

# GridPP

UK Computing for Particle Physics

## UK STEP09 ACTIVITY

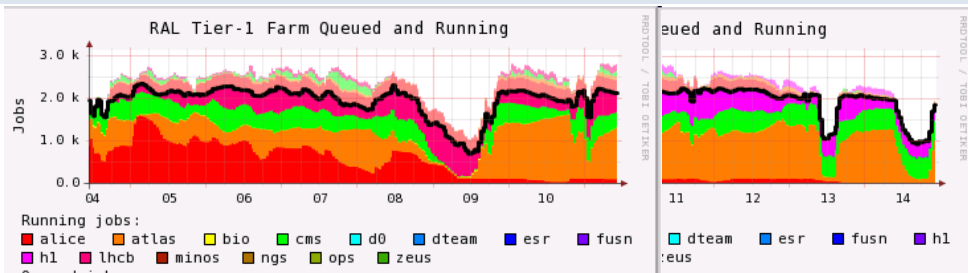
Brian Davies  
STFC-RAL



Science & Technology Facilities Council  
Rutherford Appleton Laboratory

- Generally very smooth operation:
  - Most service systems relatively unloaded plenty of spare capacity
  - Calm atmosphere.
    - Daytime “production team” monitored service
    - Only one callout,
    - Most of the team even took two days out off site for department meeting!
  - Very good liaison with VOs and good idea what was going on.
    - In regular informal contact with UK representatives
  - Some problems with CASTOR tape migration (3 days) on ATLAS instance but all handled satisfactorily and fixed. Did not visibly impact experiments.
    - Robot broke down for several hours (stuck handbot led to all drives de-configured in CASTOR). Caught up quickly.
- Very useful exercise - learned a lot, but very reassuring
  - More at: <http://www.gridpp.rl.ac.uk/blog/category/step09/>

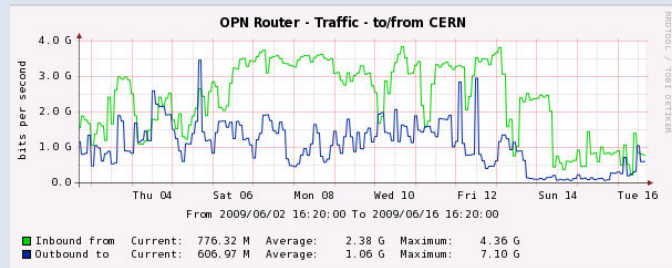
- Farm typically running > 2000 jobs. By 9<sup>th</sup> June at equilibrium: (ATLAS 42%, CMS 18%, Alice 3%, LHCb 20%)



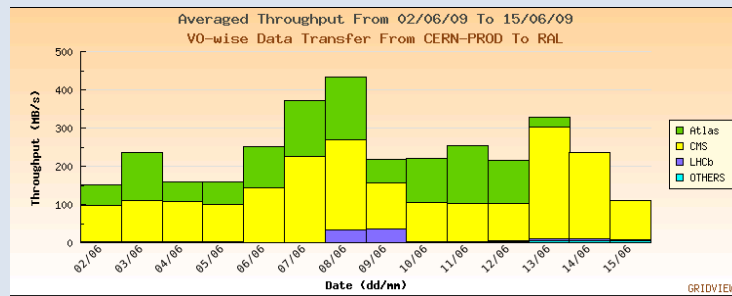
- Problem 1: ATLAS job submission exceeded 32K files on CE
  - See hole on 9<sup>th</sup>. We thought ATLAS had paused ☹ took time to spot.
- Problem 2: Fair shares not honoured as aggressive ALICE submission beat ATLAS to job starts.
  - Need more ATLAS jobs in queue faster. Manually cap ALICE. Fixed by 9<sup>th</sup> June. See decrease in (red) ALICE work.
- Problem 3: Occupancy initially poor (initially 90%). Short on memory (2GB/core but ATLAS jobs needed 3GB vmem). Gradually increase MAUI over-commit on memory to 50%. Occupancy --> 98%.



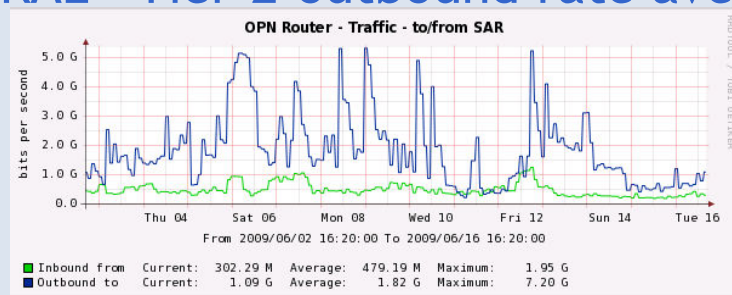
- Batch Farm drawing approx 3Gb/s from CASTOR during reprocessing. Peaked at 30Gb/s for CMS reprocessing without lazy download.
- Total OPN traffic. Inbound 3.5Gb/s, outbound 1Gb/s



