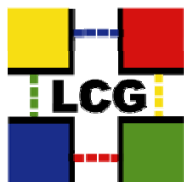
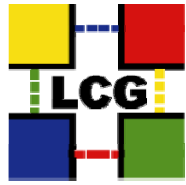


SRM v2.2: service availability testing and monitoring

SRM v2.2 deployment Workshop - Edinburgh, UK
12-13 November 2007

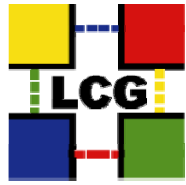
Flavia Donno
IT/GD, CERN





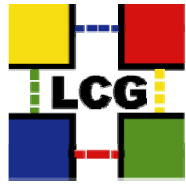
Outline

- The available testing suites for SRM v2.2
- The S2 test suites
- The bdii test suite
- The lcg-utils test suite
- The SAM monitoring system



The available testing suites for SRM v2.2

- The S2 families of test suites
 - Availability
 - Basic
 - Usecase
- BDII test suite
 - Validation of information published in the information system
- Lcg-utils test suite
 - Equivalent to current SAM SE tests



The S2 families of test suites

- The *S2* is *tree-based testing language* developed initially at RAL and enhanced by CERN.
 - <http://s-2.sourceforge.net>
- We needed a *testing framework* with the following characteristics:
 - Support for quick development of single test cases
 - Minimization of human coding errors
 - Plug-in mechanisms for external libraries (such as an SRM client)
 - Engine for parsing the output of a command
 - Support for parallel and sequential execution as well as timers both at instruction and test unit level.
 - “self-describing” logging facility
- Examined *several products available* on the market (TTCN-3 standard for telecommunication protocols)
- *S2 satisfies our requirements, allows for direct control of the code with no license fees, relatively quick learning*



The S2 families of test suites

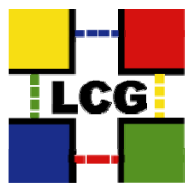
```
% srmLs TEST $MATCH{(?P<srmTest>.*).s2$ ${0}}
&& timeout=180000000 srmLs $ENV{ENDPOINT} SURL[$ENV{SRM_ENDPOINT}]
numOfLevels=0 requestToken=(?P<requestToken>.*)
pathDetails=(?P<pathDetails>.*)
returnStatus.explanation=(?P<returnexplanation>.*)
returnStatus.statusCode=(?P<returnCode>.*)
    SYSTEM echo "${srmTest}: Executed srmLs ..." >> $ENV{S2_LOG}
    && SYSTEM echo "${srmTest}: Status=${returnCode}" >> $ENV{S2_LOG}
&& TEST
$MATCH{(SRM_SUCCESS|SRM_REQUEST_QUEUED|SRM_PARTIAL_SUCCESS|SRM_INPROG
RESS) ${returnCode}}
    SYSTEM echo "${srmTest}: OK: ${returnCode}" >>
$ENV{SRM2_SUPPORTED}
    && TEST !$DEFINED{requestToken}
        SYSTEM echo "${srmTest}: Ls is synchronous" >>
$ENV{SRM2_SUPPORTED}
        || SYSTEM echo "${srmTest}: Ls is asynchronous" >>
$ENV{SRM2_SUPPORTED}
    || SYSTEM echo "${srmTest}: KO: ${-returnCode} ${-returnexplanation}"
>> $ENV{SRM2_SUPPORTED} && exit ${!}
```



