

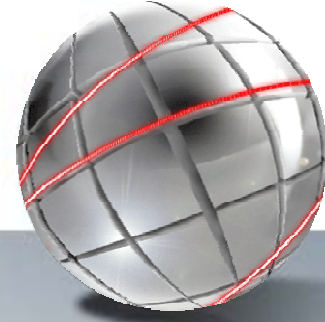
# ***I WORKSHOP do SPRACE***

***Março de 2007***

**SPRACE:**  
**do McFarm ao PhEDEX**  
***Eduardo Gregores***

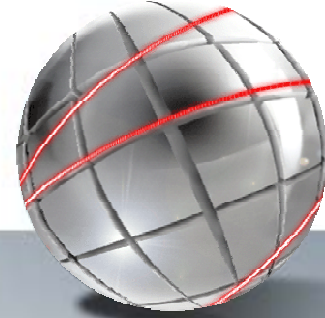


# Resumo



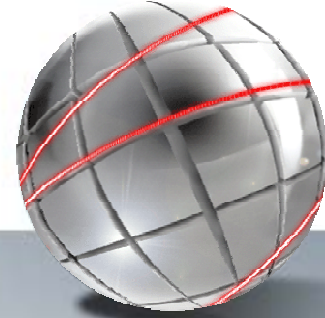
- **Evolução Histórica**
  - 1ª Fase: A Era McFarm
  - 2ª Fase: A Era SamGrid
  - 3ª Fase: A Era OSG
- **SPRACE no OSG**
  - Panorama Geral
  - Computing Element
  - Storage Element
- **SPRACE no CMS**
  - Monte Carlo e Reprocessamento (ProdAgent)
  - Trabalhos de Análise (JobRobot)
  - Gerenciamento de Dados (PhEDEx)

# SPRACE: Evolução Histórica



- **Retorno de Eduardo do Fermilab em final de 2001.**
  - Como contribuir para o DZero estando no Brasil?
  - Desenvolvimento de software e análise de dados
    - Compra de servidor biprocessado (d0server) com recursos do Pronex
    - Instalação do ambiente de desenvolvimento e análise do DZero (D0RunII)
    - Instalação do gerenciamento de dados do DZero (d0ift sam station)
- **Retorno de Sergio do Fermilab em final de 2002.**
  - Como estabelecer um grupo do DZero em São Paulo?
    - Apenas 2 pessoas, Sergio e Eduardo.
    - DZero iniciava implantação dos Regional Analysis Center (RAC's)
    - Santoro já propunha a implantação da Computação em Grid para o CMS
  - Recursos Físicos: Proposta de Projeto Temático
    - Criação do São Paulo Regional Analysis Center -- SPRACE
    - Audacioso, grande quantidade de recursos e apenas 2 pesquisadores
    - Prof. Gil do IFUSP oferece espaço em seu laboratório
  - Recursos Humanos: Proposta de Projeto Jovem Pesquisador
    - Absorção do Grupo de Fenomenologia já existente com 4 pesquisadores.
    - Participação no Experimento DZero
- **Projetos Aprovados:**
  - Temático aprovado em final de 2003
    - Criado o São Paulo Regional Analysis Center a ser implementado gradativamente em tres fases anuais.
    - Planejamento de cada fase determinado com objetivos, métodos e resultados esperados.
    - Sucesso total na realização de todas as fases.
  - Projeto Jovem Pesquisador aprovado em meados de 2004
    - Presença de Eduardo, Pedro e Lietti garantida por 3 anos.
    - Estabelecida a existência do grupo de Física de Altas Energias em São Paulo.
  - Projeto de Contratacao de Técnicos de Nível Superior aprovado em 2004
    - Contratação de Rogério como gerente de sistema do SPRACE

# Histórico > 1ª Fase > A Era McFarm



- **Objetivo da 1ª Fase**

- Instalação de um Centro de Análise Regional (RAC) do DZero
- Produção de Monte Carlo para colaboração

- **Execução do Projeto**

- Início do processo de compra em novembro de 2003
- Início das reformas do CPD, elétrica e de ar-condicionado em janeiro de 2004
- Pedido de auxílio à colaboração
  - Encontro com Spokesman do DZero em Janeiro de 2004 durante Lishep
  - Sugerida nossa inclusão no D0 Southern Analysis Region (D0SAR)
  - Oferecido envio de um especialista.
  - Oferecida garrafa de vinho se conseguissemos por uma farm de pé em menos de tres meses.
- Implantação da 1ª fase
  - Término das obras de instalação e chegada dos equipamentos em final de fevereiro
  - Vinda de Joel Snow em inicio de março por uma semana.
  - Primeiros eventos de Monte Carlo do DZero armazenados no Fermilab no final de marco.
  - Farm implantada e produzindo em menos de 1 mês.
  - Garrafa de vinho paga com satisfação ao Joel pelo Spokesman.



## • Equipamento

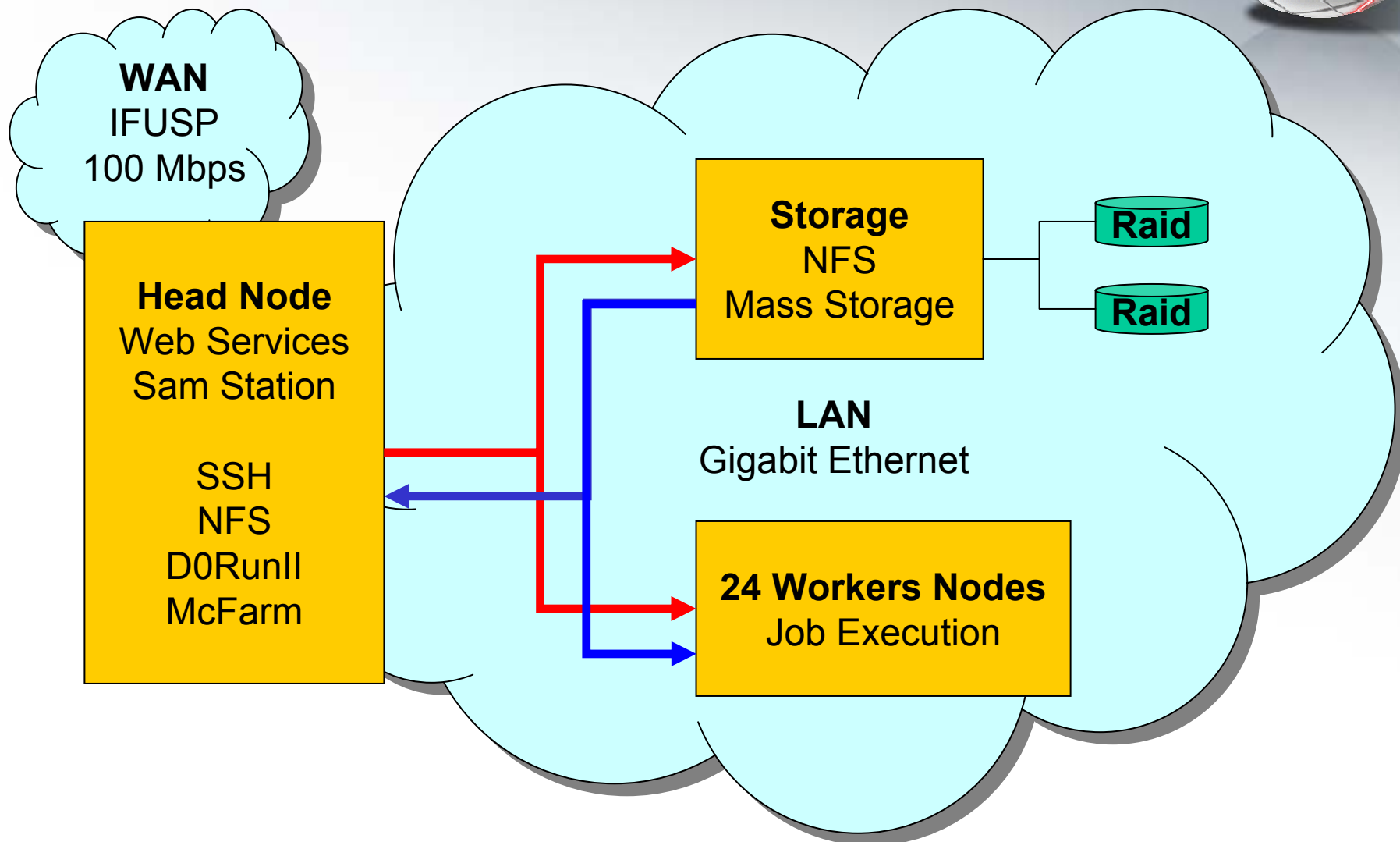
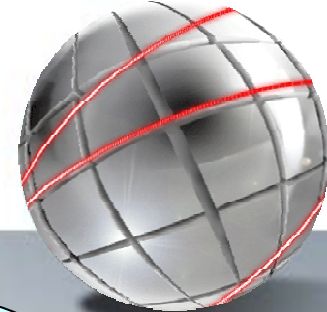
- 1 Head Node (sprace.if.usp.br, adm.cluster)  
Itautec Tower, Dual Xeon 2.4 GHz , 1GB RAM, 280 GB SCSI, dual Giga NIC
- 24 worker nodes (nodexx.cluster)  
Itautec 1U, Dual Xeon 2.4, 1GB RAM, 36 GB SCSI, dual Giga NIC
- 1 Storage Server (storage.cluster)  
Dell 2U, Dual Xeon 2.4, 1 GB RAM, 2x36 GB SCSI em RAID1, dual Giga NIC
- 2 RAID Modules  
2 particoes RAID5 de 2 TB cada
- 2 Switches 24 portas Gigabit.

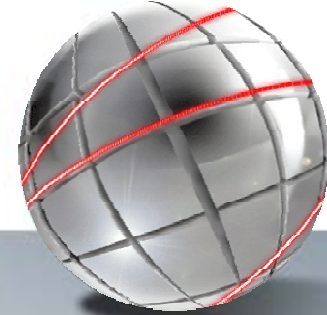
## • Configuração da Rede

- Head Node conectado à rede do Instituto de Física a 100 Mbps.
- Conexão interna Gigabit de todos os elementos do cluster.



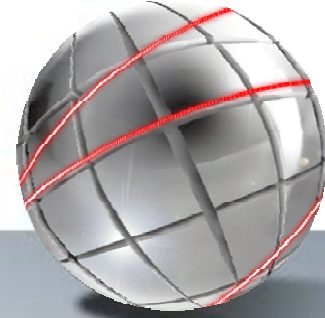
# Histórico > 1ª fase > Configuração do Cluster



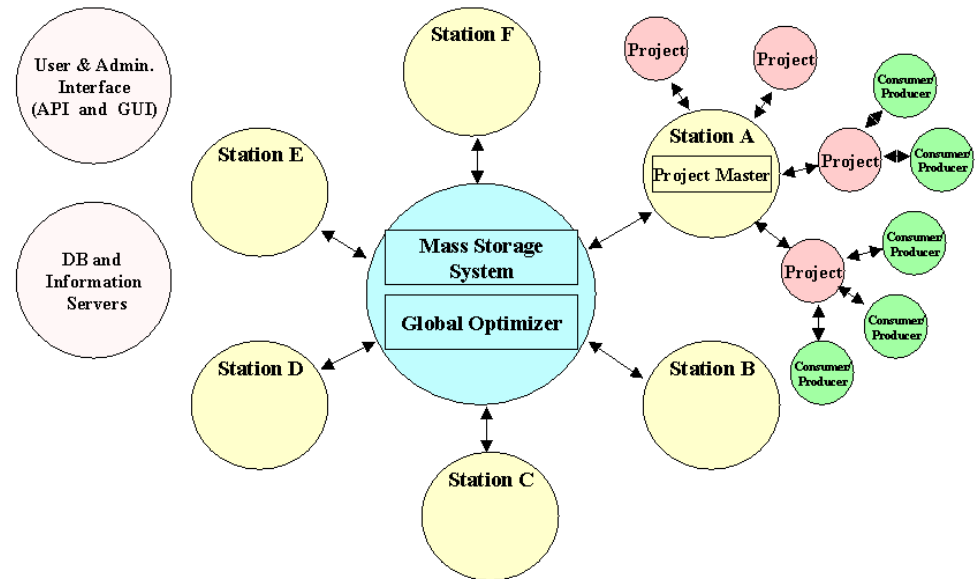


- **Produção de Monte Carlo**
  - Criar eventos que simulem um evento real.
  - 1 Evento → Conjunto dos produtos da reação
  - Calibrado com eventos reais conhecidos.
  - Gera-se eventos que se quer investigar.
  - Compara-se com eventos observados.
- **Etapas da Produção**
  - **D0RunJob**  
Encadeamento de todos os programas para a cadeia de processos
  - **McFarm**  
Gerenciamento da D0RunJob  
Distribuição dos jobs aos nodes  
Armazenamento no SAM dos resultados
  - **SAM**  
Gerenciamento de Dados do DZero  
Transferência dos Dados produzidos  
Registro dos dados produzidos
- **Cadeia de Processos**
  - **Event generation:**  
Generates physical events of interest.  
Pythia, Alpgen, Herwig, Isajet, Comphep, etc.  
External software.
  - **Experiment Simulation:**  
Software dependent.  
Full simulation of DZero RunII detector
    - D0GSTAR -- DØ GEANT Simulation of the Total Apparatus Response
    - How much energy is deposited in the active areas of the detector by the particle produced by the generator.
  - **Raw data simulation:**
    - D0SIM - Electronics Simulation.
    - Adds noise and inefficiencies to the events from D0GSTAR.
    - Merges hard scatter and minimum bias events.
    - Adds calorimeter pileup from previous crossings.
  - **Data Reconstruction.**  
Same functionality as for real data.
- **Aproximadamente 3 min. / evento**
- **~ 100.000 eventos / processo**

## Histórico > 1ª Fase > SAM



- Organized system of distributed servers.
  - Store and retrieve files and associated metadata.
    - Track locations and metadata for each file in the system.
    - Interface to a mass storage system on a robotic tape store.
    - Cache files on local disk and make them available for other stations.
    - GridFTP enabled for file transfers using globus (preferred method).
  - Provide methods of job submission for local or grid-aware systems.
  - Adaptable to grid submission systems using Condor and Globus grid tools.
- Used by DZero and CDF Experiments
- More than 50 SAM stations worldwide

