

# Storage Interfaces and Access pre-GDB

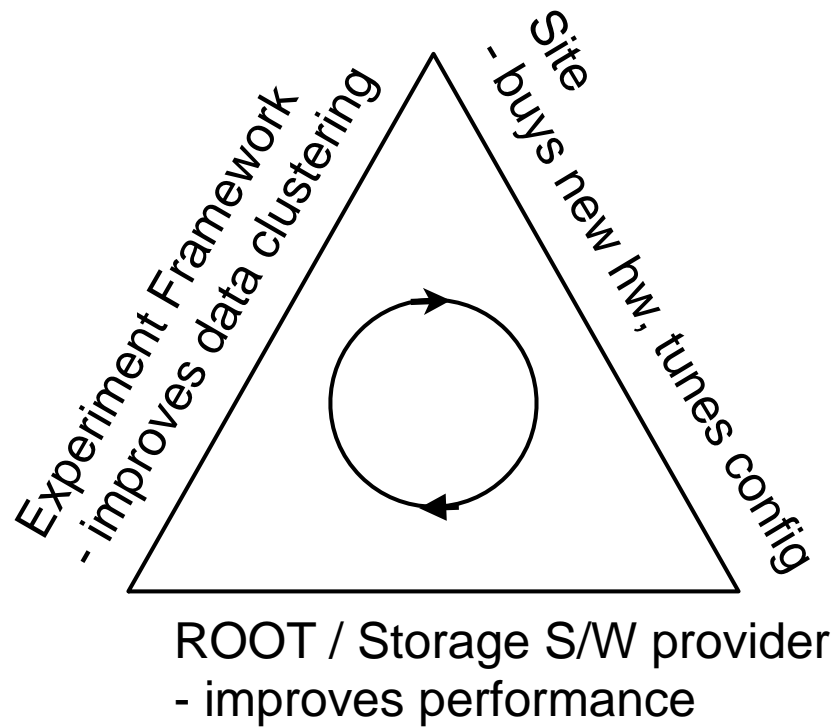
Wahid Bhimji  
University of Edinburgh

On behalf of all those who participated

# Pre-GDB focused on Storage Working Groups

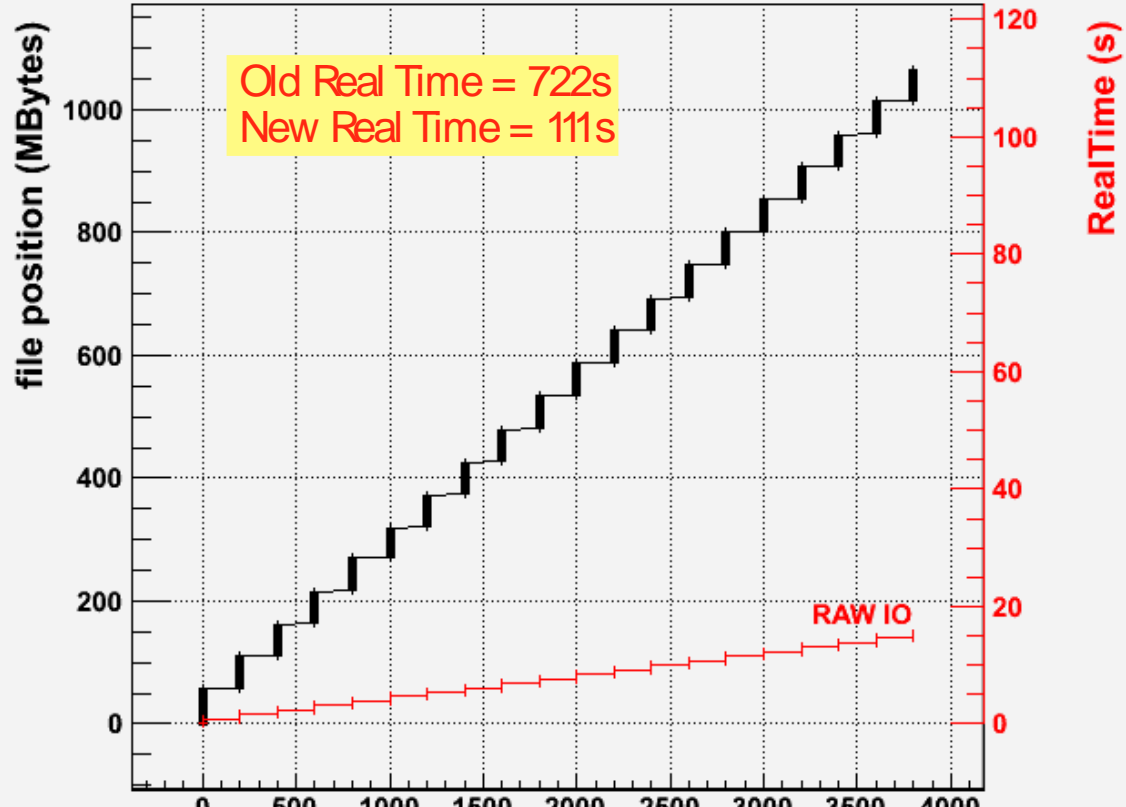
- Working groups proposed following Storage/Data TEGs see [TEG report](#):
  - Benchmarking – This was first full meeting.
  - Storage Interfaces – This was 2<sup>nd</sup> full meeting.
  - Federation – This would have been 5<sup>th</sup> meeting.
- I am only covering first two as Fabrizio has a separate talk today and anyway we didn't manage to discuss much because Vidyo is pants.