The S2 families of test suites

The S2 *.e1 output file:

```
0:TEST "$MATCH{ (?P<srmTest>.*).s2$ 15_Ls.s2 }"  
0:timeout=180000000 srmLs https://srm-v2.cern.ch:8443/srm/managerv2  
  SURL[srm://srm-v2.cern.ch:8443/srm/managerv2?SFN=/castor/cern.ch/grid/dteam]  
  numOfLevels=0 requestToken=(?P<requestToken>.*) pathDetails=(?P<pathDetails>.*)  
  returnStatus.explanation=(?P<returnexplanation>.*)  
  returnStatus.statusCode=(?P<returnCode>.*) path0=/castor/cern.ch/grid/dteam  
  returnStatus.explanation0="" returnStatus.statusCode0=SRM_SUCCESS  
  returnStatus.explanation="" returnStatus.statusCode=SRM_SUCCESS  
0:      SYSTEM echo "15_Ls: Executed srmLs ..." >>  
  /home/tests/testing/scripts/protos/srm/2.2/basic/s2_logs/22CASTORCERN/15_Ls.log  
0:      && SYSTEM echo "15_Ls: returnStatus=SRM_SUCCESS" >>  
  /home/tests/testing/scripts/protos/srm/2.2/basic/s2_logs/22CASTORCERN/15_Ls.log  
0: && TEST  
  "$MATCH{ (SRM_SUCCESS|SRM_REQUEST_QUEUED|SRM_PARTIAL_SUCCESS|SRM_INPROGRESS)  
  SRM_SUCCESS}" 0: SYSTEM echo "15_Ls: OK: SRM_SUCCESS" >>  
  /home/tests/testing/scripts/protos/srm/2.2/basic/s2_logs/22CASTORCERN/15_Ls.out  
0: && TEST !$DEFINED{requestToken} 0: SYSTEM echo "15_Ls: Ls is synchronous" >>  
  /home/tests/testing/scripts/protos/srm/2.2/basic/s2_logs/22CASTORCERN/15_Ls.out
```



The S2 families of test suites

3 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://s-2.sourceforge.net/en_GB.indexch3.html#x4-5

CERN IT Depa... MMM Services http://..._Ls.e1 SRM2.2 depla... 3 (Untitled)

S2

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[Contact](#)

Download

Releases

Official releases are [deployed](#) by the SourceForge release infrastructure. Every officially released package has an [SHA1 sum](#) and `.asc` detached signature using DSA keys with ID `0xFDEDEE4B` and `0xB5902FA9`. These keys belongs to the current developers of this project: [Jiří Mencák](#) and [Flavia Donno](#). You can download the `0xFDEDEE4B` and `0xB5902FA9` public keys from <http://www.keyservers.net>.

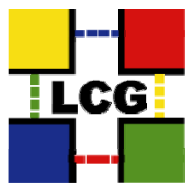
CVS

SourceForge [CVS](#) server hosts this project. Please refer to the [SourceForge project's CVS](#) page on how to retrieve the files. Module name is `s2`. The latest tag is `v2_8`. Note that there is currently a 5 hour syncing delay between developer and public CVS servers. Therefore you may need to wait a few hours for the latest tagged revision.

Last modification August 13, 2007

Done

The S2 families of test suites will be integrated into SAM. The work will be done using the new monitoring Framework that has been proposed (first prototype In December 2007). It can take sometime to actually have it.



The S2 families of test suites

Summary of S2 SRM v2.2 basic tests - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Summary of S2 SRM v2.2 basic test - Wednesday 14 November 2007 09:18am

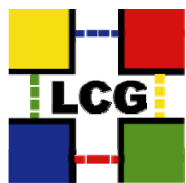
SRM function	CERN C2	CNAF C2	CERM LHCB	RAL C2	BNL2 dCache	DESY dCache	UKED dCache	FZK dCache	IN2P3 dCache	NDGF dCache	SARA dCache	FNAL dCache	UCSD dCache	CI	DESY	DESY	DESY	DESY
WLCG MoU SRM v2.2 methods																		
Ping	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PtP	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
StOfPut	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PutDone	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PtG	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
StOfGet	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
BoL	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
StOfBoL	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
AbortR	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
AbortF	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
RelFiles	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
GetReqSum	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
GetReqToks	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
GetTrProt	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log

http://lxdev25.cern.ch/s2test/basic/s2_logs/

<http://lxdev25.cern.ch/s2test/basic/history/>

↑
avail
usecase

This is not meant to support the WLCG production infrastructure. However, your endpoint can be tested on demand