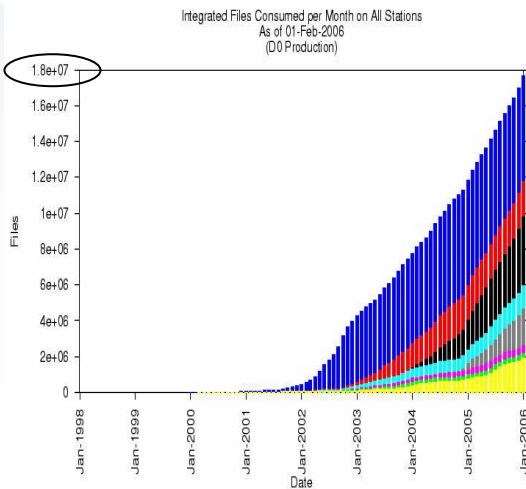




# Histórico > 1ª Fase > SAM in Numbers: The PetaByte Era

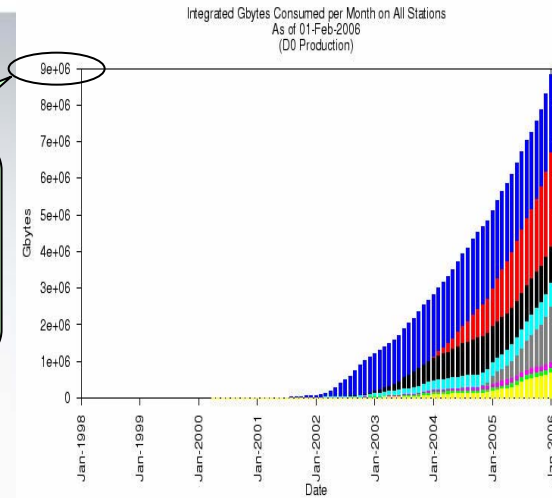


18 Million Files Delivered by the Stations



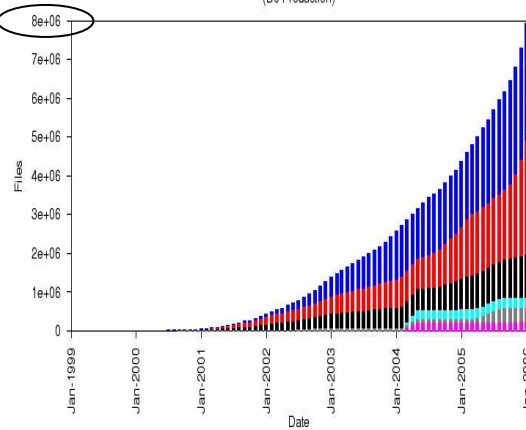
DataTier  
 central-analysis cab final-cabsrv1 final-farm final-cabsrv2 olued0-y5 d0karlsruhe other

9 PetaBytes of Data Delivered by the Stations



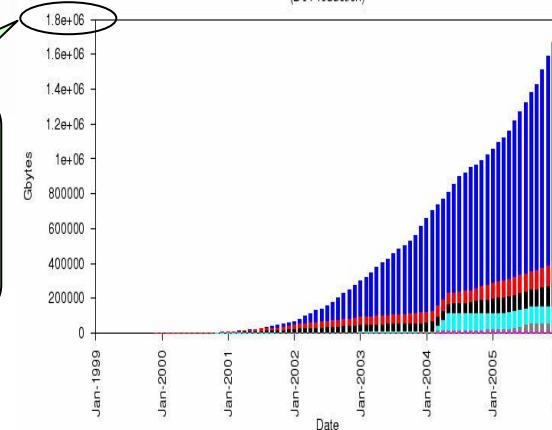
DataTier  
 central-analysis cab final-cabsrv1 final-farm final-cabsrv2 olued0-y5 d0karlsruhe other

8 Million Files Stored on Tape



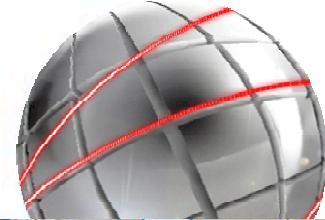
File Type  
 Detector Simulated (metadata-only) Simulated Generic Detector (metadata-only) Generic (metadata-only)

1.8 PetaBytes of Data Stored on Tape



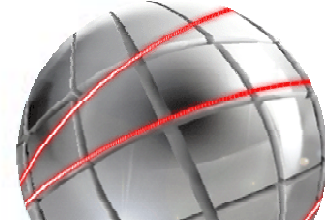
File Type  
 Detector Simulated (metadata-only) Simulated Generic Detector (metadata-only) Generic (metadata-only)

# Histórico > 2ª Fase > A Era SamGrid

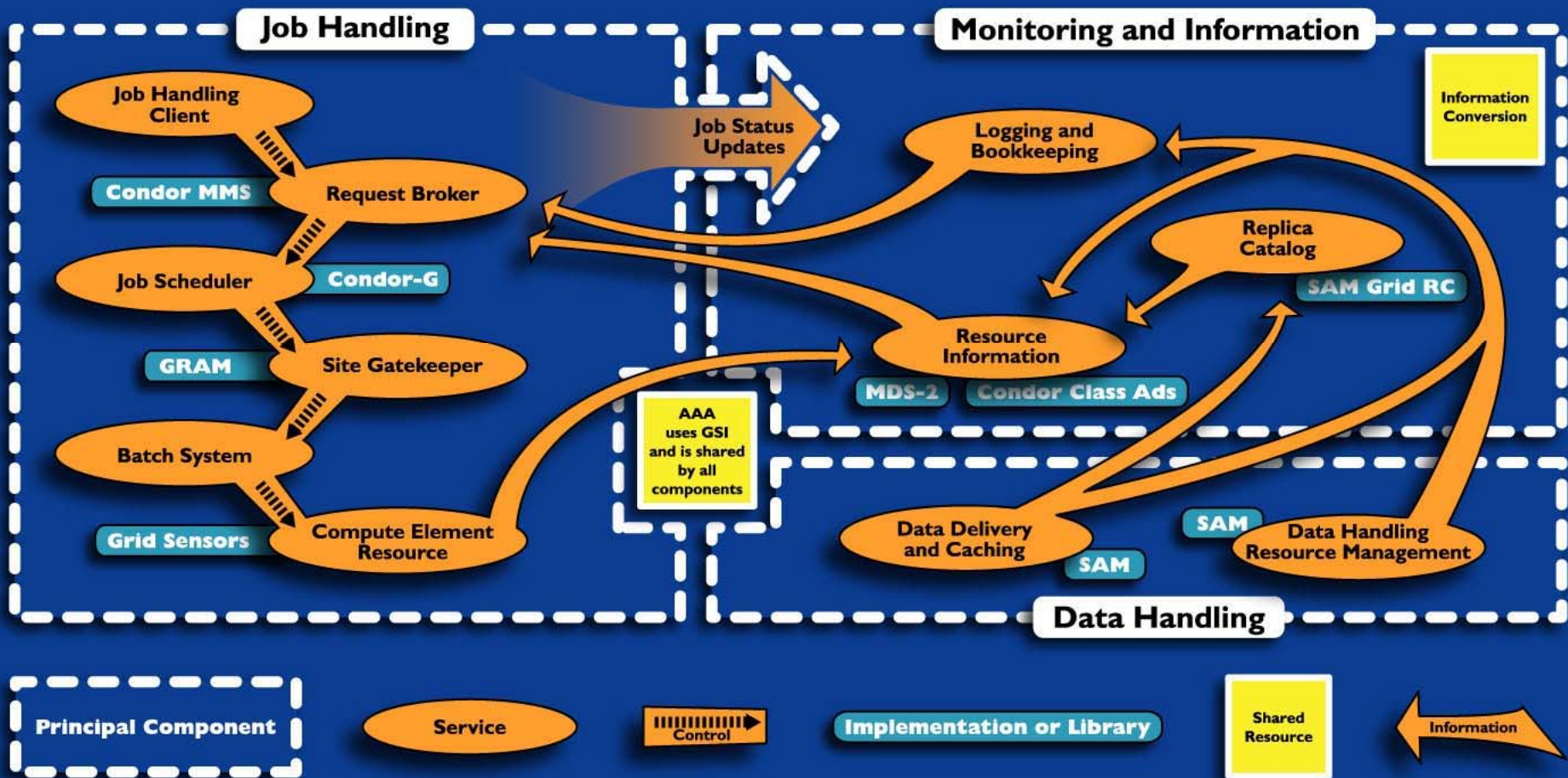


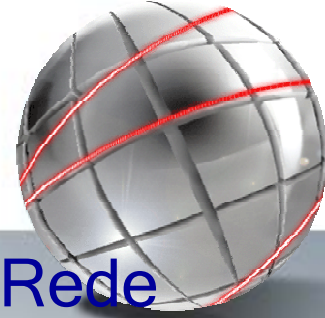
Participating Experiments:

- DO
- CDF



# SAM-Grid Architecture





### • Equipamento

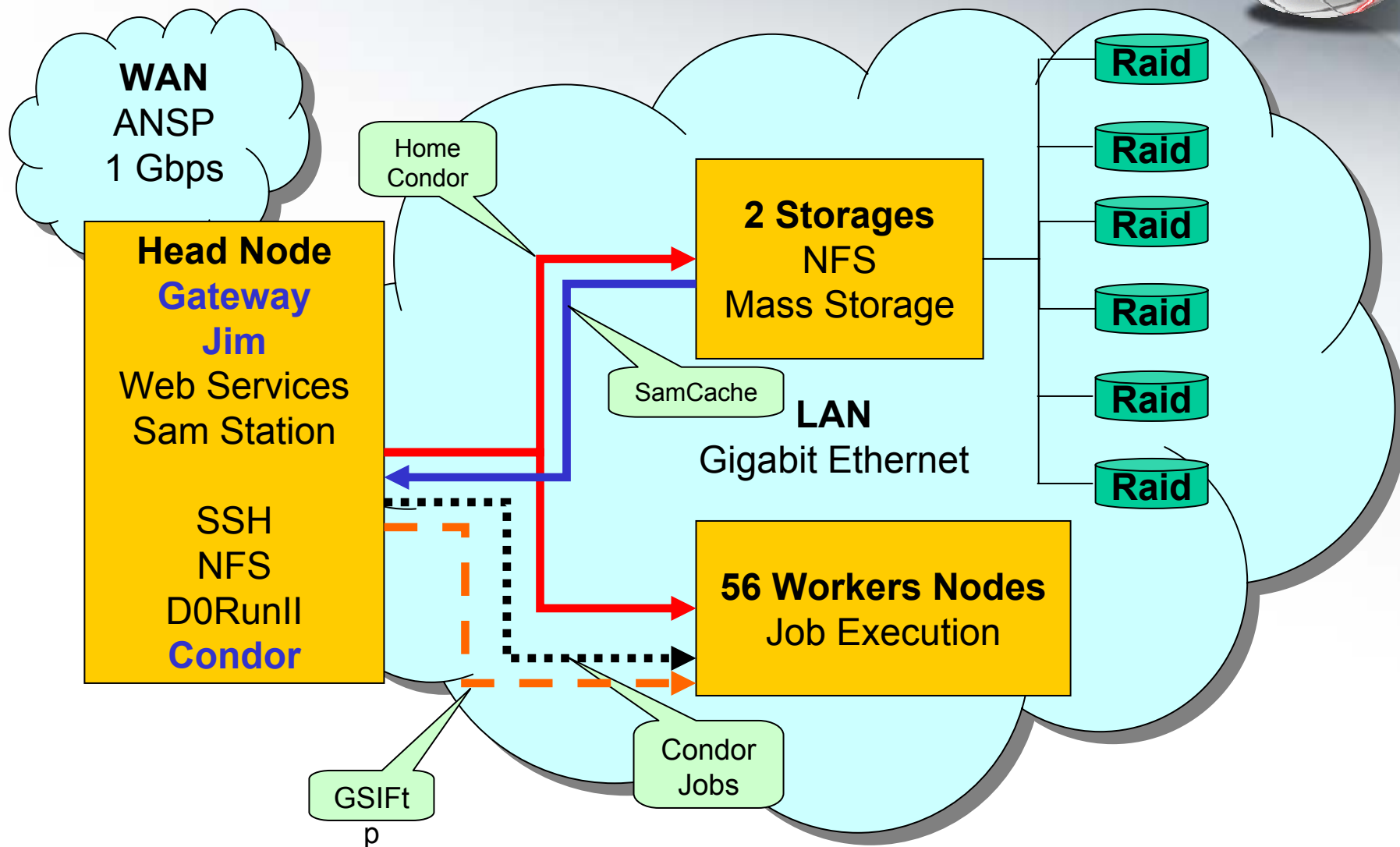
- 1 Head Node (sprace.if.usp.br, adm.cluster)
  - Itautec Tower, Dual Xeon 2.4 GHz , 1GB RAM, 280 GB SCSI, dual Giga NIC
- 56 worker nodes (nodexx.cluster)
  - 24 Itautec 1U, Dual Xeon 2.4, 1GB RAM, 36 GB SCSI, dual Giga NIC
  - 32 Itautec 1U, Dual Xeon 3.0, 2GB RAM, 36 GB SCSI, dual Giga NIC
- 2 Storage Server (storage.cluster)
  - Dell 2U, Dual Xeon 2.4, 1 GB RAM, 2x36 GB SCSI em RAID1, dual Giga NIC
  - Dell 1U, Dual Xeon 3.0, 2 GB RAM, 2x36 GB SCSI em RAID1, dual Giga NIC
- 6 RAID Modules
  - 6 particoes RAID5 de 2 TB cada
- 4 Switches 24 portas Gigabit.
- 1 Switch L3 Gigabit 24 + 4

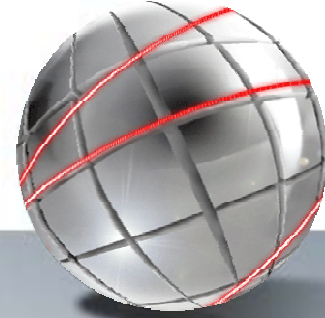
### • Configuração da Rede

- Cluster conectado diretamente ao PTT em 1 Gbps.
- Conexao interna Gigabit de todos os elementos do cluster.



