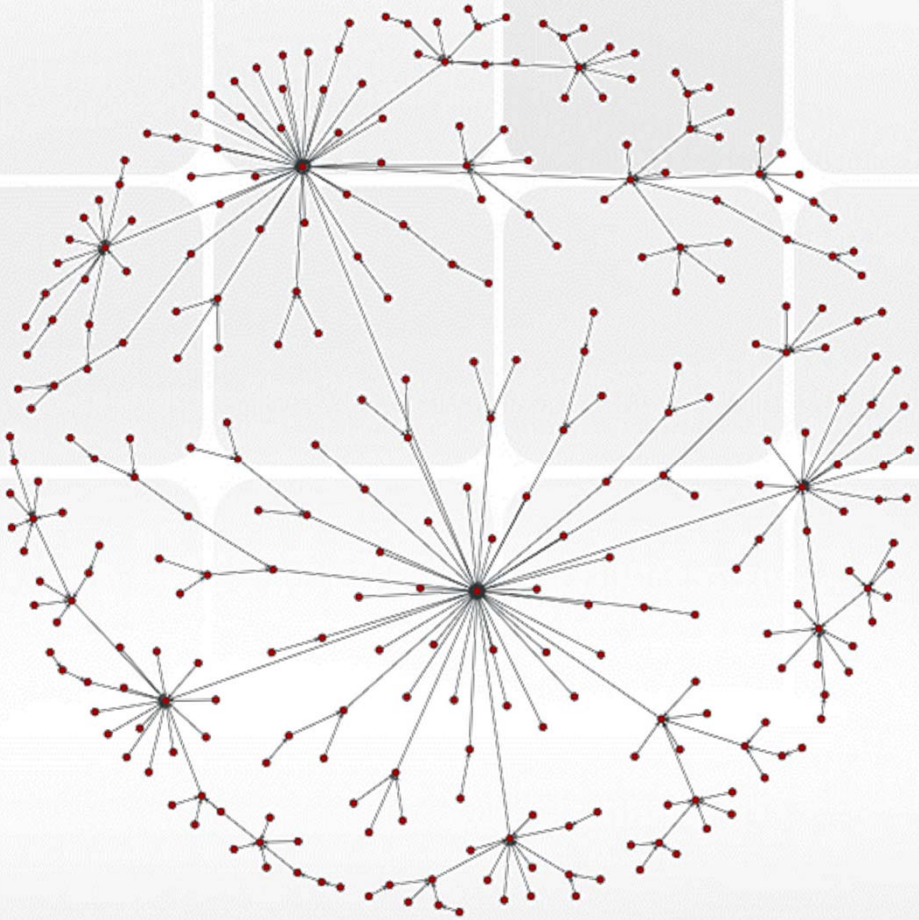
Development of the HPC in Chile: NLHPC



Gonzalo Hernandez
U. de Valparaíso, Escuela Ingeniería Industrial
U. de Chile, Centro de Modelamiento Matemático

