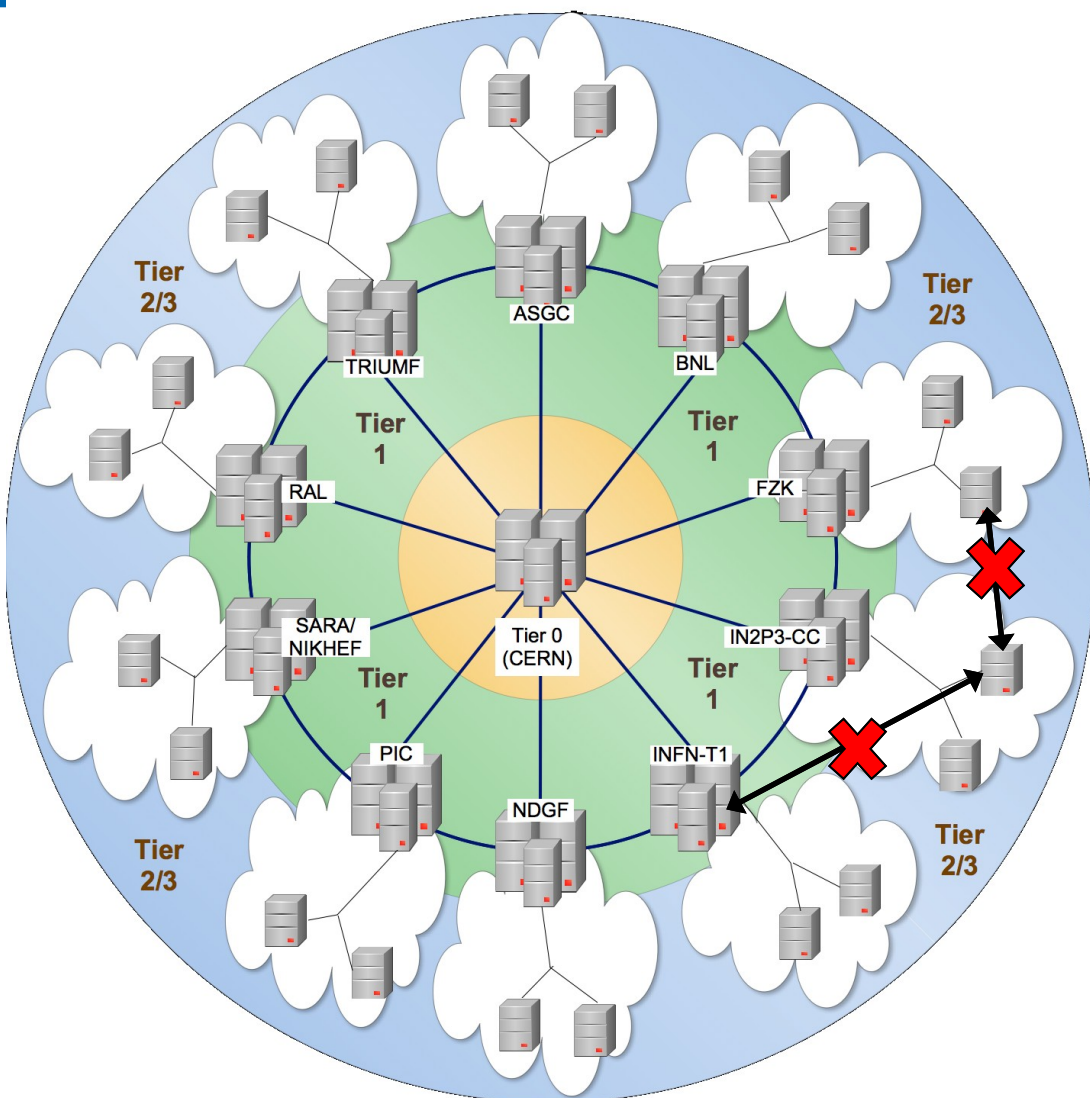


Link commissioning in ATLAS

Fernando H. Barreiro Megino
Simone Campana
CERN IT-ES-VOS



Old cloud model



- Hierarchical tier organization according to network topology which was laid out for the data distribution
- Possible communications:
 - T0-T1
 - T1-T1
 - Intra-cloud T1-T2
- Forbidden communications:
 - Inter-cloud T1-T2
 - Inter-cloud T2-T2
- However network capacities have increased significantly since the date of the Computing Model and we need to explore cross cloud transfers