# Histórico > 2ª fase > Configuração do Cluster



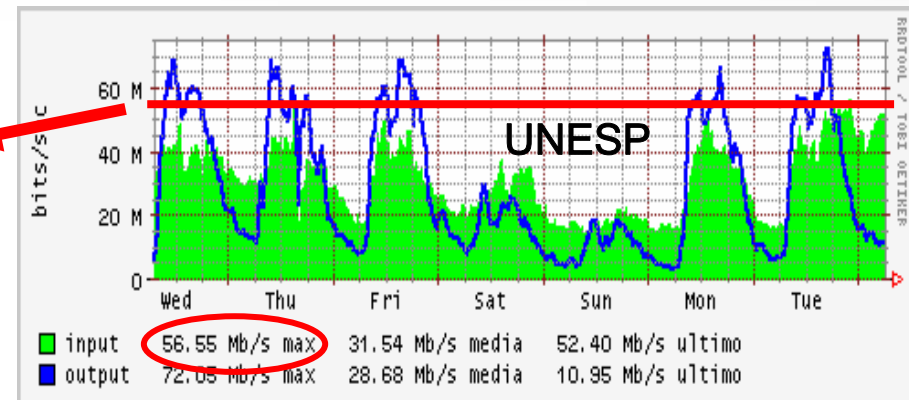
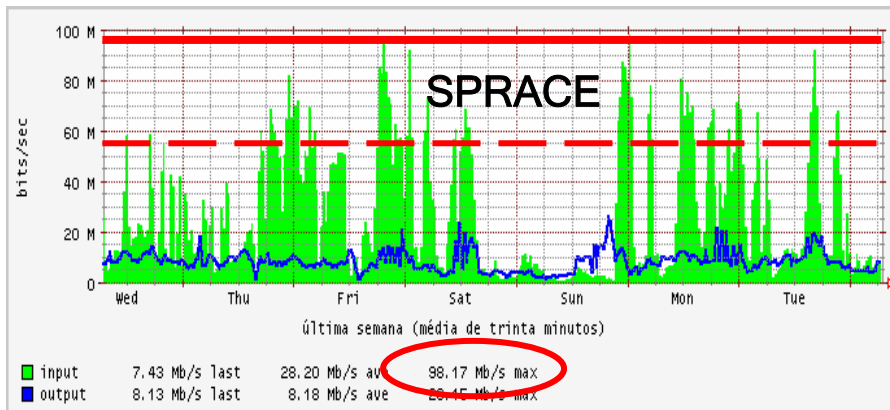


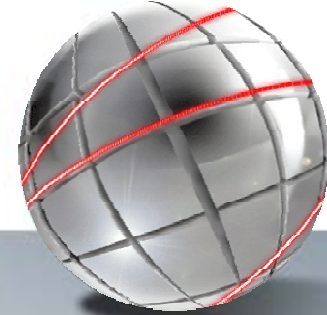
## Standalone Cluster

- From March/04 to July/05.
- Monte Carlo Production
  - Produced about 4.5 Million events.
  - Stored more than 1.4 TBytes on tape at Fermilab.

## SamGrid Enabled

- Started Operation on July/05
- Data Reprocessed at SPRACE:
  - 4,253 raw data files
  - 9,206,931 events
  - 3.12 TB of data
- Monte Carlo Production
  - About 10 million events produced up to now.





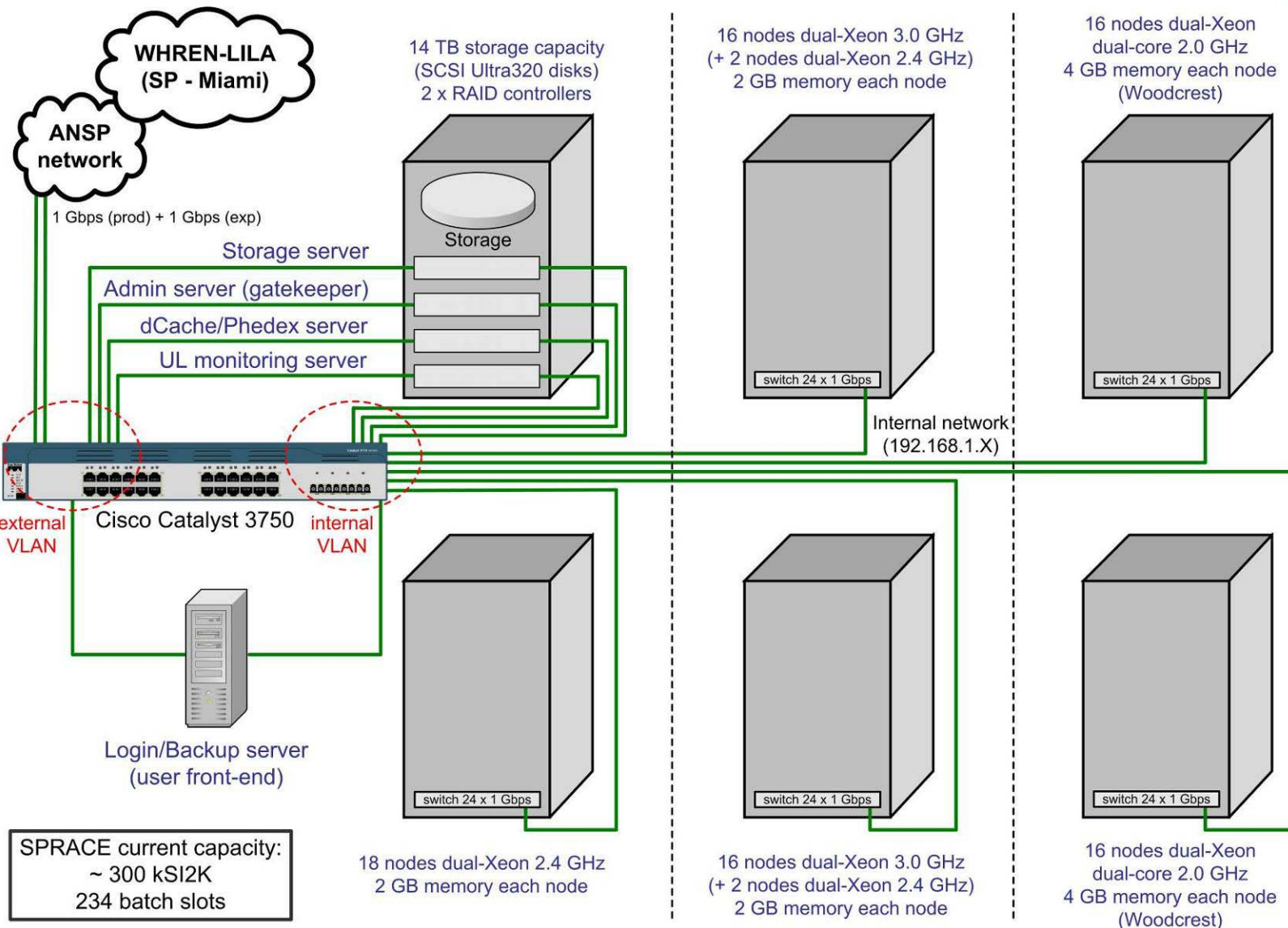
- **SPRACE Cluster:**

- 20 dual Xeon 2.4 GHz 1GB workers since March 2004.
- 32 dual Xeon 3.0 GHz 2 GB workers since June 2005.
- 32 dual Xeon dual Core (Woodcrest) 2.4 GHz 4GB
- 1 CE head node, 1 disk server, 1 SE head node.
- 12 TB on 4 RAID modules (SCSI Ultra 360 10K).
- 232 Condor batch slots with 320 kSpecInt2k of overall computing power.
- Extra 16 TB on local disks to be deployed soon, making 28 TB total.

- **SPRACE Connectivity:**

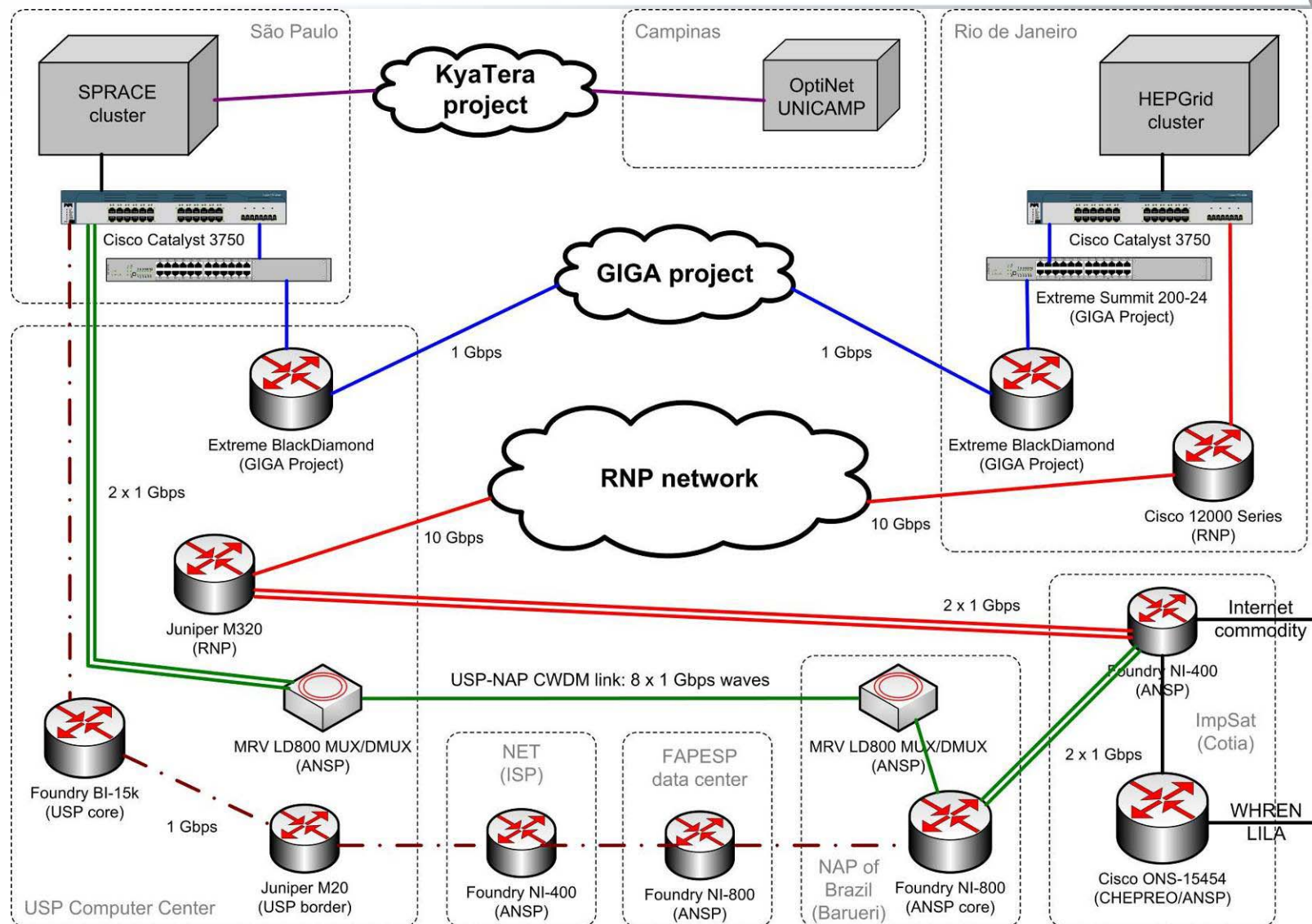
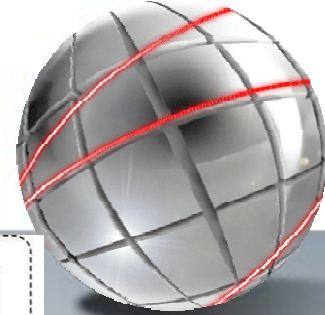
- Internal Gigabit connection between all cluster elements.
- Exclusive Gigabit Lambda to WHREN-LILA Giga link to Abilene(1.2 → 2.5 Gbps soon).

# Histórico > 3ª Fase > Equipamento

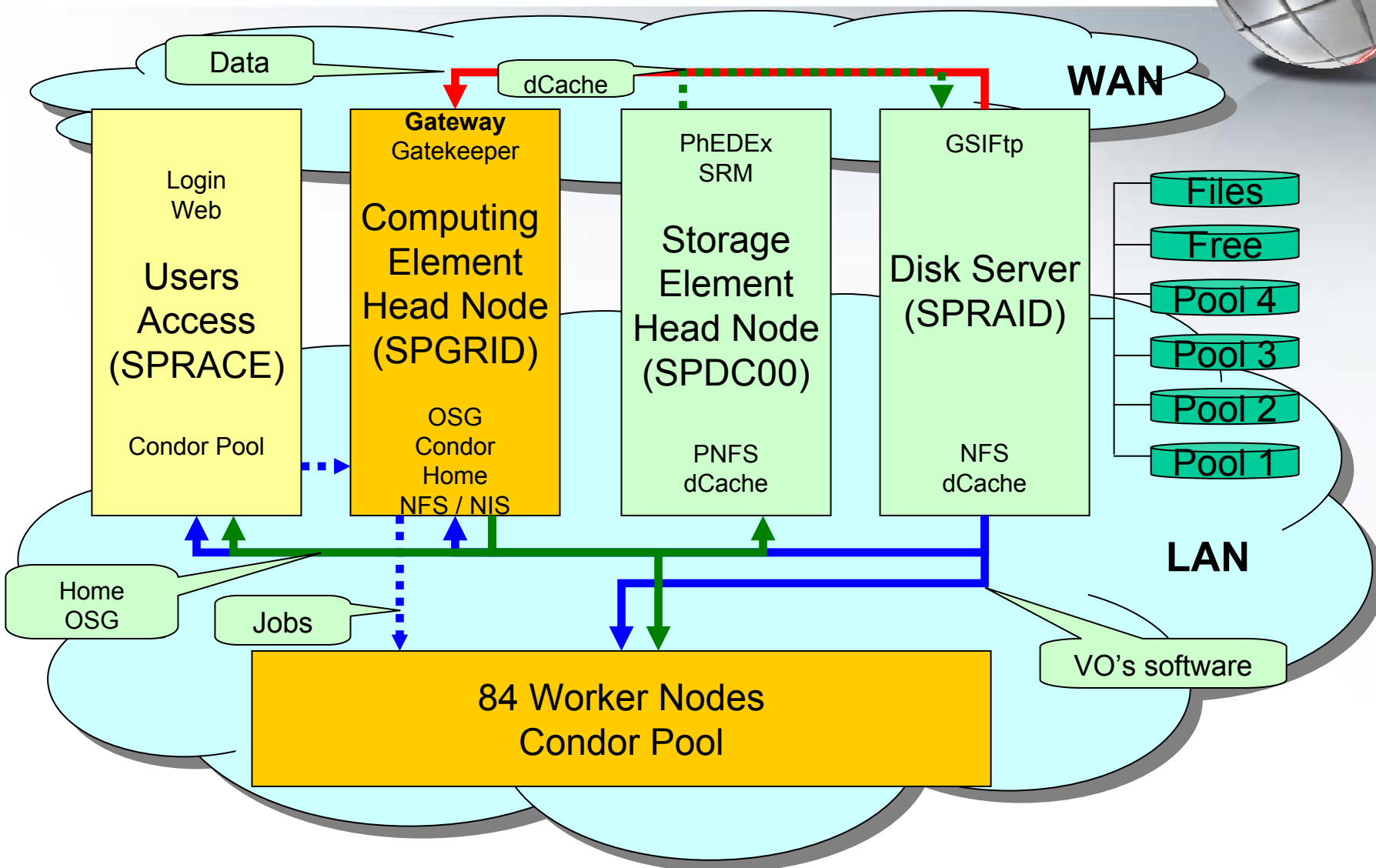
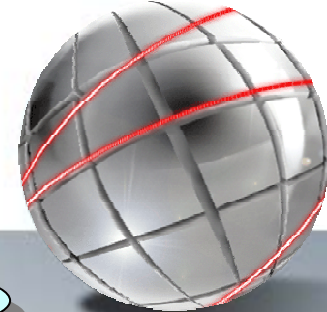