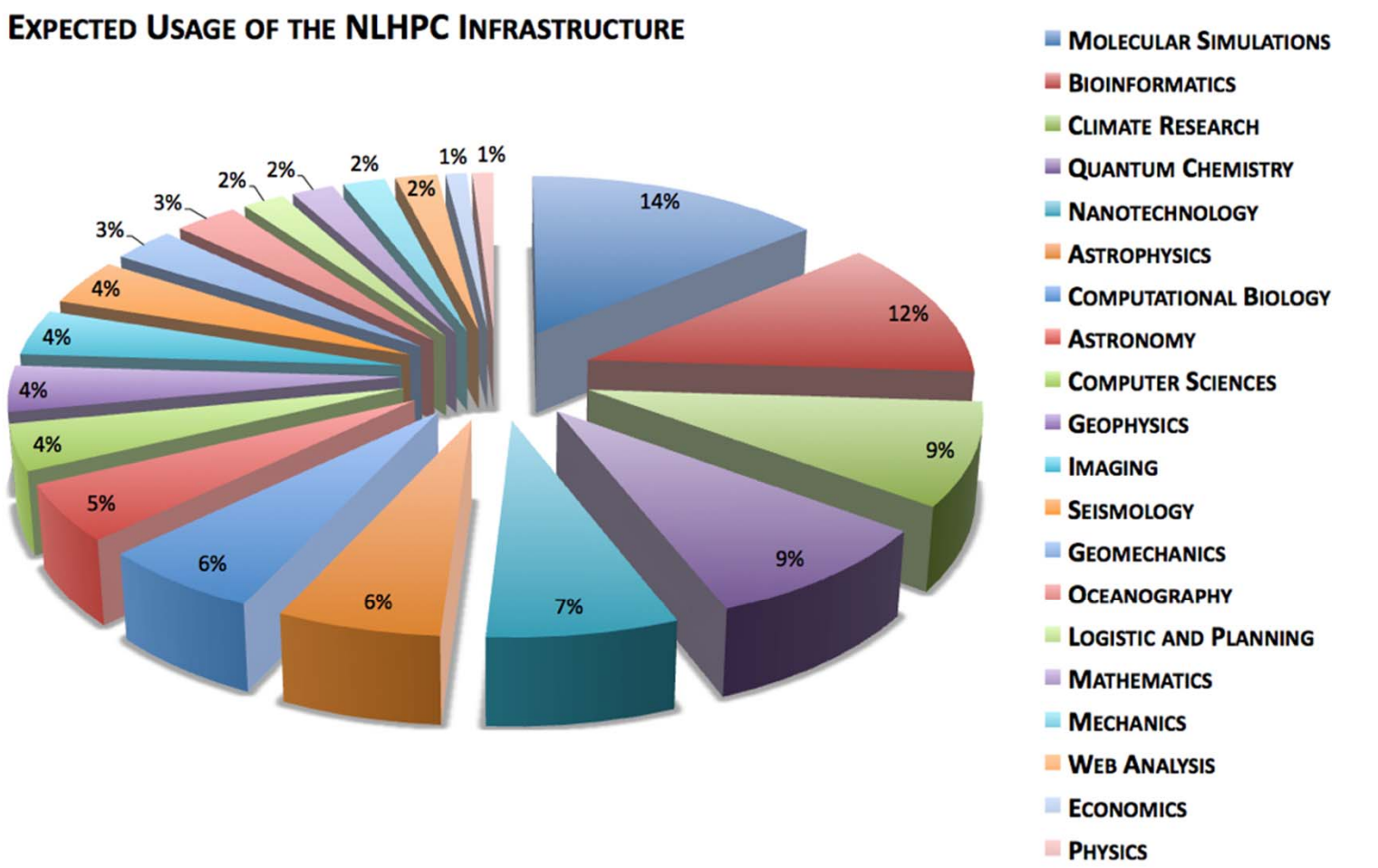
Mission & Vision

- 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

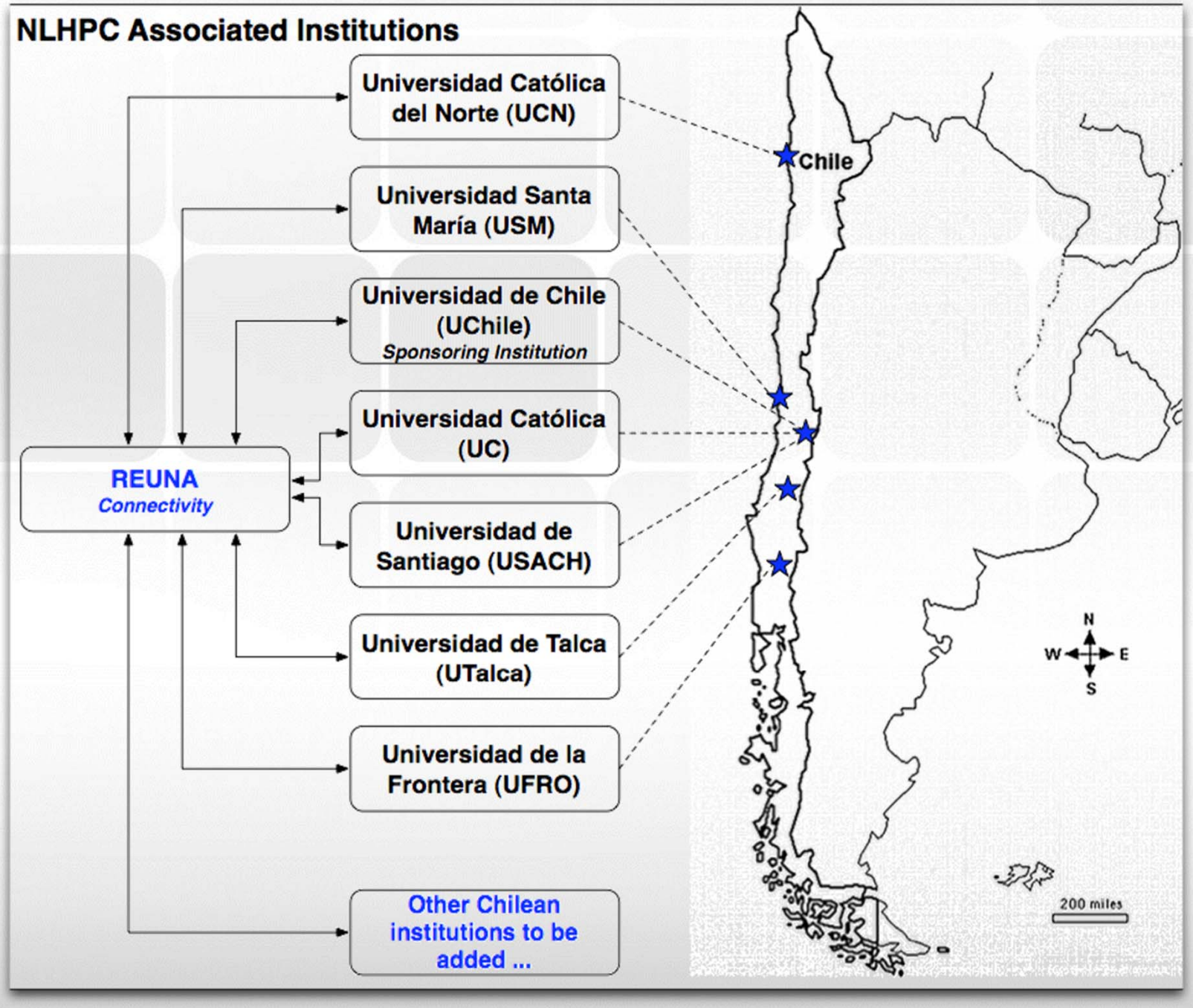
1) To develop and support powerful and reliable computing and network resources enabling national researchers to have access to HPC capacity to solve computing- and data-intensive scientific problems.
2) To stimulate and participate in the creation of a national high-capacity network for the transmission 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: A Key Issue for for improving Chilean competitiveness

