



PROJECT OVERVIEW AND IMPLEMENTATION

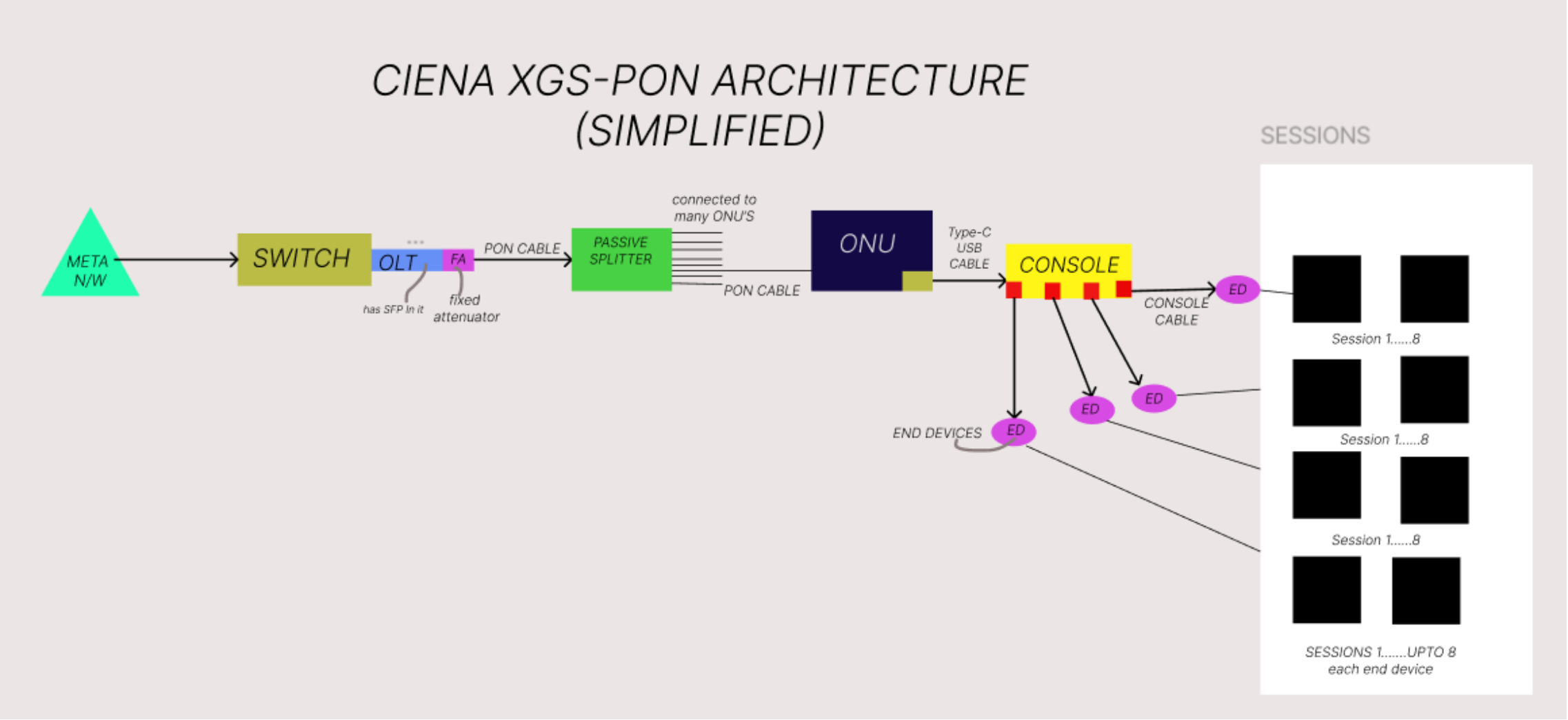
1. UNDERSTANDING PON AND XGSPON BASICS

- **Passive Optical Network (PON)** is a fiber-optic technology where a single fiber from an Optical Line Terminal (OLT) in the central office is split passively to connect multiple Optical Network Units (ONUs) at user premises to transmit data.
- **XGS-PON** is an advanced PON standard, offering symmetrical 10 Gbps speeds by enhancing both upstream and downstream bandwidth between the OLT and ONUs. It is ideal for meeting the growing demand for high-speed internet in homes, businesses, and enterprise environments.



