

SRM 2.2: status of the implementations and GSSD



19th March 2007

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SRM 2.2 specifications

- Main issues with the SRM 2.2 specifications have been solved.
 - Last critical points discussed during the Data Management phone conference of the 9th of March 2007. Already included in test suite families.
 - Some implementations do not comply with the specifications because of the internal design of the back-end MSS.
 - SRM 2.2 clients developers are aware of the differences in the implementations. They will adapt the clients so that internal differences will not be exposed to end-users.
 - A list of "unspecified" behaviours is being compiled and will be published and presented to experiments, so to prevent possible problems derived by direct usage of the SRM interface (if any).
- Other non-critical issues postponed to SRM version 3.
- Documentation is publicly available:
 - <https://twiki.cern.ch/twiki/bin/view/SRMDev>



Tests executed

- S2 test suite testing availability of endpoints, basic functionality, use cases and boundary conditions, interoperability, exhaustive and stress tests.
 - Availability: Ping and full put cycle (putting and retrieving a file)
 - Basic: basic functionality checking only return codes and passing all basic input parameters
 - Usecases: testing boundary conditions, exceptions, real use cases extracted from the middleware clients and experiment applications.
 - Interoperability: servers acting as clients, cross copy operations
 - Exhaustive: Checking for long strings, strange characters in input arguments, missing mandatory or optional arguments. Output parsed.
 - Stress: Parallel tests for stressing the systems, multiple requests, concurrent colliding requests, space exhaustion, etc.
- S2 tests cron job running 5 times per day
- In parallel, manual tests from GFAL/lcg-utils, FTS, DPM test suite.



Testing Plan

- Plan for 1Q of 2007 :

- Phase 1: From 16 Dec 2006 until end of January 2007:**

- Availability and Basic tests
- Collect and analyze results, update page with status of endpoints:
<https://twiki.cern.ch/twiki/bin/view/SRMDev/ImplementationsProblems>
- Plot results per implementation: number of failures/number of tests executed for all SRM MoU methods.
- Report results to WLCG MB.



- Phase 2: From beginning until end of February 2007:**

- Perform tests on use-cases (GFAL/lcg-utils/FTS/experiment specific), boundary conditions and open issues in the spec that have been agreed on.
- Plot results as for phase 1 and report to WLCG MB.



- Phase 3: From 1 March until "satisfaction" :**

- Stress testing
- Add more SRM 2.2 endpoints (some T1s ?)
- Plot results as for phase 2 and report to WLCG MB.

*Started on
March 15, 2007*



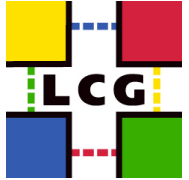
Tests executed

Summary of S2 SRM v2.2 basic test - Saturday 27 January 2007 09:00am CET

SRM function	CERN CASTOR	FNAL DCACHE	CERN DPM	LBL LBNL	STORM
WLCG MoU SRM v2.2 methods:					
Ping	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PrepareToPut	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfPutRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutDone	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PrepareToGet	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfGetRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
BringOnline	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfBringOnlineRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
AbortRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
AbortFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReleaseFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetRequestSummary	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetRequestTokens	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetTransferProtocols	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Ls	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Mkdir	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Rmdir	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Rm	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Mv	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReserveSpace	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfReserveSpaceRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReleaseSpace	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetSpaceTokens	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetSpaceMetaData	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ExtendFileLifeTime	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
WLCG MoU SRM v2.2 methods needed by end of 2007					
Copy	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfCopyRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ChangeSpaceForFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfChangeSpaceForFilesRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log

Summary of S2 SRM v2.2 basic test - Sunday 18 March 2007 08:13p

SRM function	CERN CASTOR	FNAL DCACHE	CERN DPM	LBL LBNL	STORM
WLCG MoU SRM v2.2 methods					
Ping	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PrepareToPut	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfPutRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutDone	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PrepareToGet	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfGetRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
BringOnline	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfBringOnlineRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
AbortRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
AbortFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReleaseFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetRequestSummary	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetRequestTokens	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetTransferProtocols	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Ls	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Mkdir	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Rmdir	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Rm	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Mv	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReserveSpace	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfReserveSpaceRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReleaseSpace	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetSpaceTokens	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetSpaceMetaData	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ExtendFileLifeTime	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
WLCG MoU SRM v2.2 methods needed by end of 2007					
Copy	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfCopyRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ChangeSpaceForFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
StatusOfChangeSpaceForFilesRequest	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log



