Brazilian Tier 2 Progress

S. F. Novaes

UNESP

Brazilian participation in LHC

CMS [6]

- **UNESP [2]**
  - Eduardo M. Gregores
  - Sérgio M. Lietti
  - Pedro G. Mercadante
  - SFN
- **UERJ [3]**
  - Alberto F. S. Santoro
  - Marcia Begalli
  - Wagner Carvalho
  - Carley de Oliveira Martins
  - José Roberto Mahon
  - Jorge Molina
  - Luiz M. Mundim Filho
  - Vitor Oguri
  - Wanda L. Prado da Silva
  - André Sznajder
  - Rene Luna
  - Helio Nogima
- **CBPF [1]**
  - Moacyr H. G. Souza
  - Gilvan A. Alves
  - Hélio da Motta
  - Maria Elena Pol
- **UFRJ**
  - Jorge Barreto
  - Mario Vaz
  - Inês Dutra
- **UFBa**
  - Newton Oliveira
- **UFRGS**
  - Claudio Geyer

Atlas

- **UFRJ**
  - Fernando Marroquim Leao de Almeida Junior
  - Carmen Lucia Lodi Maidantchik
  - José Manoel de Seixas.
- **UFSJ**
  - Maria Aline Barros do Vale.
- **UFJF**
  - Augusto Santiago Cerqueira.

LHCb

- **CBPF**
  - Arthur Kos Antunes Maciel
  - Alberto Correa dos Reis
  - Javier Edgardo Magnin
  - Geraldo Roberto Carvalho Cernicchiaro
  - Jussara Marques de Miranda
  - Ignacio Bediaga
  - Ademarlaudo França Barbosa.
- **PUC/RJ**
  - Carla Gobel Burlamaqui de Mello
- **UFRJ**
  - Bernard Marie Marechal
  - Leandro Salazar de Paula
  - Jose Helder Lopes
  - Sandra Filipa Amato
  - Miriam Mendes Gandelman
  - Erica Ribeiro Polycarpo Macedo.

Alice

- **USP**
  - Alejandro Szanto de Toledo
  - Alexandre Alarcon do Passo Suaide
  - Marcelo Gameiro Munhoz
  - Jun Takahashi.

AliEn & Dirac

- LHCb:
  - Very small participation from US
    - Syracuse University: 11 out of 654 members
  - Focused on European solutions
    - LCG, EGEE
    - → EELA (**E**-Infrastructure shared between **E**urope and **L**atin **A**merica)
  - Using **DIRAC** Grid Framework for LHCb
  - **D**istributed **I**nfrastructure with **R**emote **A**gent **C**ontrol
    - Python based grid job management system
    - Follows Condor model of job pools
    - Service Oriented Architecture

- Alice
  - **Ali**ce **En**vironment
  - Starting point for developing the gLite, next generation of grid middleware developed by EGEE
  - Projects using AliEn
    - ALICE is using for simulation, reconstruction and distributed analysis of physics data
    - Panda at GSI, Darmstadt is using for simulation
    - Mammogrid, European Federated Mammogram Database
  - AliEn will be progressively interfaced to emerging products from both Europe and the US

Present Status and New Initiatives

- Present Computing Power:
  - SPRACE:
    - 240 processors = 310 kSi2k = 1.45 TeraFlops (after last upgrade)
    - 15 TB of disk space
  - HEPGrid UERJ:
    - 200 processors = 210 kSi2k = 1.06 TeraFlops
    - 7 TB of disk space
  - UFRJ and CBPF
    - Small number of machines

