UTFSM/CCTVal Data Center and LHCONE in Chile

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Outline

- Chilean participation in LHC
- UTFSM and CCTVal
- Research projects
- Data center brief history
- REUNA, RedCLARA
- Chilean LHCONE project

Chilean Participation in LHC

- **Chilean researches participate in ATLAS and ALICE experiments**
  - 2007 : ATLAS - PUC (Santiago), UTFSM (Valparaiso)
  - 2011 : ALICE - UTALCA (Talca)

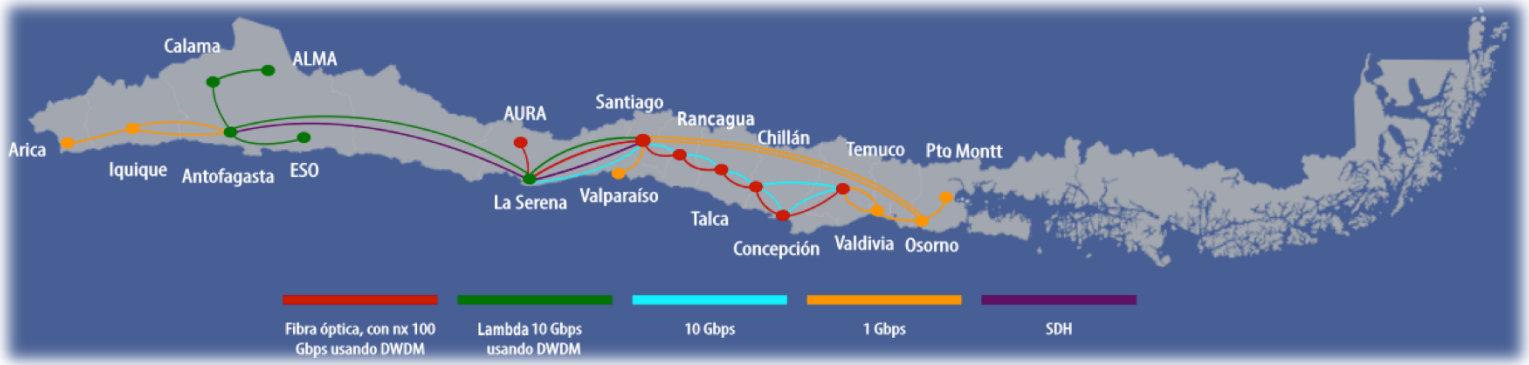
PONTIFICA UNIVERSIDAD CATÓLICA DE CHILE

UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA

TALCA UNIVERSIDAD CHILE

- **Grid sites in Chile**
  - EELA-UTFSM (Tier-2, ATLAS, UTFSM, 450 cores, 300TB)
  - ATLAND (Tier-3, **ATL**AS **And**ino group, PUC, 170 cores, in preparation)
  - AstrogridPUC (Tier-3, **Astro**nomy **Grid**, 4 cores, PUC, in preparation)
  - GrimaPUC (**Gr**upo de **I**ntelligencia de **Ma**quina, PUC, in preparation)

- **Academic institutions in Chile use REUNA (Chilean NREN)**



Universidad Técnica Federico Santa María

- Since 1931 (according to will and testament of Federico Santa María, died 1926)
- Five campuses in Chile and one en Ecuador
- Focus on science and engineering
- Master's Degree in around 20 areas
- PhD in Physics, Chemistry, Informatics, Electronics Engineering and Biotechnology
- Hosts a number of Research Centers, including **CCTVal**

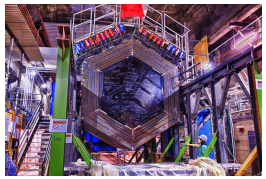
Centro Científico Tecnológico de Valparaíso

CCTVal (Scientific and Technological Centre of Valparaiso) was created and acknowledged by **CONICYT** (Comisión Nacional de Investigación Científica y Tecnológica - Commission for Scientific and Technological Research) through its backing with the **Basal** Financing program as a Scientific and Technological Centre of Excellence. The main research groups are: **Theoretical Particle Physics**, **Experimental High Energy Physics**, **Informatics** and **Electronics**.

