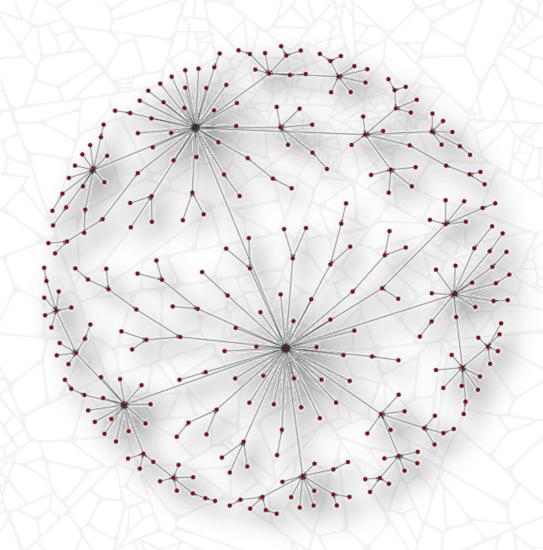# HPC Development in Chile

National Laboratory for HPC

2011 - 2014

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CCTVAL – Centro Científico y Tecnológico de Valparaíso
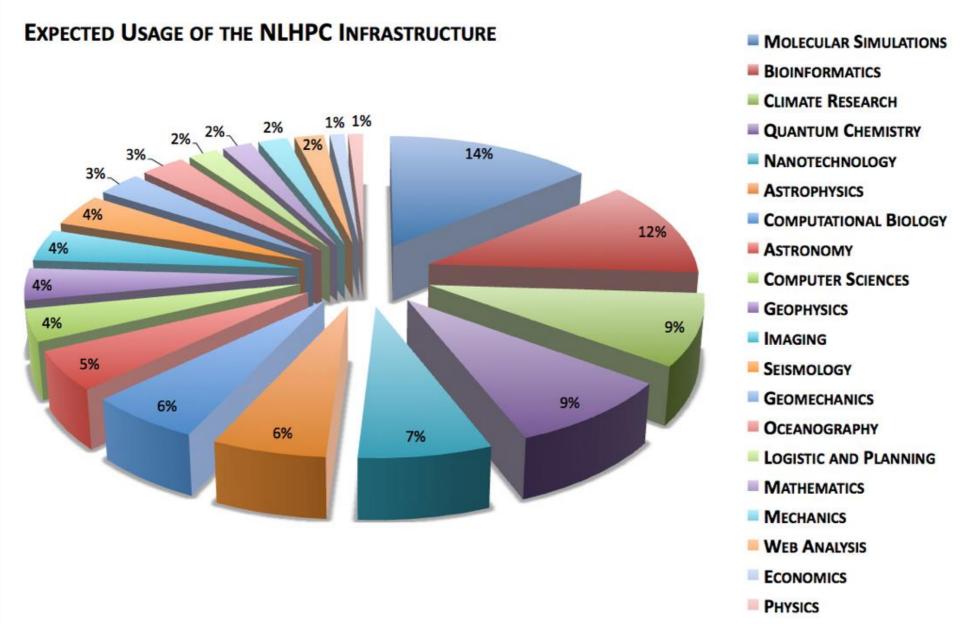Universidad Santa María

Mission & Vision

- Our mission is to consolidate a national facility for HPC by offering top quality services and advanced training to answer the national demand for scientific computing, developing links between research groups, the industry and the public sector.

- We envision the NLHPC as a competitive facility of world-class quality for research services in HPC.

Objectives

1) To develop and support powerful and reliable computing and network resources enabling national researchers to have access to HPC capacity to solve computing- and data-intensive scientific problems.

2) To stimulate and participate in the creation of a national high-capacity network for the transmission of research data.

3) To use and explore innovative architectures and techniques to accelerate scientific computing.

4) To trigger new industrial initiatives in HPC.

5) To provide insights into advanced modeling needs through the NLHPC's scientific network.

6) To help educate the next generation of scientists and engineers in HPC.

7) To increase social awareness of the role of HPC in contemporary society and technological development.

Estimated Scientific Demand for HPC

EXPECTED USAGE OF THE NLHPC INFRASTRUCTURE

Legend:
- MOLECULAR SIMULATIONS
- BIOINFORMATICS
- CLIMATE RESEARCH
- QUANTUM CHEMISTRY
- NANOTECHNOLOGY
- ASTROPHYSICS
- COMPUTATIONAL BIOLOGY
- ASTRONOMY
- COMPUTER SCIENCES
- GEOPHYSICS
- IMAGING
- SEISMOLOGY
- GEOMECHANICS
- OCEANOGRAPHY
- LOGISTIC AND PLANNING
- MATHEMATICS
- MECHANICS
- WEB ANALYSIS
- ECONOMICS
- PHYSICS

- Near to 50 Chilean research groups (aprox. 300 researchers) are actually demanding HPC resources

- The expansion of Chilean research in data-driven sciences such as Omics, Bioinformatics and Astronomy, requires a national facility for HPC services

