Orchestration and monitoring of SURFnet photonic test network

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Project Objectives

The objective of the project is the orchestration and monitoring of the Optical nodes such that 3 scenarios are demonstrated:

1)Optical pre-emption of waves.

2)Wavelength Switched Optical Network: monitoring and restoration

3) Alien Wave services; Creation, modification and deletion.

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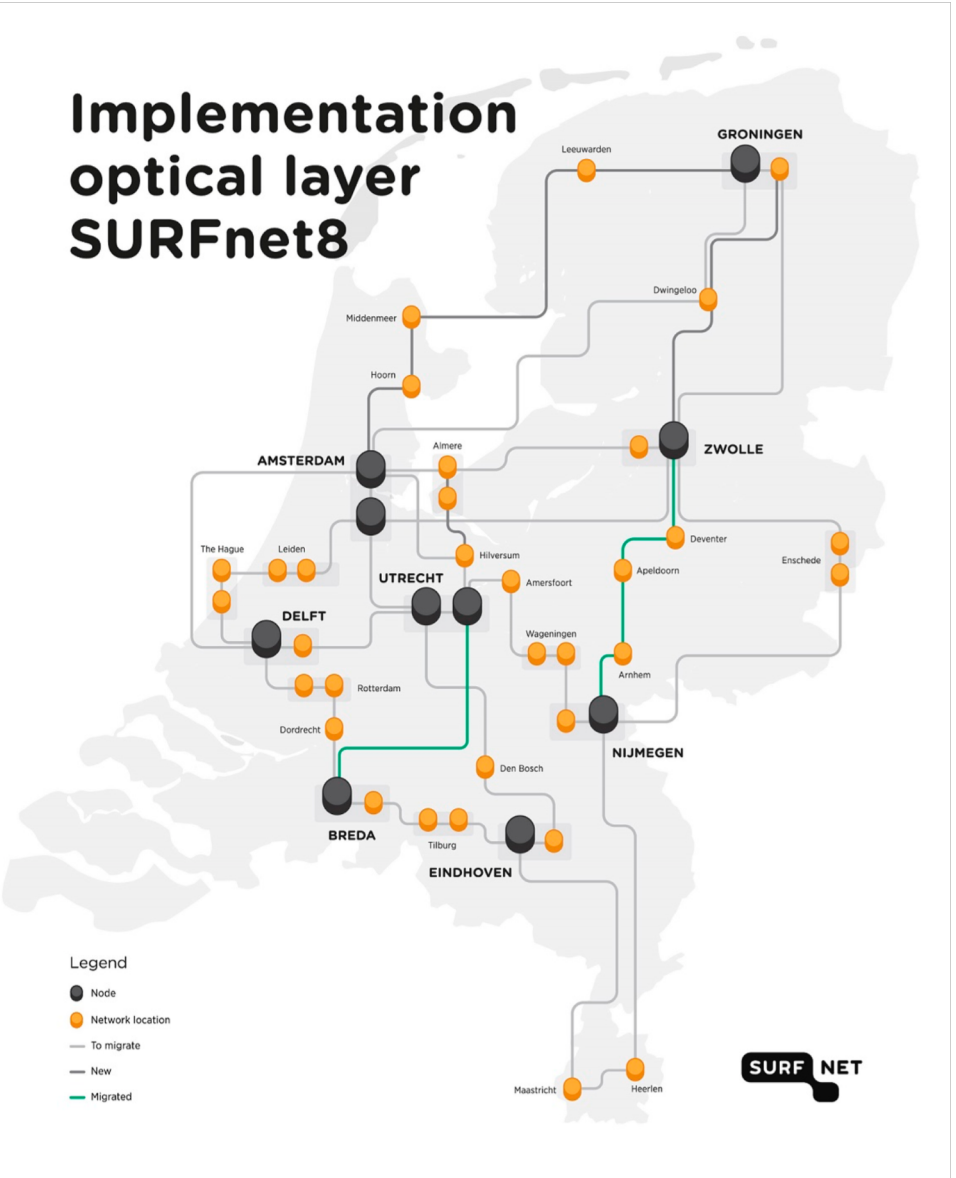
SURF NET