Cross cloud transfers

- Current Computing Model does not foresee direct $T2_{\text{cloud1}} \rightarrow T2'_{\text{cloud2}}$ communication

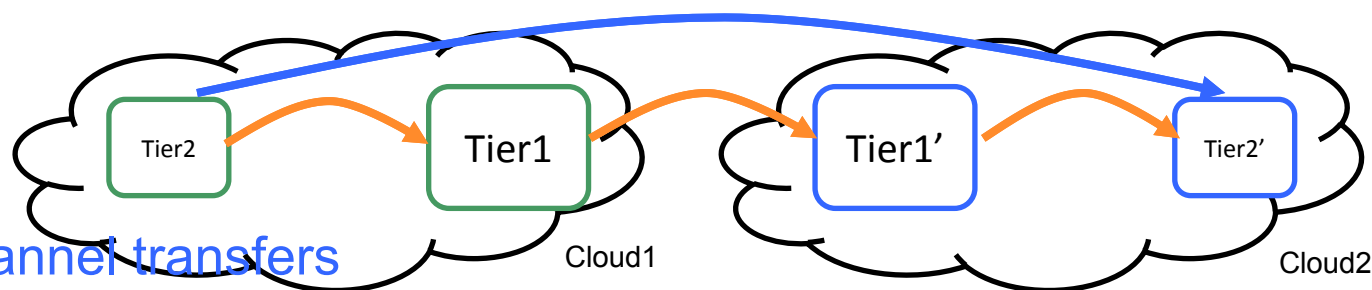
- But we need to reduce cloud boundaries!

- User analysis with jobs running in different clouds and collected in one place
- PD2P

- Possibilities:

- FTS STAR-Channel transfers

- Multihopping (not natively supported in FTS, done via DaTRI atm)



Solution in Site Services:

- **Automatic path selection:** cost estimation of STAR-channel and multihop transfers based on FTS statistics
- **In case of multihop:** Submission of *child subscriptions* through Tier1 SCRATCHDISKs

- Triggered on Monday
- Stopped and cleaned on Thursday
- Check the Sonar results on Friday
- Cover full ATLAS Grid mesh
 - Excepting few small sites that have asked to be excluded
- Tests consists of 15 FTS transfers
 - 5 small files: 20 MB each
 - 5 medium files: 200 MB each
 - 5 large files: 2 GB each