Associative Model: An Open Model

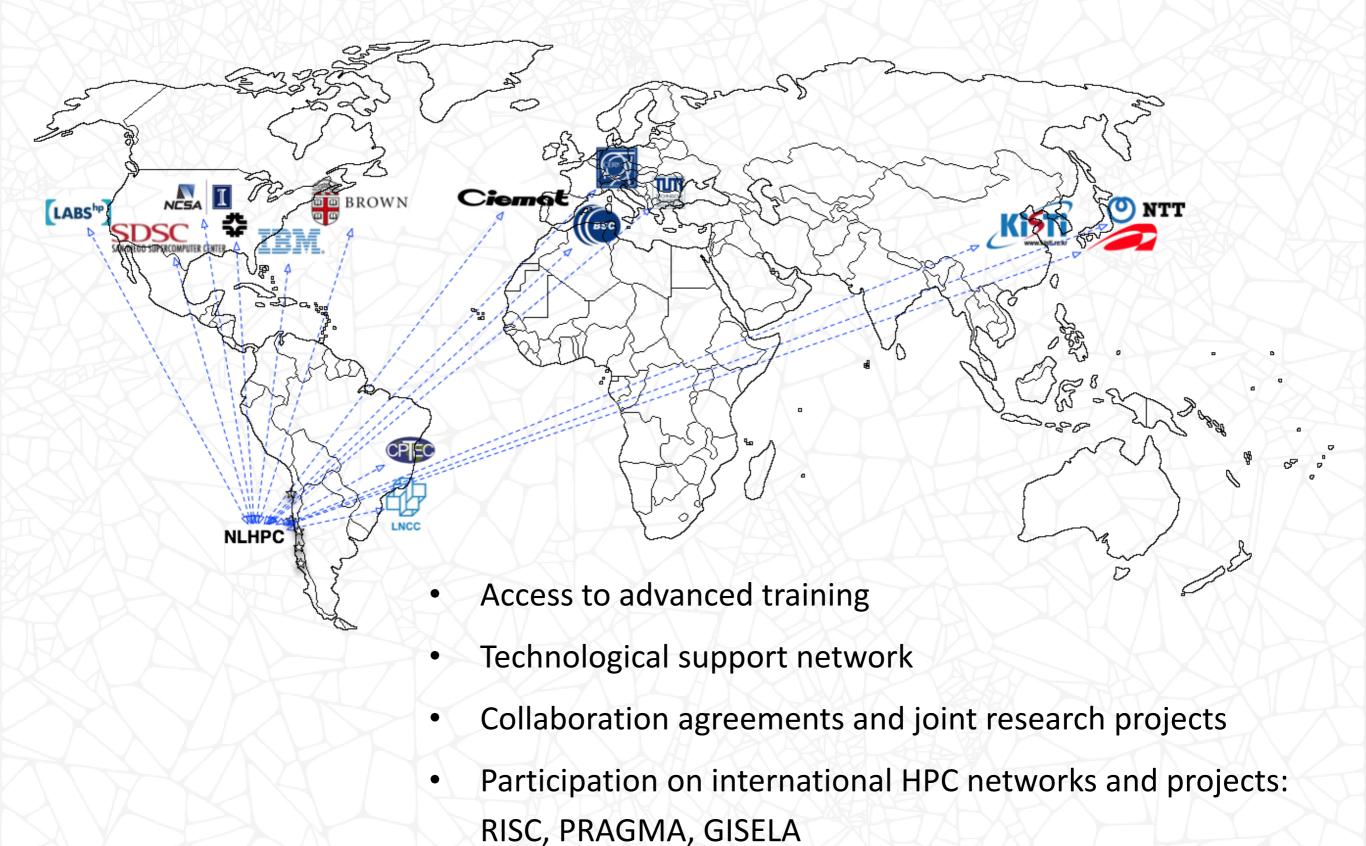|	
AURA	Universidad Católica del Norte (UCN)
CINV - UV	Universidad de la Serena (ULS)
INRIA - Chile	Universidad Santa María (USM)
Fundación Ciencia & Vida (FCV)	Universidad de Chile (UChile) Sponsoring Institution
REUNA	Universidad Católica (UC)
Other Chilean Institutions to be added ...	Universidad de Santiago (USACH)
	Universidad de Talca (UTalca)
	Universidad del Bío-Bío (UBB)
	Universidad de la Frontera (UFRO)
	Universidad Austral (UACH)
	Other Chilean Universities to be added ...

NLHPC International Network: Global Outlook

- Access to advanced training

- Technological support network

- Collaboration agreements and joint research projects

- Participation on international HPC networks and projects:
RISC, PRAGMA, GISELA

NLHPC Supercomputers: Levque (Relámpago)

Lefque: IBM iDataplex

- 66 Nodos de computo

- 600 cores, Intel X5550

- 3 GB per core

- Conexión Infiniband 40 GB/s

NLHPC Supercomputers: Leftaru (Ave Rapaz Veloz)

- 128 Nodos de cómputo HP SL230 mas 4 HP SL250

- 2640 cores INTEL Ivy Bridge E5-2660V2 + 12 Xeon Phi 5110p

- 5.4 TB de RAM + 274GB almacenamiento de altas prestaciones (DDN)

- Conexión Infiniband FDR a 56Gbits/s

NLHPC: Scientific Cooperation & Training

- Formation of international scientific cooperation networks between globally important HPC centers.

- Participation in Several ALFA Projects of the European Community.

- Organization of Advanced Training Activities.

- Schools (Latin-America, bilateral, national) & Tutors School.