Implementation optical layer SURFnet8



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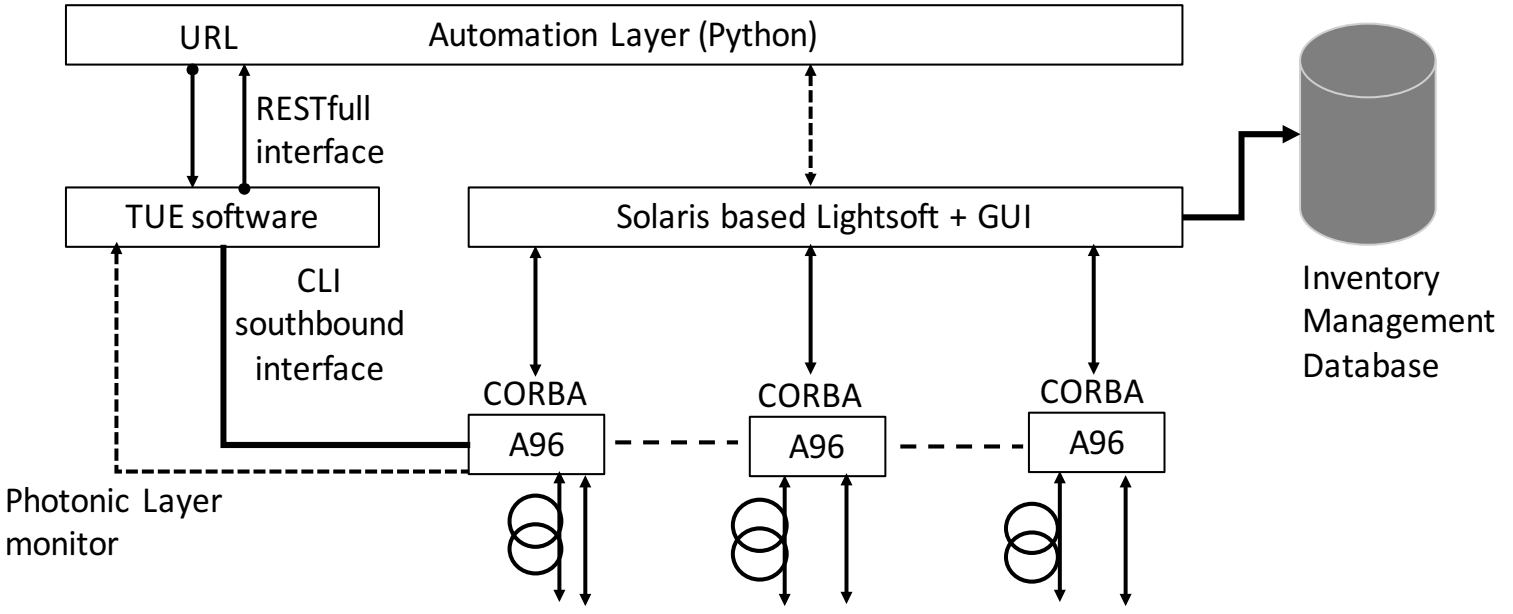
Software Architecture



Building the Test Environment

Hardware Implementation

- Building the node
- Fibers to SURFnet
- Fibers from SURFnet to Lab
- Creating safe access

Software Implementation

- Exploring functionality
- Establishing control
- Create 100G clients
- Testing and Demonstration