# Benchmarking- Intro

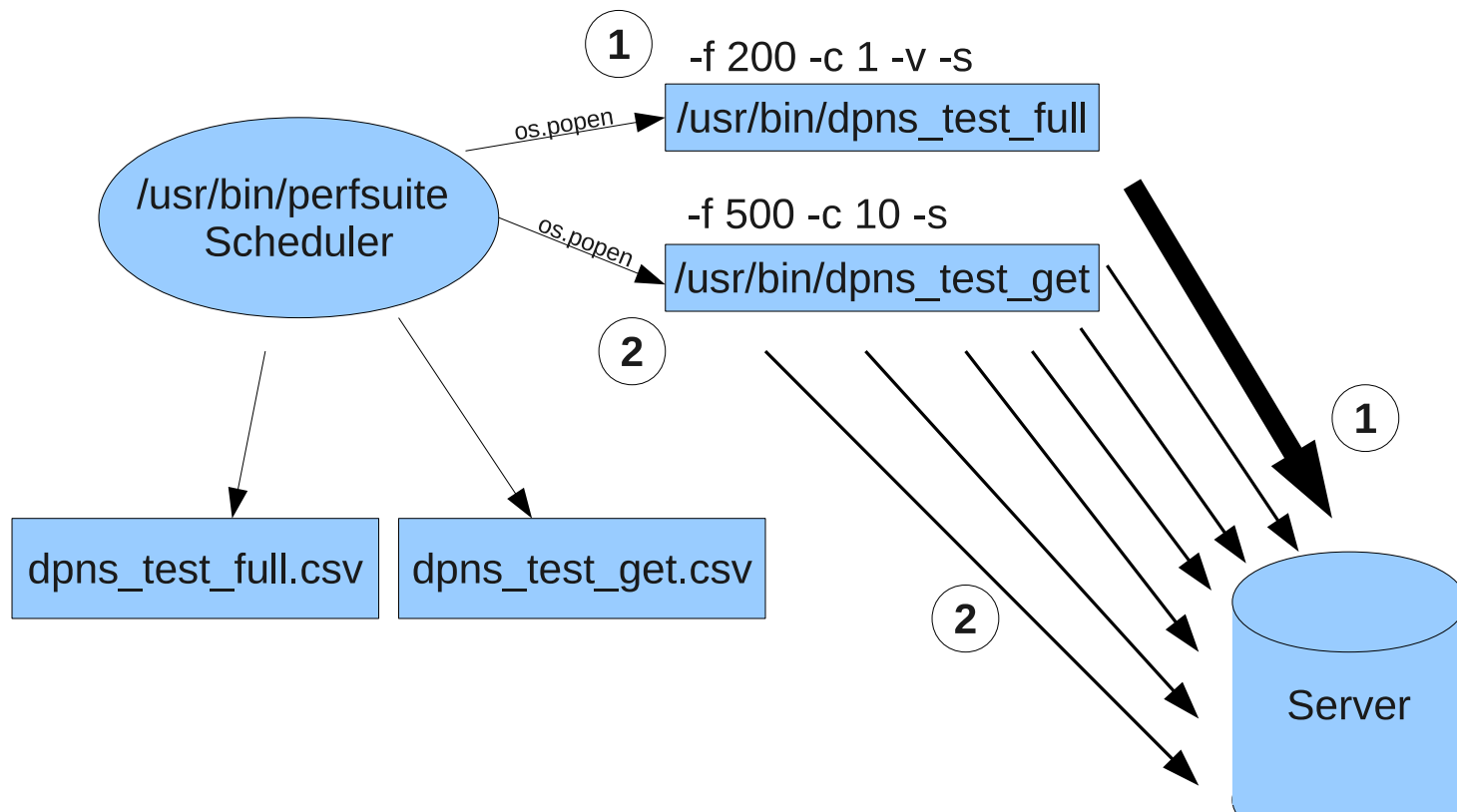


# ROOT TTreePerfStats etc.

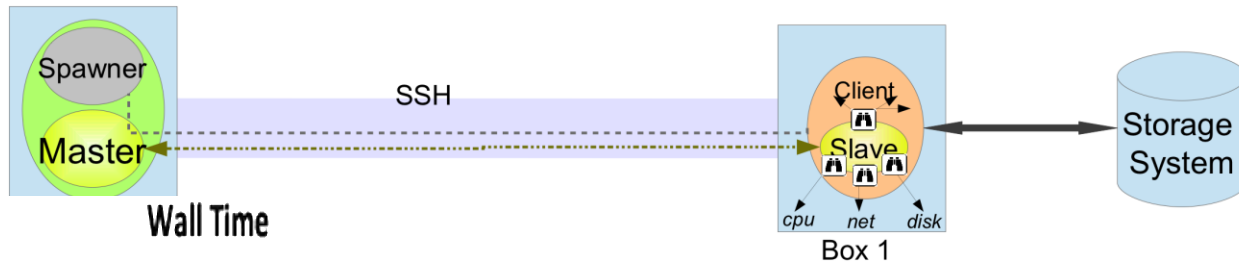
TreeCache = 60 MB  
N leaves = 9705  
ReadTotal = 1070.72 MB  
ReadUnZip = 3936.2 MB  
ReadCalls = 521  
ReadSize = 2055.130 KB  
Readahead = 256 KB  
Readextra = 0.00 per cent  
Real Time = 111.563 s  
CPU Time = 96.340 s  
Disk Time = 15.374 s  
Disk IO = 69.645 MB/s  
ReadUZRT = 35.282 MB/s  
ReadUZCP = 40.857 MB/s  
ReadRT = 9.597 MB/s  
ReadCP = 11.114 MB/s