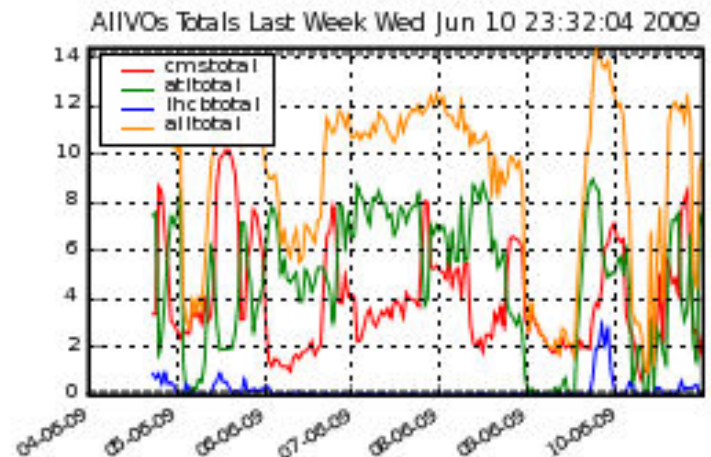
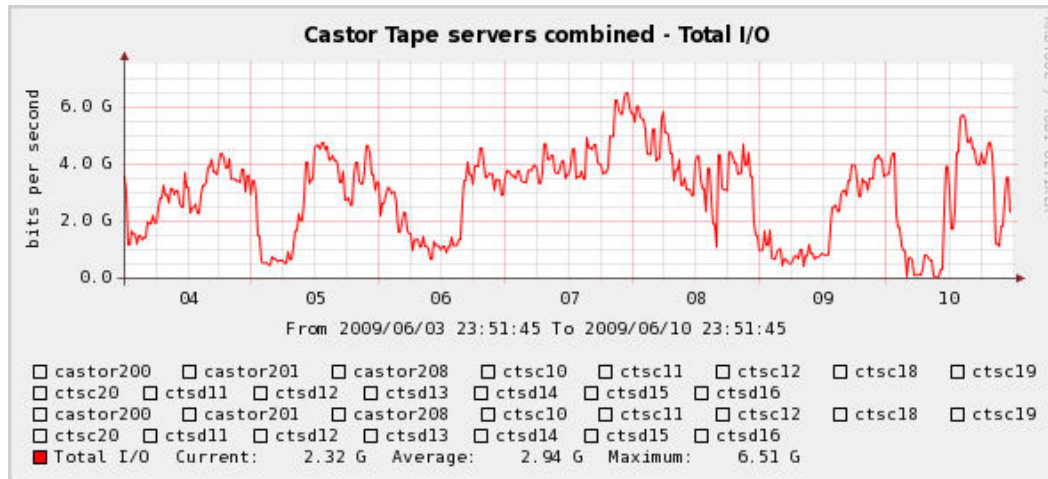
- CERN->RAL rate stable 2-2.5Gb/s (don't understand peak 5Gb rate)



- RAL->Tier-2 outbound rate average 1.5Gb/s but 6Gb/s spikes!



- Tape system worked well. Sustained 4Gb/s during peak load on 13 drives (ATLAS+CMS), 15 drives with LHCb. We played with a mix of dedicated (4 ATLAS, 4 CMS, 2 LHCb, 5 shared).
  - Typical average rate of 35MB/s per drive (1 day average)
  - Lower than we would like (looking for nearer 45MB/s)
  - On CMS instance, modified write policy gave > 60MB/s but reads more challenging to optimise.



- Number of stability improvements planned before data taking starts
- Major disruption to service during move to new machine room after step June/July
- ALL Intervention and upgrades suspended during STEP'09

- Business as usual, albeit with focus on monitoring
- CASTOR tape migration stopped (recall OK) due to connectivity glitch. No service impact due to sufficient cache.

## ATLAS

- (Source of errors on ATLAS dashboard)
- Disk cache large enough to cope with CASTOR migration glitch

## CMS

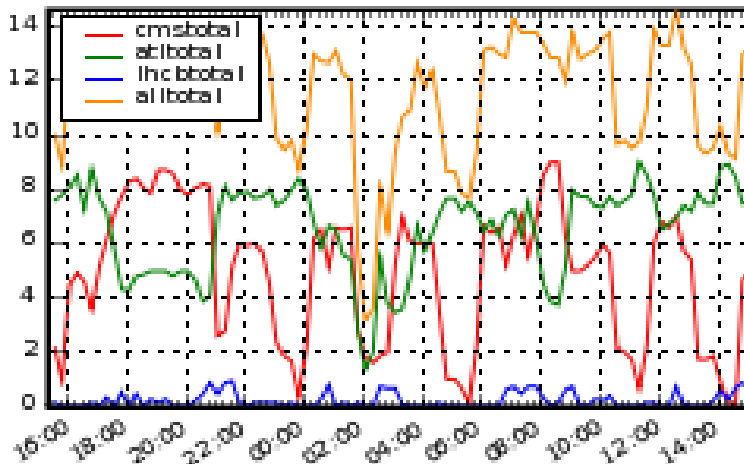
- Used PhEDEx pre-staging agent
- RAL performed well on all counts