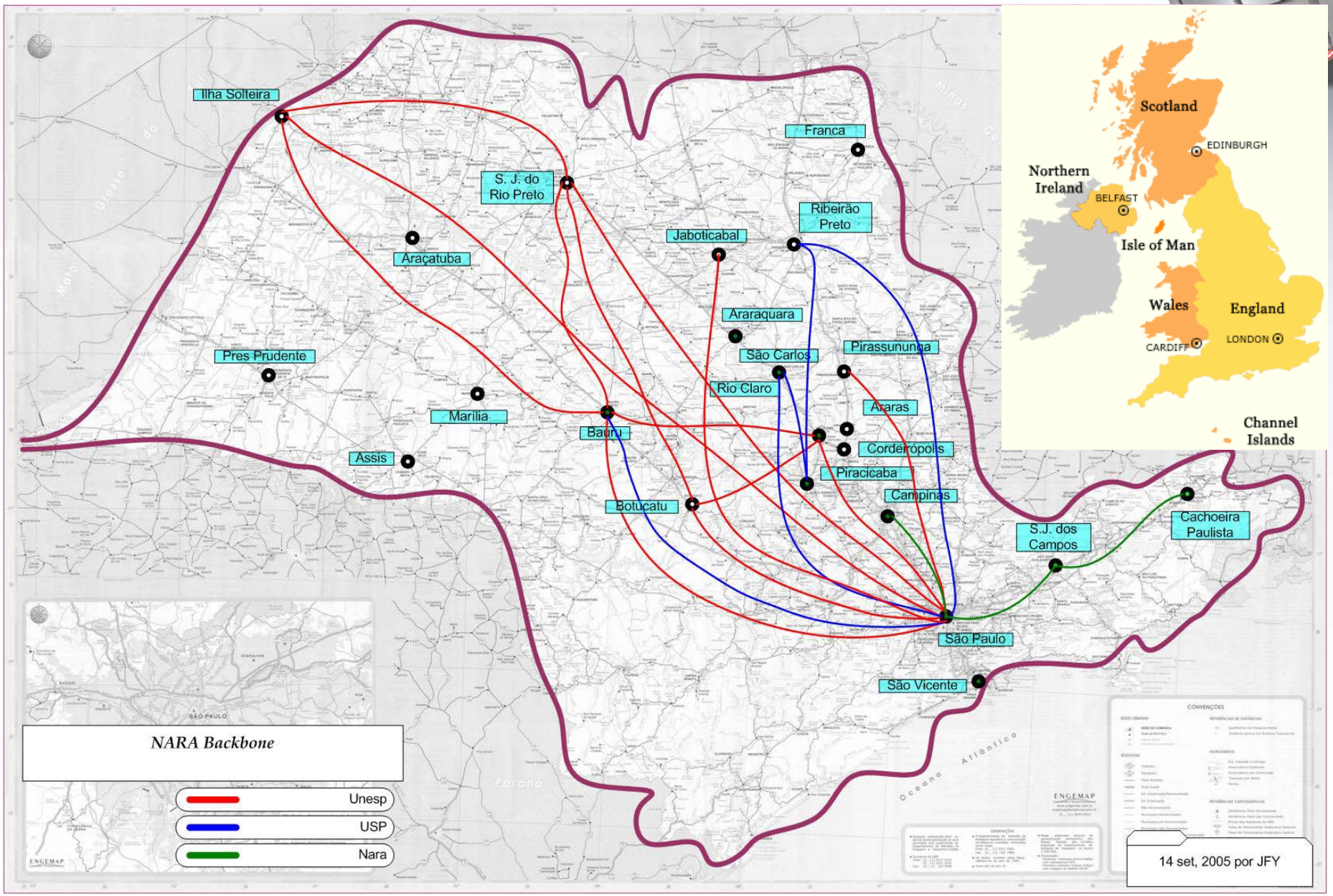
- New initiatives
  - GridUNESP
    - A set of cluster focused on different branches of Science (UNESP)
  - Multi-users Facility
    - New Cluster for HEP (CBPF): Proposal in preparation

gridunesp

- Tier 0
  - 512 processors + 12 TB RAID
- Tiers 1
  - 7 X 64 processors + 4 TB RAID

- Several research areas:
  - High Energy Physics
  - Lattice QCD
  - High Tc Superconductivity
  - Bioinformatics
  - Genomics and Cancer Studies
  - Protein Folding
  - Molecular Biology
  - Geological and Hydrographic Modeling
  - Fluid Dynamics and Turbulent Flow
  - Numerical Methods in Mechanical Engineering.