# DPM perfsuite benchmarking tool

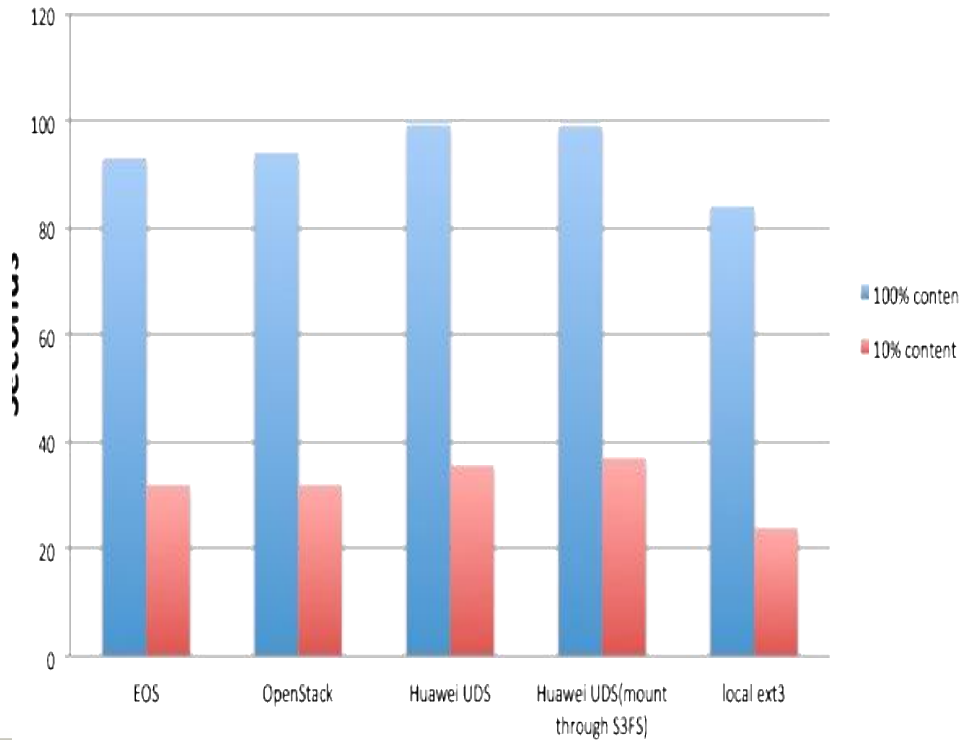


# EOS benchmarking tool



ns?