CCTVal Research Projects

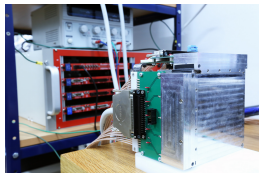
Research Projects in Science, Medicine and Technology

GlueX Experiment (Jefferson Lab, Hall D): characterization of 2800 Multi Pixel Photo Counters (MPPC), manufacture of 4000 lightguides *etc.*

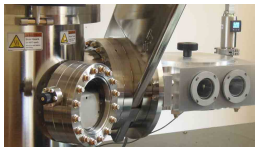


MINERvA Experiment (Fermilab): acquisition of data, conducting and improving a solid reconstruction of neutral pion, exclusive analysis of neutral pion charged current

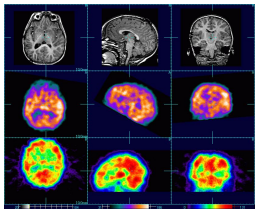
ATLAS Experiment (CERN): manufacture part of small-strip Thin Gap Chambers (sTGC) for the Muon Small Wheel (140 detectors)



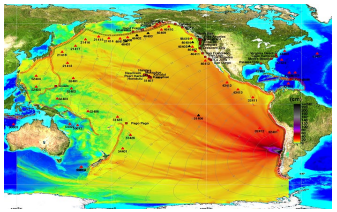
NA64 Experiment (CERN): design and construction of a Pre-shower detector (provides the transversal coordinate of a particle beam and estimates its energy before this one impact on an electronic calorimeter)



Project MAGNAMED: design, fabricate and assesses novel magnetic nanostructures (MNS) with unique spin configurations for innovative diagnostics and therapy techniques (to improve cancer detection *etc.*)



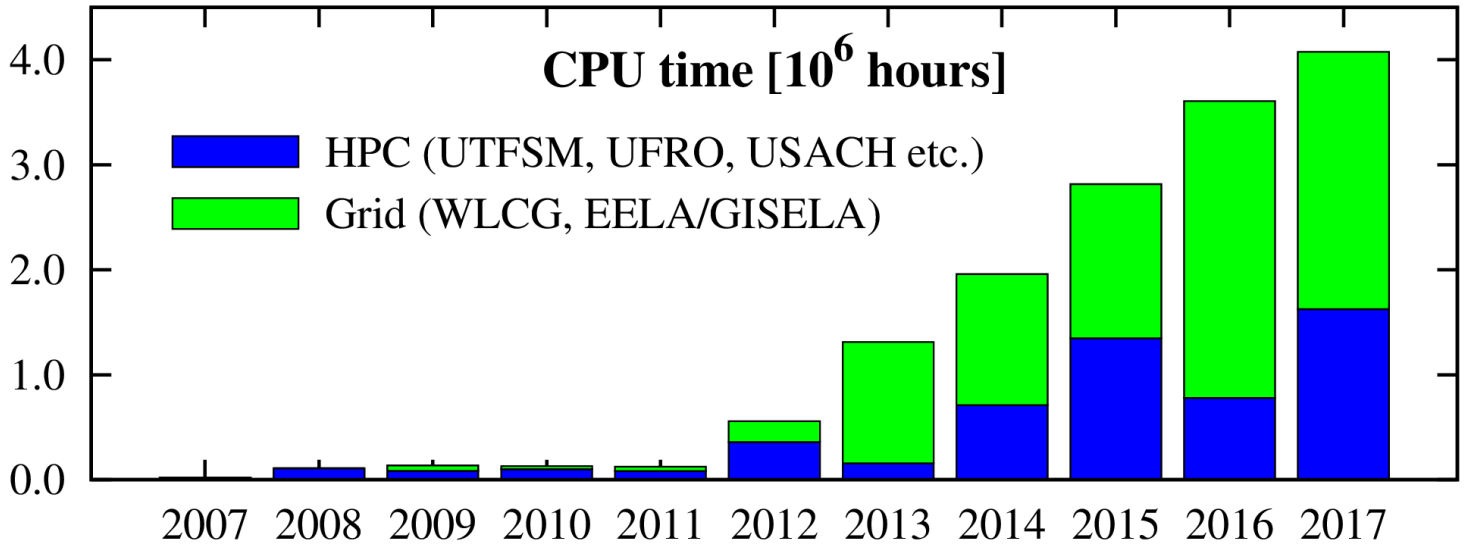
HPC Medical Imaging: local and remote processing of imaging of the biological or medical kind



