

Planning for SC4 and the Initial LHC Service: Step 3

Executive Summary

This document defines the target data rates that must be demonstrated for Tier0 - Tier1 (disk – disk) transfers prior to commencing Service Challenge 4.

These tests are required to ensure that the SRMs are correctly configured at all participating sites and that the problems seen during the July 2005 Throughput tests have been resolved.

Under the assumption that the disk – disk transfers are met (the primary focus being reliable, production quality transfers) disk – tape transfers will also be carried out, as a stepping stone towards the more aggressive targets of the SC4 Throughput tests scheduled for April 2006.

To avoid changes to the numbering below, any corrections, additions or other updates will be made at the end of the document and indicated as shown below.

0. Sample correction.

SRM by Tier1

1. The SRMs currently deployed across the various Tier1 sites, together with the backend Mass Storage Systems and primary tape hardware for bulk data is given in the table below.

Centre	SRM	MSS	Tape H/W
Canada, TRIUMF	dCache	TSM	
France, CC-IN2P3	dCache	HPSS	STK
Germany, GridKA	dCache	TSM	LTO3
Italy, CNAF	CASTOR	CASTOR	STK 9940B
Netherlands, NIKHEF/SARA	dCache	DMF	STK
Nordic Data Grid Facility	DPM	N/A	N/A
Spain, PIC Barcelona	CASTOR	CASTOR	STK
Taipei, ASGC	CASTOR	CASTOR	STK
UK, RAL	dCache	ADS→ CASTOR(?)	STK
USA, BNL	dCache	HPSS	STK
USA, FNAL	dCache	ENSTOR	STK

Table 1 – SRM / MSS deployment at the LCG Tier1 Sites

Tape Throughput

- 2. Many sites currently used STK 9940B drives, with a nominal maximum throughput of 30MB/s.
- 3. Experience shows that the maximum expected throughput under realistic production conditions is in the range 15-20MB/s.



- 4. Future drives, with a nominal throughput in the range of 100MB/s can be expected on the timescale of SC4.
- 5. For planning purposes, effective throughput of some 50MB/s is currently assumed, suggesting that a pool of 5 drives should be sufficient to achieve the maximum nominal targets of 200MB/s (using dedicated drives).
- 6. This throughput should be measured as soon as possible using a 'loop-back test' aimed at simulating Tier0 Tier1 transfers.

Pre-Requisites

- 7. Deployment of gLite FTS 1.4 (srmcp support).
- 8. dCache 1.6.6 (or later) release and deployed at all dCache sites.
- 9. CASTOR2 clients and CASTORSRM version x.x at all CASTOR sites.
- 10. Upgrade to CERN internal network infrastructure.
- 11. 10Gbit/s network connections at operational at the following sites: xxx

Nominal Tier0 – Tier1 Throughput Rates

- 12. The transfer rates that need to be demonstrated between CERN and each Tier1 for disk disk transfers using SRMs at both source and destination are given in the table below.
- 13. These transfer rates are restricted to the target for disk disk transfers foreseen for SC3 (150MB/s), although higher nominal values are required for BNL, CNAF, FNAL, FZK and IN2P3 (200MB/s).

Centre	ALICE	ATLAS	CMS	LHCb	Target Data Rate MBytes/sec
Canada, TRIUMF		Х			50
France, CC-IN2P3	Х	Х	Х	Х	150
Germany, GridKA	Х	Х	Х	Х	150
Italy, CNAF	Х	Х	Х	Х	150
Netherlands, NIKHEF/SARA	Х	Х		Х	150
Nordic Data Grid Facility	Х	Х	Х		50
Spain, PIC Barcelona		Х	Х	Х	100
Taipei, ASGC		Х	Х		100
UK, RAL	Х	Х	Х	Х	150
USA, BNL		Х			150
USA, FNAL			Х		150
Target data rate at CERN				1,000	

Table 2 - Nominal Network/Disk Data Rates by Site

14. Disk – tape transfer rates, using existing hardware, are the minimum of the above transfer rates or that which can be obtained using 5 existing technology drives (e.g. 75 – 100MB/s). The exact value is not fixed – the goal being to be



obtain further data on realistic efficiencies under Tier0 – Tier1 transfer conditions.

Centre	ALICE	ATLAS	CMS	LHCb	Target Data Rate MBytes/sec
Canada, TRIUMF		Х			50
France, CC-IN2P3	Х	Х	Х	Х	75
Germany, GridKA	Х	Х	Х	Х	75
Italy, CNAF	Х	Х	Х	Х	75
Netherlands, NIKHEF/SARA	Х	Х		Х	75
Nordic Data Grid Facility	Х	Х	Х		50
Spain, PIC Barcelona		Х	Х	Х	75
Taipei, ASGC		Х	Х		75
UK, RAL	Х	Х	Х	Х	75
USA, BNL		Х			75
USA, FNAL			X		75

Table 3 - Target Disk - Tape Throughputs

Corrections and Updates

Date	Heading	Details
00/00/00	Executive Summary	Dummy text.