Wall Time



Box 1

Box 2

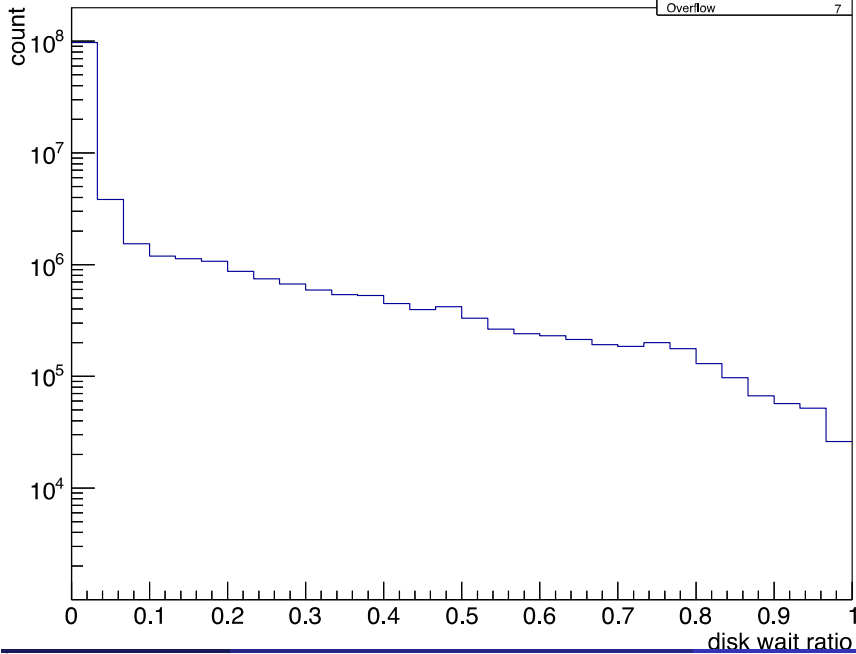
Box n

# EOS monitoring

disk wait ratio

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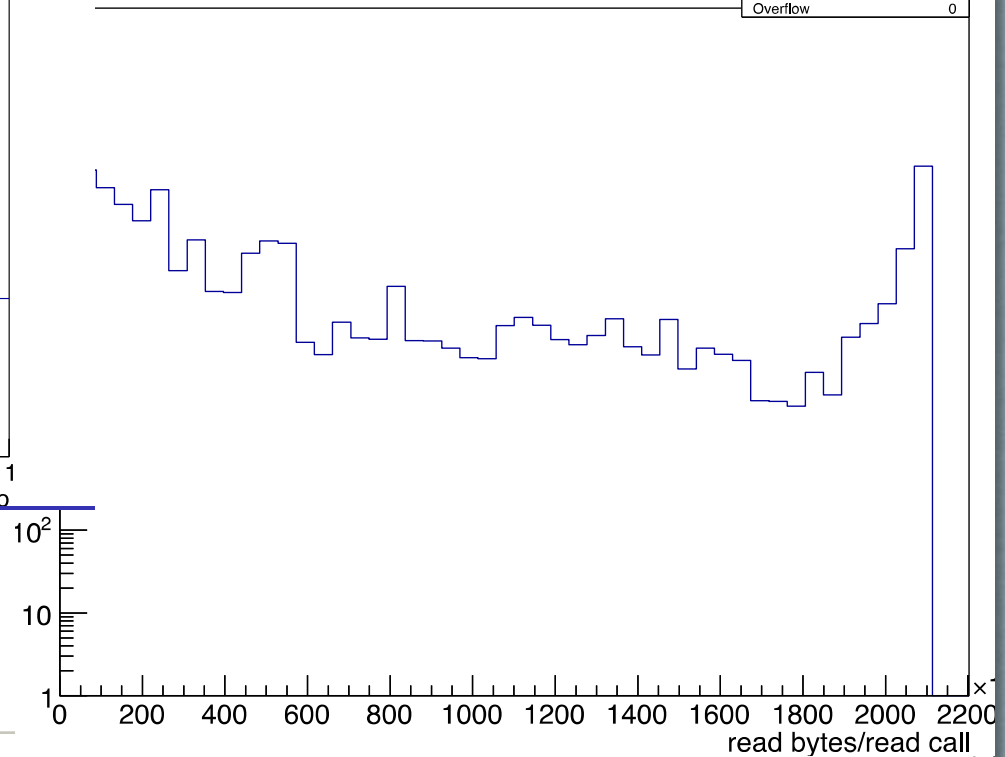
disk wait ratio	
Entries	1,13926e+08
Mean	0,04746
Underflow	0
Overflow	7



Read bytes / call

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Read bytes / call	
Entries	1,139261e+08
Mean	8,22e+04
Underflow	0
Overflow	0



# Benchmarking Summary

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- Now have a good overview of existing work, products and metrics.
- Next step to try and compare and converge on these Metrics and Tools .
- A suggested list of top 10 metrics and a doodle for next meeting will follow shortly.



# Storage Interfaces WG: Background and Mandate

- Little of current management interface (SRM) is used. Leads to performance overheads for experiments; work on developers to maintain; restricts sites technology choices.
- Building on Storage/Data TEG, clarify **for disk-only systems** the minimal functionality for WLCG Storage Management Interface.
- Evaluate alternative interfaces as they emerge, call for the need of tests whenever interesting, and recommend those shown to be interoperable, scalable and supportable. Help ensure that these alternatives can be supported by FTS and lcg\_utils to allow interoperability.
- Meetings to coincide with GDBs plus extras on demand:
  - Presentations from developers / sites / experiments covering activity
  - **Not** designing a replacement interface to SRM but there **are** already activities so bringing together and coordinating these.

# Summary of SI session

- Experiment's Data Management plans:
  - **CMS**: no “blockers” for non-SRM usage; Nebraska SRM-free site; Example ways of doing things that can be used by others.
  - **ATLAS**: some issues that may be resolved in next gen of data management: **rucio**. Open to trying controlled non-SRM sites using common solutions / interfaces.
  - **LHCb** expressed concerns but have not very different requirements than Atlas.
- Sites Perspective: **CERN**: Bestman SRM doesn't scale for them – want to remove it. (Also RAL future disk only technology, choice ideally wouldn't be hampered by SRM options)
- Middleware and tool development : e.g. **DPM**; **FTS3**; **gFal2**

# Stated Goals for that session

Finalize **functionality map**; identify **blocking issues** and needed **development**.

Links between SI WG and:

- Accounting (StAR) and publishing (glue/bdii)
  - Later is only minimally used (and former doesn't exist yet). Is this within scope of WG?
- Federation WG:
  - Medium term there will still be another interface
  - Longer term use of federation is not yet clear.