Tests executed

Availability

Summary of S2 SRM v2.2 availability test
- Saturday 27 January 2007 09:00am CET

CERN CASTOR	FNAL DCACHE	CERN DPM	LBNL DRM	STORM
UP	UP	UP	UP	UP

Summary of S2 SRM v2.2 availability test - Sunday 18
March 2007 06:04pm CET

CERN CASTOR	FNAL DCACHE	CERN DPM	LBNL BeStMan	STORM
UP	UP	UP	UP	UP

Interoperability/ Cross Copy

Summary of S2 SRM v2.2 cross test - Saturday 27 January 2007 09:00am CET

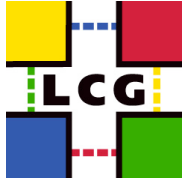
SRM function	CERN CASTOR	FNAL DCACHE	CERN DPM	LBNL DRM	STORM
Copy Tests in PUSH mode					
CopyToFNALDCACHE	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyToCERNDPM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyToLBNLDRM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyToSTORM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Copy Tests in PULL mode					
CopyFromFNALDCACHE	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyFromCERNDPM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyFromLBNLDRM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyFromSTORM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log

Summary of S2 SRM v2.2 cross test - Monday 19 March 2007 07:00am CET

In these tests the srmCopy function is exercised. This function should be implemented by all available Storage System by the end of the 3Q of 2007. dCache is required to implement this function as of now. Therefore, it is OK to have red columns for all SRM endpoints except for dCache. However, it is not OK to have red rows since this means that a file cannot be copied between SRMs with simple get and put operations.

SRM function	CERN CASTOR not needed	FNAL DCACHE	CERN DPM not needed	LBNL BeStMan	STORM
Copy Tests in PUSH mode					
CopyToCERNCASTOR	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyToFNALDCACHE	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyToCERNDPM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyToLBNLDRM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyToSTORM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Copy Tests in PULL mode					
CopyFromCERNCASTOR	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyFromFNALDCACHE	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyFromCERNDPM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyFromLBNLDRM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
CopyFromSTORM	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log

*StoRM
No Copy
In pull
mode*



Tests executed

Use Cases

Summary of S2 SRM v2.2 use-case test - Saturday 27 January 2007
09:00am CET

SRM test	CERN CASTOR	FNAL DCACHE	CERN DPM	LBNL DRM	STORM
GetRemoved01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsFullDetail	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsNonExistent	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Pin01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Pin02	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Pin03	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Pin04	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PrepareToPutNEVER	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutGet01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutNearline	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutNoOverwrite	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutOverwrite	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutRemoved01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReleaseFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReserveSpace	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Rmdir01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Space00	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Space01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Space02	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
TokenSensCase	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log

Summary of S2 SRM v2.2 use-case test - Sunday 18 March 2007 08:36pm CET

SRM test	CERN CASTOR	FNAL DCACHE	CERN DPM	LBNL BeStMan	STORM
ExtendFileLifeTime	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
FileNames00	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
FileNames01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetRemoved01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetStatusPartialEx	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
GetStatusPartialNe	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsDirCountOffset	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsDirDetail	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsDirFull	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsFullDetail	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsNonExistent	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
LsTopDir	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Mkdir00	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
MvBeingPut	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
MvDirBeingPutInto1	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
MvDirBeingPutInto	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
MvDir	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
MvIntoDir	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
MvSameFile	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
OverwritePin	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Pin01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Pin02	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Pin03	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PrepareToPutNEVER	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutGet01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutGet0File1	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutGet0File	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutNearline	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutNoOverwrite	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutNoOverwriteTransf	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutOverwrite	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutOverwriteTransf	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutRemoved01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutRemoved02	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutRemoved03	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutStatusPartialEx	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
PutStatusPartialNe	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReleaseFiles	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
ReserveSpace	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Rmdir01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
RmdirBeingPutInto	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
RmdirBeingPutIntoTransf	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Space00	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Space01	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Space02	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
Space03	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log
TokenSensCase	StdOut Log	StdOut Log	StdOut Log	StdOut Log	StdOut Log



