SAACC 2019: REUNA in the Sky

REUNA continues to grow

New optical network:

- 850Km
- 11 optical nodes
- 100G capability

Launch event:

- 16-04-2019

Only 400 km to Pto Montt
and then FOA

The dream: get to Antartic

First steps are important

- Status:
  - The 100Gbps network is operational
  - Sep'15 REUNA acquired 2 filaments of fiber.
  - Fibers delivered to REUNA on May '17
  - 2016 a REUNA did the 100G DWDM equipment tender process
  - 2017 the equipment were installed
- The network has a potential capacity of 80 DWDM channels.
- 4 x 100G channels are being used
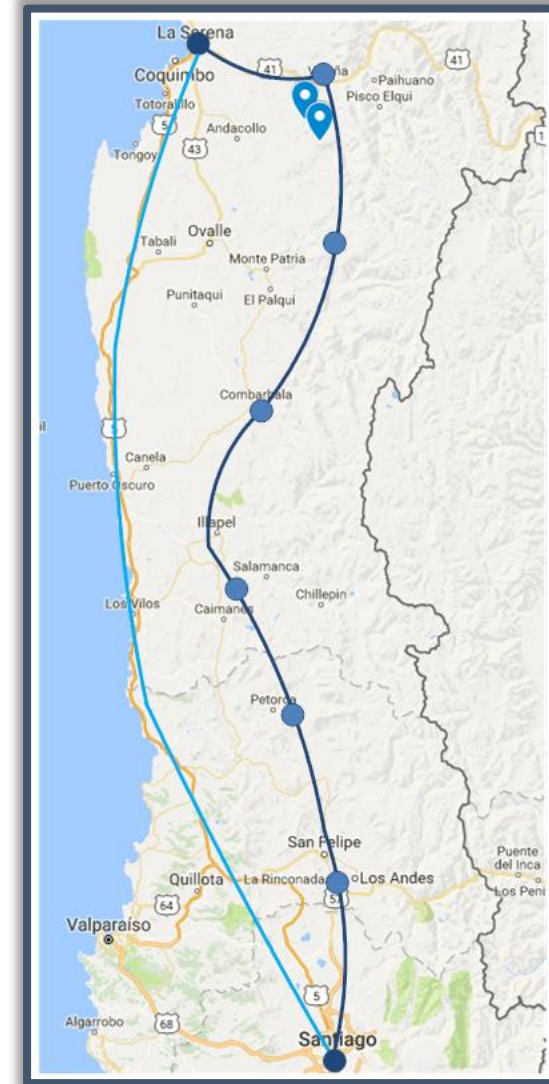
This is how we look now

Segment	Technology	Capacity
Arica-Antofagasta	Leased capacity	2Gbps to 1Gbps
Antofagasta – Santiago	DWDM over a optical lambda	10 Gbps
La Serena - Santiago	Fiber plus DWDM technology and Leased capacity	100 Gbps and 2x10 Gbps
Santiago - Valparaíso	Leased capacity	1 Gbps
Santiago – Temuco	Fiber plus DWDM technology and Leased capacity	100 Gbps and 10 Gbps
Temuco – Puerto Montt	Leased capacity	2 Gbps to 1 Gbps
Santiago - Osorno	Backup by Argentina, Leased capacity	2 Gbps

REUNA's network key elements

- + 8.470 km of total length from north to south
- + 1.500 Km at 100Gbps capacity
- High availability: primary links and backup links
- More tan 20 years of network engineer and network operation
- The design and deployment of the network is done under strictly REUNA's network engineer supervision and control
- REUNA manage the network equipment of the backbone, DWDM and IP technology
- REUNA's NOC in a 24x7 modality

What's next?

Extension La Serena - Antofagasta

- Status:
  - A Tender process is in progress
  - A 100Gbps solution based on optical cannel spectrum is being analyzed
  - The plan is to have this infrastructure in operation at 2020

- We are working with our partners institutions to explore synergies, some of them are ESO, ALMA.