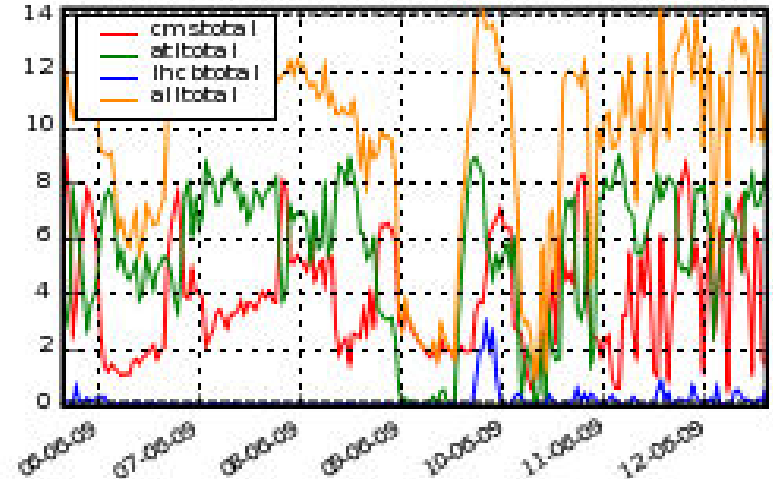
- Efficient communication with users
  - Dedicated experiment reps
  - Tier1 Blog <http://www.gridpp.rl.ac.uk/blog/>
- 24/7 on call system
- Stability of CASTOR
- Dedicated resources for instances
  - In CASTOR (named SRMs, tape drives)
  - Separate quotas for FTS channels

- Drive Usage

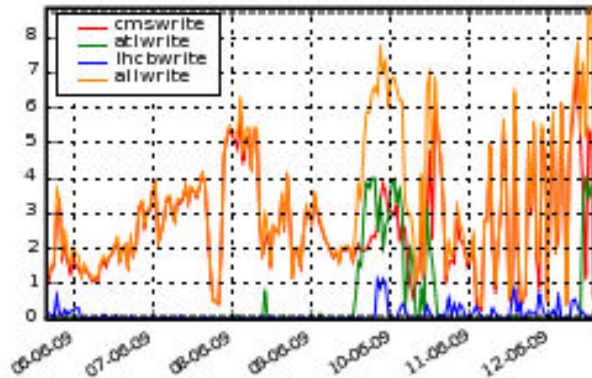
AllVOs Totals Last Day Fri Jun 12 15:04:04 2009



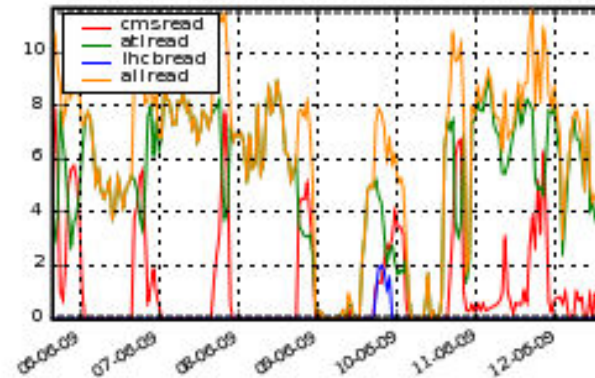
AllVOs Totals Last Week Fri Jun 12 14:48:04 2009



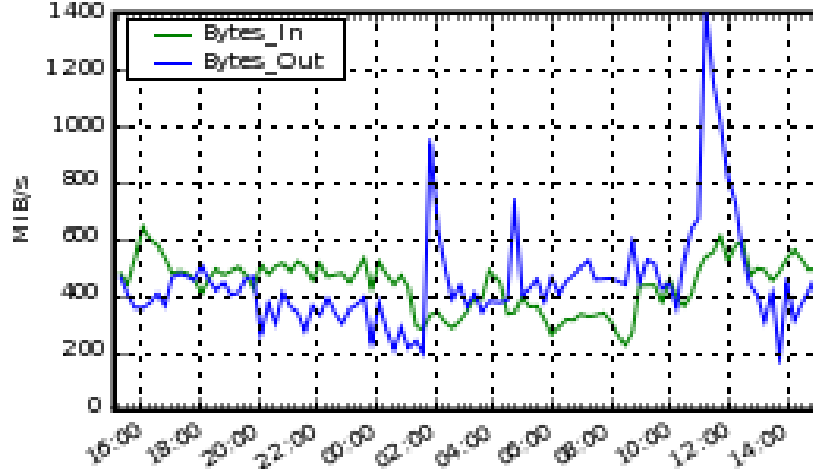
AllVOs Write Last Week Fri Jun 12 14:48:04 2009