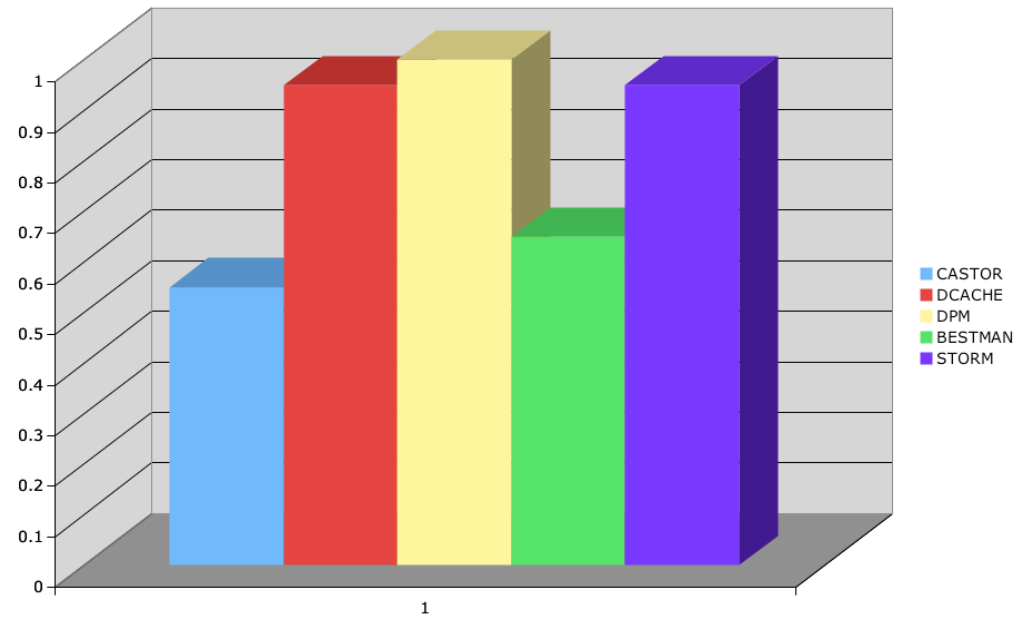
Critical Use Case Tests

- **FileNames00:** It checks that filenames that are 255 characters are supported. This is a requirement that comes from ATLAS. This feature is available at the moment in DPM, StoRM and soon in CASTOR.
- **Put[No]Overwrite:** It checks that the overwrite option in the Put operation works correctly. At the moment 2 implementations do not conform to the SRM spec: dCache and DPM for various valid reasons.
- **SURL existence/PutGet0File:** dCache assumes that a SURL/file exists only after the transfer has been initiated. Others make the SURL available after a PrepareToPut operation. This should only partially affect clients. Experiments will be warned about this behaviour in case they use the SRM interface directly.
- Other minor issues:
 - **Get/PutStatusPartialEx/Ne:** It performs get operations on a set of existing and non-existing files. It expects SRM_PARTIAL_SUCCESS to be returned. BeStMan returns SRM_SUCCESS or SRM_FAILURE.
 - **LsFullDetail:** It checks that some details about the file are returned (size, file locality, permission, etc.) DPM fails this test since it does not yet return the file locality.
 - **MvIntoDir:** It moves a file into a new directory without specifying the destination filename. This operation is not allowed at the moment by DPM.
 - **Pin01:** It checks that a file handle is made unavailable after a put cycle is finished. dCache does not enforce this.
 - **RmdirBeingPutInto:** It checks what happens to the file if the directory containing the files is removed while the file is being created. All implementations behave correctly. DPM does not warn the user that the file is in use.