# Areas requiring development – now with ways forward!

Needed by?	Issue	Solution
ATLAS/ LHCb	Reporting of space used in space tokens.	JSON publishing currently used in some places on ATLAS – probably temporary. WebDav quotas?
ATLAS/ LHCb	Targeting upload to space token.	Could just use namespace but certain SEs would need to change the way they report space to reflect. (Or use e.g. http)
ATLAS/L HCb	Deletion	gFal2 will help.
LHCb (ATLAS)	Surl->Turl	Require a redirecting protocol and SURL = Turl for sites that want no SRM.
Any?	Checksum check – confirm not needed?	Some service query is needed by ATLAS – as is some “srm-ls”. gFal2 will help
All?	pure gridFTP on different storage types	DPM at least willing to look at this.

# Conclusions

- Activity on Benchmarking, Federations and Storage Interfaces is progressing.
- Meeting was valuable in bringing harmony, discovering duplicated effort, etc.
- There are many overlaps in topic and attendance so having such joint storage meetings is desirable.

# Extra Slides

# Table of used functions from TEG

	<i>Is this feature used by ...</i>				Tier	SRM function <sup>2</sup>
	<i>Atlas</i>	<i>CMS</i>	<i>LHCb</i>	<i>FTS only</i>		
<b><i>Transfer Management</i></b>						
Upload / download a complete file	Yes	Yes	Yes	No	All	srmPrepareToPut/Get//Put/GetDone
Manage transfers.	Yes	Yes	Yes	Yes	T1/2	srmAbort/Suspend/ResumeRequest
Balance over multiple transfer servers.	Yes	Yes	Yes	Yes	T1/2	srmPrepareToGet <sup>3</sup>
Manage third-party copy	Yes	Yes	Yes	Yes <sup>5</sup>	T1/2	
Negotiating a transport protocol	No	No	No			srmGetTransferProtocols
<b><i>Namespace Interaction</i></b>						
Querying information about a file (stat)	No	No	Yes <sup>1</sup>	Yes <sup>6</sup>	T1/2	srmLs
Upload data integrity information (chksums)	No	No	No	No	T1/2	
Check integrity information	Yes	Yes	Yes	Yes		srmLs
Creating/Deleting data and directories	Yes	Yes	Yes <sup>1</sup>	Yes <sup>7</sup>	All	srmMkdir srmRmdir srmRm srmMv
Changing ownership, perms and ACLs	No	No	No	No	-	srmSet/Check/GetPermission
<b><i>Storage Capacity Management</i></b>						
Query used capacity (like df)	Yes	No	Yes	No	T1/2	srmGetSpaceMetaData/Tokens
Create/remove reservations; assign characteristics	No	No	No	No	-	srmReserve/Update/ReleaseSpace
Targeting uploads to specific reservation	Yes	Yes	Yes	No	T1/2	srmPrepareToPut
Moving files between reservations	No	No	Yes	No	T1/2	srmChangeSpaceForFiles
<b><i>Server Identification</i></b>						
Test service availability and information	Yes	Yes	No	No		srmPing

- Somewhat simplified and removed those only relevant for Archive/T1
- Still probably can't read it (!) but a couple of observations:
  - Not that much is needed – e.g. space management is only querying and not even that for CMS

# Brief functionality table:

(see also LHCb talk and backup slides)

Function	Used by ATLAS	CMS	LHCb	Is there an existing <b>Alternative</b> or <b>Issue</b> (to SRM)
Transfer: 3 <sup>rd</sup> Party (FTS)	YES	YES	YES	Using just gridFTP in EOS (ATLAS) and Nebraska (CMS) What about on other SEs?
Transfer: Job in/out (LAN)	YES	YES	YES	ATLAS and CMS using LAN protocols directly
Negotiate a transport protocol	NO	NO	YES	LHCb use lcg-geturls;
Transfer: Direct Download	YES	NO	NO	ATLAS use SRM via lcg-cp, Alternative plugins in rucio
Namespace: Manipulation / Deletion	YES	YES	YES	ATLAS: Deletion would need plugin for an alternative
Space Query	YES	NO	YES?	Development Required
Space Upload	YES	NO	YES?	Minor Development Required