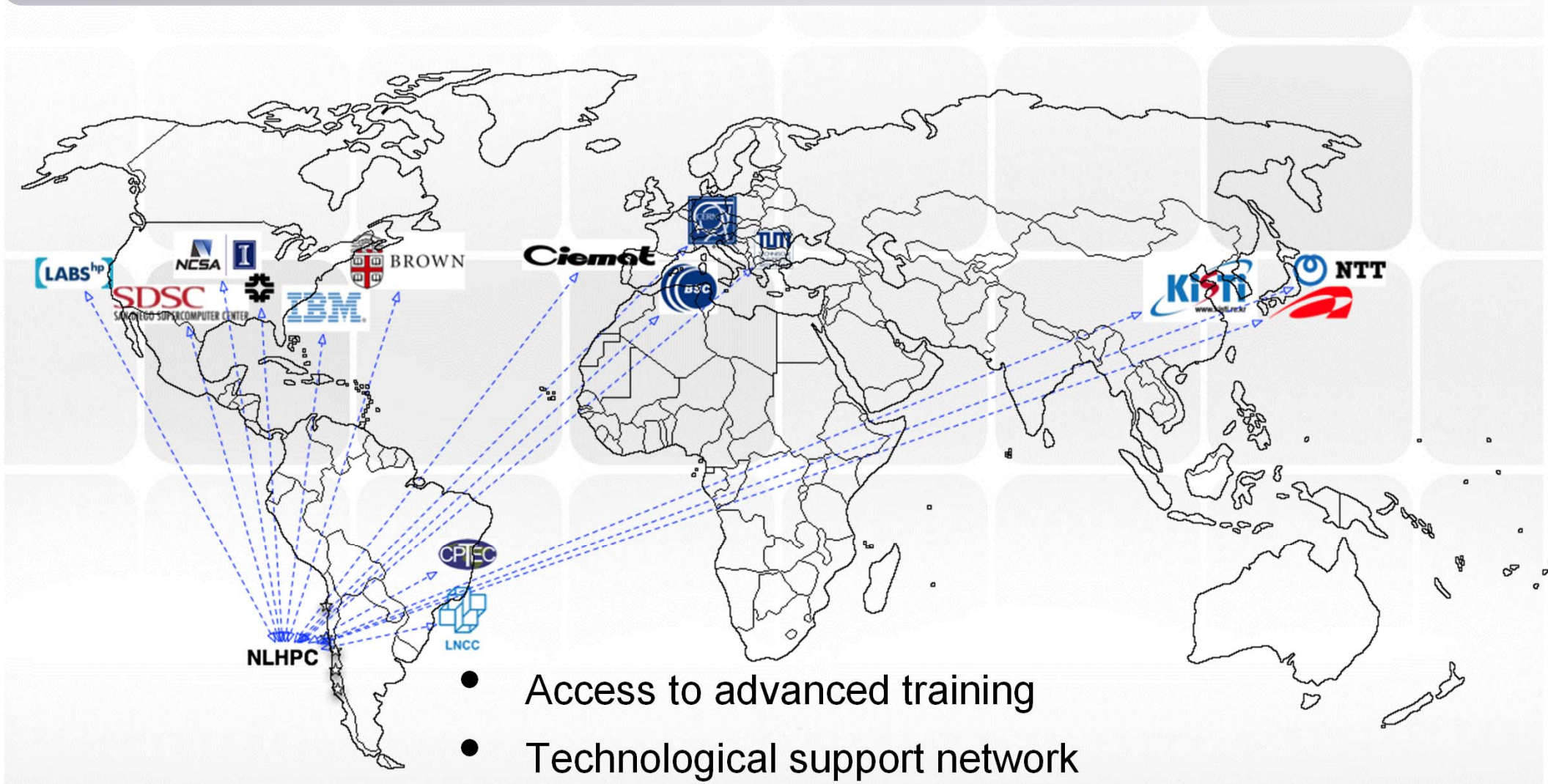


- Near to 50 Chilean research groups (aprox. 300 researchers) are actually demanding HPC resources
- The expansion of Chilean research in data-driven sciences such as Omics, Bioinformatics and Astronomy, requires a national facility for HPC services

