

Software Defined Distributed Access Architecture

Sudhanshu Naithani, MSc. student

Distributed Cable Access Architecture

- Cable networks are migrating from centralized to distributed architecture to reduce operational and capital expenditure, support higher data rates, and improve network efficiency [2].
- DAA has different variants including Remote physical layer architecture (**R-PHY**), which moves the modulation and demodulation to the fiber node and Remote MAC-PHY (**R-MACPHY**), which relocates both the PHY layer and processing MAC layer to the node [3].
- DAA migration should overcome various challenges including interoperability issues and realizing a flexible configuration and management framework for the distributed devices.

Software-Defined Networking (SDN)

- SDN** is an evolving **networking** paradigm that separate control and data planes.
- The control plane is implemented as **software** applications in a logically centralized node using high-level languages [1].
- The centralized control enables network operators to optimally manage the entire network.
- SDN is considered a candidate technology to overcome the challenges of DAA.

Research Focus

- Designing an optimized SDN-based DAA that supports both QoS and failure management [4].
- Quality of Service is responsible for differentiating between different classes of traffic.
- Failure management is essential to accommodate possible failures in network components.
- Integrate the developed solutions in real cable networks.

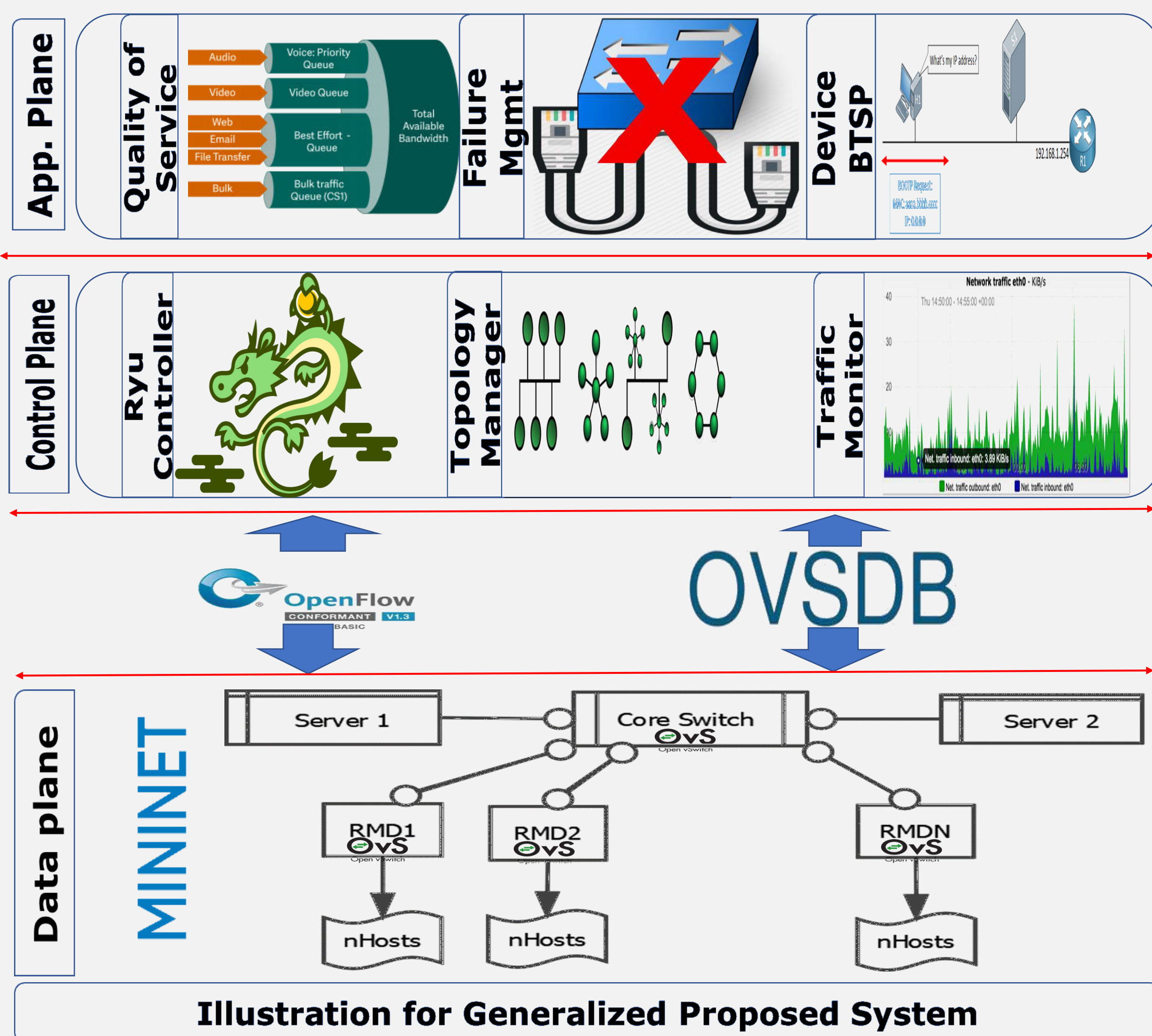
Research Plan

We plan to use various research techniques to realize the project objectives:-

- Analytic methods would be used to design optimized traffic routing that adheres to QoS and failure management goals.
- Simulated testbed will be used to develop, implement and test different network topologies and configurations.
- Implementing an experimental prototype that integrates real core and remote devices to tackle issues related to network bootstrapping and configuration.

Project Progress

- Literature review on SDN, DAA and failure management in SDN based networks.
- Initial implementation for simulator.
- QOS and link emulation.



Results

For results link configuration has been achieved w.r.t delay, bandwidth and priority for loop free topologies. A demo video can be found at <https://tinyurl.com/y46pp4jx> Or scan QR code



References

- [1] Software-Defined Networking Using OpenFlow: Protocols, Applications and Architectural Design Choices. Braun, W., & Menth, M. (2014). Future Internet, 6(2), 302-336. [<https://tinyurl.com/p3s6hu5e>]
- [2] Evolution to Distributed Access Architectures (DAA). [<https://tinyurl.com/csnndy4t>]
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- [4] A Tutorial on Machine Learning for Failure Management in Optical Networks. Musumeci, F., Rottondi, C., Corani, G., Shahkarami, S., Cugini, F., & Tornatore, M. (2019). Journal of Lightwave Technology, 37(16), 4125-4139. [<https://tinyurl.com/9w4kcmdt>]

Supervisors

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