



The CNAF Tier1 center

XXIV HTASC Meeting

Pisa, 12 June 2003

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General Informations

- CNAF is the INFN National Centre for Research and Development in Telematics and Informatics Technologies.
- Originally was dedicated to the measurements of the Bubble Chambers photos.
- Hosted by the Physics Dept. of the University of Bologna.
- Personnel: 17 staff + 17 time limited contracts.
- Total annual budget around 1.7 M€+ Projects funds



CNAF Activities

- General INFN services
 - AFS, DNS, WWW, News and Mail...
 - Video Conference: H320 & H323 MCU
 - Hosting of training courses (C, C++, ODB...)
- Projects
 - TIER1 Regional Center
 - GRID: DataGrid, DataTAG, INFN-GRID, EGEE, LCG, Grid.it
 - High Bandwidth Networks: Optical Networks, WDM, GARR-G Pilot
 - Testing of new technologies



TIER1 – General Considerations

TIER1 is meant as a computing facility for INFN HNEP community

CNAF will be a multi-experiment TIER1 (ATLAS, CMS, LHCb, ALICE, VIRGO and later CDF)

Aims

- providing experiments with computing resources
- support to TIER2s and TIER3s
- coordination with TIER0, other TIER1s and TIER2s

INFN-TIER1 is only a prototype

- TIER1 becomes fully operational: end of 2003
- end of project Phase I: beginning of 2004



TIER1 Services

Computing servers (CPU farms)

Access to on-line data (disks)

Mass storage / tapes

Broad-band network access and QoS

System administration

Database administration

Experiment specific library software

Helpdesk



Issues

Technical staff

- Recruiting & Training

Resource management

- Minimization of manual operations

Sharing of resources (network, CPU, storage, HR) among experiments

- Resource use optimization

Compatibility between tests and production activity

- Technological tests for Tier-1

- Prototype phase (LHC experiments)

- Production phase (VIRGO, BaBar, CDF II, etc.)

Integration with grid framework (EDG, EDT and LCG)

- Interoperation

- Common tool development and test



Computing Resources

Computing servers (CPU farms)

- 150 (soon ~320) 1U bi-processors Pentium III/IV 800-2400 MHZ (IBM, DELL, SuperMicro)
- System installation and administration
 - Linux RedHat (6.2, 7.2, 7.3)
 - Experiment specific libraries and software
 - LCFG, Remote access to KVM.

Access to on-line data (DAS, NAS, SAN)

- ~35 TB (soon to become >70 TB)
- Study of large file system solutions (GFS, GPFS)
- SAN on WAN tests (collaboration with CASPUR)
- Test of several HW technologies (EIDE, SCSI, FC)



Network (1)

New GARR-B Backbone with 2.5 Gbps F/O lines already in place (soon to pass to 10 Gbps).