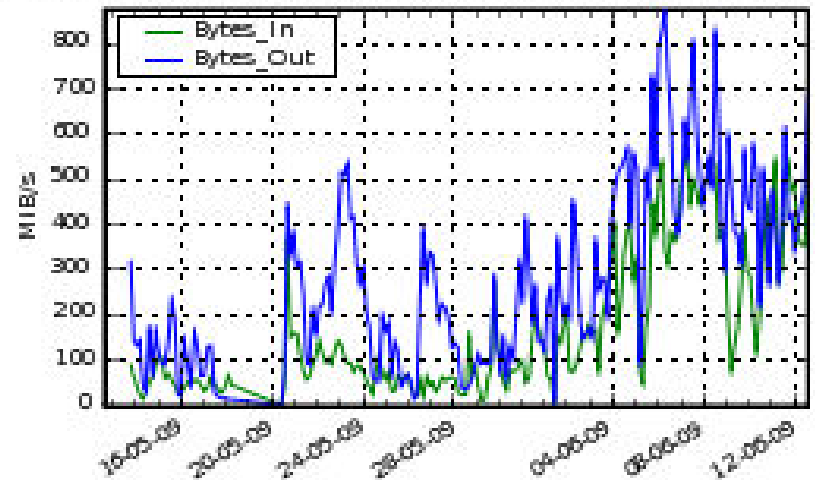
AllVOs Read Last Week Fri Jun 12 14:48:04 2009



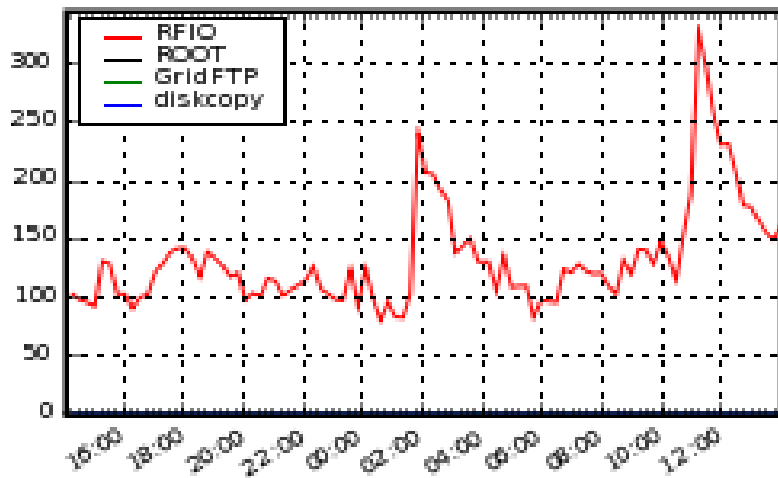
Storage\_CASTOR\_ATLAS Network Last Day Fri Jun 12 14:58:00 20



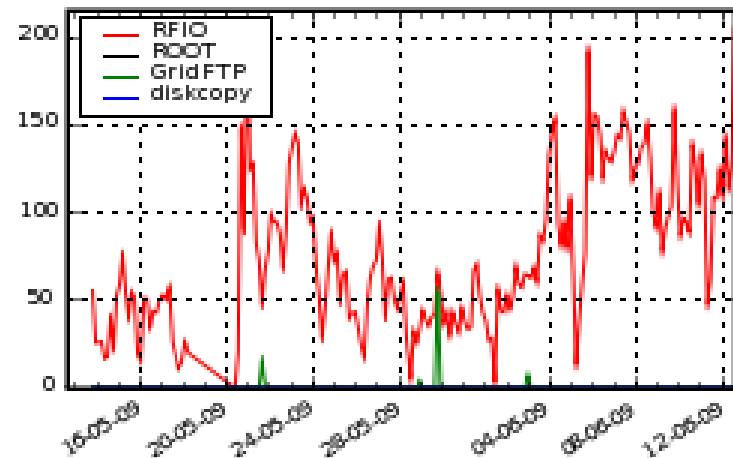
Storage\_CASTOR\_ATLAS Network Last Month Fri Jun 12 13:29:00 20