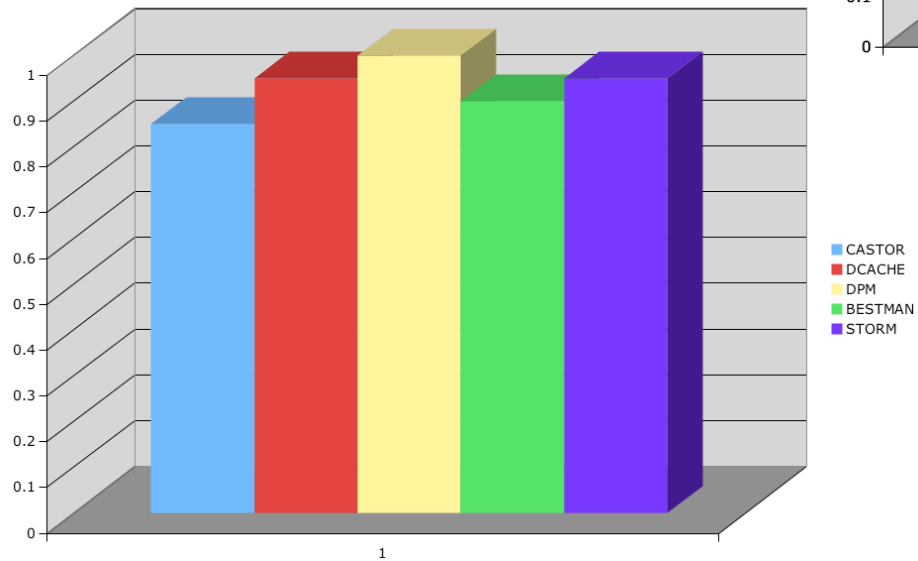
Test results

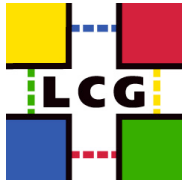


Availability - Period 27/2/2007 - 18/3/2007



