ATLAS Experience with SRM2

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for the ATLAS DDM team

Overview

- Objectives
- SRM2 test setup: ATLAS-DDM
- Results for many small files at NDGF, CNAF
- Results with large T0-export files
- First impression of the srm-pin/stage tools
- ATLAS requirements on SRM tools

Objectives

- Test new SRM2 implementations with the existing ATLAS DDM system
 - Do usability, not functional tests!
 - Understand what we have to change in DDM
 - Allows using the standard queues on FTS, standard Certificates
 - Understand how fast Atlas DDM can be adjusted to work with Test-Sites
- Understand new features:
 - Pinning/Staging
 - Space Tokens

Test setup with ATLAS DDM



Tests with many Small Files

- Sent 70k small files of 100kB size to sites
- Small files should stress the SRM most...
- Picked first sites that were read: NDGF & CNAF
- No modifications in DDM:
 - No Space Tokens used
 - Not making use of e.g. Pre-staging functionality
- Writing tested only...



Activity Summary (Last 168 Hours) Click on the cloud name to view list of sites

				and around manne							
		Tra	ansfers		Serv	vices	Errors				
Cloud	Efficiency	Throughput	Files Done	Datasets Done	DQ	Grid	Transfer	Local	Remote	Central	
ASGC	0%	0 MB/s	0	0			0	0			
BNL	0%	0 MB/s	0	0			0	0			
CERN	0%	0 MB/s	0	0			0	0			
CNAF	0%	0 MB/s	0	0			0	0			
FZK	0%	0 MB/s	0	20			874502	0			
LYON	0%	0 MB/s	0	0			0	0			
NDGF	75%	0 MB/s	41220	0			13562	88406			
PIC	0%	0 MB/s	0	0			0	0			
RAL	0%	0 MB/s	0	0			0	0			
SARA	0%	0 MB/s	0	0			0	0			
TRIUMF	0%	0 MB/s	0	0			0	0			

All Errors from CERN Castor...

State from FTS: Failed; Retries: 3; Reason: SOURCE error during PREPARATION phase: [REQUEST_TIMEOUT] failed t to prepare source file in 60 seconds\$168State from FTS: Failed; Retries: 3; Reason: SOURCE error during PREPARATION phase: [GENERAL_FAILURE] CastorSt agerInterface.c::2162 Required tape segments are not all accessible (errno=0, serrno=0)\$204State from FTS: Failed; Retries: 3; Reason: TRANSFER error during TRANSFER phase: [TRANSFER_TIMEOUT] gridftp_ copy_wait: Connection timed out\$09State from FTS: Failed; Retries: 1; Reason: SOURCE error during PREPARATION phase: [INVALID_PATH] CastorStage Interface.c::2162 No such file or directory (errno=0, serrno=0)\$147State from FTS: Failed; Retries: 2; Reason: SOURCE error during PREPARATION phase: [GENERAL_FAILURE] cannot c ontinue since no size has been returned after PrepareToGet or SmStat90State from FTS: Failed; Retries: 3; Reason: SOURCE error during PREPARATION phase: [GRIDFTP] a system call faile d (connection refused)71State from FTS: Failed; Retries: 3; Reason: SOURCE error during PREPARATION phase: [INVALID_PATH] specified f ile(s) does not exist39State from FTS: Failed; Retries: 3; Reason: SOURCE error during TRANSFER phase: [GRIDFTP] a system call faile d (connection refused)21Np2VBFCut_00504.tar.gz.104633: not a plain file.21State from FTS: Failed; Retries: 3; Reason: SOURCE error during TRANSFER phase: [GRIDFTP] the server sent an error response: 550 550 lcg00118.grid.sincia.edu.tw:/flatfiles/SE00/at/stage/alpgen.008162.AlpgenJimmyZtautau Np2VBFCut_00504.tar.gz.104633: not a plain file.18State from FTS: Failed; Retries: 3; Reason: SOURCE error during TRANSFER phase: [GRIDFTP] the server sent an error response: 550 550 lcg00118	NDGFTEST	75%	0 MB/s	41220	0	ОК		13562	88406		
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	State from FTS: Fa	ailed; Retrie	es: 3; Reaso	n: SOURCE	error during T	RANSFER pl	nase: [GRID	FTP] the se	erver sent a	an	

CNAF-StoRM works well, too...