Project Tsunami: modeling of tsunami hydrodynamics, creation of an tsunami operational data base

Data Center Brief History

2006 EELA cluster: 40 CPU cores 1.6GHz, 2TB
2008 Mostly local users, Grid tests
2009 EELA-2, WLCG Tier-3
2011 HPC cluster: 250 cores, 15TB
2012 HPC cluster: 500 cores, 200TB, ATLAS Production
2013 HPC cluster: ATLAS Analysis, WLCG Tier-2
2014 HPC cluster: GPU (Tsunami), NLHPC
2016 HPC cluster: 800 cores, 300TB, 10Gbps internal



Cluster Evolution

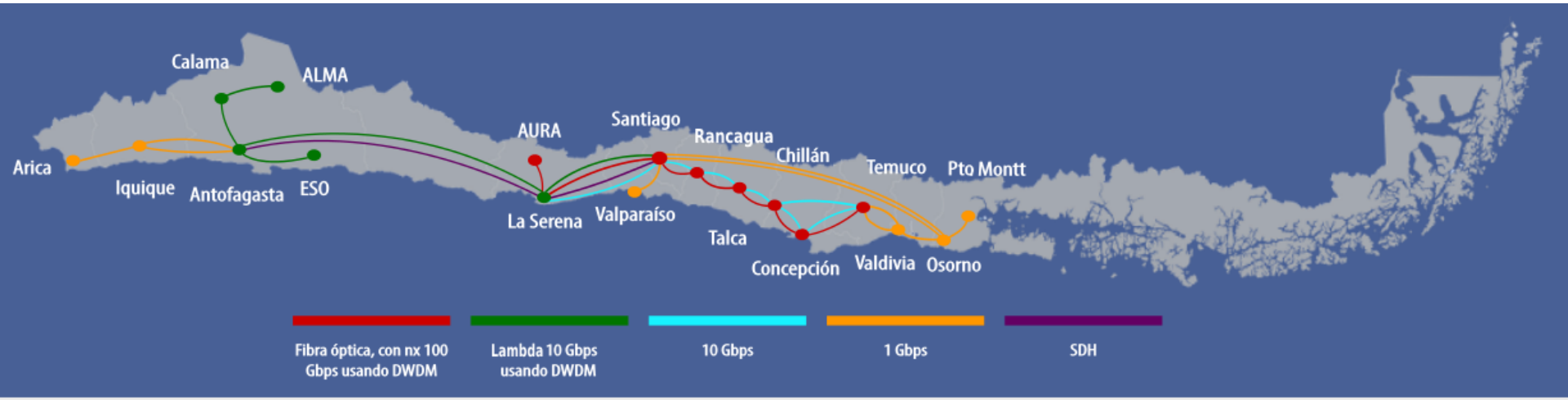
CPU: 40 Cores 1.6 GHz (DELL)
Disk: 2 TB

CPU: ~ 850 Cores 2.8-3.1 GHz (DELL, HP)
Disk: ~ 400 TB (DELL, HP, Supermicro)
GPU: nVidia (C1060, M2050, K20m)