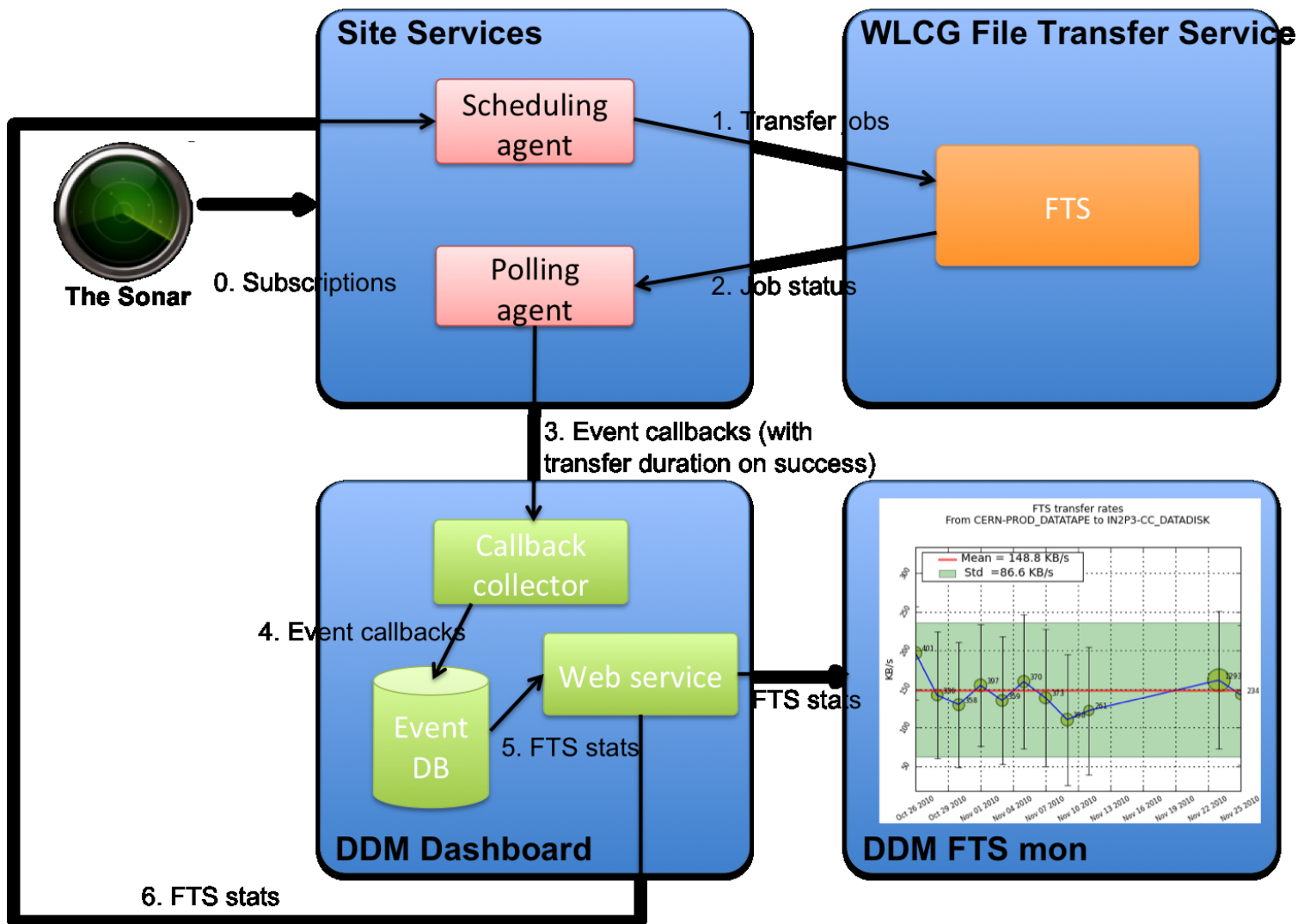
Definitions

Small file: 0 – 100 MB

Medium file: 100MB – 1GB

Large file: 1GB - ∞

Overview of machinery in place



http://bourricot.cern.ch/dq2/ftsmon/sonar_view/cached/

Only DATADISK to DATADISK transfers are shown

Show entries Search all columns:

Prio	Source	SCloud	Destination	DCloud	MB/s
10	CERN-PROD	CERN - T0	TRIUMF-LCG2	CA - T1	0.764+0
10	CERN-PR	CERN - T0	IN2P3-CC	FR - T1	1.54+0
Avg(ByteRate)+StD(ByteRate)					
SMALL	<0.05MB/s	<0.1MB/s	≥0.1MB/s		
MEDIUM	<1MB/s	<2MB/s	≥2MB/s		
LARGE	<10MB/s	<15MB/s	≥15MB/s		
10	CERN-PROD	CERN - T0	TRIUMF-LCG2	CA - T1	0.664+0
10	CERN-PROD	CERN - T0	IN2P3-CC	FR - T1	1.734+1
10	CERN-PROD	CERN - T0	SARA-MATRIX	NL - T1	1.184+0
9	FZK-LCC				0.084+0
9	FZK-LCC				0.234+0
Number of files transferred					
SMALL	≤3	4	≥5		
MEDIUM	≤2	3	≥4		
LARGE	≤1	2	≥3		
9	FZK-LCG2	DE - T1	TRIUMF-LCG2	CA - T1	0.224+0
9	FZK-LCG2	DE - T1	IN2P3-CC	FR - T1	1.694+1
9	FZK-LCG2	DE - T1	SARA-MATRIX	NL - T1	0.114+0
9	NDGF-T1	NG - T1	FZK-LCG2	DE - T1	0.84+1.29
9	NDGF-T1	NG - T1	PIC	ES - T1	0.32+0.78
9	NDGF-T1	NG - T1	NIKHEF-ELPROD	NL - T1	1.32+0.04