OVFRVIEW

OVERVIEW Activity Activity in Last Hour Activity in Last 4 Hours Activity in Last 24 Hours Activity in Last 7 Days Activity in Last 30 Days Activity in ...

200

100

Cloud Activity ASGC Cloud BNL Cloud CERN Cloud CNAF Cloud FZK Cloud LYON Cloud NDGF Cloud PIC Cloud RAL Cloud SARA Cloud TRIUMF Cloud





Total Number Errors

Data Transferred (GBytes)

Completed File Transfers





Activity Summary (Last 24 Hours) Click on the cloud name to view list of sites

		Tra	ansfers		Services Errors					
Cloud	Efficiency	Throughput	Files Done	Datasets Done	DQ	Grid	Transfer	Local	Remote	Central
ASGC	0%	0 MB/s	0	0			0	0		
BNL	0%	0 MB/s	0	0			0	0		
CERN	0%	0 MB/s	0	0			0	0		
CNAF	93%	0 MB/s	22587	0			1667	0		
FZK	0%	0 MB/s	0	0			49707	0		
LYON	0%	0 MB/s	0	0			0	0		
NDGF	1%	0 MB/s	45	0			5055	0		
PIC	0%	0 MB/s	0	0			0	0		
RAL	84%	54 MB/s	1489	840			290	0		
SARA	0%	0 MB/s	0	0			0	0		
TRIUMF	0%	0 MB/s	0	0			0	0		

Errors again from Castor...

		/ -					-			
CNAF	93%	0 MB/s	22587	0			1667	0		
Click on the site name to go to the site name.										
CNAFDISK	0%	0 MB/s	0	0	OK	-	0	0		
CNAFTAPE	0%	0 MB/s	0	0	OK		0	0		
CNAFTEST	93%	0 MB/s	22587	0	OK		1667	0		
State from FTS: Failed; Retries: 1; Reason: SOURCE error during PREPARATION phase: [GENERAL_FAILURE] CastorSt agerInterface.c:2162 Required tape segments are not all accessible (errno=0, serrno=0)										
State from FTS: F srmPut file becau	ailed; Retri se it alreac	es: 1; Reas ly exists!	on: DESTINA	TION error dur	ing PREPARA	ATION phas	e: [FILE_EX	ISTS] Cann	ot 235	
State from FTS: F rInterface.c:2162	ailed; Retri No such fil	es: 1; Reas le or directo	on: SOURCE ry (errno=0,	error during P serrno=0)	REPARATION	I phase: [IN	VALID_PAT	H] CastorSt	age 81	
State from FTS: Failed; Retries: 1; Reason: SOURCE error during PREPARATION phase: [REQUEST_TIMEOUT] failed t o prepare source file in 180 seconds								ed t 32		
State from FTS: For led to prepare De	ailed; Retri stination fi	es: 1; Reas ile in 180 se	on: DESTINA conds	TION error dur	ing PREPARA	ATION phas	e: [REQUES	T_TIMEOUT] fai 25	
State from FTS: F ile(s) does not ex	ailed; Retri ist	es: 1; Reas	on: SOURCE	error during P	REPARATION	l phase: [IN	VALID_PAT	H] specified	f 15	
State from FTS: For ontinue since no state since	ailed; Retri size has be	es: 1; Reas een returne	on: SOURCE d after Prepa	error during P reToGet or Srr	REPARATION nStat	I phase: [G	ENERAL_FAI	(LURE] cann	iot c 7	
State from FTS: F agerInterface.c:2	ailed; Retri 145 Intern	es: 1; Reas al error (err	on: SOURCE no=0, serrno	error during P =1015)	REPARATION	l phase: [G	ENERAL_FAI	ILURE] Cast	orSt 3	
State from FTS: F d (Connection ref	ailed; Retri used)	es: 1; Reas	on: SOURCE	error during T	RANSFER ph	ase: [GRIDI	-TP] a syste	m call faile	1	
State from FTS: F d path	ailed; Retri	es: 1; Reas	on: DESTINA	TION error dur	ring PREPARA	ATION phas	e: [INVALID	_PATH] Inva	ali 1	
State from FTS: F agerInterface.c:2	ailed; Retri 162 Is a di	es: 1; Reas rectory (erri	on: SOURCE no=0, serrno	error during P =0)	REPARATION	I phase: [G	ENERAL_FAI	(LURE] Cast	orSt 1	

Conclusions from First Phase

- SRM2 works very well as a drop-in replacement for SRM1, at least for the dCache and StoRM implementations
- Pre-staging should be able to help a lot in efficiency
- Unfortunately: Files in SRM-Test instances also picked up for transfers to other sites
 - Reading tested in uncontrolled way, too!
- Next phase: Need to integrate better with ongoing tests...