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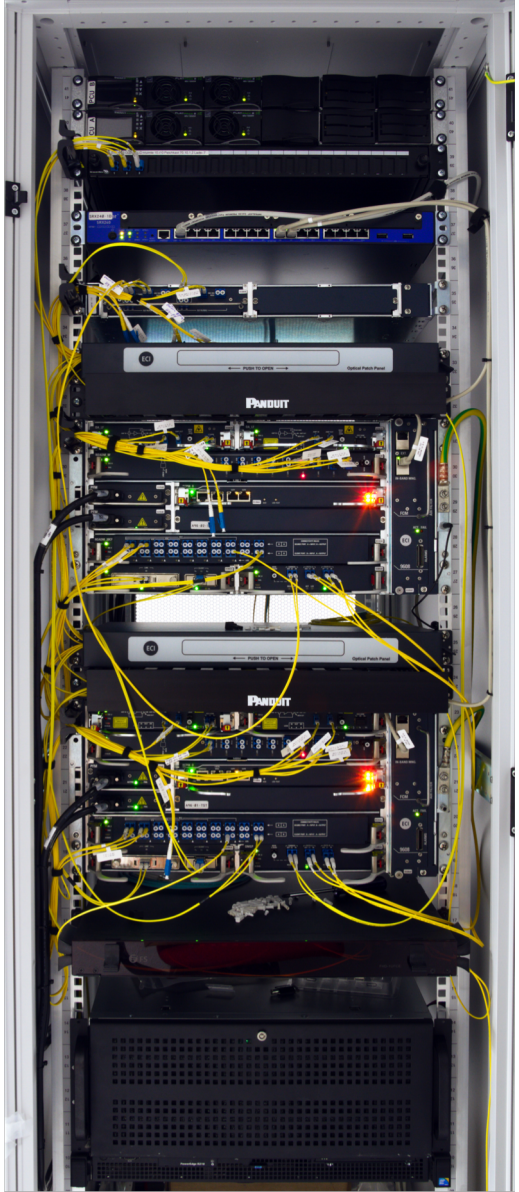