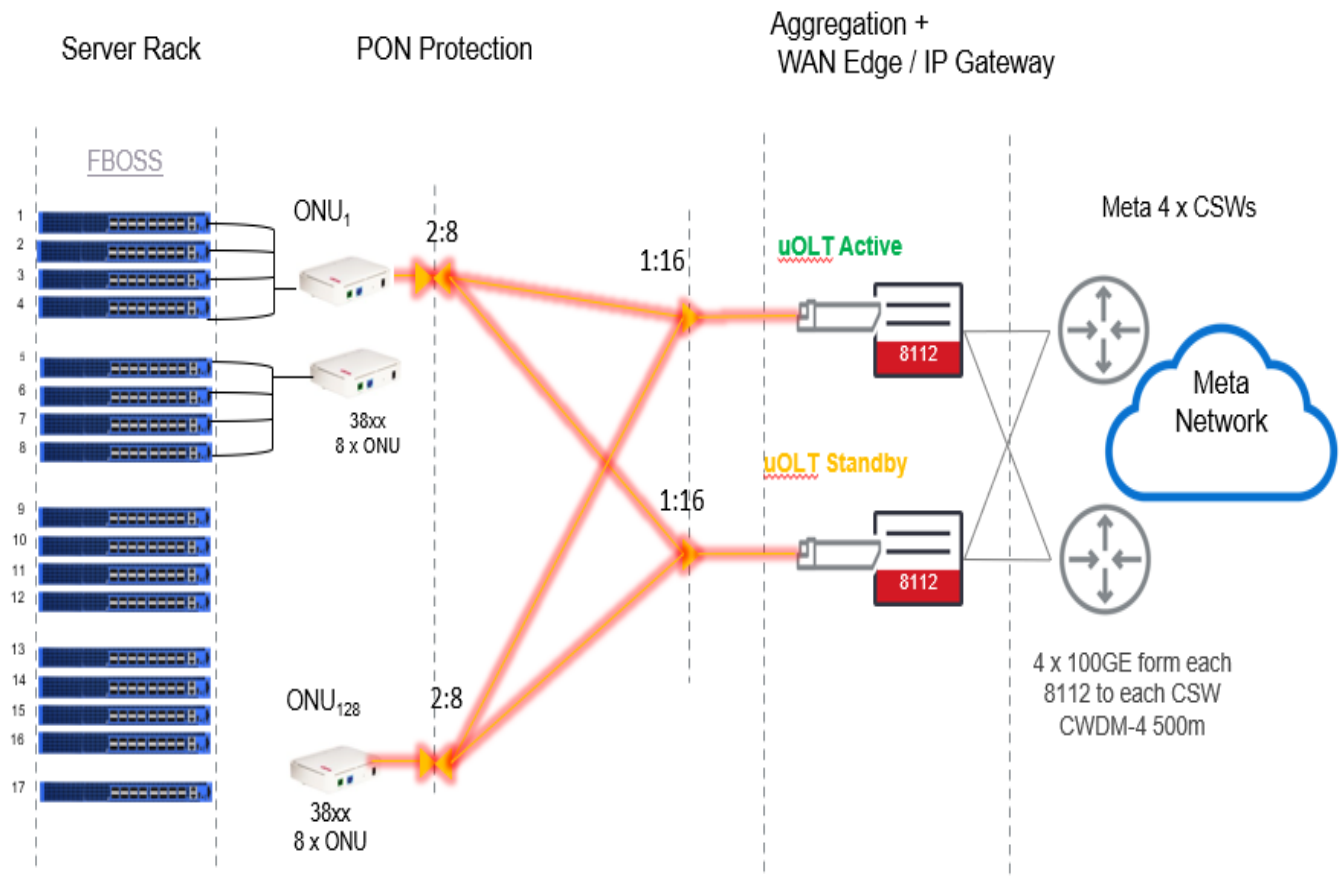
Basic PON diagram

2. CIENA XGSPON ARCHITECTURE

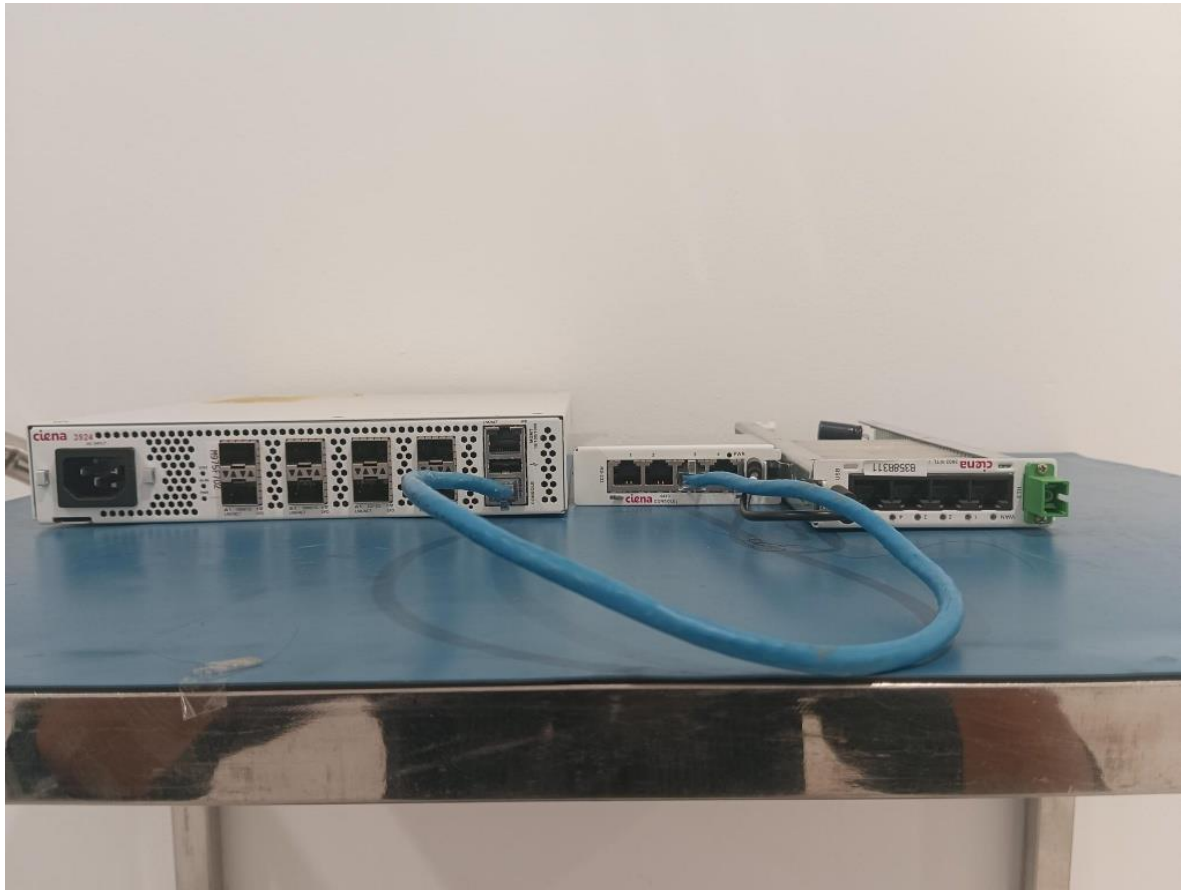