Writing large files

- Now integrated with ongoing T0 exercise:
 - Export tests from CERN with large files to T1 sites
 - Tests mainly throughput: 3GB files
- Add new site: LYON
 - BNL had trouble with dCache
 - FZK not in production BDII
 - LAL not considered (T2)



Activity Summary (Last 1 Hours)

Click on the cloud name to view list of sites

		11	ansters		Serv	lices	Errors			
Cloud	Efficiency	Throughput	Files Done	Datasets Done	DQ	Grid	Transfer	Local	Remote	Central
ASGC	0%	0 MB/s	0	0			0	0		
BNL	0%	0 MB/s	0	0			0	0		
CERN	0%	0 MB/s	0	0			0	0		
CNAF	12%	9 MB/s	10	2			76	0		
FZK	0%	0 MB/s	0	0			0	0		
LYON	56%	8 MB/s	5	1			4	0		
NDGF	100%	11 MB/s	13	З			0	0		
PIC	0%	0 MB/s	0	0			0	0		
RAL	51%	147 MB/s	189	55			184	0		
SARA	0%	0 MB/s	0	0			0	0		
TRIUMF	0%	0 MB/s	0	0			0	0		

StoRM

• CNAF problems result from StoRM dynamic space allocation feature:

		, -	-	-			-	-			
CNAF	0%	0 MB/s	0	0			700	0			
Click on the site name to go to the site page											
CNAEDISK	0%	0 MB/s	0	0	ок	-	0	0			
CNAFTARE	0%	0 MB/s	0	0	OK		0	0			
CNAFTERT	0%	0 MB/s	0	0	OK		200	0			
CNAFIEST	070	0 140/5	0		UN.		700	0			
State from FTS: F	ailed; Retri	les: 1; Reaso	n: DESTINAT + failed	FION error dur	ing PREPAR	ATION pha	ise: [GENER/	AL_FAILUF	RE] Spa	697	
ce Management s	icep in sini	Fiepareitoru									
State from FTS: Failed; Retries: 1; Reason: TRANSFER error during TRANSFER phase: [GRIDFTP] an end-of-file wa										3	
s reached (possib	ny the desi	unation disk	is tuir)								
LNF	0%	0 MB/s	0	0	OK		0	0			

• Currently under investigation...

SRM-pin tool preview

- Understood that we will use BringOnline
- But to see whether this is useful for us, we need to change our data management software
 - Could be interesting to do pre-staging before scheduling FTS transfer

Conclusions

- SRM2 implementations can be used as drop-in replacements for SRM1 instances
- Problems observed seem to be due to backend configuration or CASTOR at CERN
- StoRM dynamic space allocation under investigation
- Atlas DDM will now regularly use the SRM2 endpoints for its export tests
- Need to include T2s (test DPM)

Future Plans

- Need to include T2s (test SRM2 of DPM)
- Test SRM2 at CERN
 - Read from SRM2
 - Test usage of Space Tokens (needs updates to DDM, first)
- Need to test new SRM2 features
 - Bring-Online can allow pre-staging
 - srm-ls?

ATLAS Requirements

- lcg-xx tools:
 - Used intensively by Production System, Analysis
 - → Need to work with SRM2
 - → Support for Space Tokens
- gfal:
 - Used on Worker Node via Root to access files
 - Sometimes used in Ganga instead of lcg-tools on WN
 - → Updates needed to work with SRM2
 - → Python wrapper needed

Tools Needed for Direct SRM Access

- Need direct access to SRM2 on CLI:
 - High interest in Distributed Data Management
 - → srm-ls: needed to check consistency with LFC
 - srm-stage: intended to pre-stage files before transfer with DDM
- Tools should be scriptable (i.e. no Java)
- Tools should not look into BDII
- Tools should be OSG interoperable

SRM access library

- Need direct SRM access library in Python
 - No detour via BDII, please
 - Should be thread-safe
 - Should work against multiple catalogues concurrently
 - Either swigged C or Python client generated from SRM 2.2 WSDL
 - OSG interoperability important

Additionally...

- For consistency of catalogues on Sites:
 - List LFC content by SURL date, needed to clean up catalogues