São Paulo State



NorduGrid: A Case Study

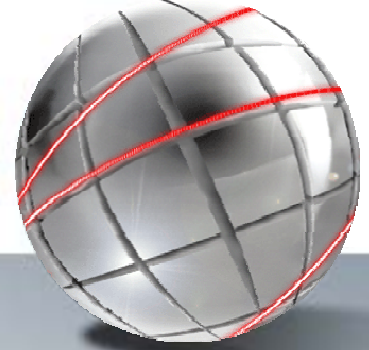
- Although the Nordic facility serves **all sciences**, its creation was **prompted** by computational needs for **LHC** and the initiative was also driven by the particle physics community
  - Nordic countries (Denmark, Norway and Sweden) **together** have the intention to contribute with a**Tier-1** for **ATLAS**
  - Finland is committed to **CMS** and intends to contribute a **Tier-2** center with Karlsruhe as Tier-1.

- SC2005:
  - 60 sites
  - 6000 processors
  - 60 TB
  - 1600 users

Expected Resources for LHC

Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
CPU (kSI2K)	393	452	1855	3582	4790	7190
Disk (TBytes)	85	170	584	1798	2950	4370
Tape (TBytes)	80	170	1210	1940	2800	3790
WAN(Gbit/sec)	10	10	10	10	10	10

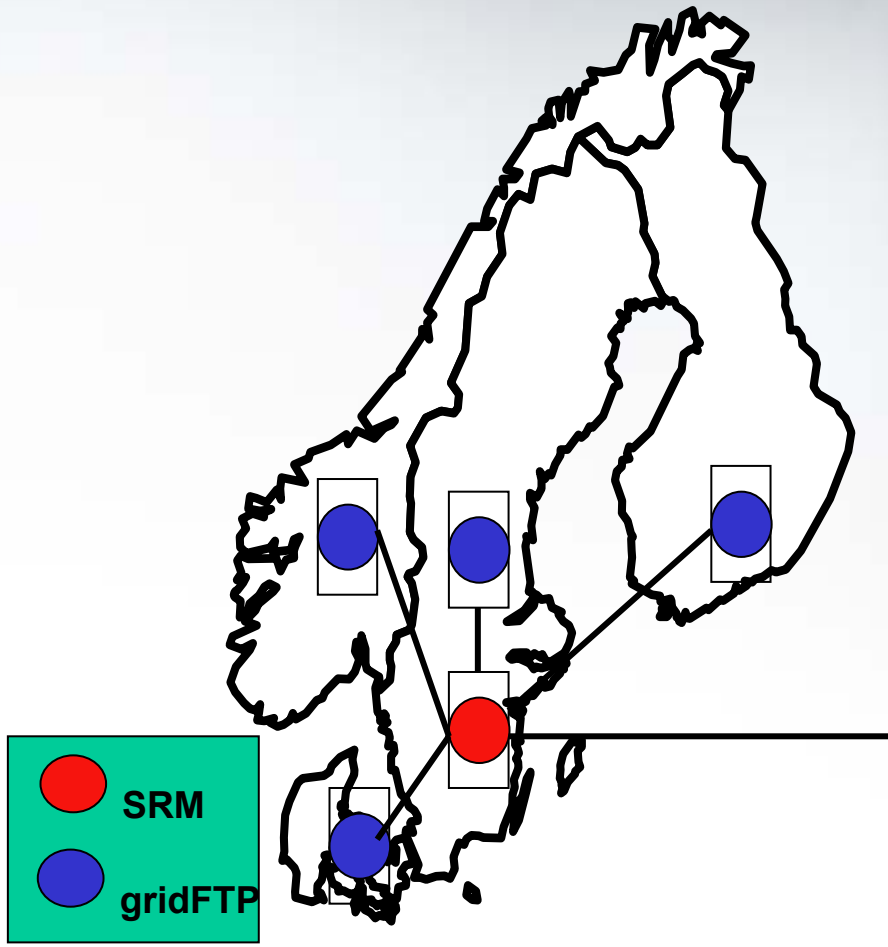
Evaluation (Spring 2005): LP2005



The Evaluation Panel agrees with the idea of establishing a common Nordic grid. The Nordic **countries, individually, appear to have difficulties with establishing the sufficient critical mass to become attractive collaboration partners** in the larger grid projects in Europe and the rest of the world. But the establishment of Nordic Data Grid Facility will ensure – for scientist in the Nordic countries – a grid infrastructure which is of sufficient critical mass to join various scientific projects needing grid and high performance computing in Europe and the rest of the world.