Associative Model: An Open Model

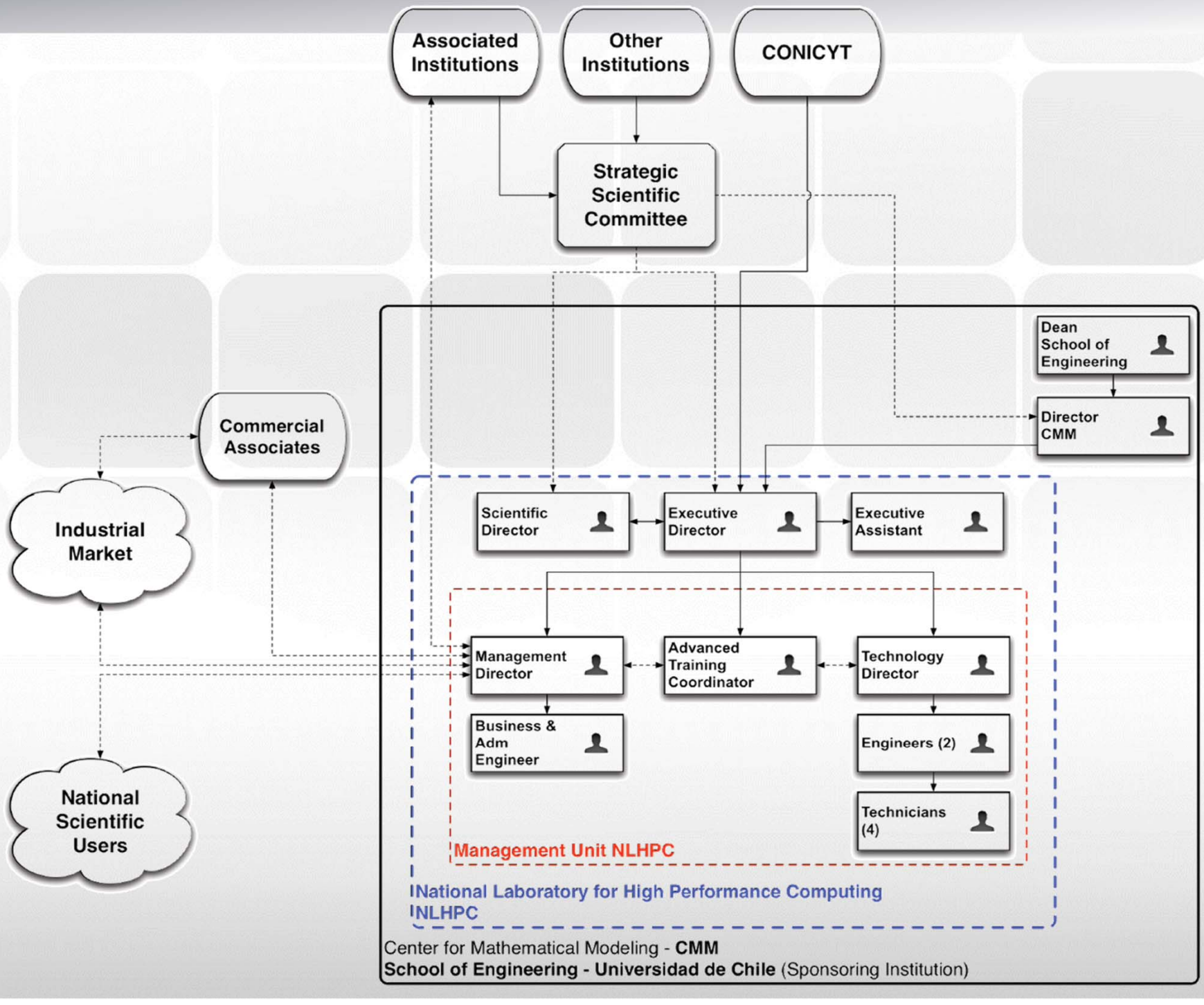


NLHPC International Network: Global Outlook



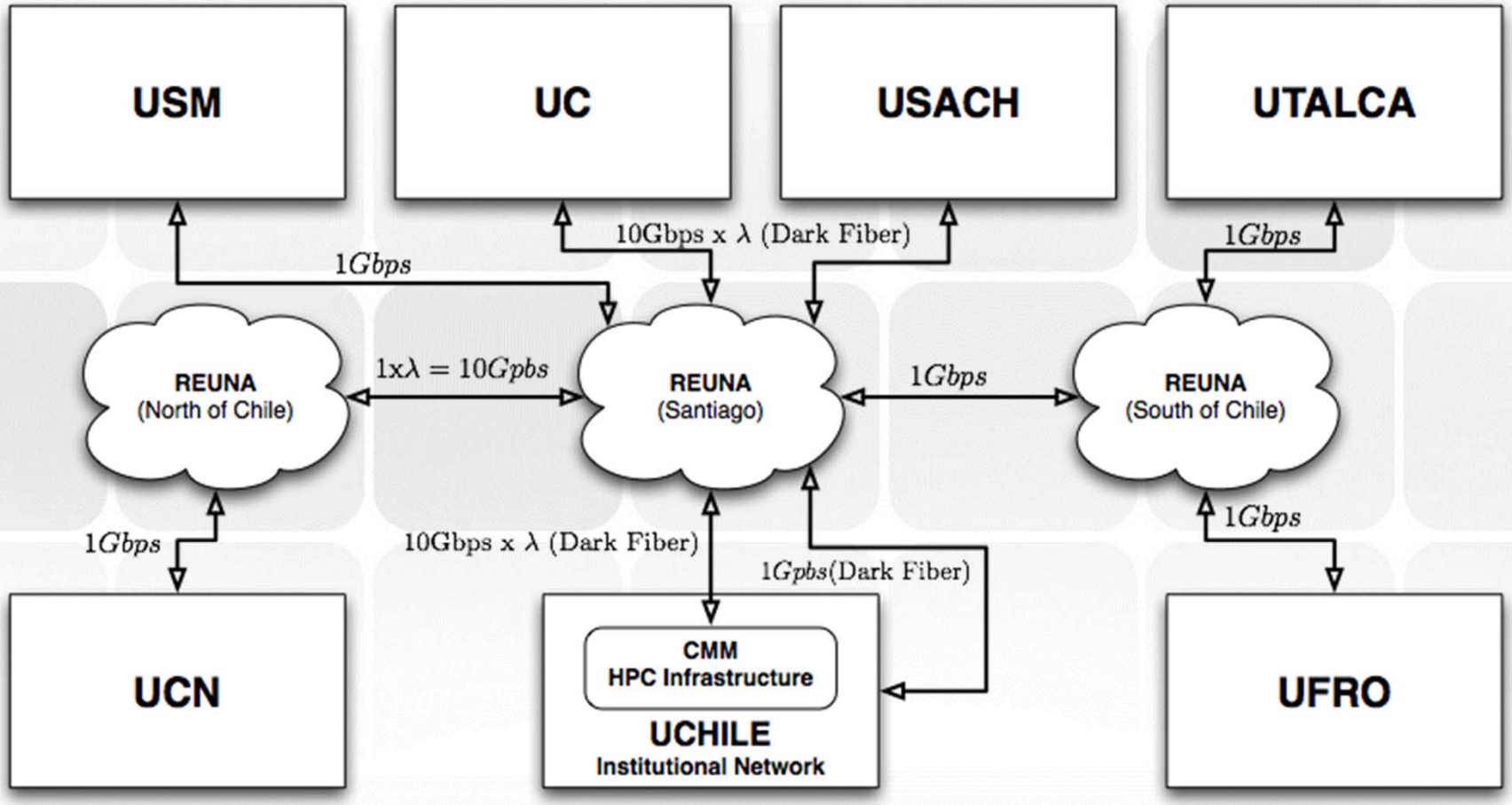
- Access to advanced training
- Technological support network
- Collaboration agreements and joint research projects
- Participation on international HPC networks and projects: RISC, PRAGMA, GISELA