REUNA

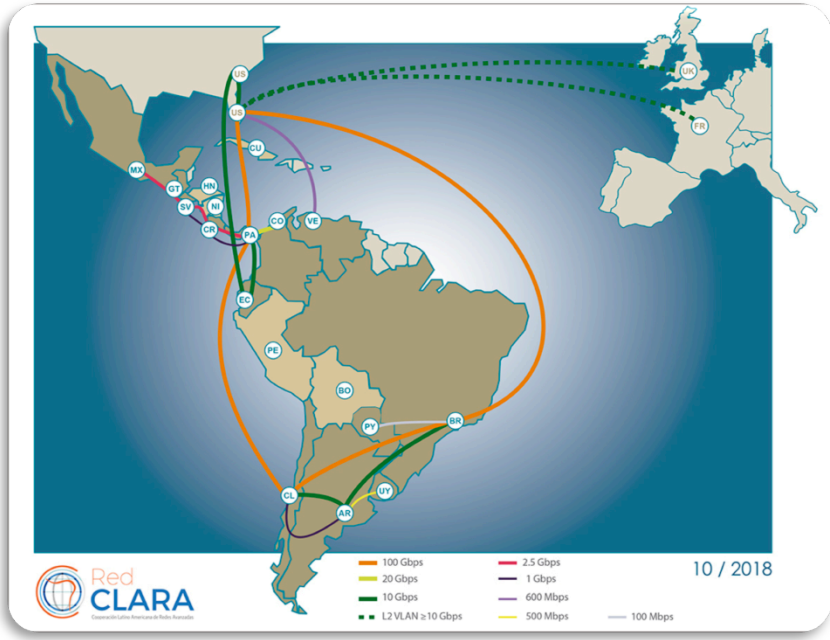
REUNA Ciencia y Educación en Red

Red **U**niversitaria **Na**cional (National University Network) is Chilean NREN. It provides network integration for universities, centers of excellence and international astronomical groups. Currently REUNA is composed of 37 institutions.



- REUNA network spans 12 regions, from Arica to Puerto Montt, and aims to add to all regions of Chile. It provides variety of services: Connectivity, Audio-video Conferencing and Multimedia, Identity (Eduroam, COFRe, Grid CA) *etc.*
- Interconnected (via RedCLARA) to peer networks worldwide such as GÉANT (Europe), Internet2 (USA), CANARIE (Canada), APAN (Asia), AARNet (Oceania), among others.

RedCLARA (REUNA, RNP, …)