Data Center Management Architecture

With PON Protection

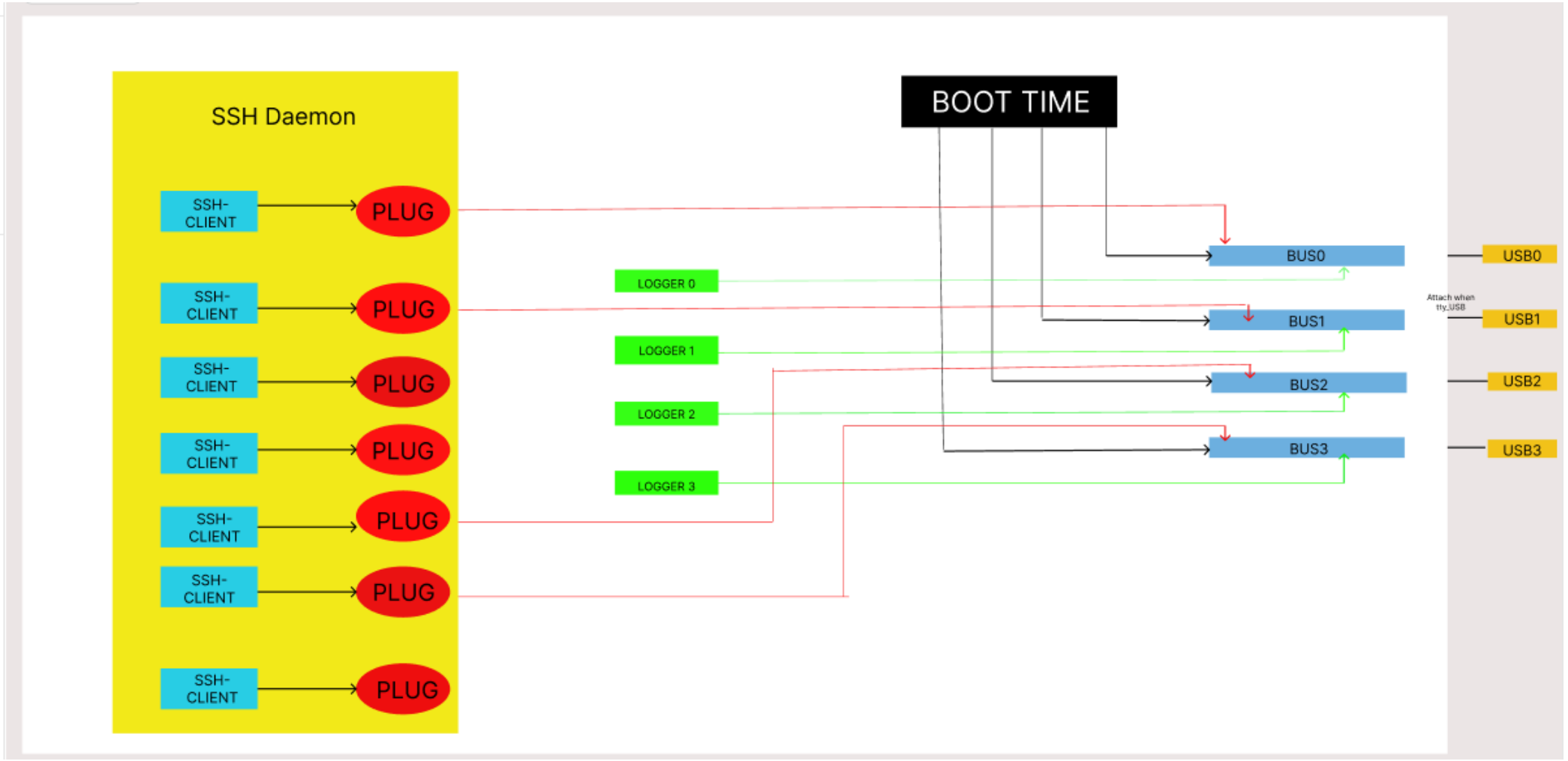