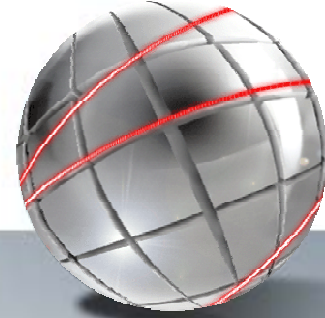
# Histórico > 3ª Fase: > Configuração de Rede



# Histórico > 3ª Fase > Configuração



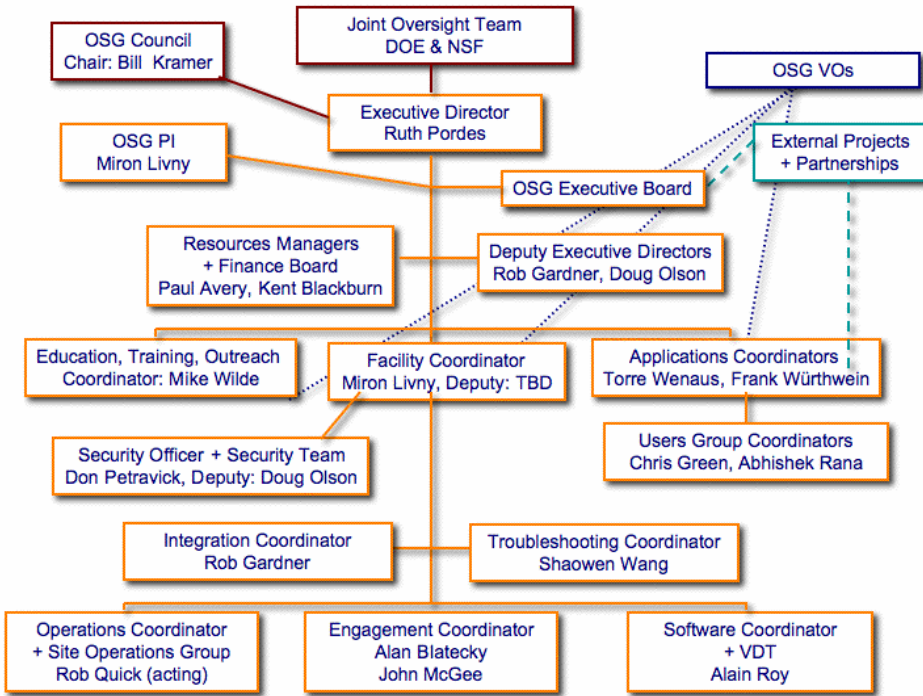
# SPRACE no OSG



## • What is the Open Science Grid?

- Distributed computing infrastructure for large-scale scientific research
- Built and operated by a consortium of universities, national laboratories, scientific collaborations and software developers.
- Formed in 2004 as continuation of Grid3, built in 2003.

## • Organizational Chart



## • Virtual Organizations

- Collider Detector at Fermilab (CDF)
- Compact Muon Solenoid (CMS)
- DZero
- Dark Energy Survey (DES)
- **Distributed Organization for Scientific and Academic Research (DOSAR)**
- Fermi National Accelerator Laboratory (Fermilab)
- Functional Magnetic Resonance Imaging (fMRI)
- Genome Analysis and Database Update (GADU)
- Grid Laboratory of Wisconsin (GLOW)
- Grid Resources for Advanced Science and Engineering (GRASE)
- GridChem
- Grid Research and Education Group at Iowa (GROW)
- International Virtual Data Grid Laboratory (iVDGL)
- Laser Interferometer Gravitational-Wave Observatory (LIGO)
- Mixed Apparatus for Radar Investigation of Cosmic-rays of High Ionization Experiment (MARIACHI)
- nanoHUB Network for Computational Nanotechnology (NCN)
- Northwest Indiana Computational Grid (NWICG)
- OSG Education Activity
- OSG Monitoring Information System (MIS)
- OSG Operations Technical Group
- Open Science Grid (OSG)
- Sloan Digital Sky Survey (SDSS)
- Solenoidal Tracker at RHIC (STAR)
- US ATLAS Collaboration



## Compute Element

- **Head Node: spgrid.if.usp.br**
  - OSG 0.4.1
    - Globus - Basic grid job handling system.
    - Monalisa - Monitoring tool.
    - GUMS/PRIMA - Grid User Membership Service. Maps and authenticates VO registered users to local accounts.
    - GIP - OSG Generic Information Provider based on the GLUE schema.
    - BDII - Berkeley Database Information Index for LCG interfacing
  - Condor Batch System. Distribute jobs to the workers.
  - Ganglia: Cluster monitoring system
  - NFS: Exports OSG and Condor to the Workers
- **Work Nodes:**
  - 84 Workers
  - NFS access to OSG, Condor and VO's Application area.
  - Work done on local scratch partition.

## Storage Element:

- **Head Node: spdc00.if.usp.br**
  - PNFS: Locally Distributed File System
  - dCache: Local Storage File Catalogue System
  - SRM: Local Storage Resources Management System
  - Phedex: CMS File Transfer and Catalogue System
  - Squid: CMS Calibration Database System for analysis jobs.
- **dCache Pool Nodes:**
  - Each node runs its own transfer agent and has its own WAN IP for overall enhanced connectivity.
  - dCache-pool and SRM clients.
  - File Server: spraid.if.usp.br
    - Raid arrays server (12 TB).
    - Exports VO's Application area to all cluster
  - Work Nodes: spdcNN.if.usp.br
    - Uses Compute Element Worker Nodes hardware
    - Local dedicated high capacity SATA disks.



## • Configuração Geral:

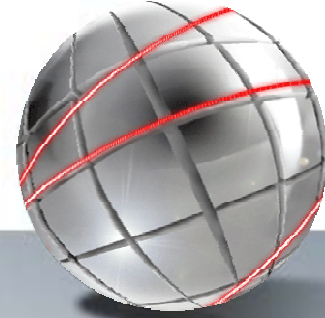
- **Hostnames:**  
spgrid.if.usp.br (200.136.80.4)  
spg00.grid (192.168.1.150)
- **Networks:**  
200.136.80.0/24 (WAN)  
192.168.1.0/24 (LAN)
- **NIS Domain:** grid
- **NFS Exports:**  
/local/home 192.168.1.0/24  
/OSG 192.168.1.0/24
- **NFS Mounts:**  
storage:/raid0 /raid0
- **Symbolic Links:**  
/OSG -> /usr/local/opt/OSG  
/opt -> /usr/local/opt  
/share -> /usr/local/share  
/scratch -> /usr/local/scratch  
/home -> /usr/local/home
- **Partitions:**  
/dev/sda7 2.0G 34M 1.9G 2% /tmp  
/dev/sda5 9.9G 4.6G 4.9G 49% /usr  
/dev/sda8 12G 5.9G 5.1G 54% /usr/local  
/dev/sda6 4.0G 1.4G 2.4G 36% /var

## • Política de Acesso e Segurança:

- **sshd**  
PermitRootLogin no  
PasswordAuthentication no
- **Deny:**  
ALL: ALL
- **Allow:**  
vdt-run-gsiftp.sh : ALL  
vdt-run-globus-gatekeeper.sh : ALL  
ALL: .unesp.br 200.145. ...
- **Firewall:**  
#Portas do servidor abertas  
UDPPORTSADM="22 80 1024:"  
TCPPTSADM="22 80 1024:"  
#Portas do cluster abertas  
UDPPORTSCLUSTER="1024:"  
TCPPTSCLUSTER="1024:"

## • Monitoramento Ganglia

- **gmetad.conf**  
data\_source "SPGRID Cluster" spgrid.if.usp.br  
gridname "SPSPACE"  
authority "http://spgrid.if.usp.br/ganglia/"
- **gmond.conf**  
name "SPGRID Cluster"  
owner "SPSPACE-HEP"  
url "http://spgrid.if.usp.br/"  
mcast\_if eth1



- **Versão 0.4.1**

- /usr/local/opt/OSG

- **Globus Gatekeeper Configuration**

- /usr/local/opt/OSG/globus/etc/globus-gatekeeper.conf

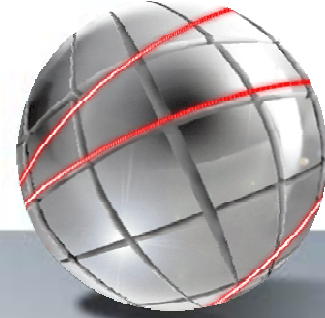
```
-x509_cert_dir /usr/local/opt/OSG/globus/TRUSTED_CA
-x509_user_cert /etc/grid-security/hostcert.pem
-x509_user_key /etc/grid-security/hostkey.pem
-logfile var/globus-gatekeeper.log
-acctfile var/accounting.log
-grid_services etc/grid-services
-port 2119
```

- **Globus Gatekeeper Logs**

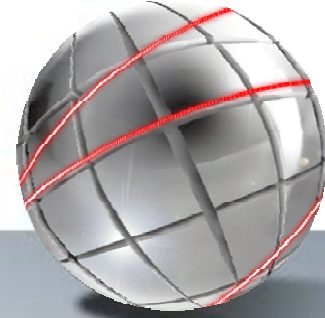
- /usr/local/opt/OSG/globus/var/accounting.log

```
JMA 2007/03/19 16:03:21 GATEKEEPER_JM_ID 2007-03-19.16:03:18.0000011315.0000000000 for
/DC=org/DC=doegrids/OU=People/CN=Dag Gillberg 739968 on 131.225.217.202
JMA 2007/03/19 16:03:21 GATEKEEPER_JM_ID 2007-03-19.16:03:18.0000011315.0000000000 mapped to dzero
(800, 800)
JMA 2007/03/19 16:03:21 GATEKEEPER_JM_ID 2007-03-19.16:03:18.0000011315.0000000000 has
GRAM_SCRIPT_JOB_ID 134482 manager type managedfork
```

## OSG > Computing Element > Head Node > Gatekeeper



- /usr/local/opt/OSG/globus/var/globus-gatekeeper.log
  - Mon Mar 19 16:32:51 2007
  - 16318 -- Notice: 6: /usr/local/opt/OSG/globus/sbin/globus-gatekeeper pid=16318 starting at Mon Mar 19 16:32:51 2007
  - ...
  - 16318 -- Notice: 6: Got connection 131.225.217.202 at Mon Mar 19 16:32:51 2007
  - ...
  - 16318 -- Notice: 5: Authenticated globus user: /DC=org/DC=doegrids/OU=People/CN=Dag Gillberg 739968
  - ...
  - 16318 -- PRIMA DEBUG prima\_module.c:266 \*\* Starting Privilege/Prima authorization callout \*\*
  - ...
  - 16318 -- PRIMA INFO Mapping service  
https://spgrid.if.usp.br:8443/gums/services/GUMSAuthorizationServicePort returned local user "dzero"  
for globus user "/DC=org/DC=doegrids/OU=People/CN=Dag Gillberg 739968"
  - ...
  - 16318 -- Notice: 5: Requested service: jobmanager-condor
  - 16318 -- Notice: 5: Authorized as local user: dzero
  - 16318 -- Notice: 5: Authorized as local uid: 800
  - 16318 -- Notice: 5:           and local gid: 800
  - 16318 -- Notice: 0: executing /usr/local/opt/OSG/globus/libexec/globus-job-manager
  - 16318 -- Notice: 0: GATEKEEPER\_JM\_ID 2007-03-19.16:32:53.0000016318.0000000000 for  
/DC=org/DC=doegrids/OU=People/CN=Dag Gillberg 739968 on 131.225.217.202
  - 16318 -- Notice: 0: Child 16342 started

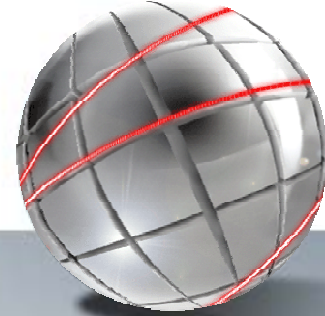


- OSG permite 3 modos de autenticação:
  - Grid3 ou Grid-mapfile Local
    - Authorization is performed only via the *grid-mapfile* on the Compute Element (CE) node.
    - Grid-mapfile created manually on each CE node
    - Grid-mapfile created using the *edg-mkgridmap* root cron
    - GUMS is not used.
  - Compatibilidade
    - Authorization is performed via the grid-mapfile on the Compute Element (CE) node.
    - Grid-mapfile created by GUMS.
    - GUMS polls VOMS Admin periodically to create the grid-mapfile
  - Full Privilege (role-enabled)
    - Implements the PRIMA authorization module with GUMS.
    - Does not use the grid-mapfile.
    - The gatekeeper uses a callout to PRIMA upon receipt of each request
    - PRIMA forwards the request to the GUMS web service which performs the dynamic mapping.
    - PRIMA can process Fully Qualified Attribute Names (FQAN).
    - Enables mapping based on VO groups and roles as defined in VOMS
- PRIMA
  - `/etc/grid-security/prima-authz.conf`

```
imsContact https://spgrid.if.usp.br:8443/gums/services/GUMSAuthorizationServicePort
samlSchemaDir /usr/local/opt/OSG/prima/etc/opensaml/
serviceCert /etc/grid-security/hostcert.pem
serviceKey /etc/grid-security/hostkey.pem
caCertDir /usr/local/opt/OSG/globus/TRUSTED_CA
```
  - `/etc/grid-security/gsi-authz.conf`

```
globus_mapping /usr/local/opt/OSG/prima/lib/libprima_authz_module_gcc32dbg globus_gridmap_callout
```