A Distributed Tier-1

- The Nordic Tier-1 will be **distributed**
  - amongst all countries
  - amongst centers within the individual countries
- However there will be **only one**:
  - interface from the rest of the world
  - network connection to Europe
- A **distributed Tier-1** has been chosen because:
  - None of the resources available will be exclusive to LCG
  - A high up-time is much easier to achieve with a distributed Tier-1



Grid Monitor

Country	Site	CPUs
Denmark	Benedict - Aalborg pr>	48
	Horseshoe (DCSC/SDU)	1159
	Louis XIV (DCGC/AAU)	52
Estonia	Tartu Observatory	5
	UT Chemistry	21
	UT CS Antarctica Clus>	19
	UT IMCB Anakonda clus>	14
	UT Physics Cluster	23
Finland	Akaatti (M-grid)	30
	Ametisti (M-grid)	132
	Hirmu Cluster (HIP)	4
	Jaspis (M-Grid, HIP)	8
	Kivi (M-grid)	10
	Kvartsi (M-grid)	96
	Opaali (M-grid)	24
	Sepeli (M-grid)	768
	Spektroliitti (M-grid)	26
	Topaasi (M-grid)	24
Lithuania	grid.ktu.lt	15
Norway	Bergen Grid Cluster	0
	EPF (UiO/FI)	13
	IBM 1300 cluster - Fi>	38
	UiO Grid	10
Russia	NorduNode in IHPCIS S>	1
	The SPbSU First Clust>	1
Slovakia	UPJS ALICE Grid	1
	UPJS AMOS Grid	9
	UPJS Grid	1
Slovenia	SiGNET	145
SriLanka	SweLanka LK	10
Sweden	Bluesmoke (Swegrid,NS>	87
	Dayhoff	32
	Hagrid (SweGrid, Uppm>	100
	Hive (Swegrid, UNICC)	101
	Ingrid (SweGrid,HPC2N)	99
	ISV	4
	Monolith (NSC)	398
	Quark Cluster	4
	Sigrid (SweGrid, Luna>	99
	SweLanka SE	10
Switzerland	Bern ATLAS Cluster	14
	Geneva-DINF/DPNC	25
	Geneva-DPNC	10
	PHOENIX (CSCS)	30
	UBELIX (University of>	288
TOTAL	***45 sites***	***4008***

User Groups and Resources

- User Groups
  - ARC Community
  - NorduGrid
  - ATLAS (**521 users**)
  - ALICE (**65 users**)
  - CMS (**430 users**)
  - SWEGRID VOs
  - Swiss VO
  - Danish VOs
  - Estonian Grid VO
  - Norgrid Users
  - M-grid VO
  - Australian VOs
- Resources Deploying NorduGrid

Next Steps

- I Brazilian LHC Computing Workshop
  - The purpose of this workshop is two-fold:
    - First, we intend to discuss:
      - The computing needs of each experiment
      - Establish the amount of computing resource that would be available in Brazil for processing the LHC data
    - Second, we intend to make:
      - A strategic plan to guarantee that the different middlewares and software could smoothly run in all the resources.
      - We should pursue the real integration of the resources in a distributed LHC Tier facility.
- Visit to CERN next June-July
  - Contacts and Discussions
  - Joint OSG and EGEE Operation Workshop

EXTRA SLIDES

OSG X LCG

- Q. **Which are the perspectives for the real integration of OSG and LCG?**
- A. *Jobs submitted by LCG VOs using the LCG Resource Broker can run on OSG sites that publish their information through the GlueSchema. Data can be moved between storage elements that are on the EGEE/LCG and OSG. To be "accepted" by OSG sites LCG VOs need to register with the OSG. This is a simple process. To date CMS, ATLAS and Geant4 have done this. In addition jobs can run on OSG that do not use the resource broker.*
- Q. **Experiments like LHCb or Alice, which have a small US participation, tend to use the LCG infrastructure. Are they going to be able to run their jobs also using OSG?**
- A. *Yes. if they register their VOs with the OSG as above.*
- Q. **On the other hand, Atlas has its US Tier 1 at BNL. Since our CMS Tier 2 should be associated to the Fermilab Tier 1, do you envisage any incompatibility of running Atlas jobs in our clusters?**
- A. *I don't see any problems. We are already running many ATLAS jobs on the CMS Tier-1 and Tier-2 sites.*