ONU 3803-MTL CONNECTED TO CONSOLE



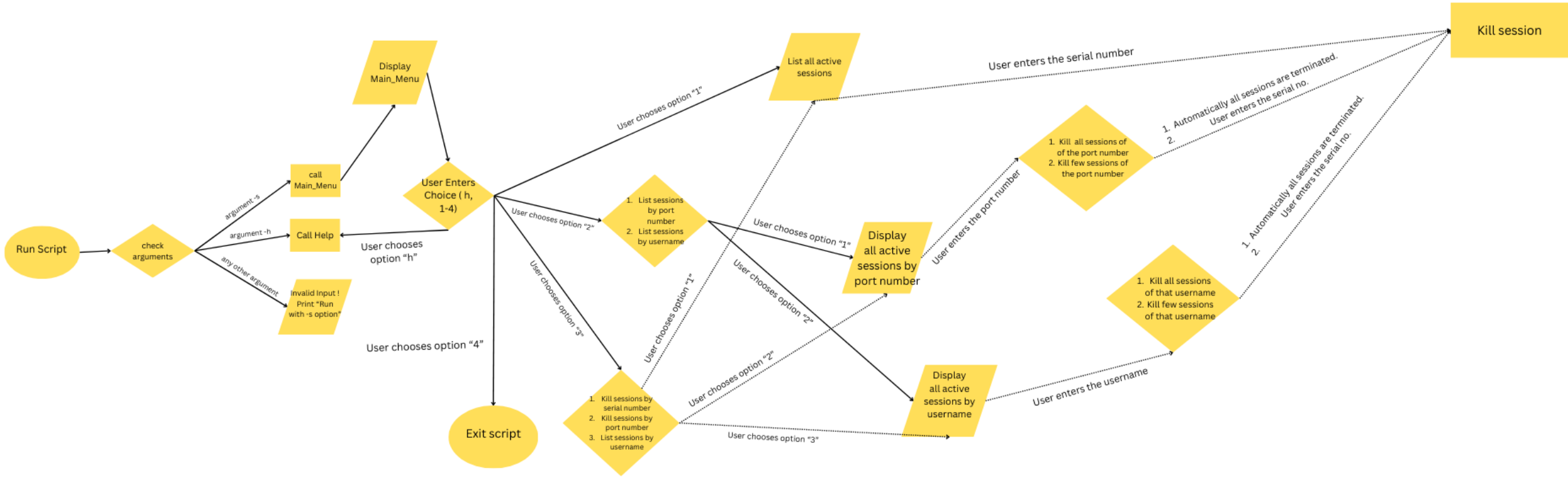
3803-MTL connected to console box through the type-C cable