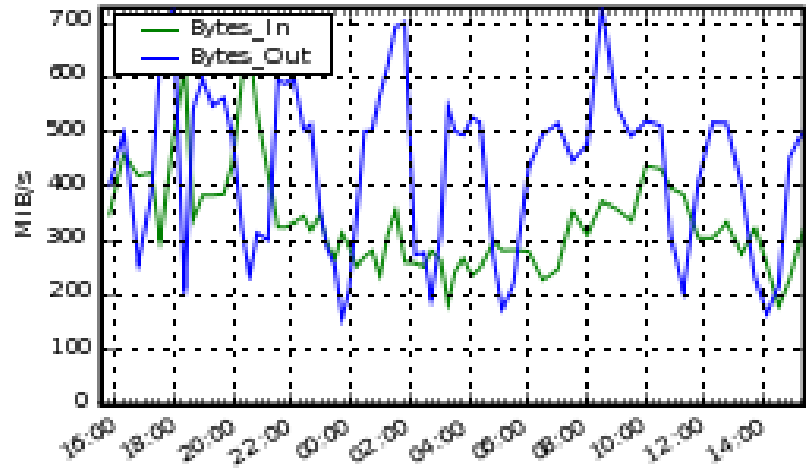
Storage\_CASTOR\_ATLAS LSF Last Day Fri Jun 12 13:58:01 20



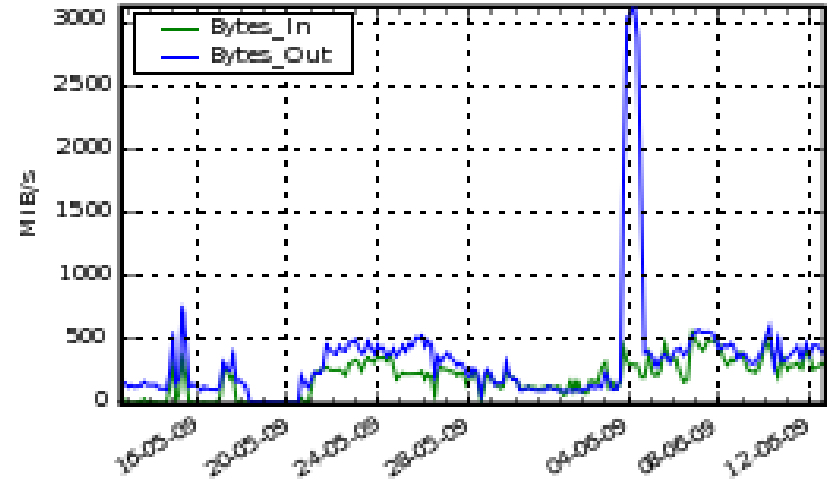
Storage\_CASTOR\_ATLAS LSF Last Month Fri Jun 12 13:31:01 200



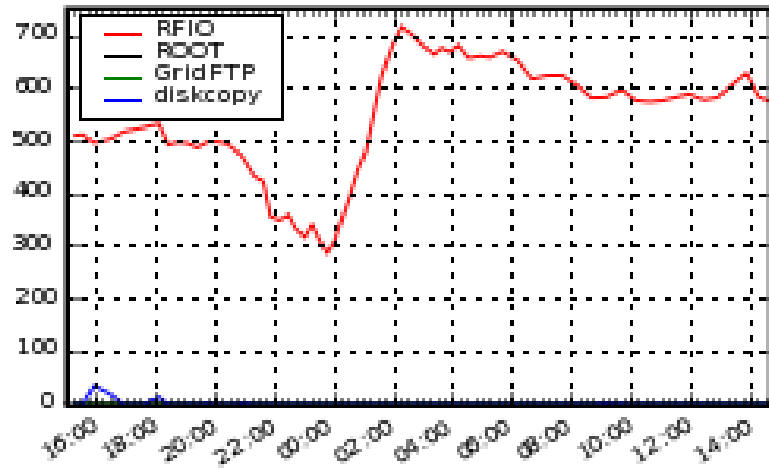
Storage\_CASTOR\_CMS Network Last Day Fri Jun 12 15:21:00 2009



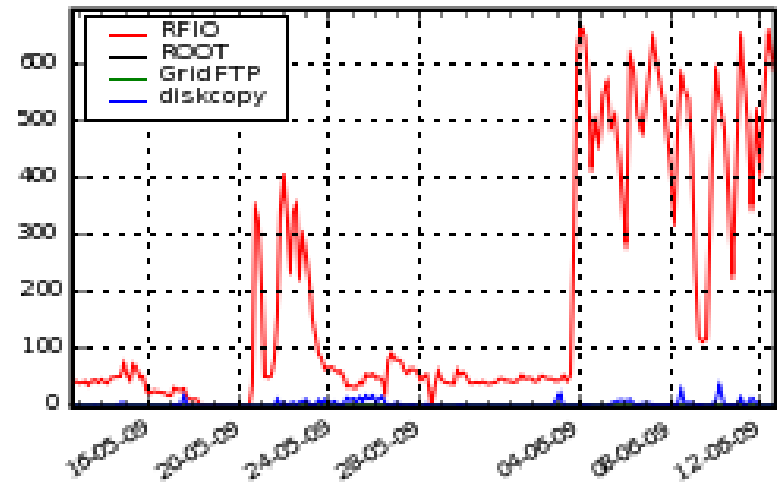
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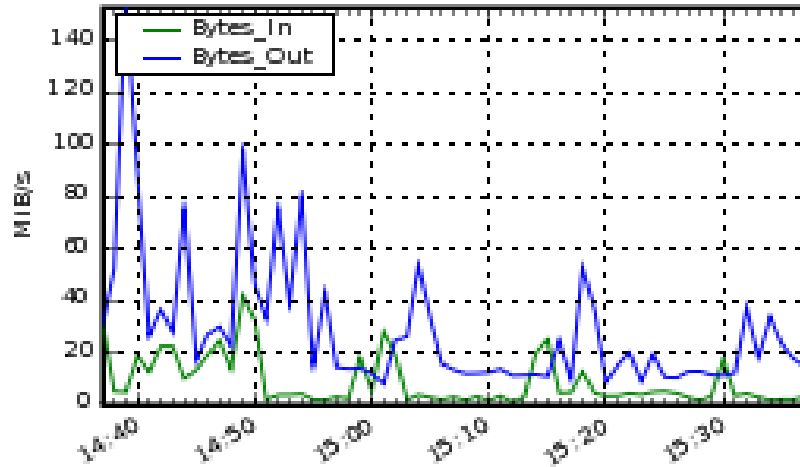
Storage\_CASTOR\_CMS LSF Last Day Fri Jun 12 14:37:01 2009