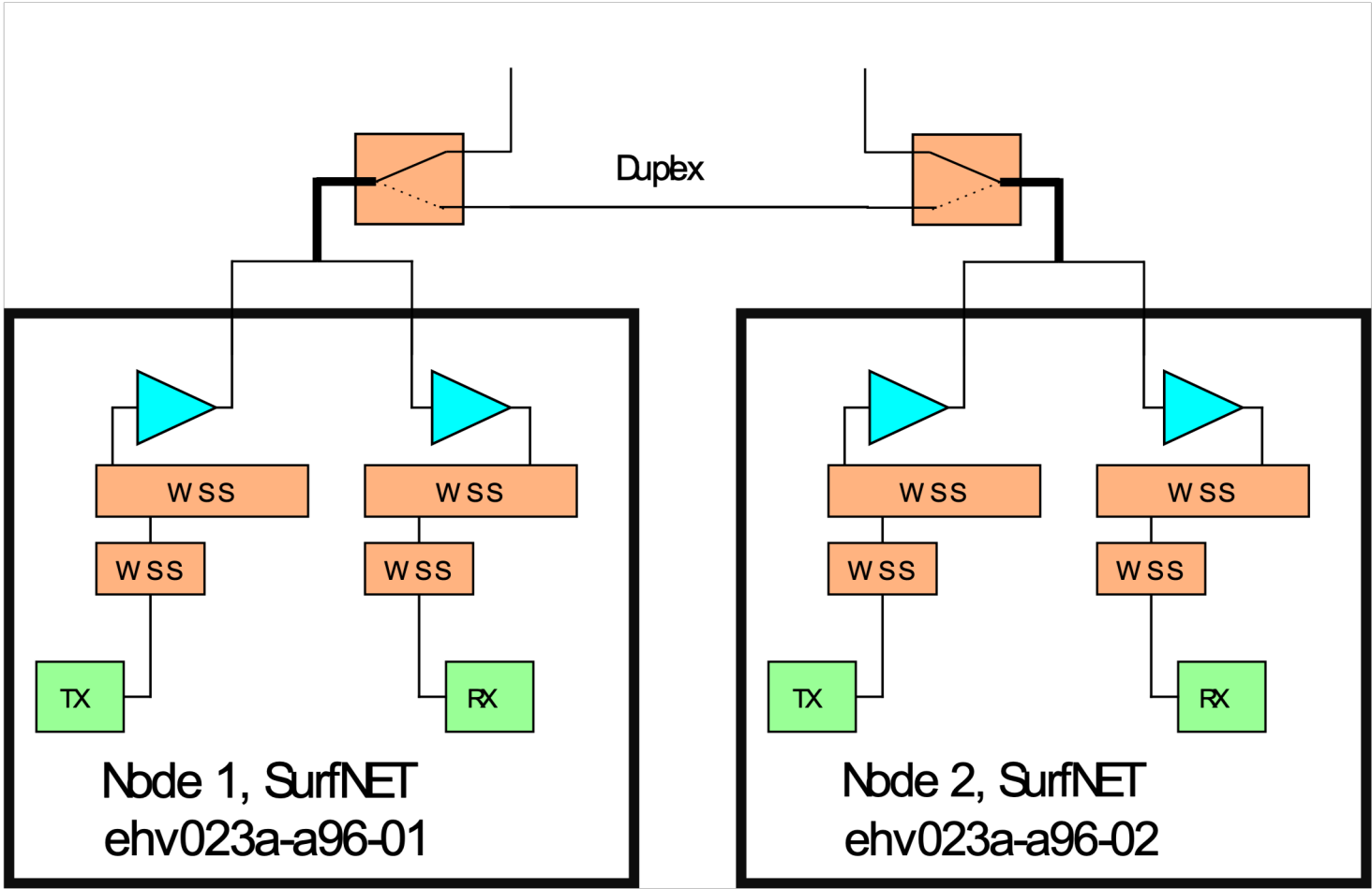
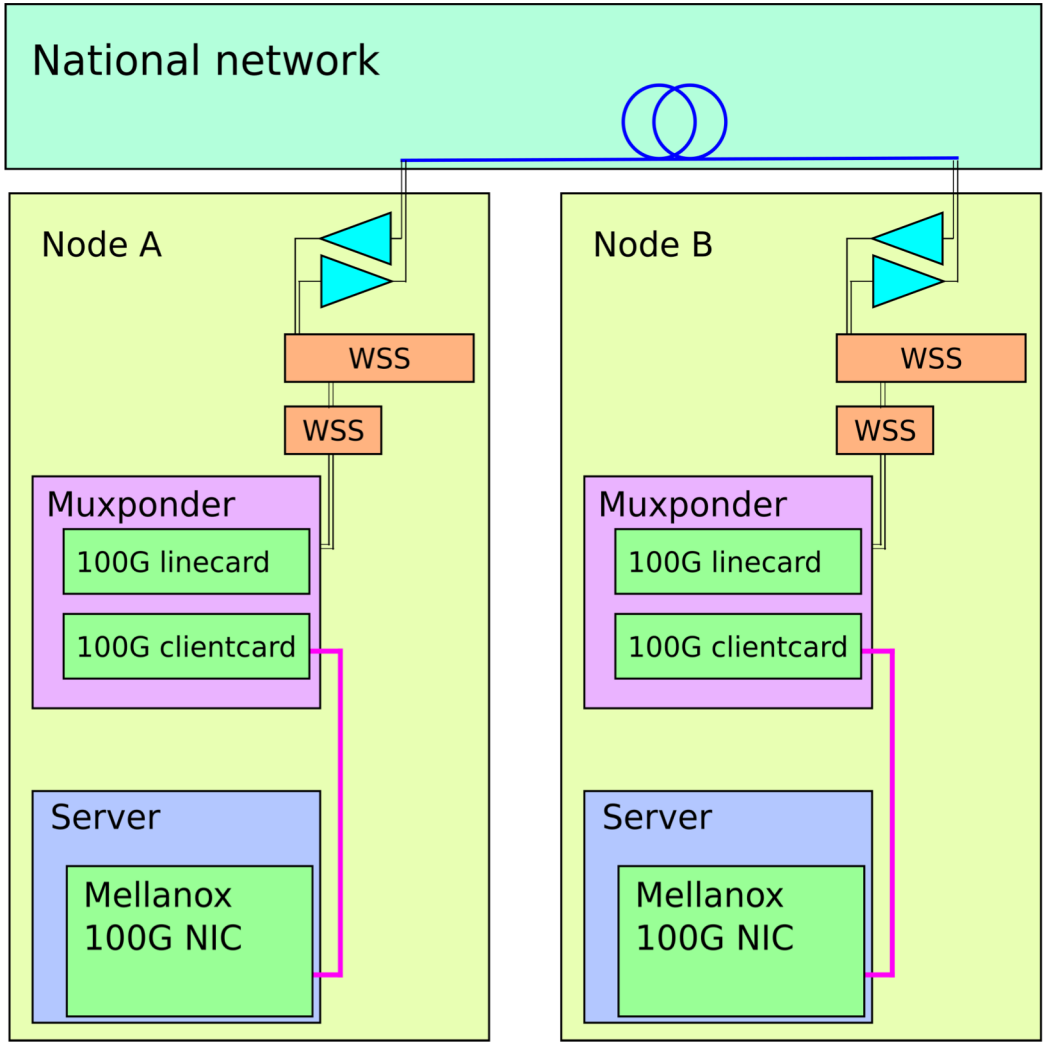
SURF NET