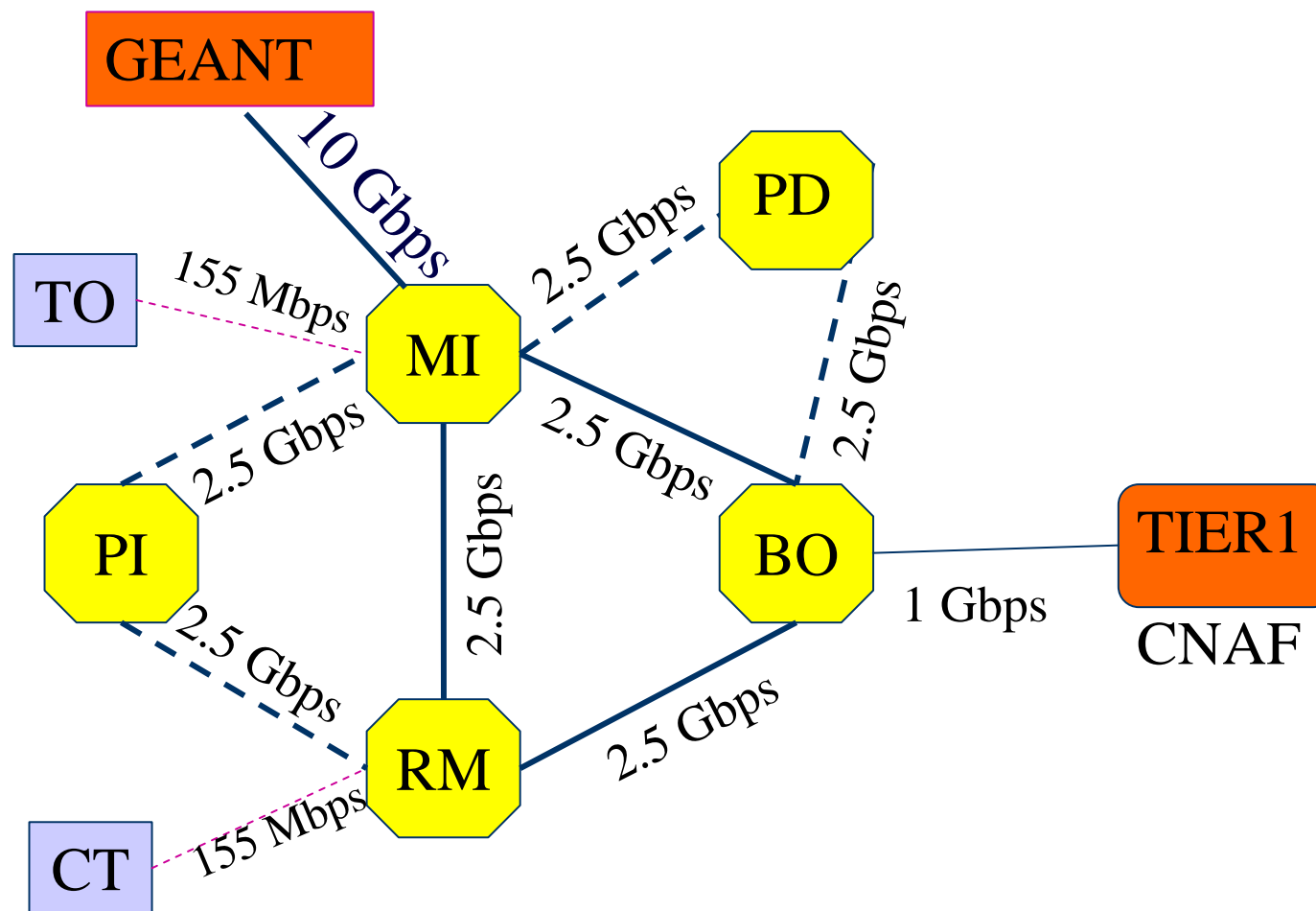
CNAF-TIER1 access is now 1 Gbps.

Gigapop is collocated within INFN-TIER1.