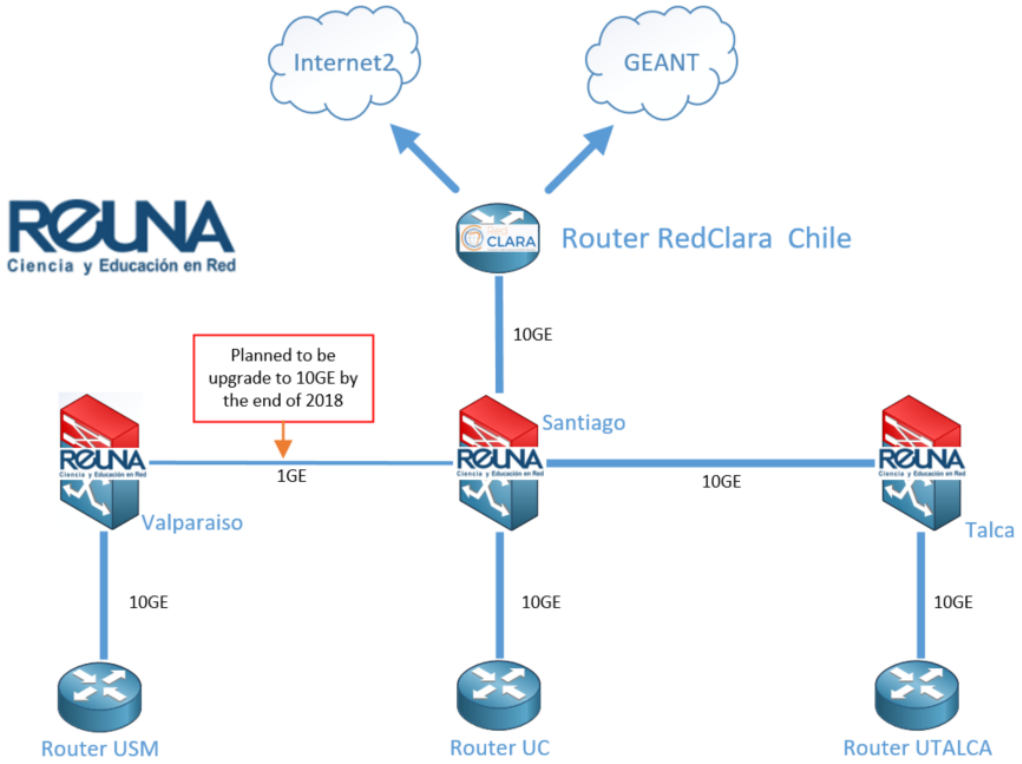


http://www.bella-programme.eu

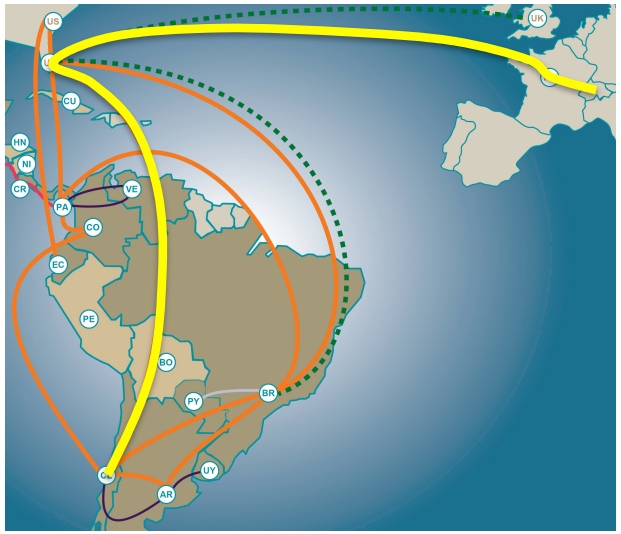
RedCLARA's, is the regional backbone for research and education, which connects the National Research and Education Networks (NRENs) of Latin America among them and from LA to abroad. High capacity international links are on place today to USA. To Europe, BELLA project, will use 100Gbps over a new submarine fiber from AL to Europe under construction.

Chilean LHCONE Project

- UTFSM/CCTVal and REUNA teams have good working relationship
- REUNA is ready to participate in LHCONE (via RedCLARA, GEANT):
  - ✓ In September 2018 REUNA already has a meeting with GEANT staff (Vincenzo Capone and Tom Fryer)
  - ✓ It is estimated that during the 1st semester of 2019 it can be implemented (it is planned to implement LHCONE VRF at RedCLARA level)



UTFSM – CERN Path



Red CLARA
Cooperación Latino Americana de Redes Avanzadas

us-cl.redclara.net
200.0.204.58

cl-reuna.redclara.net
200.0.204.153

GÉANT

redclara-gw.par.fr.geant.net
62.40.125.168

ae2.mx1.gen.ch.geant.net
62.40.98.153

cern-gw.mx1.gen.ch.geant.net
62.40.124.158

rci2-reuna.reuna.cl

1G

perfSONAR
perfsonar.reuna.cl
146.83.188.9

REUNA
Ciencia y Educación en Red

UTFSM Border Switch

perfSONAR
psb.hpc.utfsm.cl
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perfSONAR
psl.hpc.utfsm.cl
146.83.90.7

dCache
se.hpc.utfsm.cl
146.83.90.110

10G

1G

146.83.90.1

HPC Cluster
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e513-e-rbrxl-1-ne10.cern.ch
192.65.184.157

CERN

perfSONAR
perfsonar-bw.cern.ch
128.142.223.246

perfSONAR
perfsonar-lt.cern.ch
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Thank you for your attention!

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