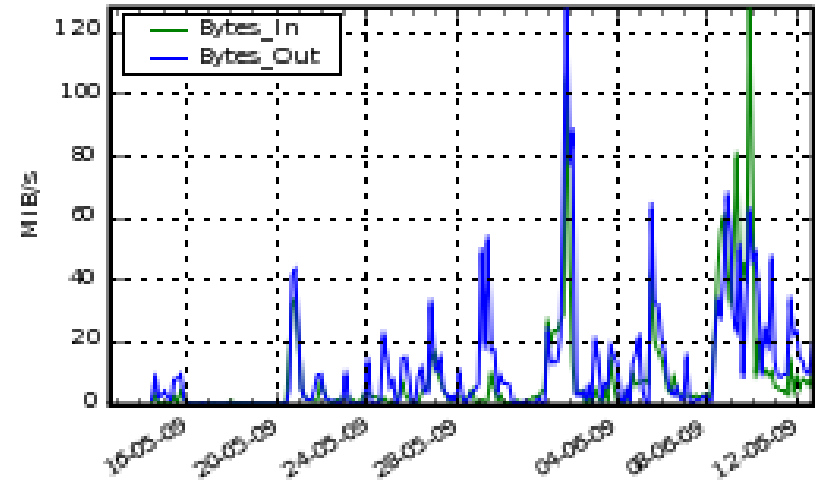
Storage\_CASTOR\_CMS LSF Last Month Fri Jun 12 14:25:01 2009



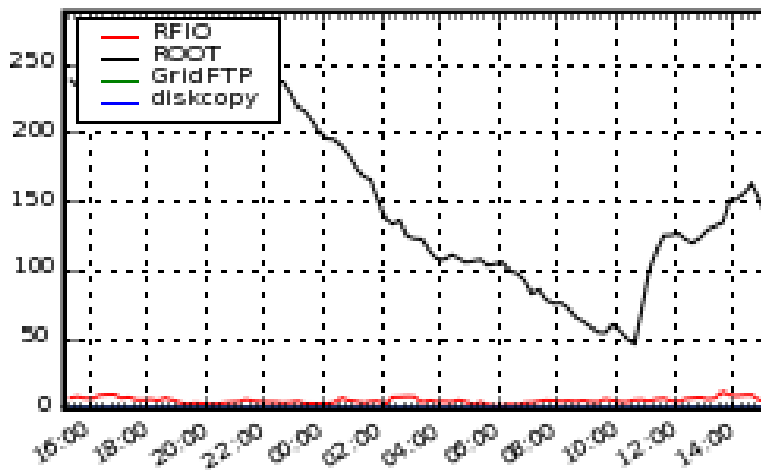
Storage\_CASTOR\_LHCb Network Last Hour Fri Jun 12 15:37:00 2009