Organization Model of the NLHPC



NLHPC Advanced Network Technology

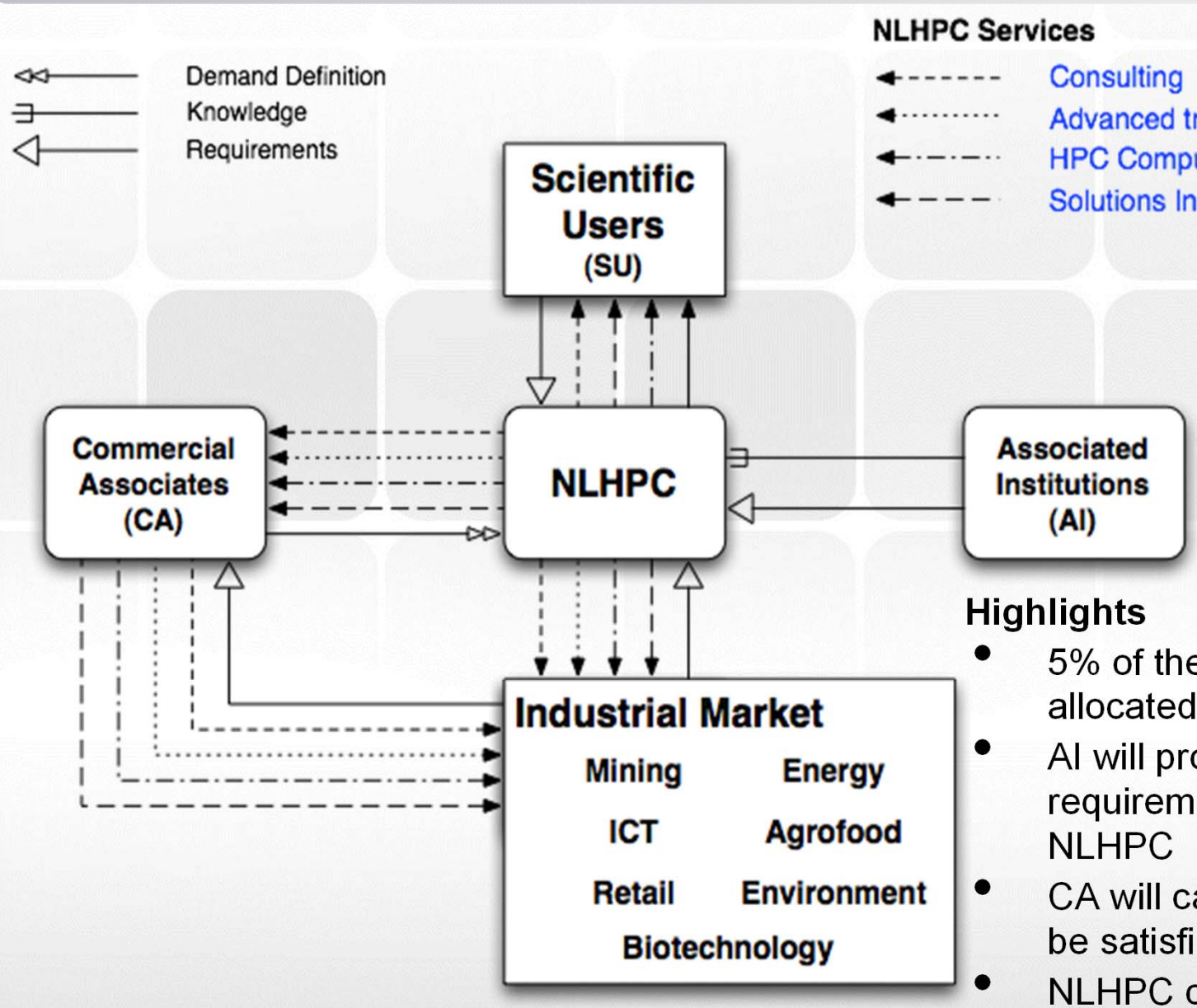
NLHPC Situation



Additional impact of the network enhancement:

- e-learning
- Video-conferencing
- Accessing e-infrastructures
- Distributing knowledge

Sustainability Model: Supporting Marginal Costs



Highlights

- 5% of the NLHPC infrastructure will be allocated for industrial applications
- AI will provide knowledge and requirements to be satisfied by the NLHPC
- CA will capture market requirements to be satisfied by the NLHPC
- NLHPC can join the AI, as Solutions Integrator, to satisfy complex industrial requirements

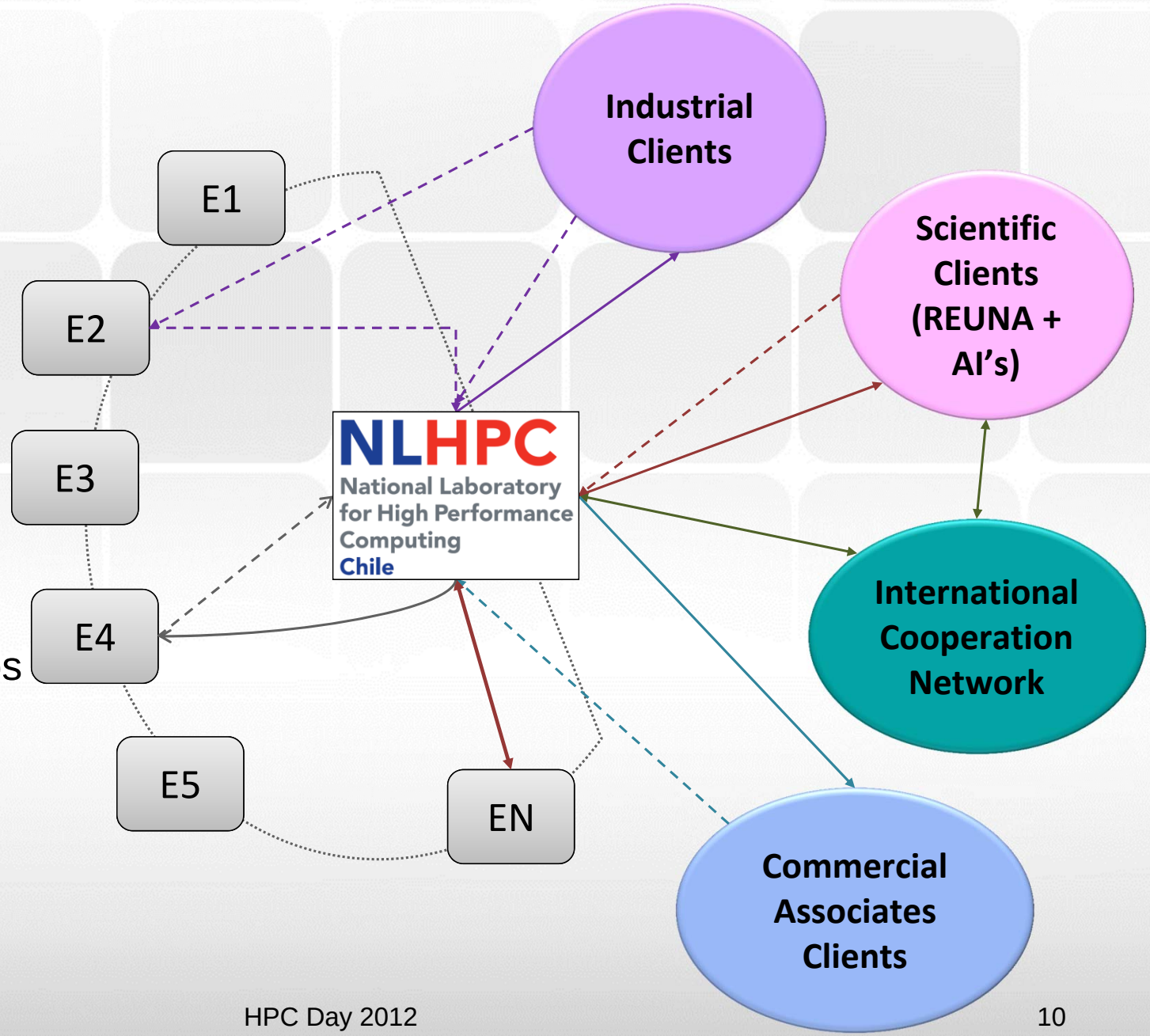
NLHPC Training & Partnership: 2011 - 2015