The backbone, 2019-2020

100Gbps	10Gbps over dark fiber	10Gbps	1Gbps	< 1Gbps	FOA Gob. Project
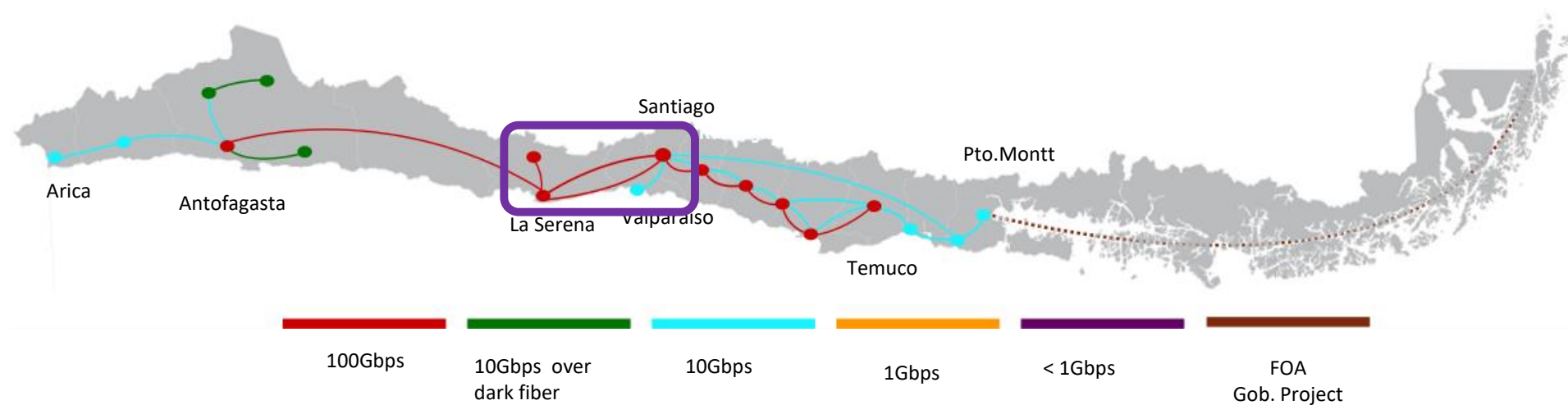
Segment	Technology	Capacity
Arica-Antofagasta	Leased capacity	10 Gbps
Antofagasta – La Serena	Optical Spectrum channels plus DWDM technology	100 Gbps
La Serena - Santiago	Fiber plus DWDM technology and Leased capacity	100 Gbps and 2x10 Gbps
Santiago - Valparaíso	Leased capacity	10 Gbps
Santiago – Temuco	Fiber plus DWDM technology and Leased capacity	100 Gbps and 10 Gbps
Temuco – Puerto Montt	Leased capacity	10 Gbps
Santiago - Osorno	Backup by Argentina, Leased capacity	10Gbps expected

adding protection in La Serena

Current implementation
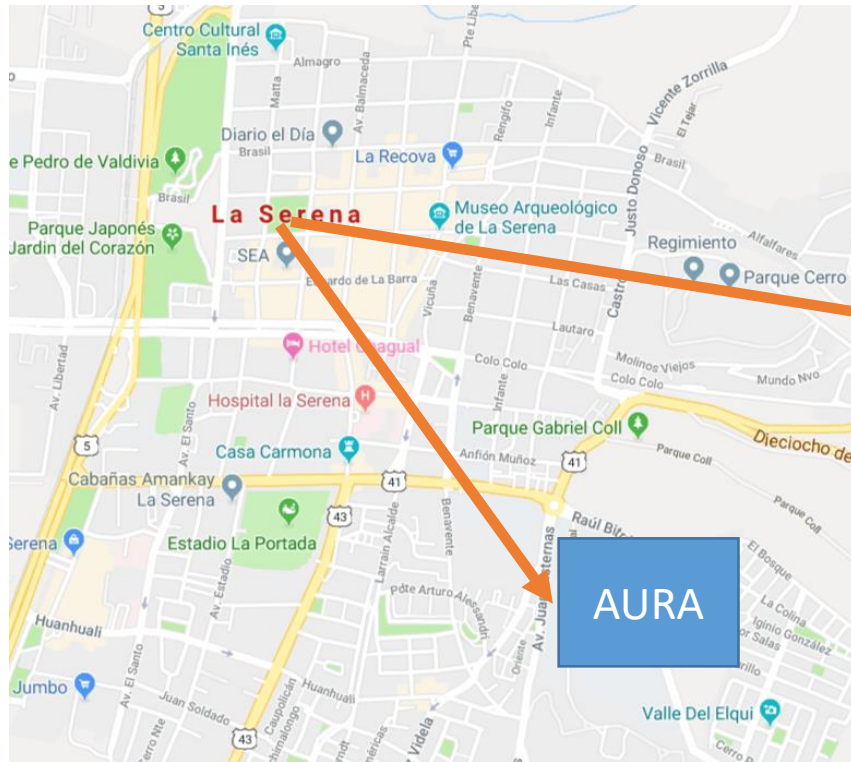
Add new DWDM in La Serena