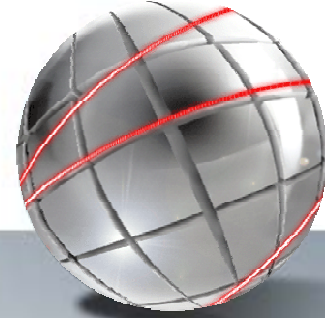




## • GUMS

- /OSG/vdt-app-data/gums/gums.config → /usr/local/opt/OSG/tomcat/v5/webapps/gums/WEB-INF/classes/gums.config

```
...
<groupMapping name='dzero' accountingVo='dzero' accountingDesc='dzero'>
  <userGroup className='gov.bnl.gums.VOMSGroup'
    url='https://fermigrid2.fnal.gov:8443/voms/dzero/services/VOMSAdmin'
    persistenceFactory='mysql'
    name='dzero'
    voGroup="/dzero"
    sslCertfile='/etc/grid-security/http/httpcert.pem'
    sslKey='/etc/grid-security/http/httpkey.pem'
    acceptProxyWithoutFQAN="true"
    matchFQAN="ignore" />
  <accountMapping className="gov.bnl.gums.GroupAccountMapper" groupName="dzero"/>
</groupMapping>
...
<groupMapping name="uscmsprod" accountingVo="uscms" accountingDesc="CMS">
  <userGroup className="gov.bnl.gums.VOMSGroup"
    url="https://lcg-voms.cern.ch:8443/voms/cms/services/VOMSAdmin"
    persistenceFactory="mysql"
    name="cmsprod"
    voGroup="/cms/uscms"
    voRole="cmsprod"
    matchFQAN="exact"
    sslCertfile="/etc/grid-security/http/httpcert.pem"
    sslKey="/etc/grid-security/http/httpkey.pem"/>
  <accountMapping className="gov.bnl.gums.GroupAccountMapper" groupName="cmsprod"/>
</groupMapping>
...
<hostGroup className='gov.bnl.gums.WildcardHostGroup' wildcard='*.if.usp.br'
  groups='uscmsprod,cmsuser,uscmsuser,uscmst2admin,uscmsphedex,uscmssoft,uscmsfrontier,cmsuser-
null,usatlas,osg,mis,fmri,grase,usatlas-voms,gridex,ligo,ivdgl,gadu,GLOW-voms,cdf-
voms,nanohub,dzero,dzeroana,sdss,ops' />
```



- **Generic Information Provider (aka GIP)**

- `/usr/local/opt/OSG/monitoring/osg-attributes.conf`

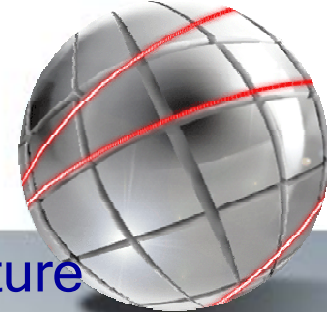
```
OSG_LOCATION="/usr/local/opt/OSG"
GLOBUS_LOCATION="/usr/local/opt/OSG/globus"
OSG_GROUP="OSG"
OSG_SITE_NAME="SPRACE"
OSG_SPONSOR="uscms:60 dzero:30 dosar:10"
OSG_SITE_INFO="spgrid.if.usp.br"
OSG_CONTACT_NAME="Eduardo Gregores"
OSG_CONTACT_EMAIL="gregores@fnal.gov"
OSG_SITE_CITY="Sao Paulo"
OSG_SITE_COUNTRY="Brazil"
OSG_SITE_LONGITUDE="-46.7358"
OSG_SITE_LATITUDE="-23.5592"
OSG_DEFAULT_SE="gsiftp://spgrid.if.usp.br/raid0/OSG"
OSG_GRID="/OSG"
OSG_APP="/usr/local/share/OSG/app"
OSG_DATA="/usr/local/share/OSG/data"
OSG_WN_TMP="/scratch/OSG"
OSG_STORAGE_ELEMENT="y"
OSG_SITE_READ="/usr/local/share/OSG/input"
OSG_SITE_WRITE="/usr/local/share/OSG/output"
OSG_MONALISA_SERVICE="y"
OSG_GANGLIA_SUPPORT="y"
OSG_GANGLIA_HOST="spgrid.if.usp.br"
OSG_GANGLIA_PORT="8651"
OSG_VO_MODULES="y"
OSG_JOB_MANAGER="condor"
OSG_JOB_MANAGER_HOME="/usr/local/opt/OSG/condor"
OSG_CONDOR_LOCATION="/usr/local/opt/OSG/condor"
OSG_CONDOR_CONFIG="/usr/local/opt/OSG/condor/etc/condor_config"
OSG_PBS_LOCATION=""
OSG_FBS_LOCATION=""
OSG_SGE_LOCATION=""
OSG_SGE_ROOT=""
OSG_LSF_LOCATION=""
OSG_JOB_CONTACT="spgrid.if.usp.br/jobmanager-condor"
OSG_UTIL_CONTACT="spgrid.if.usp.br/jobmanager"
OSG_USER_VO_MAP="/usr/local/opt/OSG/monitoring/grid3-user-vo-map.txt"
OSG_GRIDFTP_LOG="/usr/local/opt/OSG/globus/var/gridftp.log"
```

- **Grid Laboratory Uniform Environment (GLUE)**

- Collection of attributes with a name, multiplicity, type and description of the content

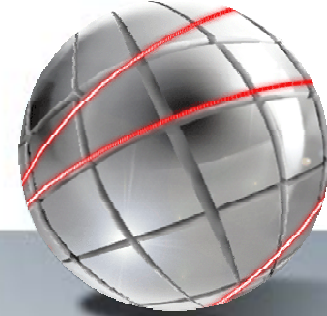
- **Berkeley Database Information Index (BDII)**

- Make US LCG resources within OSG visible to the LCG grid
- LDAP databases that are populated by an update process



- Monitoring Agents in A Large Integrated Services Architecture (MonALISA)
  - /usr/local/opt/OSG/MonaLisa/Service/CMD/  
MONALISA\_USER=daemon  
JAVA\_HOME=/usr/local/opt/OSG/jdk1.4  
SHOULD\_UPDATE=true  
MonaLisa\_HOME=/usr/local/opt/OSG/MonaLisa  
FARM\_HOME=\${MonaLisa\_HOME}/Service/VDTFarm  
FARM\_CONF\_FILE=\${FARM\_HOME}/vdtFarm.conf
  - /usr/local/opt/OSG/MonaLisa/Service/VDTFarm/ml.properties  
MonaLisa.ContactName=Eduardo Gregores  
MonaLisa.ContactEmail=gregores@fnal.gov  
MonaLisa.Location=Sao Paulo  
MonaLisa.Country=Brazil  
MonaLisa.LAT=-23.5592  
MonaLisa.LONG=-46.7358  
lia.Monitor.LUSs=monalisa.cacr.caltech.edu,monalisa.cern.ch  
lia.Monitor.group=OSG  
lia.Monitor.useIPaddress=200.136.80.4

# OSG > Computing Element > Condor Batch System



## • Condor

- Used to manage a cluster of dedicated compute nodes
- Used to harness wasted CPU power from otherwise idle desktop workstations
- Seamlessly combine all of an organization's computational power into one resource
- Flocking technology allows multiple Condor compute installations to work together
- Provides:
  - Job queueing mechanism
  - Scheduling policy
  - Priority scheme
  - Resource monitoring
  - Resource management

## • Condor-G

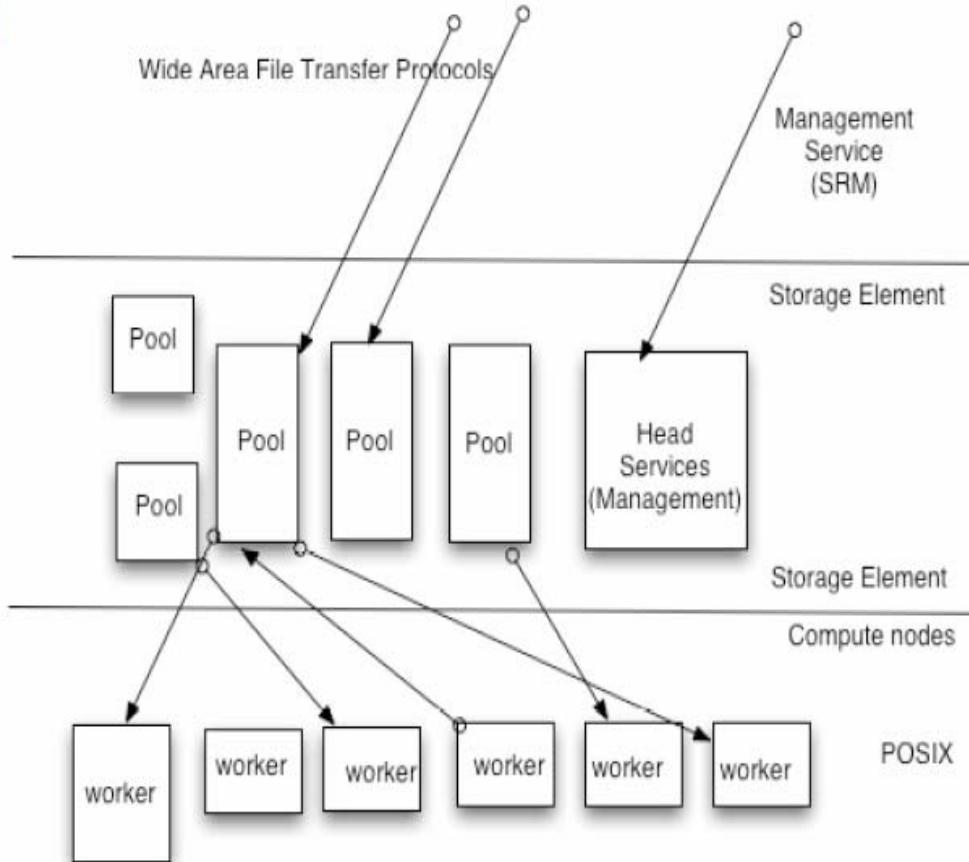
- Computation Management Agent for Multi-Institutional Grids
- Combine the inter-domain resource management protocols of the Globus Toolkit and the intra-domain resource management methods of Condor
- Harness multi-domain resources as if they all belong to one personal domain.

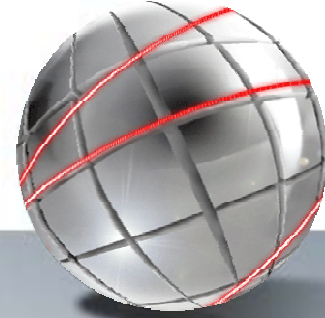
## • Condor Configuration at SPRACE

- HomeDir = /scratch/condor/
- On Head Node
  - /usr/local/opt/OSG/condor/etc/condor\_config
    - CONDOR\_HOST = spg00.grid
    - CONDOR\_LOCATION = /usr/local/opt/OSG/condor
    - RELEASE\_DIR = \$(CONDOR\_LOCATION)
    - LOCAL\_DIR = \$(TILDE)
    - LOCAL\_CONFIG\_FILE = \$(LOCAL\_DIR)/condor\_config.local
    - CONDOR\_ADMIN = root@spgrid.if.usp.br
    - UID\_DOMAIN = grid
    - FILESYSTEM\_DOMAIN = grid
    - COLLECTOR\_NAME = SPRACE
    - USE\_NFS = True
    - MAX\_JOBS\_RUNNING = 250
    - APPEND\_REQUIREMENTS = (\
    - (Disk > 3000000 || machine == "spgrid.if.usp.br") && \
    - (UidDomain == "grid") && \
    - (machine != "spgrid.if.usp.br" || JobUniverse == 12 || Owner == "cmssoft"))
  - /scratch/condor/condor\_config.local
    - COLLECTOR\_NAME = SPRACE
    - DAEMON\_LIST = MASTER, COLLECTOR, NEGOTIATOR, STARTD, SCHEDD
    - COLLECTOR = \$(SBIN)/condor\_collector
    - NEGOTIATOR = \$(SBIN)/condor\_negotiator
    - NETWORK\_INTERFACE = 192.168.1.150
- On Workers
  - /scratch/condor/condor\_config.local
    - Blanc File



# Storage Element



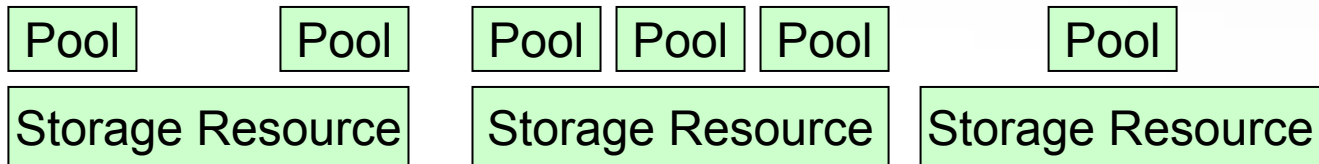


Phedex: Data Catalogue, Replica Manager, Data Movement

SRM: Storage Resource Management (Pull, Push)