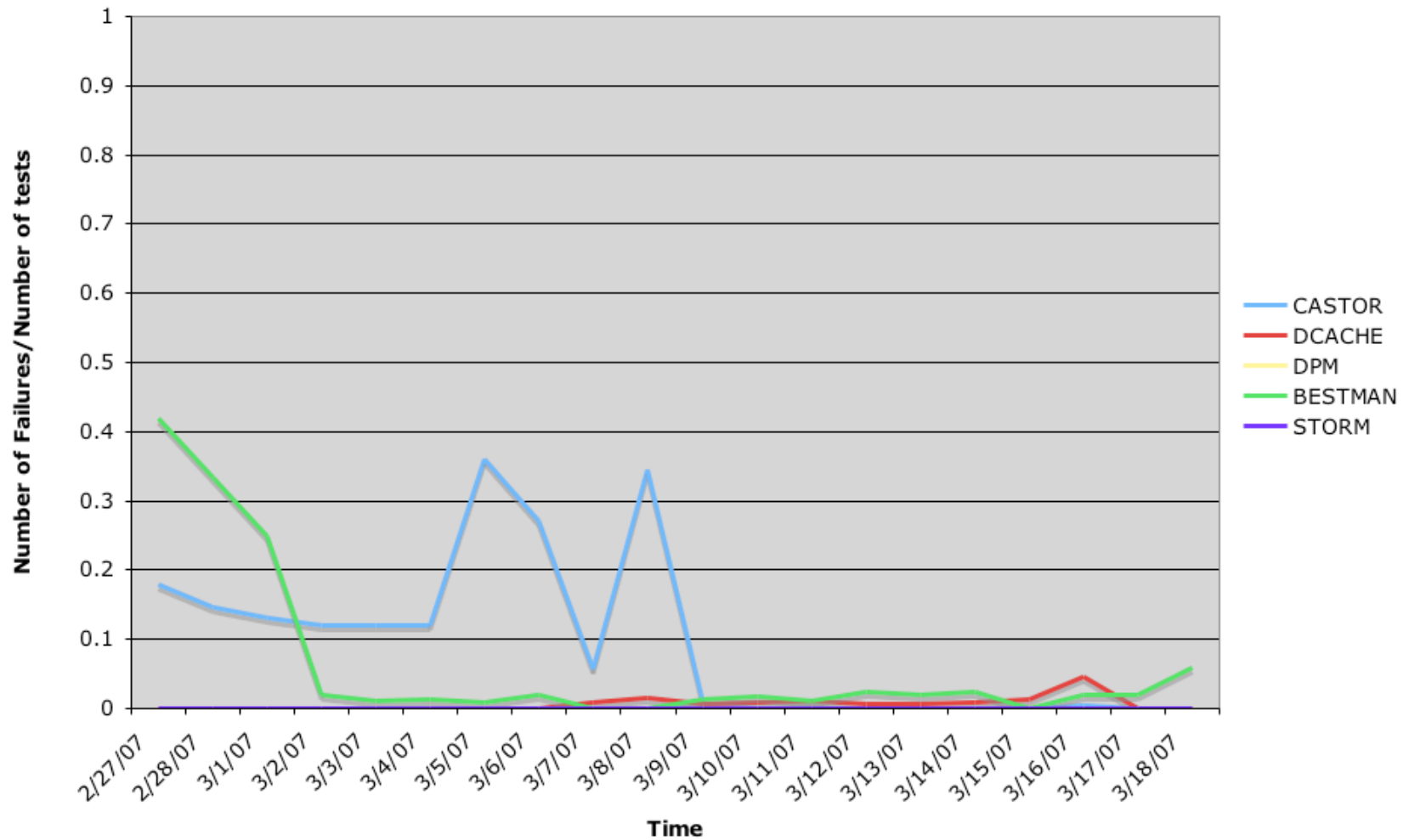
Ping - Period 27/2/2007 - 18/3/2007





Test results

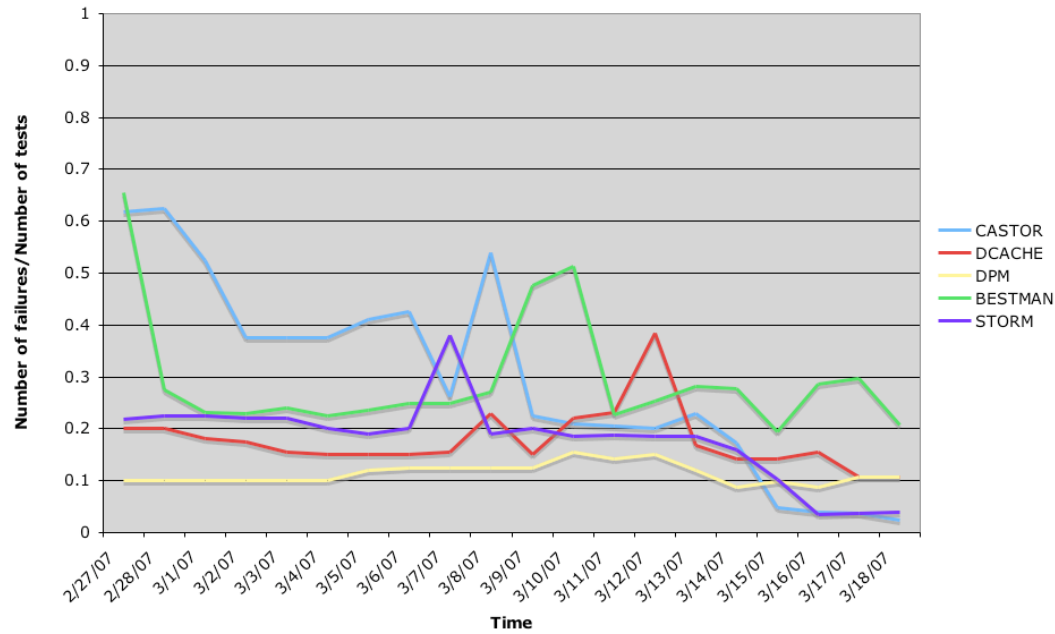
Basic Tests - Period 27/2/2007 - 18/3/2007