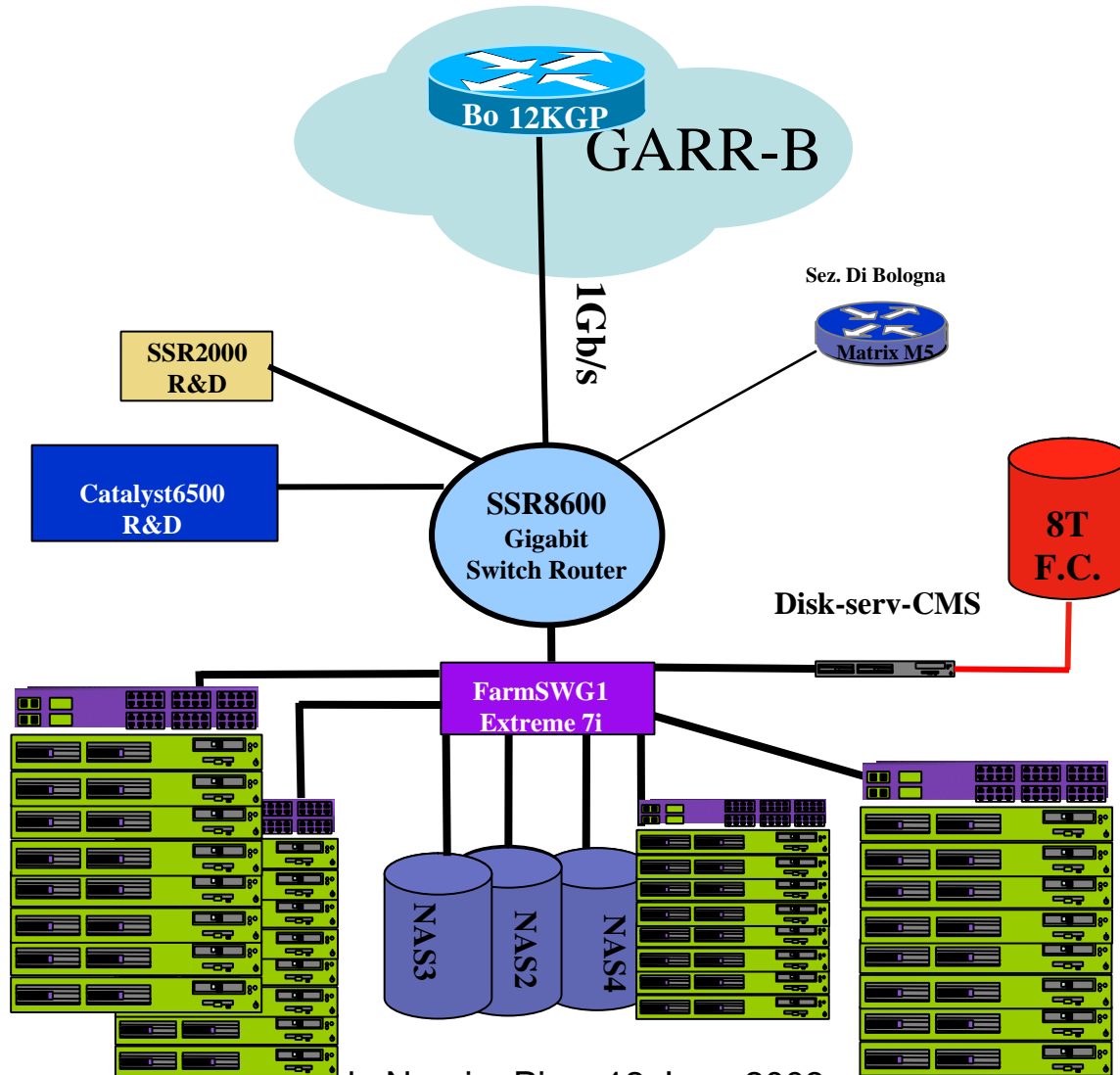
Many TIER2s are now 155 Mbps.

International Connectivity via Geant: 10 Gbps access in Milano and 3x2.5 Gbps links of Geant with US (Abilene) already in place