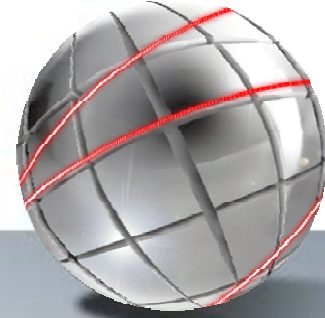
dCache: Posix translator from pNFS, Pool manager

pNFS: Local File Database Location

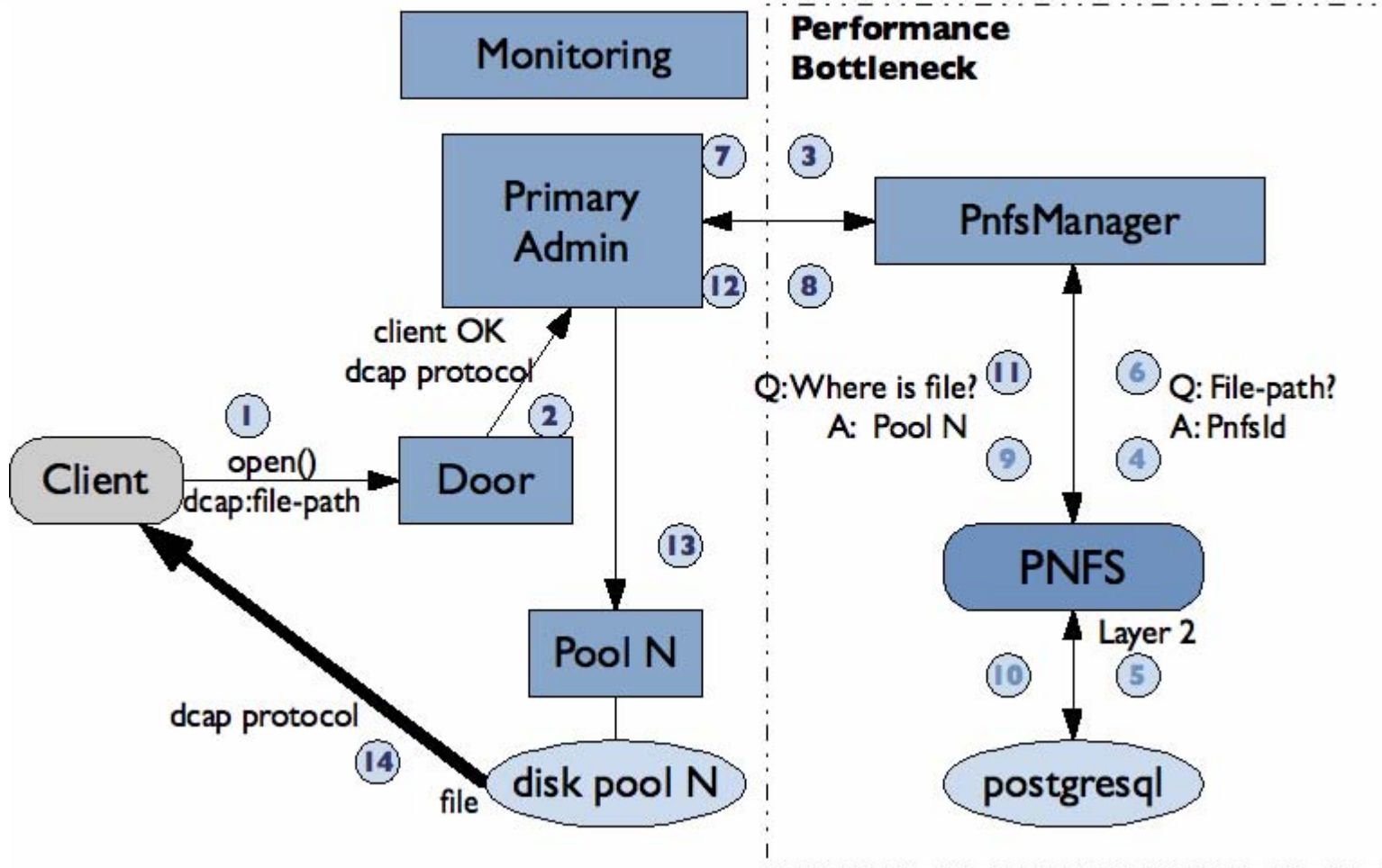




- Uses single name space across the entire pool of disk servers.
- Distributed storage resources looks like a single, giant disk system to the users.
- Pretty Normal File System (pnfs) provides the single name space
- Key features of dCache:
  - Combine hundreds of commodity disk servers to get a huge petabyte scale data store
  - Strict separation of the namespace from the data repositories increases fault tolerance
  - Allows several copies of a single file for distributed data access
  - Internal load balancing using cost metrics and transfers between the site's pools
  - Automatic file replication on high load ("hotspot detection")
- Running on sites from a few terabytes to petabyte systems
- A dCache installation consists of:
  - Admin Node which run the administrative services and modules.
  - Door Nodes which provide IO access through GridFTP to the stores.
  - pnfs Node, the system that masks the complexity of the data store by mapping logical names to physical locations that may be spread out across disk.
  - Pool Nodes, the systems that manage the pools of storage. There may be one pool node or hundreds.



# Client Reads File In dCache

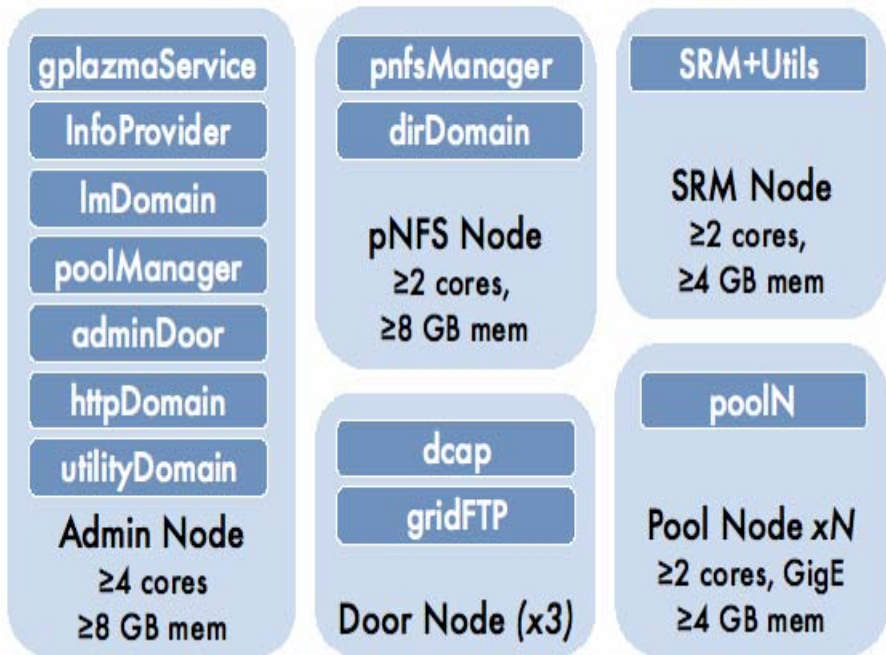






- Recommended by OSG

### OSG Tier 2 dCache Installation



- On SPRACE

- spdc00

- Dual Xeon 2.4 GHz, 2 GB mem

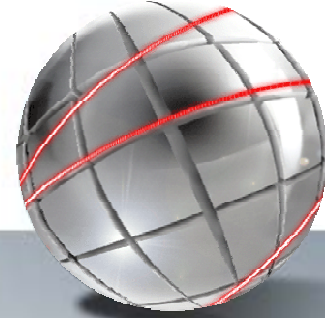
InfoProvider	utilityDomain
ImDomain	pnfsManager
poolManager	dirDomain
adminDoor	SRM+Utils
httpDomain	

- spraid

- Dual Xeon 2.4 GHz, 2 GB mem

poolN  
gridFTP

# OSG > Storage Element > Configuração na spdc00



- **Mounting points**

- **/etc/fstab**

```
spg00:/home          /home          nfs          defaults    1 2
spg00:/OSG           /OSG           nfs          defaults    1 2
storage:/raid0       /raid0         nfs          defaults    1 2
LABEL=PNFS           /pnfs          ext3         defaults    1 2
```

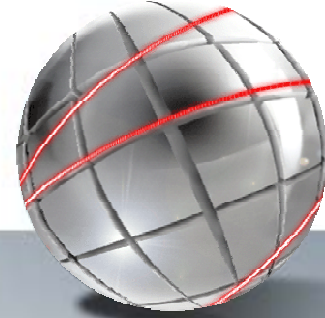
- **# mount**

```
spg00:/home on /home type nfs (rw,addr=192.168.1.150)
spg00:/OSG on /OSG type nfs (rw,addr=192.168.1.150)
storage:/raid0 on /raid0 type nfs (rw,addr=192.168.1.100)
/dev/sda7 on /pnfs type ext3 (rw)
localhost:/fs on /pnfs/fs type nfs (rw,udp,intr,noac,hard,nfsvers=2,addr=127.0.0.1)
```

- **Pnfs Location**

- **[root@spdc00 root]# ll /pnfs**

```
drwxr-xr-x    3 dbfrontier dbfrontier    4096 Aug 17  2006 frontier
drwxrwxrwx    1 root      root          512 Sep  1  2006 fs
lrwxrwxrwx    1 root      root           8 Aug 14  2006 ftpBase -> /pnfs/fs
lrwxrwxrwx    1 root      root           6 Aug 14  2006 if.usp.br -> fs/usr
drwx-----   2 root      root        16384 Jul  5  2006 lost+found
drwx-----   4 postgres postgres    4096 Aug 14  2006 pgsql
drwxr-xr-x    2 root      root          4096 Sep  2  2006 tmp
```



- Data Location

- [root@spdc00 root]# ls -l /pnfs/if.usp.br/\*

- drwxr-xr-x 1 cmsprod cmsprod 512 Aug 16 2006 cms
    - drwxr-xr-x 1 dzero dzero 512 Jan 8 20:01 dzero
    - drwxrwxrwx 1 root root 512 Mar 24 18:25 tmp

- This is a posix compliant **pnfs namespace**, and NOT an ext3 as it looks like!

- PNFS Namespace

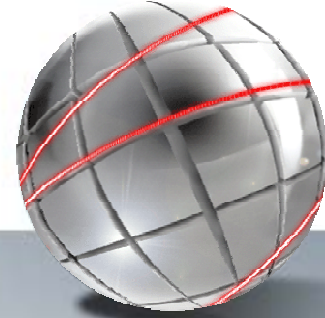
- The files are physically located on the pools, on spraid raid partitions.

- Commands that can be used in PNFS space:

- ls, pwd, find, rm and rmdir, cd, mkdir, ln (hard links only),  
chown, chmod.

- Commands that can **NOT** be used in PNFS space:

- cp, mv, cat, more, less, grep, head, tail, wc, od, file.



- **SRM Commands for I/O operations**

- **srmcp:**

- Copy files or batch of files.

- Either source(s) or destination or both should be (an) srm url

- `srmcp [command line options] source(s) destination`

- `srmcp [command line options] -copyjobfile <file>`

- ```
> srmcp file:///home/gregores/test_file \  
srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/data/tmp/testfile  
> srmcp \  
srm://cmsrm.fnal.gov:8443/srm/managerv1?SFN=/11/store/PhEDEx_LoadTest07/LoadTest07_Prod_  
FNAL/LoadTest07_FNAL_F6_WsrjdoyB_1 \  
srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/data/cms/store/PhEDEx_LoadT  
est07/LoadTest07_Prod_FNAL/SPRACE/1/LoadTest07_FNAL_F6_WsrjdoyB_1
```

- **srm-advisory-delete**

- Client command for grid users to remove a dCache file

- ```
> srm-advisory-delete \  
srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/data/tmp/testfile
```

- **srm-get-metadata**

- Get the metadata of dCache data, for example, the file size,

# OSG > Storage Element > dCache Monitoring



**dCache service**

*Quick Finder*

- Cell Services*
- Pool Usage*
- Tape Transfer Queue*
- Detailed Tape Transfer Queue*
- Pool Transfer Queues*
- Action Log*

*Pool Selection Configuration*

**Status**

- Cell Services** Availability and response times of pools and major services

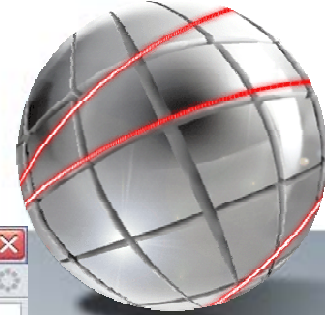
**Various Queues**

- Tape Transfer Queue** Data Transfer Queue from Tape to dCache disks.

Done

start Microsoft PowerPoint ... Inbox for gregores@... Cygwin/XFree86 - 0:0 dCache service - Mozi... 16:25

# OSG > Storage Element > dCache Monitoring



dCache ONLINE - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://spdc00.if.usp.br:2288/cellInfo

srm valid commands - Google Search

USATLAS dCache System at BNL

Welcome to the dcache.org

dCache ONLINE

## Services

CellName	DomainName	Requests Pending	Threads	Ping	Creation Time
DCap	doorDomain	0	4	54 msec	03/24 16:28:57
GFTP-spraid	gridftp-spraidDomain	0	4	58 msec	03/26 12:38:09
LoginBroker	httpdDomain	0	2	5 msec	03/24 16:29:12
PnfsManager	pnfsDomain	0	5	22 msec	03/24 16:29:26
PoolManager	dCacheDomain	0	4	18 msec	03/24 16:28:43
SRM-spdc00	srm-spdc00Domain	0	2	19 msec	03/24 16:29:41
SRM-spraid	srm-spraidDomain	0	2	117 msec	03/24 16:47:51
spraid_1	spraidDomain	0	114	33 msec	03/24 16:53:11
spraid_2	spraidDomain	0	129	26 msec	03/24 16:54:11
spraid_3	spraidDomain	0	136	32 msec	03/24 16:54:45
spraid_4	spraidDomain	0	114	24 msec	03/24 16:55:19
srm-LoginBroker	httpdDomain	0	2	6 msec	03/24 16:29:12

Done

start

Microsoft PowerPoint ...

Inbox for gregores@...

Cygwin/XFree86 - 0:0

dCache ONLINE - Mo...