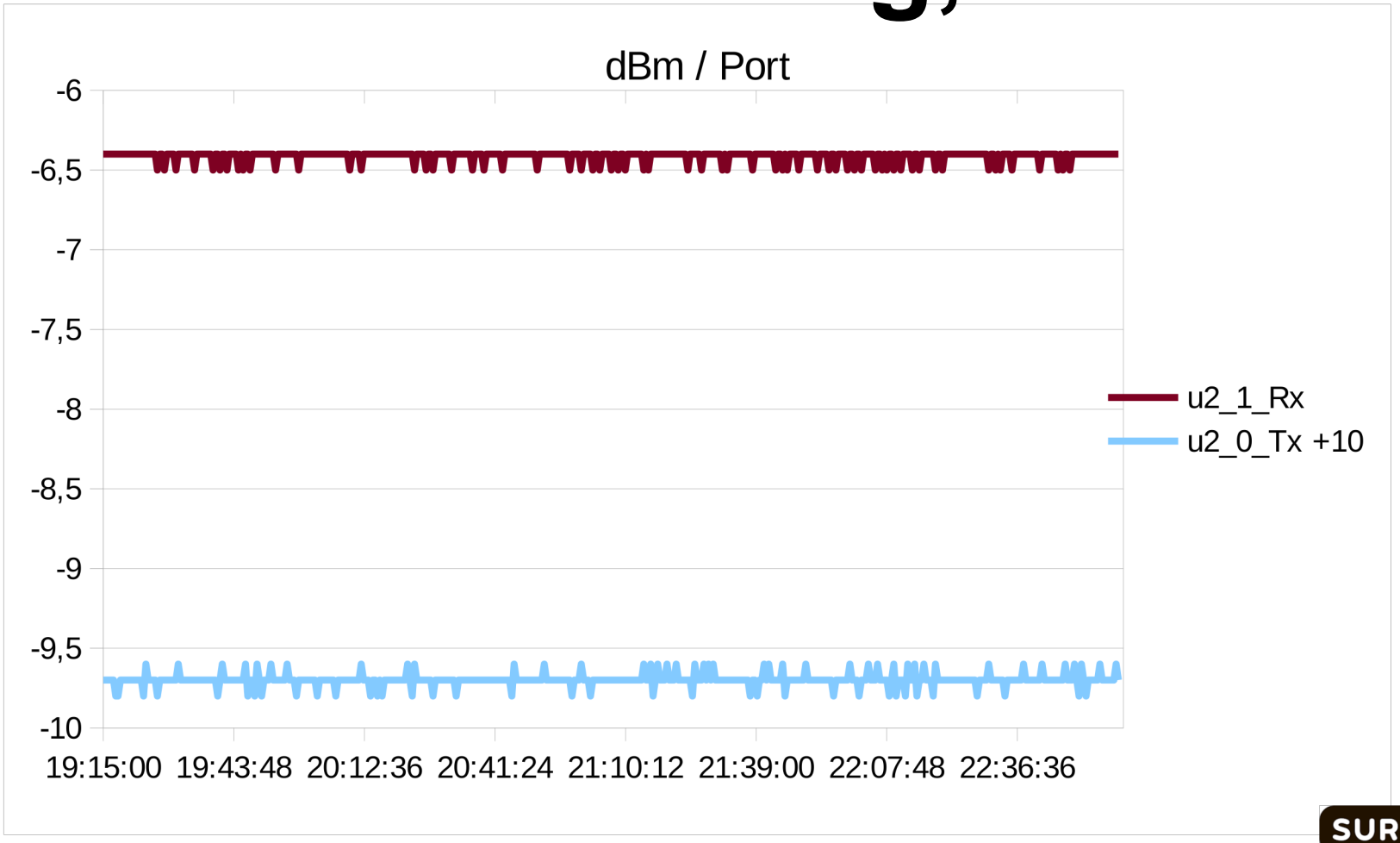
Node Setup


Duplex
WSS
WSS
WSS
WSS
TX
RX
Node 1, SurfNET
ehv023a-a96-01
WSS
WSS
WSS
WSS
TX
RX
Node 2, SurfNET
ehv023a-a96-02