Network (2) GARR-B



TIER1 Network





Storage

Mass storage/tapes

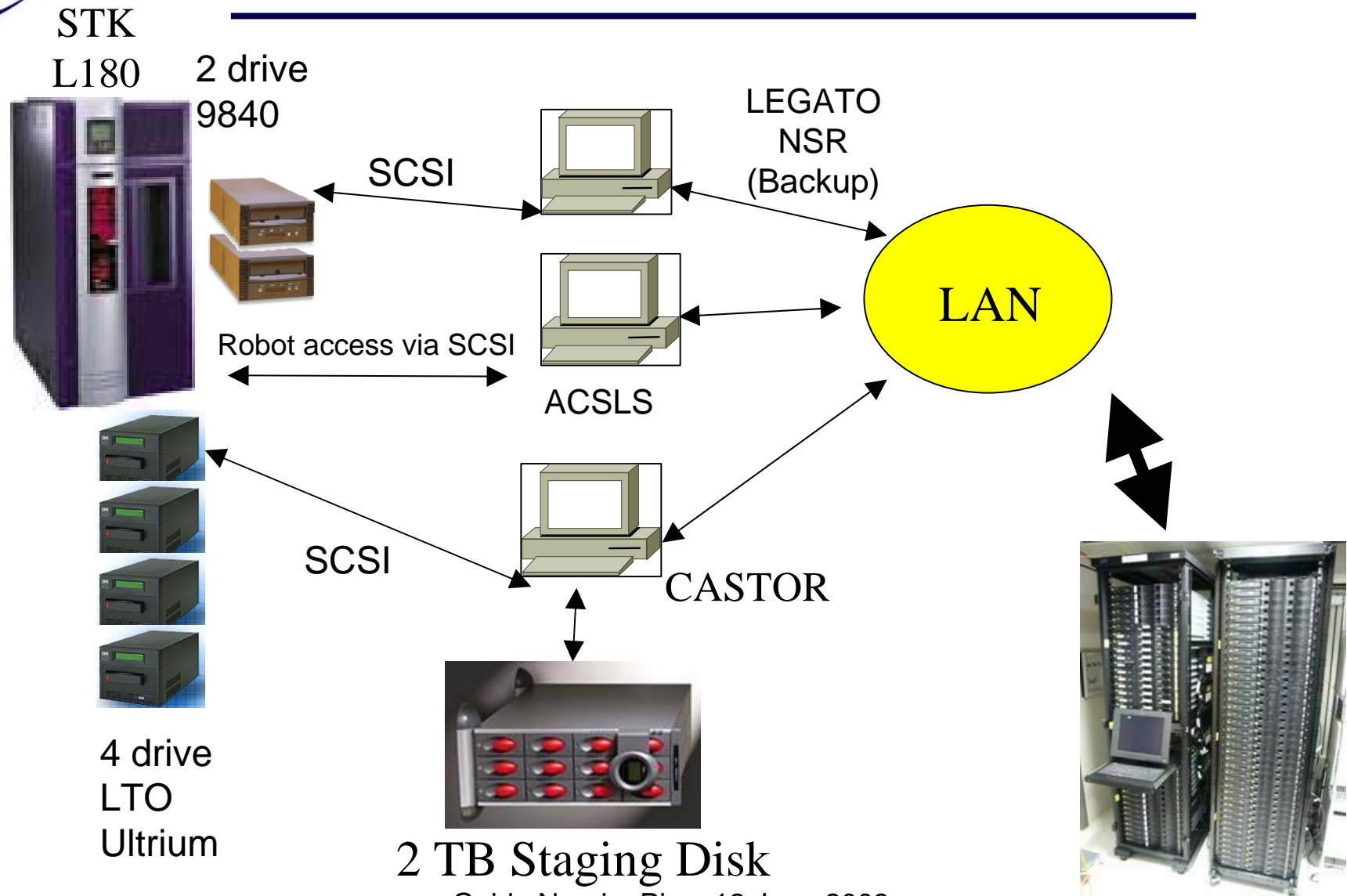
- StorageTek library with 9840 (30 tapes) and LTO drives (150 tapes, 100 GB each)
- CASTOR as front-end software for archiving
 - Direct access for end-users
 - Oracle as back-end
- New library with 2000-5000 tapes capability in September

Disk storage

- 8 TB Fibre Channel (DELL)
- 2 TB Fibre Channel-EIDE (AXUS)
- 2 TB SCSI (Raitec) used as staging for CASTOR
- 16 TB NAS based on FC (Procom)
- 2 TB NAS IDE



CASTOR at CNAF



2 TB Staging Disk

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Developed at CNAF – Monitoring

by Felice Rosso

Farm monitoring tool

- series of light scripts (bash, Perl)
monitoring the status of a computing farm
(CPU Load, disk usage...)
- fast: <1 sec for 100 machines
- tainted: no shell allowed
- no multi-thread (no hacking allowed)
- remote monitoring
- soon to come more efficient tool (Python)



Developed at CNAF – Resources Database

by Barbara Martelli

Aims

- Centralized repository for hardware informations
- Monitoring
- Alarm
- Configuration facilities

Based on

- PostgreSQL
- PHP interface
- Web interface

Managed Data

- Batch informations
- hardware informations
- Technical assistance
- Software configuration
- Network configuration



Conclusions

INFN TIER1 is offering an experimental service...

- VIRGO, CMS, ATLAS, LHCb, ALICE
- DataGrid and DataTAG test-beds

...but we are still in a test phase

- Study and tests of technological solutions

Main goals of the prototype are

- train people
- adopt standard solutions
- optimize resource usage
- integration with the grid

Operational phase foreseen starting from end of 2003