16:23

# OSG > Storage Element > dCache Monitoring



**dCache ONLINE - Mozilla Firefox**

File Edit View Go Bookmarks Tools Help

http://spdc00.if.usp.br:2288/usageInfo

srm valid commands - Google Search | USATLAS dCache System at BNL | Welcome to the dcache.org | **dCache ONLINE**

Birds Home

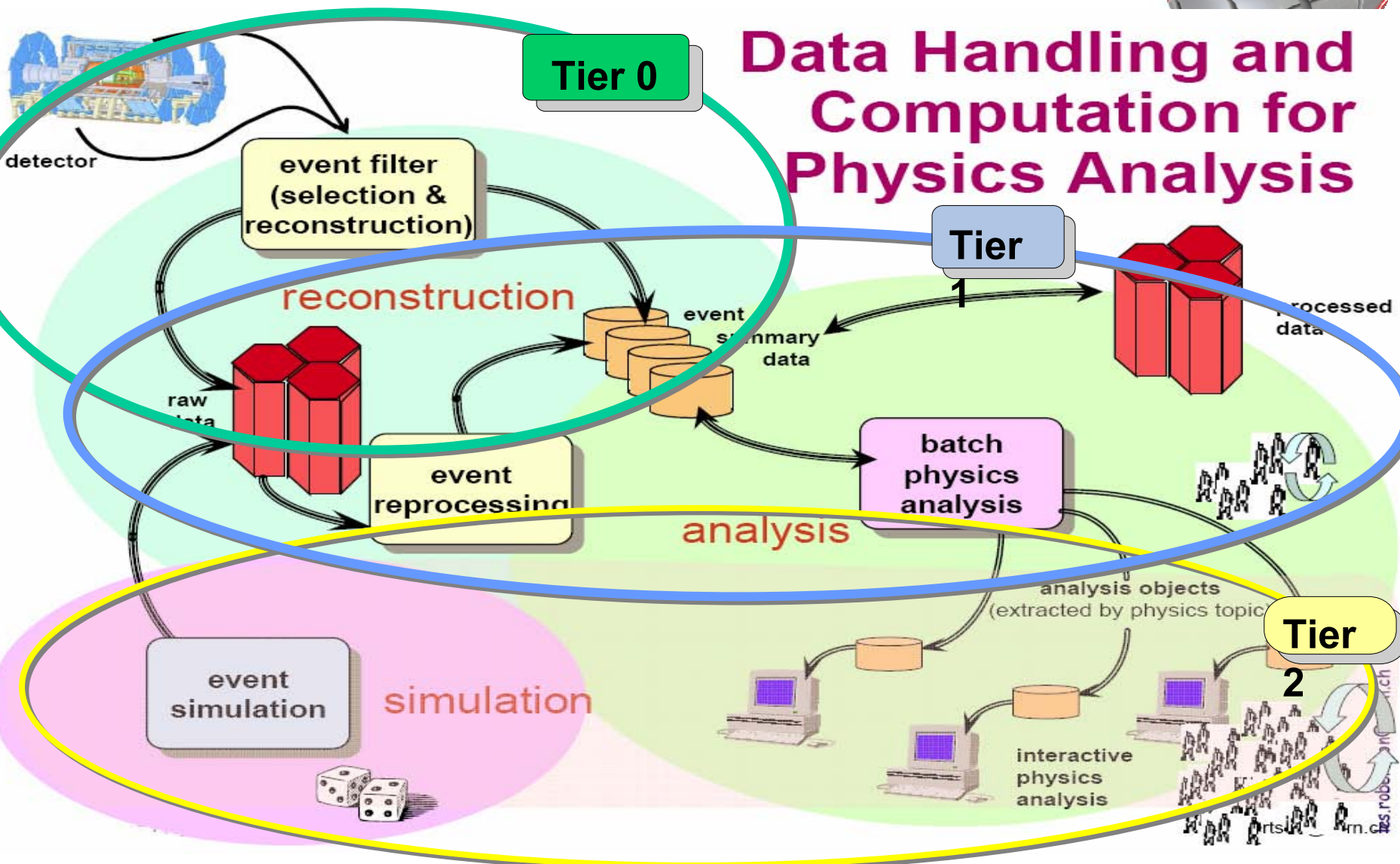
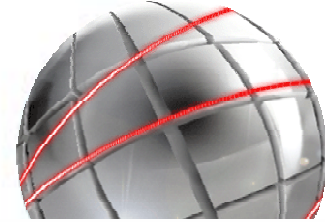
## Disk Space Usage

CellName	DomainName	Total Space/MB	Free Space/MB	Precious Space/MB	Layout (precious/free)
spraid_1	spraidDomain	1536000	358765	1095389	
spraid_2	spraidDomain	1536000	431298	1016920	
spraid_3	spraidDomain	1536000	433535	1045001	
spraid_4	spraidDomain	1536000	361306	1109955	

Done

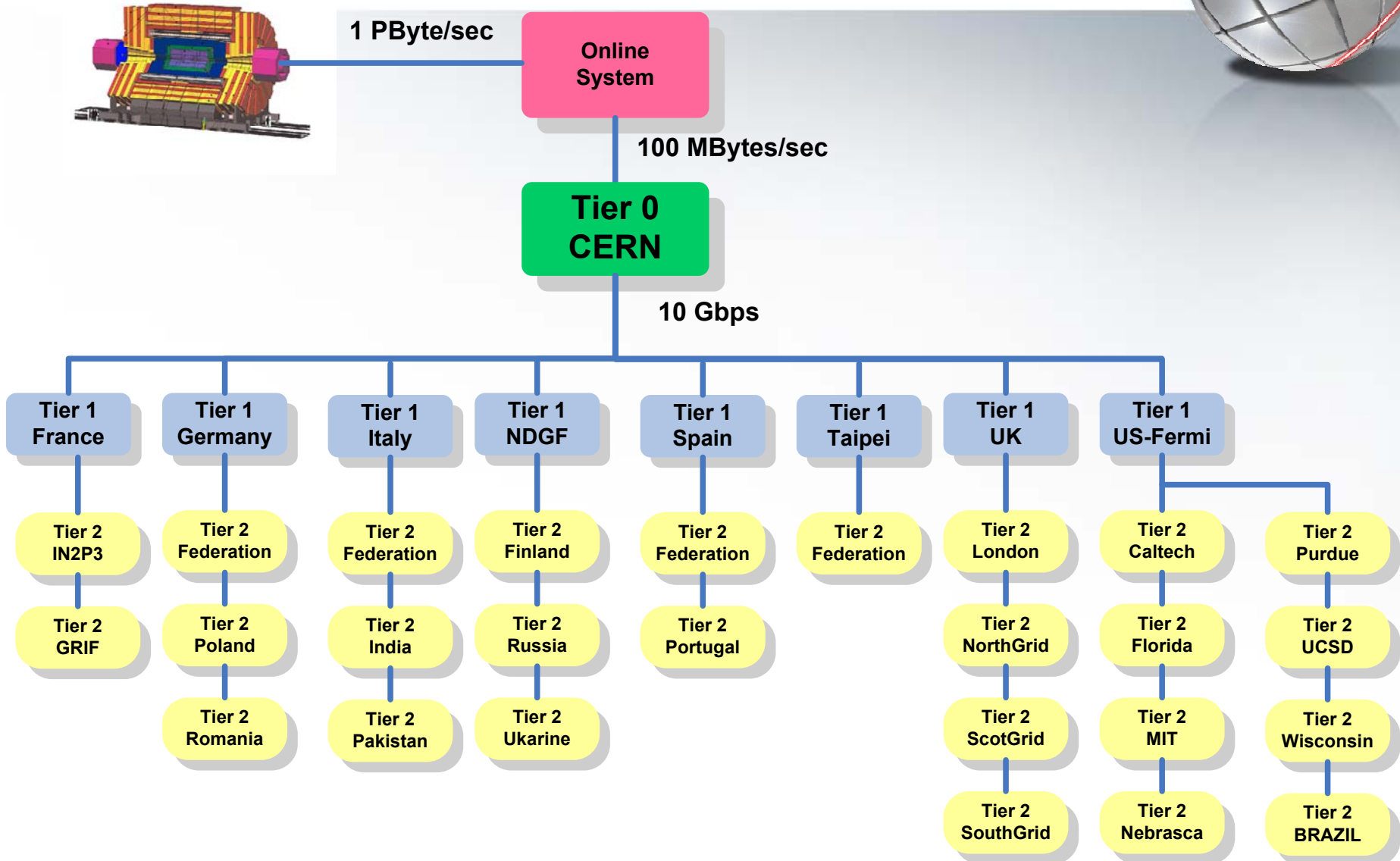
start | Microsoft PowerPoint ... | Inbox for gregores@... | Cygwin/XFree86 - 0:0 | dCache ONLINE - Mo... | 16:29

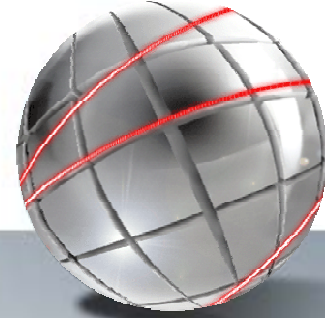
# SPRACE no CMS





# SPRACE > CMS > Arquitetura de Níveis (Tiers)





- **MC Production Operations**

- Tiered architecture that allows processing tasks to be distributed to Grids and Farms.
- Centrally managed by dedicated teams.  
CE list for OSG - Primary Contact: Ajit Mohapatra  
cmsgrid02.hep.wisc.edu, red.unl.edu, cit-gatekeeper.ultraviolet.org, lepton.rcac.purdue.edu, osg-gw-2.t2.ucsd.edu, ce01.cmsaf.mit.edu , ufloridapg.phys.ufl.edu, cmsosgce.fnal.gov, spgrid.if.usp.br

- **ProdRequest**

- User and admin request management frontend application to request the submission of a production workflow to the production machinery.
- Local interface which injects workflows directly to a local prodagent.
- Server which is then accessed by PRODMANAGER which schedules the request according to the implemented policies

- **ProdMgr**

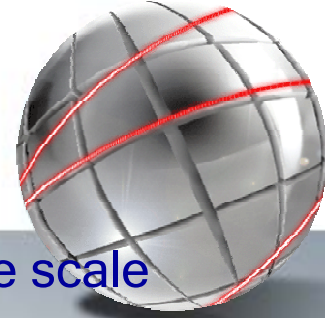
- Responsible for providing the information required to generate Job Specifications for the ProdAgent
- ProdMgr supplies work to ProdAgent based on requests from ProdRequest
- ProdMgr components  
ProdMgr Services → Exposes interfaces for interaction between ProdAgent and ProdRequest  
RequestCollector → Periodically retrieves requests from various request systems  
FileCleaner → Cleans left over job specifications.

- **ProdAgent**

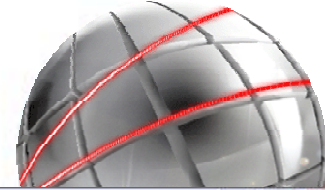
- Network of agents that execute the workflows on some resource.
- Work for the ProdAgent is pulled from the ProdMgr
- Requests are defined by WorkflowSpecs
- ProdAgent Components:  
ProdAgentMonitoring - What is required to be gathered from tasks at runtime.  
ProdAgentTrivialFileCatalog - How the TFC is used for stage out in ProdAgent jobs.  
ProdAgentStageOut - Refactoring of ProdAgent stage out  
ProdAgentPileup - How Pileup is handled in the Production system



- **CRAB (CMS Remote Analysis Builder)**
  - Tool which allows you to run CMSSW on Grid environments
  - Data discovery through DBS/DLS catalogues
  - You don't need to know details of Grid environments but you just have to know how to run CMSSW
  - CRAB is a tool written in python language
  - CRAB has to be installed in a Grid User Interface
- **CRAB homepage**
  - <http://cmsdoc.cern.ch/cms/ccs/wm/www/Crab/>
- **FAQ**
  - <https://twiki.cern.ch/twiki/bin/view/CMS/Crab.faq>



- Perform user analysis using CRAB on CMS resources on a large scale
  - use the LCG/EGEE resource broker to submit jobs.
  - run analysis jobs on all datasamples at all sites individually.
  - sustain a defined scale GRID-wide
  - sustain a defined scale per site (pending+running jobs)
- A user analysis task by CRAB consists of the following steps:
  - job creation
    - data discovery using DBS/DLS
    - job splitting according to user requirements
    - preparation of job dependent files
  - job submission
    - use edg-job-list-match to check if job is resolving any valid resources in the BDII of the used RB
    - use edg-job-submit to submit the job to the used RB (wrapped into Boss)
  - job status check
    - use python edg api to check job status individually
  - job output retrieval
    - use edg-job-get-output to retrieve sandbox from RB
- Locally mapped at SPRACE as uscms01 user.



## JobRobot Page

The JobRobot is a program, currently operated from FNAL, that creates CRAB jobs, submits them to specific SE sites, and collects them while keeping track of the corresponding information. Its main objective is to test how sites are responding to job processing in order to detect possible problems and correct them as soon as possible.

This page contains a summary of the information found with the JobRobot. It is ordered by days: by using the corresponding link, you can go to the day's "summary page". From there, you can choose the information you want to see about the jobs that have shown errors just by clicking over the appropriate links.

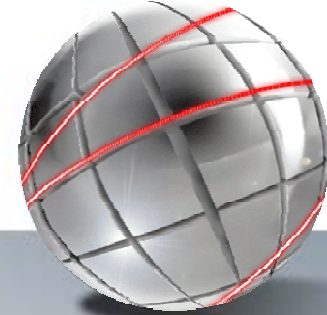
If you are interested in seeing a more detailed discussion about how the JobRobot works, you can go to the [JobRobot's Twiki page](#). Also, if you have problems finding a solution for the reported errors, you can go to the [Solutions Page](#) (probably it has already been solved by someone else); any new solutions are welcomed for posting.