Traffic protected:

- 100G LSST Primary link
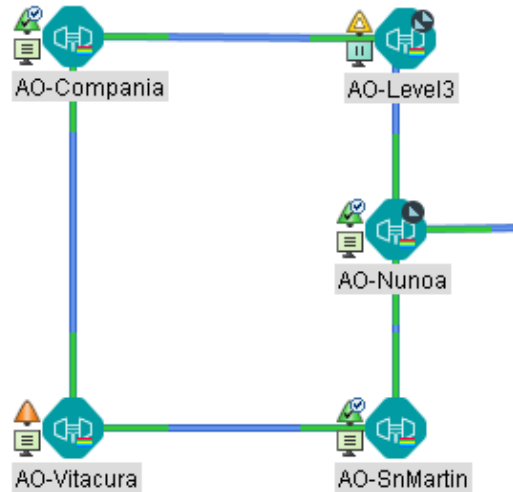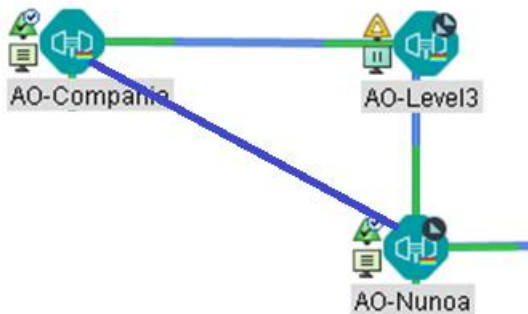- 40G LSST Backup
- 40G AURA Primary

Next step

Changes in metropolitan ring

Current
Implementation

2020

- Current ring has 5 nodes
- Will be reduce to 3 nodes
- Implementation of WSS on all nodes
- Impact
 - Less last miles links dependency
  - Auto power tune

Other initiatives

- Setup a backup connectivity scenario in synergy with several institutions

- Complete missing links for this connectivity scenario

  - Microwave radio links between:

    - CTIO-LSO

    - LCO-LSO

- Coordinate the utilization of the existing infrastructure with the actors:

  - CTIO – La Serena links (technical feasibility done)