Training Activities:

- Seminars & Workshops
- Schools
- Undergraduate
- Graduate
- E-learning (REUNA)
  - Videoconference
  - Training on demand
  - Digital library
  - Online courses
  - Virtual classrooms & labs

Partnership Acts.:

- Meetings
- Training Support
- Proposal Preparation
- Project Development



NLHPC Workshops

- CMM - San Pedro de Atacama Symposium / 7th AccessNova Forum, July 07–10 2012, San Pedro de Atacama, Chile. (HPC in Astronomy)
- Day of Data Conference, May 17 & 18 2012, ICERM, Brown University, USA (Data Driven Sciences).
- NLHPC Seminar: Impact of the HPC in the develpment of Industrial Applications, Mariano Vázquez, Barcelona Supercomputing Center, April 12 2012, CMM, Santiago, Chile.
- NLHPC Seminar: On the Importance of Thread Placement on Multicore Architectures: Concepts & Software Tools, Tobias Klug, Department of Informatics, Technological University of Munich, September 08 2011, CMM, Santiago, Chile.

NLHPC Training: Past Events

Training in Parallel Computing:

- Cluster computing
- Memory management optimization for parallel multi-core hybrid programs
- Parallel programming: MPI & OpenMP libraries
- GPU Computing
- Performance evaluation of large scale simulations

Events:

- HPC School Concepción, August 2011.
- PASI School, January 2011.
- HPC School Chillán, December 2010.
- GPU Day, January 2010.
- NLHPC Workshops:
  - 10 in 2011
  - 4 in 2010

NLHPC & HPC Laboratory: Scientific Cooperation

- RISC: A network for supporting the coordination of Supercomputing research between Europe and Latin America.
- CLGrid: Implementation of grid applications.
- Formation of international scientific cooperation networks between globally important HPC centers: PRAGMA, San Diego Supercomputing Center (SDSC), Barcelona Supercomputing Center (BSC), Leibniz Supercomputing Centre (LRZ).
- Participation in ALFA Projects of the European Community:
  - SCAT Scientific Computing & Advanced Training, 2006 – 2008.
  - EELA-1 & EELA-2: E-Infrastructure shared between Europe and Latin America, 2006 – 2009.
  - Grid Initiatives for e-Science virtual communities in Europe and LA.

NLHPC & HPC Laboratory: Conferences

- Organization of five CLGrid workshops
  - Short training courses including laboratory sessions.
  - Plenary conferences.
  - Presentations of scientific articles and thesis projects.
  - Talks by companies related to HPC.
- HPC Latam 2009, 2010, 2011: Latin American HPC Symposium, Argentina.
- CLCAR 2009, 2010, 2011: Latin American Conference on HPC.
- XIII WSDP: Workshop on Parallel and Distributed Systems, Santiago, Chile.

40 JAIIO
JORNADAS ARGENTINAS DE INFORMÁTICA

29 de Agosto al 02 de Septiembre de 2011
Universidad Tecnológica Nacional - Facultad Regional Córdoba
Ciudad Universitaria - Córdoba - Argentina.

Welcome to HPC Latam 2011

HPC
High-Performance Computing - LATAM

Córdoba, Argentina
August 31 – September 01, 2011

HPC 2011 Program Summary

1) 4 Keynotes: Crupnicoff, Dalcin, Klug, Magro.
2) 16 Talks and 2 Posters in different areas of HPC:
   - Parallel Computing
   - Large Scale Simulations
   - GPU Computing
   - Grid Computing
3) Round Table: “Acciones para el Desarrollo de la HPC en América Latina” (Activities for the Development of the HPC in Latin-América).

HPC Opportunities

1) Organization of training activities:
   - Schools (Latin-America, bilateral, national)
   - **Tutors School**
   - Postgraduate programs
   - Thematic workshops
   - Industrial workshops
2) HPC LA 2012, 2013, 2014 ….
3) CLCAR.
4) Scientific cooperation projects:
   - Bilateral
   - Latin-America
   - European Community