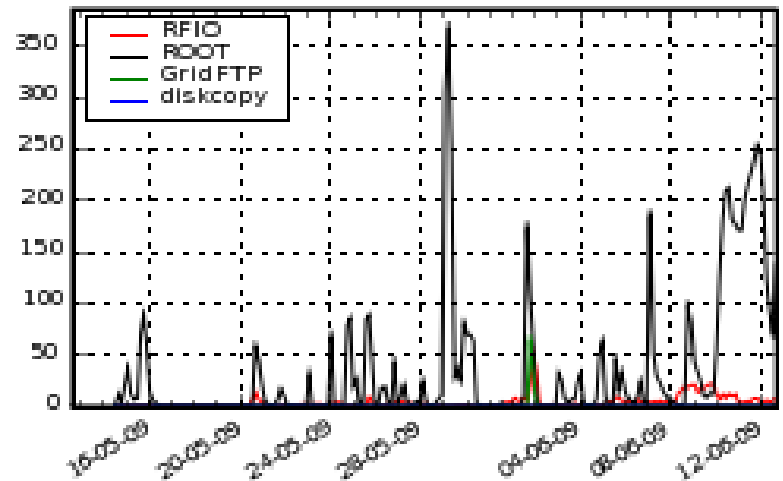
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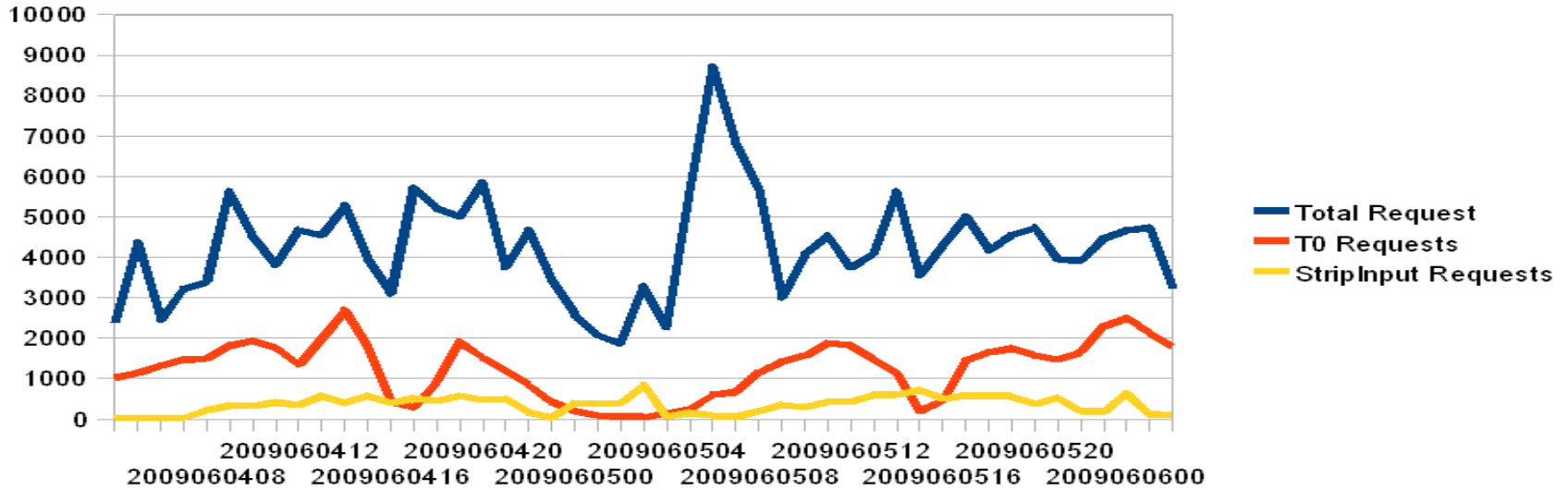
Storage\_CASTOR\_LHCb LSF Last Day Fri Jun 12 15:07:01 2009