  - LCO – CTIO links (pending to review)
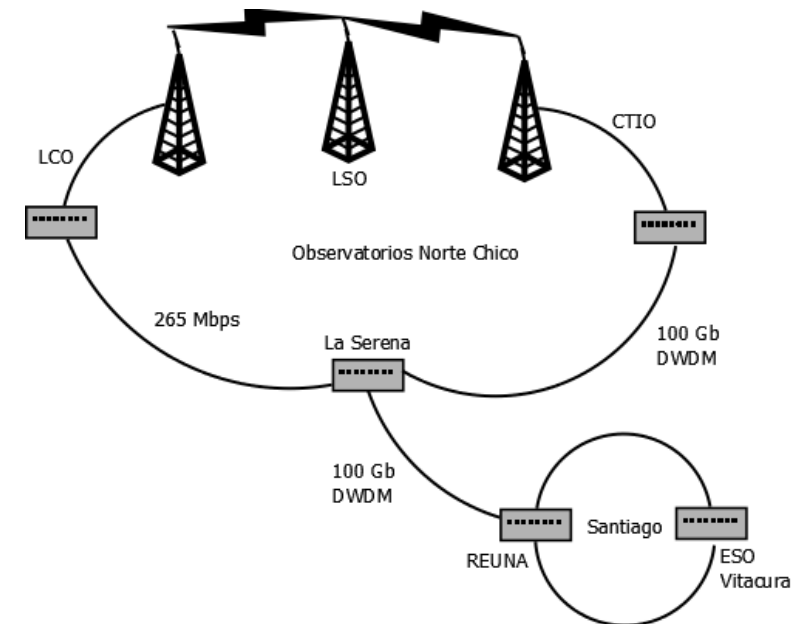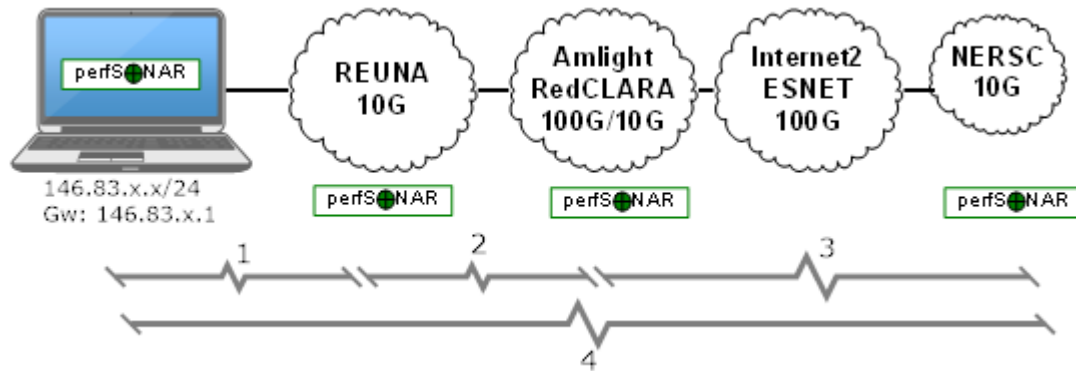
Simulating a PoP at AOS: Simons test
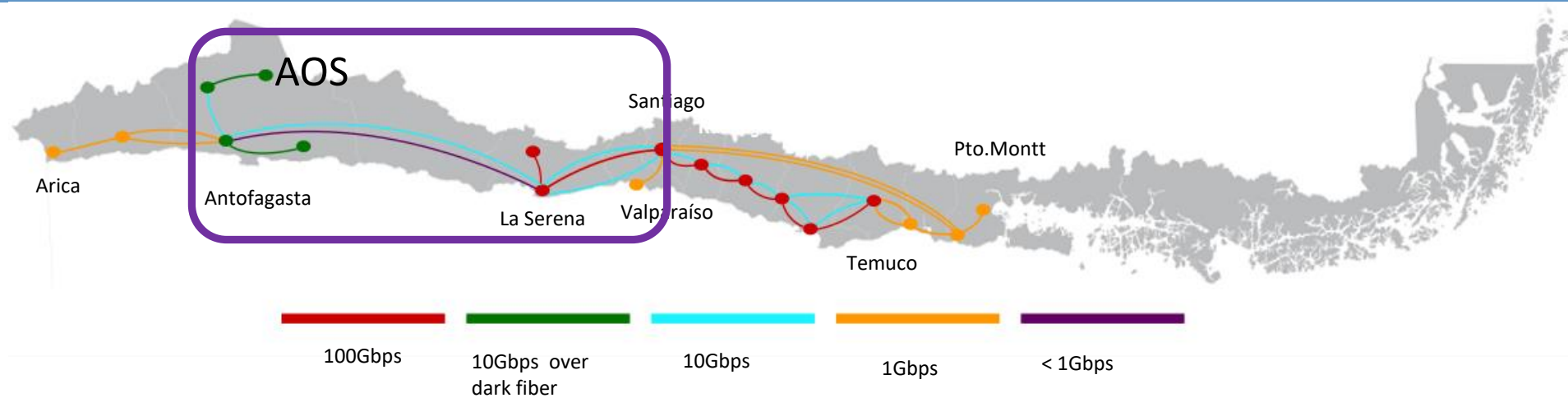
Network infrastructure

- AOS – Calama: Fiber, transporting 1x10Gbps today
- Calama – Antofagasta: 10Gbps
- Antofagasta-La Serena: 10Gbps
- La Serena – Santiago: 2x10Gbps*

Use of the 10G Antofagasta – Santiago:
    2G ESO, 4G REUNA & RedCLARA, 2G ALMA

Test results

SOURCE	DESTINATION	THROUGHPUT	LATENCY (MS)	LOSS
perfsonar.reuna.cl 146.83.188.9 Details | Traceroute ⬈	146.83.182.3	→ 941 Mbps ← 936 Mbps	→ 24.5 (rtt) ← n/a	→ n/a ← n/a
perfsonar.reuna.cl 146.83.188.9 Details | Traceroute ⬈	200.0.207.49	→ 395 Mbps ← 299 Mbps	→ 107 (rtt) ← n/a	→ n/a ← n/a
146.83.182.3 Details | Traceroute ⬈	perfsonar.nersc.gov 128.55.199.18	→ 185 Mbps ← 92.9 Mbps	→ n/a ← n/a	→ n/a ← n/a
146.83.182.3 Details | Traceroute ⬈	wash-pt1.es.net 198.124.238.34	→ 296 Mbps ← 311 Mbps	→ n/a ← n/a	→ n/a ← n/a