Testbed Components



Power Monitoring, static



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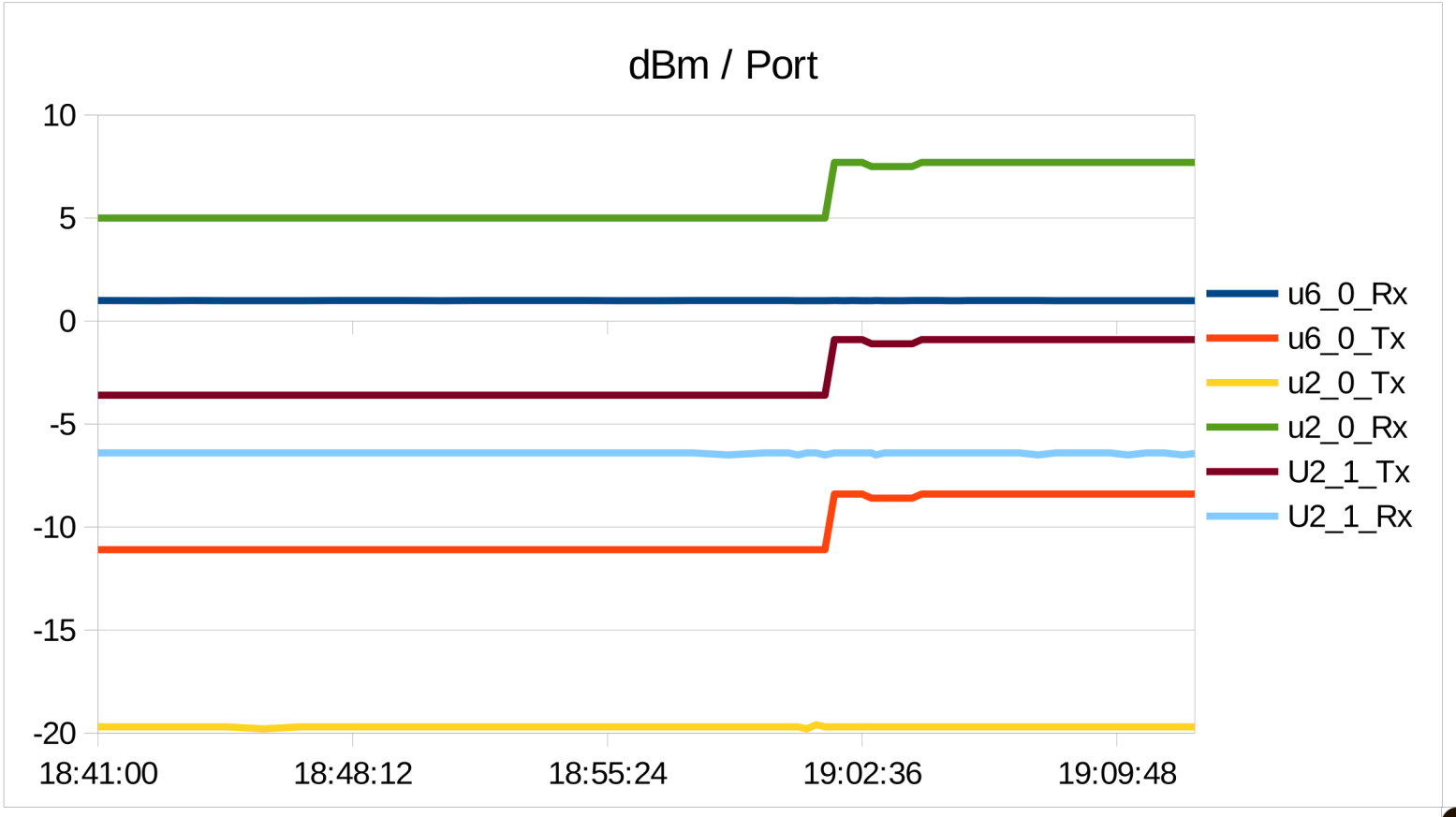
Power Monitoring, event