DESTINATION	SOURCE			
	Tier0	Tier1	Tier2	Tier3
Tier3	0	0	0	0
Tier2	4	4	2	0
	Close 7	Close 7	Close 5	0
		Cloud 8	Cloud 6	0
Tier1	10	9	4	0
			Close 7	Cloud 3
Tier0	9	9	4	0
			Close 7	0

Filter pr Filter source Source clou Filter dest Dest cloud

Showing 1 to 25 of 7,657 entries First Previous 1 2 3 4 5 Next Last



Sonar monitoring – Examples

Show 25 entries

BNL to any T1

Search all columns:

Prio	Source	SCloud	Destination	DCloud	SMALL FILES			MEDIUM FILES			LARGE FILES		
					MB/s	MB	#Ev	MB/s	MB	#Ev	MB/s	GB	#Ev
9	BNL-OSG2	US - T1	FZK-LCG2	DE - T1	0.31+0.74	8.16+19.35	5351	7.07+2.56	232.14+108.84	3087	25.05+11.56	2.15+1.07	3355
9	BNL-OSG2	US - T1	NDGF-T1	NG - T1	0.04+0.04	1.12+0.64	4310	5.55+1.15	204.43+10.85	6	21.22+6.62	2.0+0.0	5
9	BNL-OSG2	US - T1	PIC	ES - T1	0.07+0.23	2.24+8.13	4568	5.39+1.98	230.24+73.7	700	20.74+4.93	2.94+1.08	11
9	BNL-OSG2	US - T1	NIKHEF-ELPROD	NL - T1	0.63+0.09	20.0+0.0	5	4.16+0.63	200.0+0.0	5	12.28+1.01	2.0+0.0	5
9	BNL-OSG2	US - T1	INFN-T1	IT - T1	0.49+0.78	18.68+29.8	6600	4.12+1.38	256.47+85.07	1718	9.68+5.26	3.94+1.32	262
9	BNL-OSG2	US - T1	TAIWAN-LCG2	TW - T1	0.02+0.01	1.12+0.64	4311	2.06+0.11	200.0+0.0	5	9.28+0.29	2.0+0.0	5
9	BNL-OSG2	US - T1	RAL-LCG2	UK - T1	0.04+0.13	2.69+10.5	4498	1.58+0.23	209.74+50.51	2138	2.4+0.27	3.74+0.8	179
9	BNL-OSG2	US - T1	TRIUMF-LCG2	CA - T1	0.51+1.1	11.66+25.0	5352	7.62+2.5	225.12+52.15	3474	31.61+10.35	3.57+0.97	82
9	BNL-OSG2	US - T1	IN2P3-CC	FR - T1	0.76+1.18	17.55+27.18	12607	8.72+4.12	255.53+139.65	7748	30.55+9.96	2.66+1.48	940
9	BNL-OSG2	US - T1	SARA-MATRIX	NL - T1	0.07+0.28	2.69+10.54	4491	5.62+1.46	211.45+36.58	3756	15.08+7.76	3.7+1.3	20

Filter pr: Source clou: Filter dest:

Showing 1 to 10 of 10 entries (filtered from 7,657 total entries)

First Previous 1 Next Last

Show 25 entries

Any T1 to BNL

Search all columns:

Prio	Source	SCloud	Destination	DCloud	SMALL FILES			MEDIUM FILES			LARGE FILES		
					MB/s	MB	#Ev	MB/s	MB	#Ev	MB/s	GB	#Ev
9	FZK-LCG2	DE - T1	BNL-OSG2	US - T1	0.04+0.04	1.15+0.99	1819	5.68+1.1	200.0+0.0	5	25.8+4.02	2.0+0.0	5
9	NDGF-T1	NG - T1	BNL-OSG2	US - T1	0.05+0.07	1.2+1.37	945	8.36+1.59	200.0+0.0	5	40.74+5.7	2.0+0.0	5
9	PIC	ES - T1	BNL-OSG2	US - T1	0.05+0.05	1.19+1.32	1020	6.89+0.61	200.0+0.0	5	10.16+9.27	2.0+0.0	5
9	NIKHEF-ELPROD	NL - T1	BNL-OSG2	US - T1	0.72+0.2	20.0+0.0	5	5.52+0.43	200.0+0.0	5	26.56+8.59	2.0+0.0	5
9	INFN-T1	IT - T1	BNL-OSG2	US - T1	0.03+0.01	1.1+0.0	795	-	-	-	-	-	-
9	TAIWAN-LCG2	TW - T1	BNL-OSG2	US - T1	0.03+0.04	1.19+1.32	1023	4.95+0.38	200.0+0.0	5	19.04+3.03	2.0+0.0	5
9	RAL-LCG2	UK - T1	BNL-OSG2	US - T1	0.03+0.01	1.1+0.0	1861	-	-	-	-	-	-
9	TRIUMF-LCG2	CA - T1	BNL-OSG2	US - T1	0.05+0.06	1.2+1.34	992	3.35+0.33	200.0+0.0	5	6.93+0.75	2.0+0.0	5
9	IN2P3-CC	FR - T1	BNL-OSG2	US - T1	0.04+0.04	1.14+0.82	2675	5.1+2.56	200.0+0.0	5	29.04+14.27	2.0+0.0	5
9	SARA-MATRIX	NL - T1	BNL-OSG2	US - T1	0.04+0.05	1.17+1.17	1310	6.2+0.88	200.0+0.0	5	20.96+3.66	2.0+0.0	5

