



Service Challenge Phase 4 Planning: INFN

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INFN Tier-1: short-term plans (1/2)



SC4: storage and computing resources will be shared with production

- **Storage**

- Oct 2005: Data disk

- 50 TB (Castor front-end)
- WAN→Disk performance: 125 MB/s (demonstrated, SC3)

- Oct 2005: Tape

- 200 TB (4 9940B + 6 LTO2 drives)
- Drives shared with production
- WAN→Tape performance: mean sustained ~ 50 MB/s (SC3, throughput phase, July 2005)

- **Computing**

- Oct 2005: min 1200 kSI2K, max1550 kSI2K (as the farm is shared)



INFN Tier-1: short-term plans (2/2)

- **Network**

- Oct 2005:

- 2 x 1 GEthernet links CNAF \leftrightarrow GARR, dedicated to SC traffic to/from CERN

- Future:

- ongoing upgrade to 10 GEthernet, CNAF $\leftarrow \rightarrow$ GARR, dedicated to SC
 - Usage of policy routing at the GARR access point
 - Type of connectivity to INFN Tier-2 under discussion
 - Backup link Tier-1 $\leftarrow \rightarrow$ Tier-1 (Karlsruhe) under discussion

- **Software**

- Oct 2005:

- SRM/Castor and FTS
 - farm middleware: LCG 2.6

- Future:

- dCache and StoRM under evaluation (for disk-only SRMs)
 - Possibility to upgrade to CASTOR v2 under evaluation (end of year 2005)



INFN Tier-1: long-term plans (Oct 2006)



- **Storage**

- data disk:
 - additional 400 TB (approx 300 TB for LHC)
 - → TOTAL: approx 350 TB
- Tape: up to 450 TB

- **Computing**

- Additional 800 kSI2K
- → TOTAL: min 2000 KSI2k, max 2300 KSI2k

- **Network**

- 10 GEthernet CNAF \leftrightarrow CERN
- 10 GEthernet CNAF \leftrightarrow INFN Tier-2 and backup connection to Karlsruhe (?)



Tier-2 candidates at INFN: SC3

- Torino (ALICE):
 - FTS, LFC, dCache (LCG 2.6.0)
 - Storage Space: 2 TBy
- Milano (ATLAS):
 - FTS, LFC, DPM 1.3.7
 - Storage space: 5.29 TBy
- Pisa (ATLAS/CMS):
 - FTS, PhEDEx, POOL file cat, PubDB, LFC, DPM 1.3.5
 - Storage space: 5 TBy available, 5 TBy expected
- Legnaro (CMS):
 - FTS, PhEDEx, Pool file cat., PubDB, DPM 1.3.7 (1 pool, 80 Gby)
 - Storage space: 4 TBy
- Bar (ATLAS/CMS)i:
 - FTS, PhEDEx, POOL file cat., PubDB, LFC, dCache, DPM
 - Storage space: 1.4 TBy available, 4 TBy expected
- LHCb
 - CNAF



Tier-2 sites at INFN: SC4

- Currently 9 candidate Tier-2 sites:
 - in some cases one Tier-2 hosting two experiments
 - Total: 12 Tier2 (4 sites for every experiment – ATLAS, ALICE, CMS)
 - LHCb Tier-2: CNAF
- Ongoing work to understand:
 - Number of Tier-2 sites actually needed
 - Availability of local manpower and adequacy of local infrastructures
 - Capital expenditure:
 - Tier-2 overall infrastructure
 - Computing power and storage
- Network connectivity: 1 GEthernet for every Tier-2, Avg Guaranteed bandwidth: 80% of link capacity
- Only after this preliminary analysis INFN will be ready for the MoU currently under definition at CERN