The S2 families of test suites

Summary of S2 SRM v2.2 basic tests - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Summary of S2 SRM v2.2 basic test - Wednesday 14 November 2007 09:18am CET

SRM function	CERN C2	CNAF C2	CERM LHCB	RAL C2	BNL2 dCache	DESY dCache	UKED dCache	FZK dCache	IN2P3 dCache	NDGF dCache	SARA dCache	FNAL dCache	UCSD dCache	CERN DPM	LAL DPM	LBNL BeStMan	CNAF StoRM	CNAF StoRM
WLCG MoU SRM v2.2 methods																		
Ping	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PtP	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
StOfPut	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PutDone	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PtG	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
StOfGet	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
BoL	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
StOfBoL	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
AbortR	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
AbortF	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
RelFiles	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
GetReqSum	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
GetReqToks	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
GetTrProts	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log

Mozilla Firefox

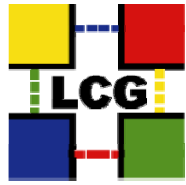
File Edit View History Bookmarks Tools Help

http://lxdev25.cern.ch/s2test/basic/02_StatusOfPutReq

```

% srmStatusOfPutRequest
TEST $MATCH( (?P<srmTest>.*).s2$ ${0})
%% srmPrepareToPut $ENV{ENDPOINT} fileRequests.SURL[$ENV{SRM_NEW_FILEO}] fileRequests.expectedFileSize[$ENV{SYSTEM} echo "${srmTest}: srmPrepareToPut, putRequestToken=${-putRequestToken}" >> $ENV{S2_LOG}
%% SYSTEM echo "${srmTest}: srmPrepareToPut returnStatus: ${returnPToP_statusCode}" >> $ENV{S2_LOG}
%% TEST $MATCH( (SRM_SUCCESS|SRM_REQUEST_QUEUED|SRM_REQUEST_INPROGRESS|SRM_PARTIAL_SUCCESS) ${returnPToP_statusCode} |2 SLEEP $EXPR($ENV{SLEEP_SOR} * ${I{0}})
srmStatusOfPutRequest $ENV{ENDPOINT} requestToken=${putRequestToken} SURL[$ENV{SRM_NEW_FILEO}] fileStat
SYSTEM echo "${srmTest}: srmStatusOfPutRequest, transferURLO=${-transferURLO}" >> $ENV{S2_LOG}
%% SYSTEM echo "${srmTest}: srmStatusOfPutRequest, returnStatus=${-returnStatus_statusCode}" >> $ENV{S2_LOG}
%% TEST $MATCH( (SRM_SUCCESS|SRM_PARTIAL_SUCCESS|SRM_REQUEST_QUEUED|SRM_REQUEST_INPROGRESS) ${returnStatus_statusCode} )
SYSTEM echo "${srmTest}: OK: ${returnStatus_statusCode}" >> $ENV{SRM2_SUPPORTED}
|| SYSTEM echo "${srmTest}: KO: ${-returnStatus_statusCode} ${-returnStatus_explanation}" >> $ENV{SRM2_SUPPORTED}

```



The S2 families of test suites

Summary of S2 SRM v2.2 basic tests - Mozilla Firefox

Summary of S2 SRM v2.2 basic test - Wednesday 14 November 2007 09:18am CET

SRM function	CERN C2	FNAL LHCb	BNL dCache	DESY dCache	UKED dCache	FZK dCache	IN2P3 dCache	NDGF dCache	SARA dCache	FNAL dCache	UCSD dCache	CERN DPM	LAL DPM	BNL BeStMan	CN St...
WLCG MoU SRM v2.2 methods															
Ping	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PtP	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
StOfPut	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log
PutDone	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log	Out Log