Filter pr: Filter source: Dest cloud:

Showing 1 to 10 of 10 entries (filtered from 7,657 total entries)

First Previous 1 Next Last

ADC Retreat Napoli
1-4 February 2011

Sorted by
priority



TOKYO as source or destination

25 entries

Search all columns: TOKYO

SMALL FILES

MEDIUM FILES

LARGE FILES

Prio	Source	SCloud	Destination	DCloud	MB/s	MB	#Ev	MB/s	MB	#Ev	MB/s	GB	#Ev
8	TOKYO-LCG2	FR - T2	IN2P3-CC	FR - T1	0.65+0.46	31.65+24.92	4508	2.41+0.8	249.94+118.98	18520	3.16+0.89	2.75+1.3	193
8	IN2P3-CC	FR - T1	TOKYO-LCG2	FR - T2	0.18+0.41	10.9+25.51	2346	5.29+2.74	483.44+209.21	5880	12.22+6.17	2.85+2.39	7600
7	FZK-LCG2	DE - T1	TOKYO-LCG2	FR - T2	0.54+0.17	38.2+22.42	10	2.71+1.76	415.1+235.52	67	7.93+4.8	4.22+1.12	419
7	INFN-T1	IT - T1	TOKYO-LCG2	FR - T2	0.74+0.52	51.34+33.6	6	4.11+1.87	409.17+248.0	51	15.16+4.11	4.2+1.07	465
7	PIC	ES - T1	TOKYO-LCG2	FR - T2	0.72+0.41	44.14+28.6	18	2.21+0.73	202.3+68.16	35	2.77+0.58	4.1+0.47	385
7	NDGF-T1	NG - T1	TOKYO-LCG2	FR - T2	1.48+0.24	81.77+10.83	208	4.52+0.56	203.95+9.68	6	16.78+3.57	2.0+0.0	5
7	SARA-MATRIX	NL - T1	TOKYO-LCG2	FR - T2	0.44+0.04	20.0+0.0	5	0.82+0.04	200.0+0.0	5	7.66+6.36	2.15+0.36	6
7	TAIWAN-LCG2	TW - T1	TOKYO-LCG2	FR - T2	0.36+0.01	20.0+0.0	5	2.46+0.19	200.0+0.0	5	12.95+1.56	2.0+0.0	5
7	TRIUMF-LCG2	CA - T1	TOKYO-LCG2	FR - T2	0.29+0.06	20.0+0.0	5	2.59+0.69	200.0+0.0	5	12.99+4.06	2.0+0.0	5
7	NIKHEP-ELPROD	NL - T1	TOKYO-LCG2	FR - T2	0.38+0.02	20.0+0.0	5	1.28+0.16	218.79+46.02	6	2.25+0.09	2.0+0.0	5
7	BNL-OSG2	US - T1	TOKYO-LCG2	FR - T2	0.72+0.35	41.93+23.5	19	6.7+3.16	475.54+240.03	79	26.81+7.48	3.63+1.49	912
6	GRIF-IRFU	FR - T2	TOKYO-LCG2	FR - T2	0.33+0.02	20.0+0.0	5	0.76+0.05	200.0+0.0	5	0.91+0.03	2.0+0.0	5
6	IN2P3-LPC	FR - T2	TOKYO-LCG2	FR - T2	0.27+0.19	20.0+0.0	5	3.11+1.58	200.0+0.0	5	22.28+1.78	2.0+0.0	4
6	BEIJING-LCG2	FR - T2	TOKYO-LCG2	FR - T2	0.38+0.02	20.0+0.0	5	2.33+0.24	200.0+0.0	5	6.04+0.28	2.0+0.0	5
6	GRIF-LPNHE	FR - T2	TOKYO-LCG2	FR - T2	0.48+0.01	20.0+0.0	5	3.77+0.19	200.0+0.0	5	22.64+0.57	2.0+0.0	5
6	GRIF-LAL	FR - T2	TOKYO-LCG2	FR - T2	0.44+0.04	20.0+0.0	5	3.24+0.33	200.0+0.0	5	15.03+6.46	2.0+0.0	5
6	TOKYO-LCG2	FR - T2	GRIF-IRFU	FR - T2	0.11+0.02	20.0+0.0	5	0.16+0.01	200.0+0.0	5	-	-	-