3. UNDERSTANDING SSH-CONSOLE SERVER



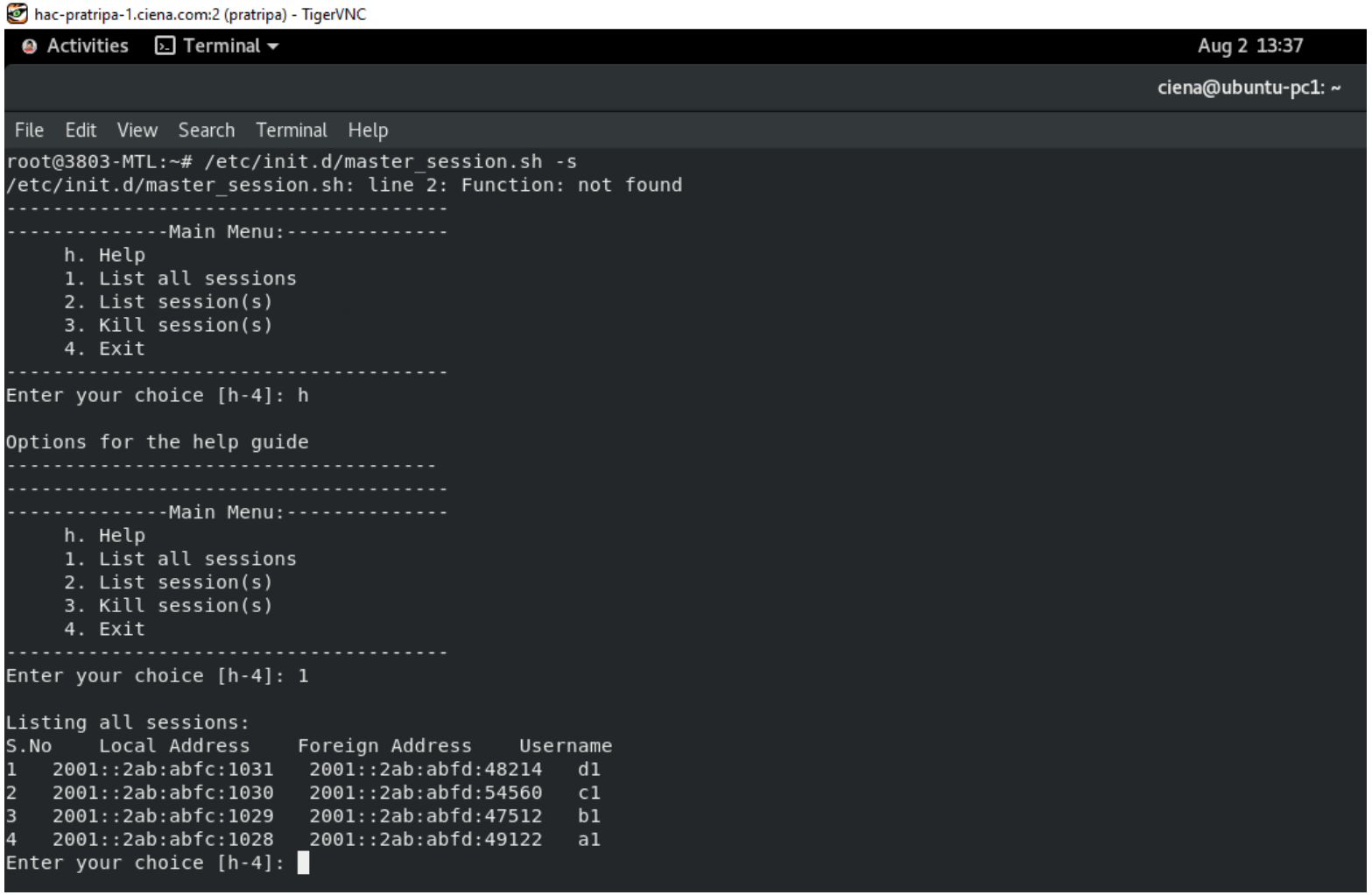
SSH-Console server design

4. DESIGNING THE MASTER SESSION

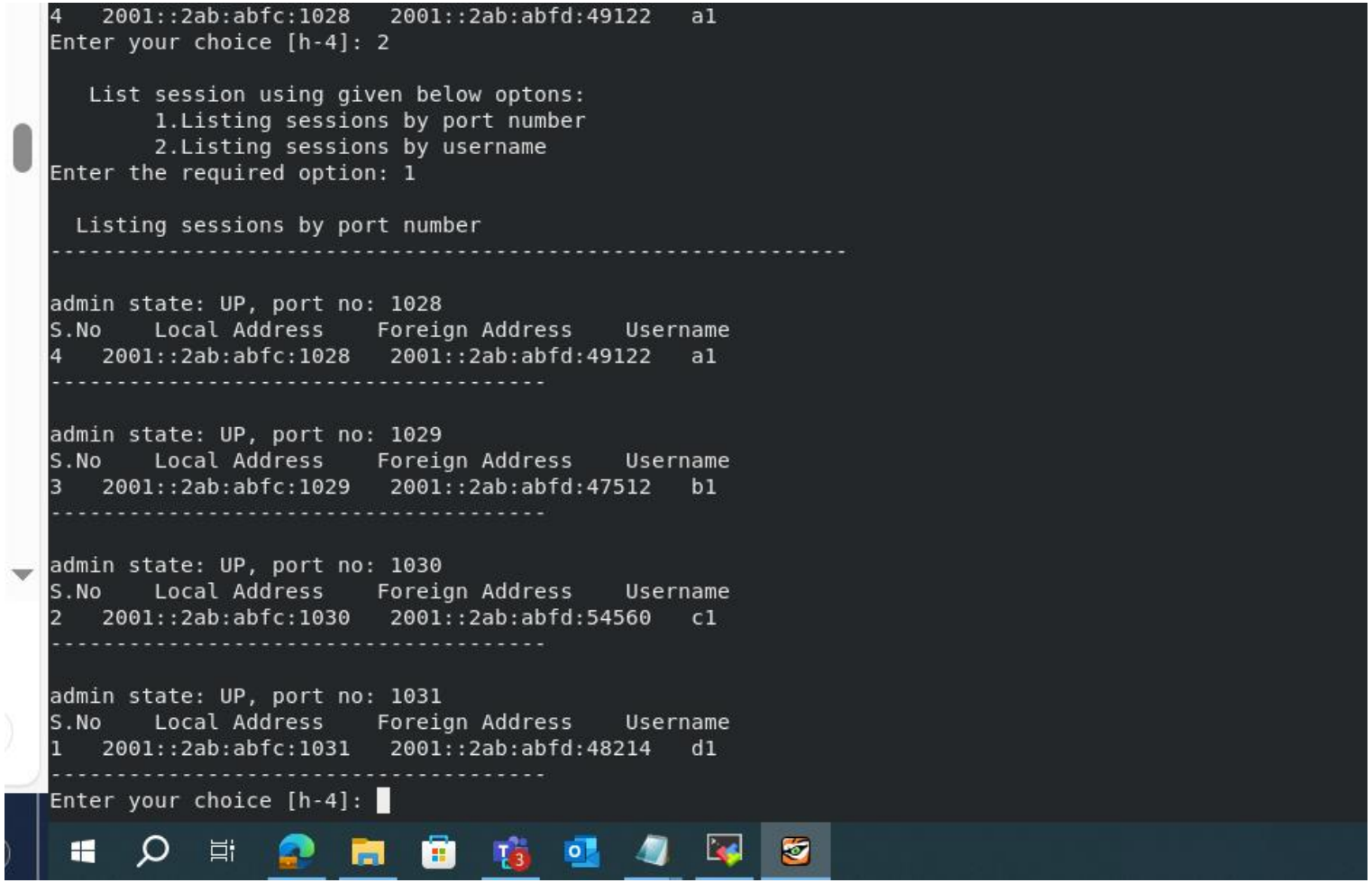


Flowchart of the Master Session script