basic - Mozilla Firefox

http://lxdev25.cern.ch/s2test/basic/s2_

basic

Script	Exit	Before exec	After exec	stdout	Log	Debug	Custom log
01 Ping	0	before exec	after exec	stdout	log	n/a	custom log
02 PrepareToPut	0	before exec	after exec	stdout	log	n/a	custom log
02 StatusOfPutRequest	2	before exec	after exec	stdout	log	n/a	custom log
04 PutDone	2	before exec	after exec	stdout	log	n/a	custom log
05 PrepareToGet	2	before exec	after exec	stdout	log	n/a	custom log
05 StatusOfGetRequest	2	before exec	after exec	stdout	log	n/a	custom log
06 BringOnline	2	before exec	after exec	stdout	log	n/a	custom log

Mozilla Firefox

http://lxdev25.cern.ch/s2test/basic/s2_logs/22

```

O:TEST "$MATCH({?P<srnTest>.*}.s2$ 02_StatusOfPutRequest.s2)"
O:&& srmPrepareToPut https://srm-v2.cern.ch:8443/srm/managerv2 fileRequests.SURL[srm://srm-v2.cer
O: SYSTEM echo "02_StatusOfPutRequest: srmPrepareToPut, putRequestToken=977897" >> /home/tests/
O: && SYSTEM echo "02_StatusOfPutRequest: srmPrepareToPut returnStatus: SRM_REQUEST_QUEUED" >>
O:&& TEST "$MATCH((SRM_SUCCESS|SRM_REQUEST_QUEUED|SRM_REQUEST_INPROGRESS|SRM_PARTIAL_SUCCESS) SRM
O:&& >0||2 SLEEP $EXPR(180*0)
2: srmStatusOfPutRequest https://srm-v2.cern.ch:8443/srm/managerv2 requestToken=977897 SURL[srm
O:&& >0||2 SLEEP $EXPR(180*1)
2: srmStatusOfPutRequest https://srm-v2.cern.ch:8443/srm/managerv2 requestToken=977897 SURL[srm
O:&& >0||2 SLEEP $EXPR(180*2)
2: srmStatusOfPutRequest https://srm-v2.cern.ch:8443/srm/managerv2 requestToken=977897 SURL[srm
2:|| SYSTEM echo "02_StatusOfPutRequest: KO: ${returnStatus_statusCode} ${returnStatus_explanatio

```



The *bdii* test suite

- The *bdii* test suite execute tests to check:
 - That the GlueSEBind objects are correctly published
 - That the GlueService lists the SRM v2.2 endpoint as such
 - That the GlueSA areas are published in a way that is compliant with the GSSD examples
 - That the GlueVOInfo objects are present
 - That a list of protocols is supported
 - That there is a GlueSE object associated to the SRM v2.2 endpoint
- It requires the environmental variable `LCG_GFAL_INFOSYS` to point to your site *bdii*
- You have to invoke the scripts passing the hostname where the SRM v2.2 service is running as input argument:
 - `./Protocols.sh srm-v2.cern.ch`
- It will be soon part of the SAM SRM v2 tests
- The distribution of scripts is available as a tarball in the GSSD pages:
<https://twiki.cern.ch/twiki/pub/LCG/GSSD/bdii-publication-check.tar.gz>



The bdi test suite

http://lxdev25.cern.ch/s2test/lcg-utils/s2_logs/

<http://lxdev25.cern.ch/s2test/lcg-utils/history/>

Summary of S2 SRM v2.2 bdi tests - Mozilla Firefox

File Edit View History Bookmarks Tools Help

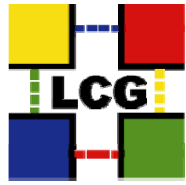
http://lxdev25.cern.ch/s2test/bdi/s2_k

Summary of S2 SRM v2.2 bdi test - Wednesday 14 November 2007 12:01pm CET

SRM test	CERN C2	CNAF C2	CERM LHCB	RAL C2	BNL2 dCache	FZK dCache	IN2P3 dCache	NDGF dCache	SARA dCache	LAL DPM	CNAF StoRM2
GlueCESEBind	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
Protocols	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
SA	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
SE	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
SRM	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log