### Available Data

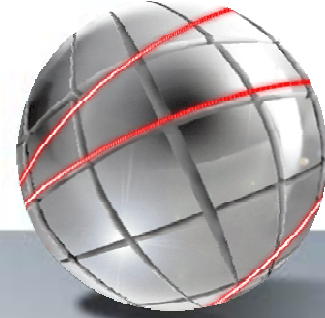
February /07	28
March /07	1 2 3 5 6 7 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

The information from the last two (2) days is updated every day for taking into account the jobs that had not finished at the moment of the report. For this reason, the results shown in the "last day's" and "before last day's" pages can change:





- **PhEDEx: The CMS data replication service**
- **Detector data distribution @ high priority**
  - One copy at Cern; one distributed copy at regional centers
  - Expected transfer volume for 2008:  $\sim 7$  PB  $\approx O(10M)$  files
  - Required transfer speed for 2008:  $\sim 5$  Gb/s
- **Simulated data distribution @ low priority**
  - Among and between regional and local centers
  - Expected bandwidth utilisation: few Gb/s per regional center
- **Data structured in blocks of files: dataset, datatiers**
- **Reliability**
  - Transfer status monitored
  - Filesize check after each replication
  - Cksum for every file in TMDb available for further checks
  - Automatic cool off for failed transfers
  - Self-throttling: limits amount of parallel transfers
  - Designed under assumption: any operation might fail
- **Monitoring**
  - Status web page: <http://cern.ch/cms-project-phedex>



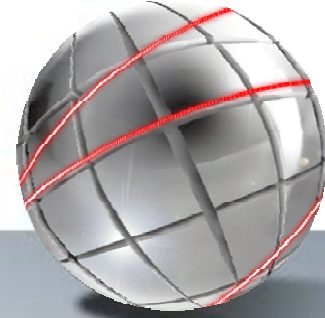
- `/home/phedex/SITECONF/SPRACE/PhEDEx`

- `[phedex@spdc00 PhEDEx]$ ll`

```
-rw-r--r--  1 phedex  phedex      3546 Mar 14 09:27 Config.Dev
-rw-r--r--  1 phedex  phedex       873 Feb 13 18:26 ConfigPart.Common
-rw-r--r--  1 phedex  phedex       204 Feb 13 18:05 ConfigPart.Export
-rw-r--r--  1 phedex  phedex     1680 Feb 24 11:59 ConfigPart.FTSDownload
-rw-r--r--  1 phedex  phedex       178 Feb 13 16:16 ConfigPart.Inject
-rw-r--r--  1 phedex  phedex       300 Feb 21 17:55 ConfigPart.Recycler
-rw-r--r--  1 phedex  phedex     1051 Feb 23 10:28 ConfigPart.Remove
-rw-r--r--  1 phedex  phedex       793 Mar  2 14:10 ConfigPart.SRMDownload
-rw-r--r--  1 phedex  phedex     3549 Mar 14 09:22 Config.Prod
-rw-rw-r--  1 phedex  phedex       938 Feb 13 18:06 DBParam
-rw-r--r--  1 phedex  phedex     1342 Feb 13 17:31 storage.xml
```

- `storage.xml`

```
<storage-mapping>
  <lfn-to-pfn protocol="direct" destination-match=".*"
    path-match="/+LoadTest/(.*)"
    result="/pnfs/if.usp.br/data/cms/phedex_loadtest/$1"/>
  <lfn-to-pfn protocol="direct" destination-match=".*"
    path-match="/+store/(.*)" result="/pnfs/if.usp.br/data/cms/store/$1"/>
  <lfn-to-pfn protocol="direct" destination-match=".*"
    path-match="/+(.*)" result="/pnfs/if.usp.br/data/cms/$1"/>
  ...
</storage-mapping>
```



## - Config.Prod

```
PHEDEX_BASE=/home/phedex;
PHEDEX_INSTANCE=Prod;
PHEDEX_LABEL=SPRACE;
PHEDEX_SITE=SPRACE;
PHEDEX_NODE=T2_${PHEDEX_SITE}_Buffer;
PHEDEX_VERSION=2_5_1;
PHEDEX_OS_VERSION=slc3_ia32_gcc323;
X509_USER_PROXY=${PHEDEX_BASE}/gridcert/proxy.cert;
PHEDEX_GLITE_ENV=/etc/glite/profile.d/glite_setenv.sh;
GLITE_SD_PLUGIN=bdii;
TIER1_FTS_SERVICE=USCMS-FNAL-WC1;
### IMPORT ConfigPart.Common
### IMPORT ConfigPart.Export
### IMPORT ConfigPart.Inject
### IMPORT ConfigPart.SRMDownload
#### IMPORT ConfigPart.FTSDownload
```

## - ConfigPart.Common

```
### ENVIRON common
PHEDEX_CONFIG=${PHEDEX_BASE}/SITECONF/${PHEDEX_SITE}/PhEDEx;
PHEDEX_DBPARAM=${PHEDEX_CONFIG}/DBParam:${PHEDEX_INSTANCE}/${PHEDEX_LABEL};
PHEDEX_STATE=${PHEDEX_BASE}/state/${PHEDEX_INSTANCE};
PHEDEX_LOGS=${PHEDEX_BASE}/logs/${PHEDEX_INSTANCE};
PHEDEX_SCRIPTS=${PHEDEX_BASE}/PHEDEX;
PHEDEX_MAP=${PHEDEX_CONFIG}/storage.xml;
```





## - ConfigPart.SRMDownload

```
### AGENT LABEL=download-srm PROGRAM=Toolkit/Transfer/FileDownload ENVIRON=common
  DEFAULT=on
  -db                ${PHEDEX_DBPARAM}
  -nodes             ${PHEDEX_NODE}
  -delete           ${PHEDEX_CONFIG}/FileDownloadDelete
  -validate         ${PHEDEX_CONFIG}/FileDownloadSRMVerify
  -accept           '%FNAL%'
  -backend          SRM
  -command          srmcp, -x509_user_proxy=${X509_USER_PROXY}, -debug=true, -retry_num=2
  -timeout          14400
  -jobs             5
  -batch-files      4
### AGENT LABEL=download-srm-remove PROGRAM=Toolkit/Transfer/FileRemove ENVIRON=common
  -db                ${PHEDEX_DBPARAM}
  -nodes             ${PHEDEX_NODE}
  -storagemap       ${PHEDEX_MAP}
  -delete           ${PHEDEX_CONFIG}/FileDownloadDelete
  -protocol         'srm'
  -accept           '%FNAL%`
```

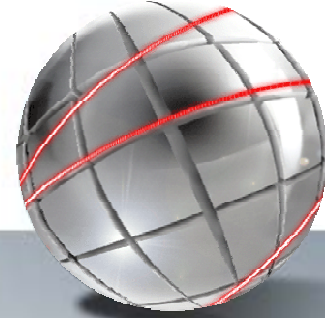
## - ConfigPart.Export

```
### AGENT LABEL=exp-pfn PROGRAM=Toolkit/Transfer/FileExport
  -db                ${PHEDEX_DBPARAM}
  -nodes             ${PHEDEX_NODE}
  -storagemap       ${PHEDEX_MAP}
  -protocols        'srm', 'direct'
```

## - ConfigPart.Inject

```
### AGENT LABEL=drop-publish PROGRAM=Toolkit/DropBox/DropTMDBPublisher
  -db                ${PHEDEX_DBPARAM}
  -node              ${PHEDEX_NODE}
```

# CMS > PhEDEx > Logs and Activities



- **Logs**

- /home/phedex/logs/Prod

-rw-rw-r--	1	phedex	phedex	1410	Feb	14	08:30	download-fts-cern
-rw-rw-r--	1	phedex	phedex	1692	Feb	14	11:22	download-fts-fnal
-rw-rw-r--	1	phedex	phedex	28095770	Mar	26	21:13	download-srm
-rw-rw-r--	1	phedex	phedex	16564	Mar	26	17:13	download-srm-remove
-rw-rw-r--	1	phedex	phedex	1558	Mar	24	11:06	drop-publish
-rw-rw-r--	1	phedex	phedex	123316	Mar	26	22:04	exp-pfn

- **Activities**

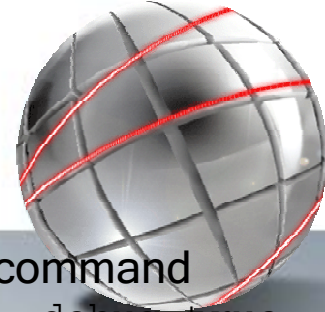
- /home/phedex/state/Prod/download-srm

drwxrwxr-x	75	phedex	phedex	12288	Mar	26	19:57	archive
drwxrwxr-x	2	phedex	phedex	4096	Feb	13	18:27	inbox
drwxrwxr-x	2	phedex	phedex	4096	Feb	13	18:27	outbox
-rw-rw-r--	1	phedex	phedex	6	Mar	24	17:12	pid
drwxrwxr-x	2	phedex	phedex	16384	Mar	26	20:43	tasks
drwxrwxr-x	7	phedex	phedex	4096	Mar	26	19:57	work

- **Work**

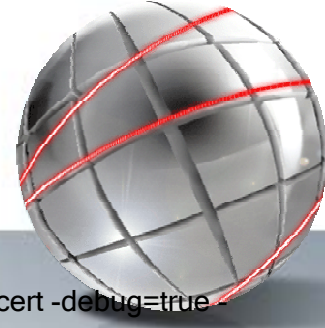
- /home/phedex/state/Prod/download-srm/work//job.1174767120.228

-rw-rw-r--	1	phedex	phedex	242	Mar	26	19:58	command
-rw-rw-r--	1	phedex	phedex	1072	Mar	26	19:57	copyjob
-rw-rw-r--	1	phedex	phedex	345	Mar	26	19:57	info
-rw-rw-r--	1	phedex	phedex	0	Mar	26	23:03	live
-rw-rw-r--	1	phedex	phedex	23408	Mar	26	23:03	log
-rw-rw-r--	1	phedex	phedex	0	Mar	26	19:58	srm-report
-rw-rw-r--	1	phedex	phedex	16	Mar	26	19:58	time-start
-rw-rw-r--	1	phedex	phedex	0	Mar	26	19:58	wrapper-log



- `/home/phedex/state/Prod/download-srm/work/job.1174767120.228/command`  
`srmcp -x509_user_proxy=/home/phedex/gridcert/proxy.cert -debug=true`  
`-retry_num=2 -copyjobfile=/home/phedex/state/Prod/download-`  
`srm/work/job.1174767120.228/copyjob -`  
`report=/home/phedex/state/Prod/download-`  
`srm/work/job.1174767120.228/srm-report`
- `/home/phedex/state/Prod/download-srm/work/job.1174767120.228/copyjob`  
`srm://cmssrm.fnal.gov:8443/srm/managerv1?SFN=/11/store/PhEDEx_LoadT`  
`est07/LoadTest07_Prod_FNAL/LoadTest07_FNAL_D2`  
`srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/dat`  
`a/cms/store/PhEDEx_LoadTest07/LoadTest07_Prod_FNAL/SPRACE/5/LoadT`  
`est07_FNAL_D2_h5VEnSAx_5`  
`srm://cmssrm.fnal.gov:8443/srm/managerv1?SFN=/11/store/PhEDEx_LoadT`  
`est07/LoadTest07_Prod_FNAL/LoadTest07_FNAL_1B`  
`srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/dat`  
`a/cms/store/PhEDEx_LoadTest07/LoadTest07_Prod_FNAL/SPRACE/5/LoadT`  
`est07_FNAL_1B_Dz7gkWhg_5`  
`srm://cmssrm.fnal.gov:8443/srm/managerv1?SFN=/11/store/PhEDEx_LoadT`  
`est07/LoadTest07_Prod_FNAL/LoadTest07_FNAL_D9`  
`srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/dat`  
`a/cms/store/PhEDEx_LoadTest07/LoadTest07_Prod_FNAL/SPRACE/5/LoadT`  
`est07_FNAL_D9_v5G75PuW_5`  
`srm://cmssrm.fnal.gov:8443/srm/managerv1?SFN=/11/store/PhEDEx_LoadT`  
`est07/LoadTest07_Prod_FNAL/LoadTest07_FNAL_16`  
`srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/dat`  
`a/cms/store/PhEDEx_LoadTest07/LoadTest07_Prod_FNAL/SPRACE/5/LoadT`  
`est07_FNAL_16_Izpxmhn6_5`

## CMS > PhEDEx > Logs and Activities



- `/home/phedex/state/Prod/download-srm/work/job.1174767120.228/log`
  - 2007-03-26 22:58:01 srmcp(1295): Executing: `srmcp -x509_user_proxy=/home/phedex/gridcert/proxy.cert -debug=true -retry_num=2 -copyjobfile=/home/phedex/state/Prod/download-srm/work/job.1174767120.228/copyjob -report=/home/phedex/state/Prod/download-srm/work/job.1174767120.228/srm-report`
  - 2007-03-26 22:58:02 srmcp(1295): Storage Resource Manager (SRM) CP Client version 1.24
  - ...
  - 2007-03-26 22:58:02 srmcp(1295): Mon Mar 26 19:58:02 BRT 2007: starting transfer in pull mode
  - 2007-03-26 22:58:03 srmcp(1295): SRMClientV1 : user credentials are: /DC=org/DC=doegrids/OU=People/CN=Eduardo Gregores 407221
  - 2007-03-26 22:58:03 srmcp(1295): SRMClientV1 : SRMClientV1 calling `org.globus.axis.util.Util.registerTransport()`
  - 2007-03-26 22:58:04 srmcp(1295): SRMClientV1 : connecting to srm at `http://spdc00.if.usp.br:8443/srm/managerv1`
  - 2007-03-26 22:58:04 srmcp(1295): Mon Mar 26 19:58:04 BRT 2007: connected to server, obtaining proxy
  - 2007-03-26 22:58:04 srmcp(1295): Mon Mar 26 19:58:04 BRT 2007: got proxy of type class `org.dcache.srm.client.SRMClientV1`
  - 2007-03-26 22:58:04 srmcp(1295): Mon Mar 26 19:58:04 BRT 2007: copying `srm://cmssrm.fnal.gov:8443/srm/managerv1?SFN=/11/store/PhEDEx_LoadTest07/LoadTest07_Prod_FNAL/LoadTest07_FNAL_16` into `srm://spdc00.if.usp.br:8443/srm/managerv1?SFN=/pnfs/if.usp.br/data/cms/store/PhEDEx_LoadTest07/LoadTest07_Prod_FNAL/SPRAC`
  - E/5/LoadTest07\_FNAL\_16\_lzpxmhn6\_5
  - ...
  - 2007-03-26 22:58:04 srmcp(1295): SRMClientV1 : copy, contacting service `http://spdc00.if.usp.br:8443/srm/managerv1`
  - 2007-03-26 22:58:12 srmcp(1295): Mon Mar 26 19:58:11 BRT 2007: srm returned requestId = -2147209128
  - 2007-03-26 22:58:12 srmcp(1295): Mon Mar 26 19:58:11 BRT 2007: sleeping 1 seconds ...
  - 2007-03-26 22:58:14 srmcp(1295): Mon Mar 26 19:58:14 BRT 2007: sleeping 4 seconds ...
  - ...