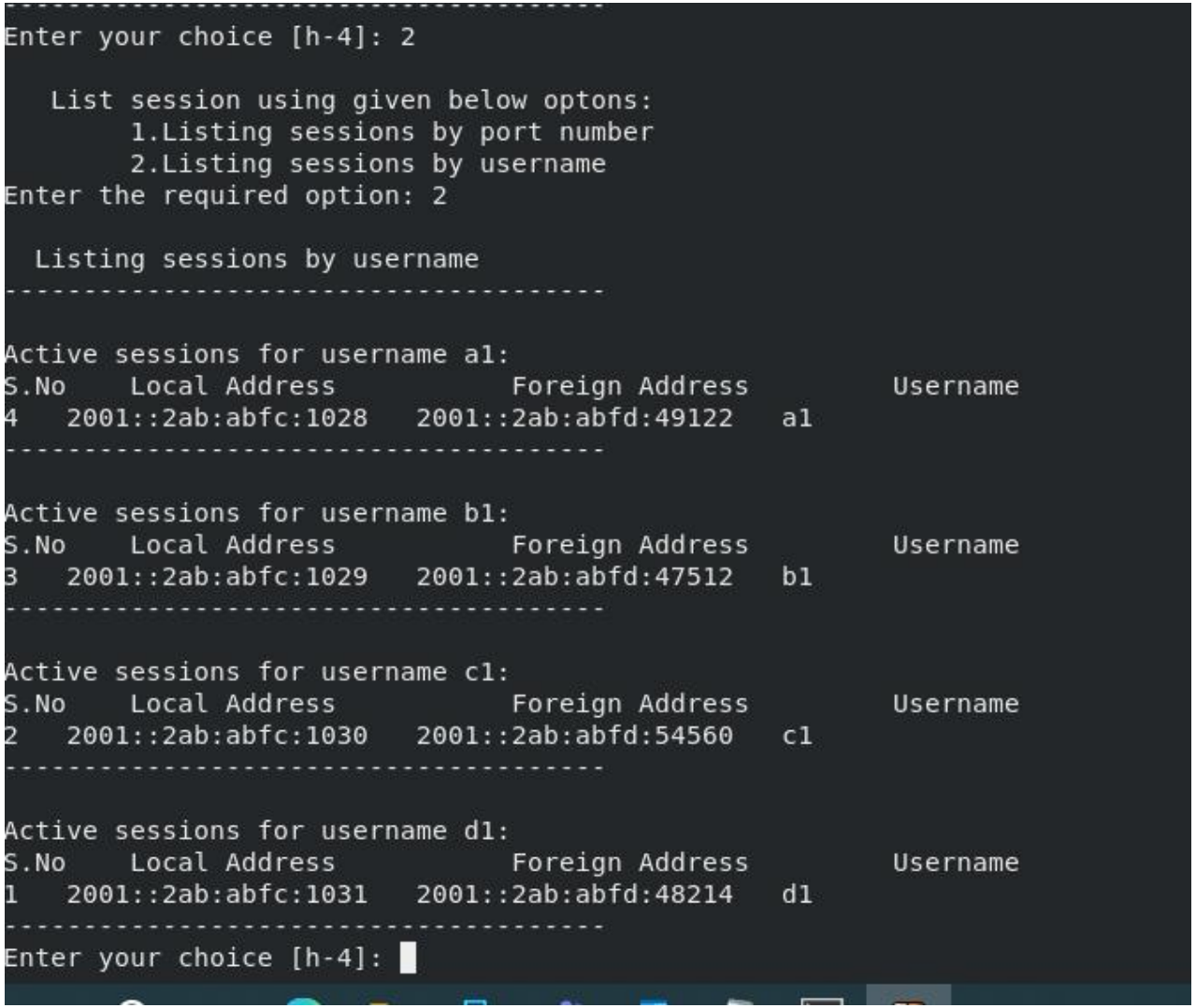
RESULT



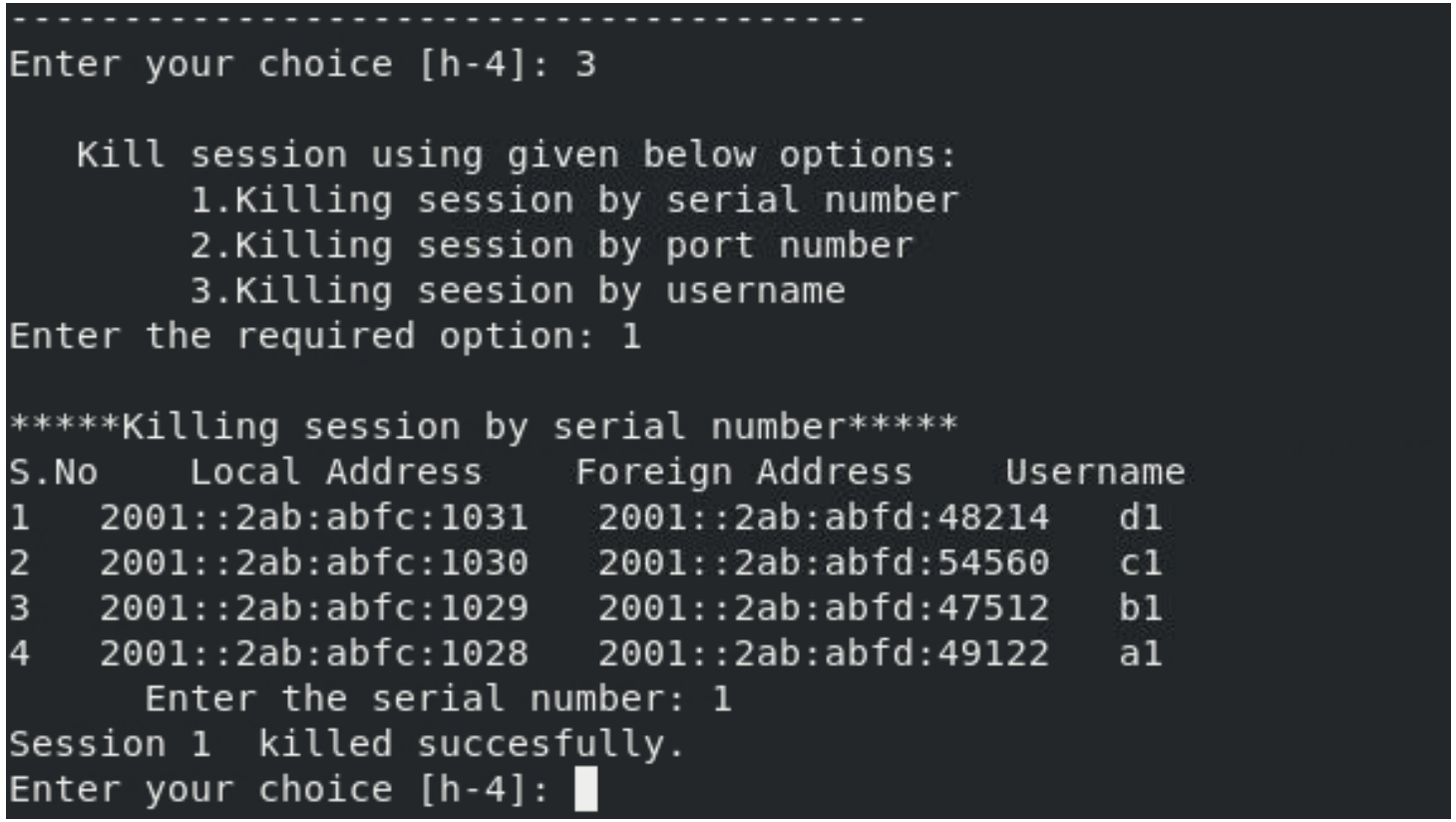
Master Session Output Screen 1



Master Session Output Screen 2



Master Session Output Screen 3



Master Session Output Screen 4

Master Session Output Screen 5

CONCLUSION

- The Master Session project has significantly enhanced the SSH-Console Server, contributing to streamlined and efficient network management.
- By automating session listing, monitoring, and control, the script has reduced administrative overhead and improved the reliability of session handling.

THANK YOU!

Actual deployment of the ONU’S in Meta’s personal data centre