This is not meant to support the WLCG production infrastructure. However, your endpoint can be tested on demand



The lcg-utils test suite

- The *lcg-bdii* test suite runs the **main lcg-* commands** on the endpoint.
- In order to run successfully this test suite you have to make sure that your endpoint **passes the bdii tests**
- It requires the environmental variable **LCG_GFAL_INFOSYS** to point to your site bdii
- You need to run it with a dteam VOMS valid proxy
- You have to invoke the scripts passing **the full SRM v2.2 endpoint as input** argument:
 - `./lcg-ls.sh`
`srm://ccsrmtestv2.in2p3.fr:8443/srm/managerv2?SFN=/pnfs/in2p3.fr/data/dteam/s-2`
- It will be soon part of the SAM SRM v2 tests
- The distribution of scripts is available as a tarball in the GSSD pages:
<https://twiki.cern.ch/twiki/pub/LCG/GSSD/lcg-utils-check.tar.gz>



The lcg-utils test suite

http://lxdev25.cern.ch/s2test/lcg-utils/s2_logs/

<http://lxdev25.cern.ch/s2test/lcg-utils/history/>

SRM test	CERN C2	CNAF C2	CERM LHCB	RAL C2	BNL2 dCache	FZK dCache	IN2P3 dCache	NDGF dCache	SARA dCache	CERN DPM	LAL DPM	CNAF StoRM2
lcp-cp	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
lcp-cr	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
lcp-gt	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
lcp-ls-dir	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log
lcp-ls	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log	Log



This is not meant to support the WLCG production infrastructure.

However, your endpoint can be tested on demand

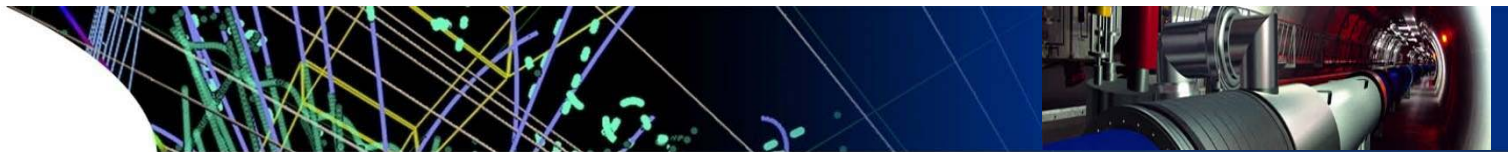


The SAM monitoring system

- It requires your site to be correctly registered in the GOCDB (either as production or PPS site)
 - **ATTENTION:** GOCDB interface does not allow nodes to be removed. You have to submit a GGUS ticket requesting for your nodes to be moved (from PPS to production, for instance) or removed from the database
 - Furthermore, the endpoint needs to correctly be published in the production/PPS BDII
- SAM performs SE, SRMv1 and SRMv2 tests + experiment specific tests (CMS, ATLAS etc.)
- SAM SE tests use lcg-utils to copy and register and to remove a SURL.
 - **ATTENTION:** they currently use an old release of the lcg-utils that do not support SRM v2 and they rely on what is published in the information system.
 - Make sure you only publish the SRM v2 endpoint if you are only running SRM v2.2.
- We are investigating how to integrate existing S2, bdii, lcg-utils tests in SAM (next release ?).
- A family of gfal tests is also available but it should run in a Grid job (it exercises the local file access protocols)
- Experiment tests available at the moment use srm* dCache client tools on SRM v1.1. We are working with the experiments to enhance current tests with SRM v2.2 functionality.



Be posted!!!



The GSSD Working Group

Please, for any further detail or information refer to the *[GSSD twiki pages](https://twiki.cern.ch/twiki/bin/view/LCG/GSSD)*:

<https://twiki.cern.ch/twiki/bin/view/LCG/GSSD>