6	TOKYO-LCG2	FR - T2	IN2P3-LPC	FR - T2	0.37+0.02	20.0+0.0	5	1.19+0.29	200.0+0.0	5	4.62+2.09	2.0+0.0	5
6	TOKYO-LCG2	FR - T2	BEIJING-LCG2	FR - T2	0.39+0.02	20.0+0.0	5	2.09+0.08	200.0+0.0	5	3.29+0.07	2.0+0.0	5
6	TOKYO-LCG2	FR - T2	GRIF-LPNHE	FR - T2	0.4+0.05	20.0+0.0	5	1.46+0.34	200.0+0.0	5	3.47+0.84	2.0+0.0	5
6	TOKYO-LCG2	FR - T2	GRIF-LAL	FR - T2	0.17+0.05	20.0+0.0	5	1.03+0.27	200.0+0.0	5	4.58+0.36	2.0+0.0	5
6	TOKYO-LCG2	FR - T2	IN2P3-LAPP	FR - T2	0.18+0.02	20.0+0.0	5	0.52+0.02	200.0+0.0	5	1.4+0.43	3.25+1.08	63
6	TOKYO-LCG2	FR - T2	RO-07-NIPNE	FR - T2	0.28+0.01	20.0+0.0	5	0.53+0.05	200.0+0.0	5	-	-	-
6	TOKYO-LCG2	FR - T2	IN2P3-CPPM	FR - T2	0.39+0.05	20.0+0.0	5	1.16+0.22	200.0+0.0	5	1.51+0.5	2.0+0.0	5
6	IN2P3-LAPP	FR - T2	TOKYO-LCG2	FR - T2	0.15+0.01	20.0+0.0	5	0.34+0.04	200.0+0.0	5	1.17+0.76	2.42+0.89	7

Filter pr

Filter source

Source clou

Filter dest

Dest cloud

Showing 1 to 25 of 152 entries (filtered from 5,807 total entries)

First Previous 1 2 3 4 5 Next Last

- **Actual sonar table**
 - Quick client-side implementation
 - Downloads all information at once: slow and at the limit of scalability
 - To make the table usable we reduced
 - some functionalities, e.g. removed possibility to sort by right columns
 - the displayed information, e.g. not showing links without any file transfers
- **This information should be in the Site Status Board**
 - Possibility of combining different **information sources** and providing a **unique view**
 - Site downtimes and exclusions
 - FTS transfer efficiency
 - Etc.
 - Work is being carried out by the dashboard team to provide the correct server-side implementation to fix limitations in current table

- Monitoring of the links: Weekly checks after the Sonar test
 - Responsibility of AMOD and shifters: Links with priorities 8 to 10 (i.e. T0-T1, T1-T1 and intracloud T1-T2 links)
 - Responsibility of cloud squad: Links with lower priorities
- Gradually increase number of “Big T2s”:
 - Connected to T1s: Create dedicated FTS channels
 - Initial selection of one “Big T2” per cloud, based on network and storage capacities
 - In the next months qualified sites should become “Big T2s”.
- Validation process: What if the links degrade?
 - Define validation process
 - Who is responsible to follow the process?

Discussion