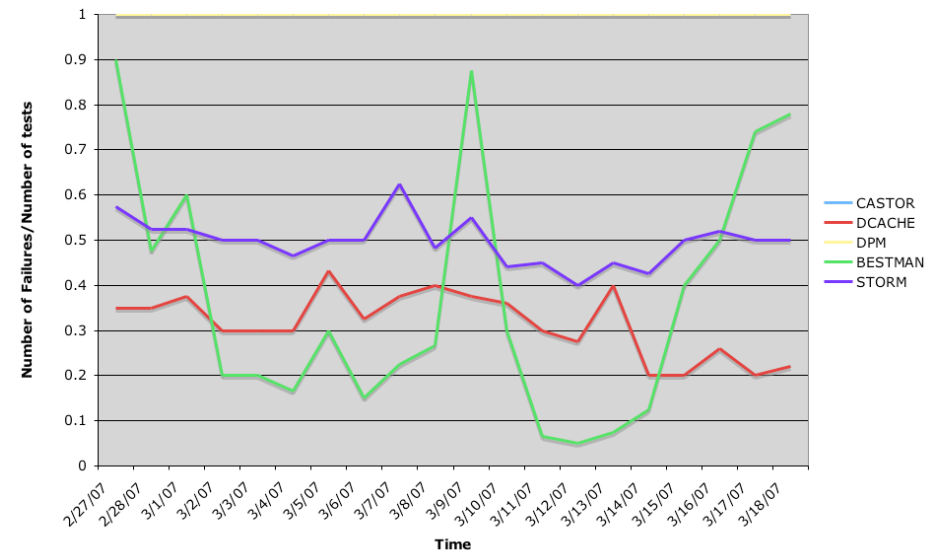


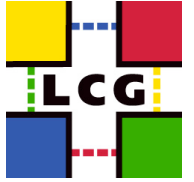
Test results

Use Cases Tests - Period 27/2/2007 - 18/3/2007



Interoperability tests - Period 27/2/2007 - 18/3/2007





Status of the implementations from SRM 2.2 perspective

- DPM version 1.6.3 available in production. SRM 2.2 features still not officially certified. Implementation stable. Use-case tests are OK. Copy not available but interoperability tests are OK. Few general issues to be solved.
- BeStMan and StoRM: Copy in PULL mode not available in StoRM. Stable implementations. Recently some instability observed with BeStMan. Some use-case tests still not passing and under investigation.
- dCache: Stable implementation. Copy is available and working with all implementations excluding DRM. Working on some use-case tests.
- CASTOR: The implementation has improved remarkably. A lot of progress during the last 3 weeks. Main instability causes found and fixed. Use-case tests OK. Copy not yet implemented but interoperability tests OK.



Status of SRM clients

■ FTS

- SRM client code has been unit-tested and integrated into FTS
- Tested against DPM, dCache and StoRM. CASTOR and DRM test started.
- Released to development testbed.
- Experiments could do tests on the dedicated UI set up for this purpose. New dCache endpoint setup at FNAL for stress test.

■ GFAL/lcg-utils

- New rpms available on test UI and being officially certified. No outstanding issues at the moment. ATLAS has started some tests.
- Still using old schema.



GLUE Schema

- GLUE 1.3 available
 - <http://glueschema.forge.cnaf.infn.it/Spec/V13>
- Not everything originally proposed, only the important changes
- LDAP implementation done by Sergio Andreozzi. Available on the test UI.
- Information providers started by Laurence Field. Static Information Providers available on test UI for CASTOR, dCache, DPM, STORM and BeStMan (all available endpoints).
- The new schema is compatible with the old one. Clients can adapt to new schema to exercise new features.

Grid Storage System Deployment (GSSD)



- *Working groups setup to work on specific issues:*
 - SRM v1 to v2 migration plan
 - Experiments input for Storage Classes, transfer rates, data flow patterns (input completed for LHCb and CMS, ATLAS coming)
 - Database entries conversion
 - Monitoring utilities
- SRM v1 to v2 migration plan
 - Some testing activity started with DPM, CASTOR and dCache. The sites that will participate in the testing activities and have committed are FNAL, DESY, IN2P3, FZK, BNL, GRIF/LAL, UK Tier-2s, and RAL
 - A draft report has been published (<https://twiki.cern.ch/twiki/bin/view/LCG/GSSDSubGroups>)
- Experiments input/Tier-1s input
 - LHCb input completed during last pre-GDB
 - Phone conf with CMS representatives. Very good progress. We need to better refine the input received so far.
 - ATLAS will be next target.
 - Discussing with sites the implications of the input received.
- Monitoring utilities
 - A draft report has been compiled with the possibilities offered by DPM and dCache.
 - It will be circulated to the list and to the DPM/dCache developers for input/corrections.
 - M. Ciriello - INFN will proceed with a prototype monitoring tool that can be included in SAM/GridView. No further efforts will be requested to MSS/SRM developers. Coordination with other monitoring efforts for Storage Services.