

Title: Astronomy & Big Data Science located in Chile at speed of light

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Five Keywords: NREN, Astronomy, DWDM, high speed network, international connectivity.

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Presenter's biography: Sandra Jaque, REUNA's CTO, Civil Electrical Engineer from University of Concepcion-Chile. She has been involved in the technological development of the research networks for more than 20 years, participating as network engineer at the beginning and nowadays in the strategic definition of the institution. She has participated in network infrastructure projects in Chile and also in international initiatives as EVALSO, LSST, RedCLARA, Amlight etc.

Presentation description

In recent years, REUNA has been accelerating the development of a high speed network for research and education in Chile with a national vision and also an international scope. The strategy is based on a "building infrastructure" model, rather than on a model of leased capacity; that permits control and flexibility to set up services whatever they are needed by the research community. This technology approach is widely motivated by the Astronomical Centres already in operation (or planned) in Chile. In this strategy, the deployment of the first nx100G DWDM long haul segment – 700Km - from La Serena to Santiago has been finished and will start operational status in 1Q2'18. The system was established over an owned pair of dark fibers together with a coherent flexigrad scalable optical solution, fully managed by REUNA. The system has a potential capacity of 20Tbps, and in the beginning 100G or 200Gbps channels will be used. The same technology was extended from the LSST/AURA summit to La Serena – an 80kms path. The use of this combination has a tremendous benefit not only in terms of an ultra-capacity backbone, but also in process optimization. This is the case for the LSST, who chose to light not only the 2x100G that were the original design, but 6x100G, facilitating the solution for the data transfer from the summit to the local Data Center located in La Serena. In the beginning, one of these 100G optical channels is being extended from Chile to reach the data repository of the LSST at the National Center for Supercomputing Applications (NCSA) in Champaign, Illinois. This extension is being implemented in collaboration with the Latin American NRENs together with the BELLA and Amlight projects.

On the same "building infrastructure" model, during 2018 another 800Km of fiber will be lighted with similar technology, to extend the network from Santiago to the south of Chile. One pair of fibers is already a reality, and lambdas of 100G as well as 10G will be set up. The difference is that in the north part of Chile, the main demand is by the observatories, while to the south the leverage is in the density of the research institutions along the way. Also, this scenario is suitable to test new network services for the institutions. One project is to use dedicated spectrum to establish inter-campus network over the backbone; a pilot is being agreed with a University with campuses distributed along 300Km. In this network strategy, it is also important to recognize the recently approved governmental project FOA – Fibra Optica Austral, which is the deployment of a submarine fiber to Puerto Williams, located at over 3.600Km south of Santiago. Connecting the

NREN to this new fiber would create a strategic opportunity to better the conditions of research in one of the southernmost points of the world that could be potentially extended to reach the Antarctic.

Because of internal strategic development and leverage by the BELLA project, in particular BELLA-T (a terrestrial Latin American DWDM backbone over the NRENs fiber or spectrum network) during 2017 a tender process has been initiated to seek for a fiber or spectrum solution to extend the network from La Serena to the north. This process is still ongoing with an optimistic projection, and it is planned to have the final selection during 2018, and to start working on the network design for this path.

In summary, the presentation will describe the status of the network infrastructure in Chile, including detailed information about the La Serena – Santiago path in the operation, how this is extended to the South and the North, to connect the Observatories not only in La Serena but also all along the fiber path, including Antofagasta, Atacama and other locations. Also we will show how this national connectivity is aligned with intercontinental projects. In this scenario, we envision having robust and high-capacity networks by 2020.