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SURF NET

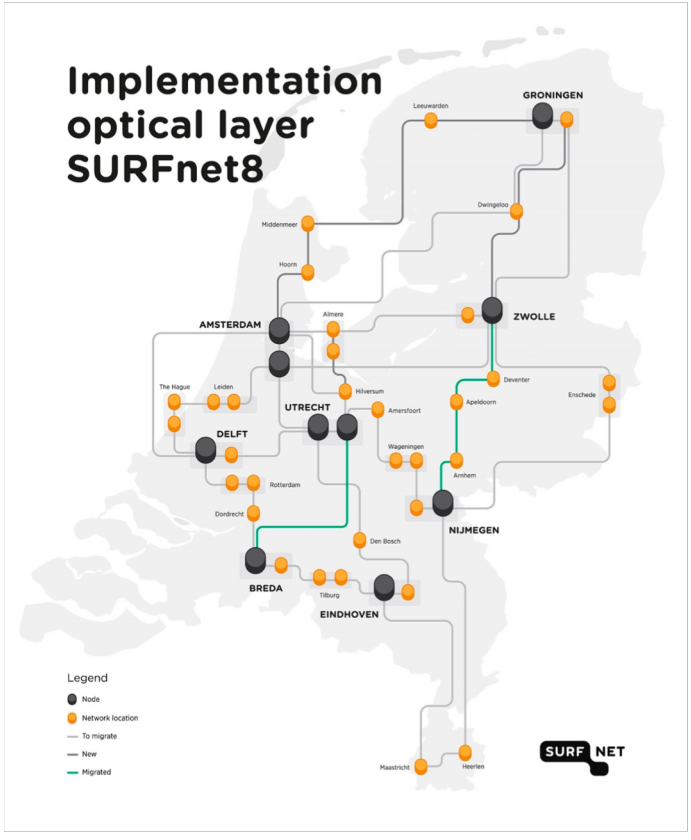
Demo

Achievements

- Full End-to-End control and measurement
- Full wave control, Pre-emption & Alien-waves
- Extensive Wavelength Switched Optical Network (WSON) monitoring
- Full node control Southbound interfaces via CLI
- Northbound RESTfull interface
- Control 100Gbps Client Interfaces

Future research for TU/e in RoN

- Multi-node orchestration
- Re-route link after multi-node breakage →distributed mesh network pathfinding
- Fiber/path characterisation → Using Full DSP capabilities or AWGN
- Recirculated transmission of emerging modulation formats over specific parts of the network



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