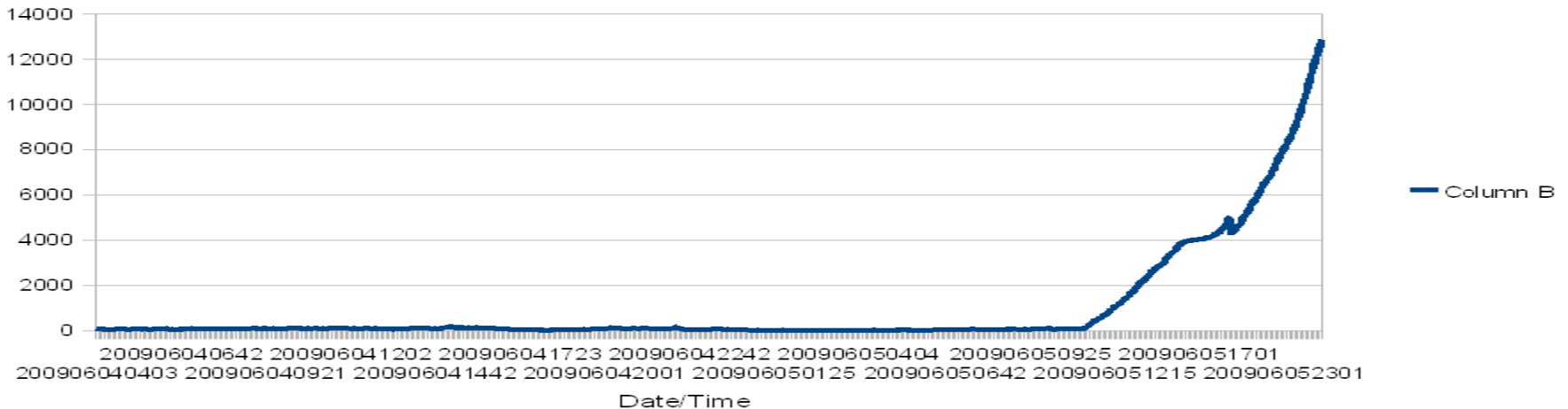
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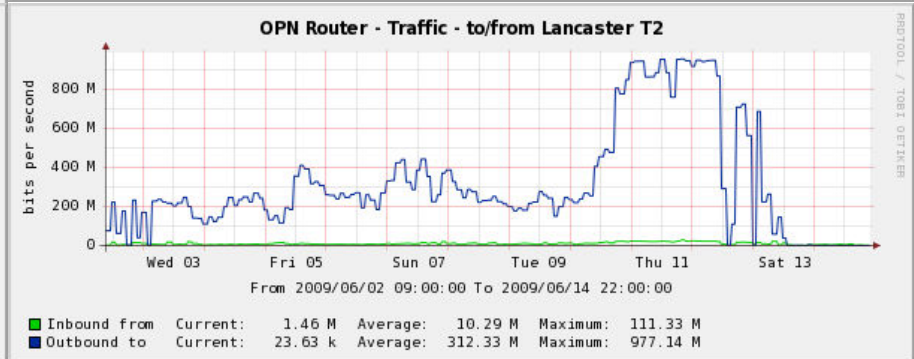
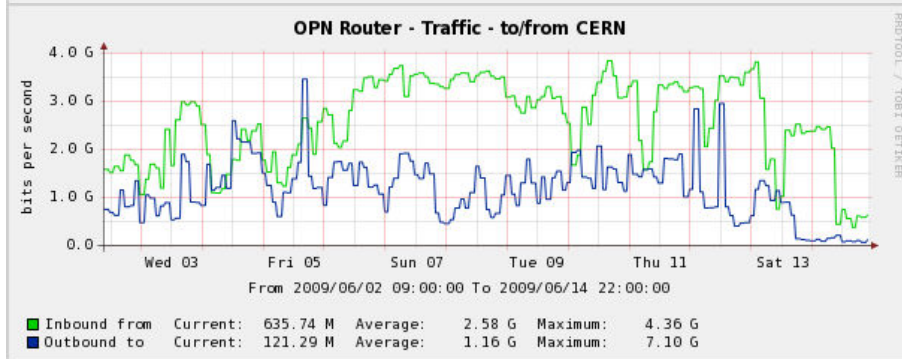
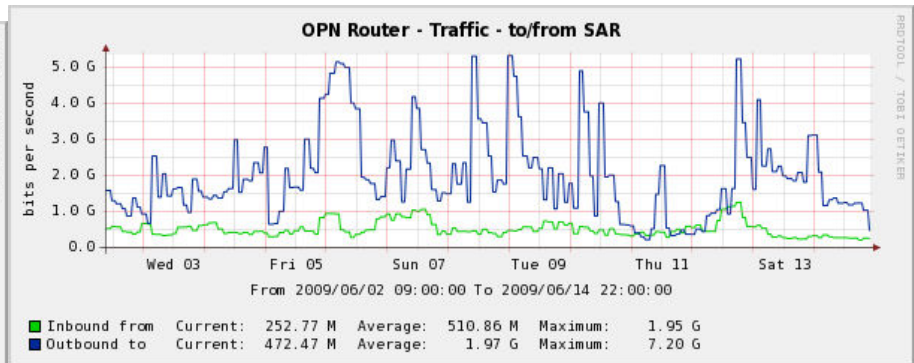
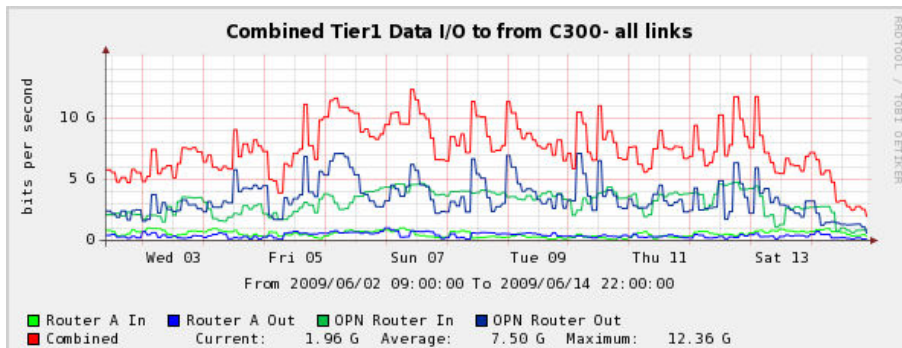
## PrepareToPut Requests



## Migration Candidates in T0 Transfer Pool



- High Rate - No Congestion
- T2 traffic not insignificant



- Disk cache large enough to cope with problems migrating data
- Separate instances allow ability to customise to VO's differing needs
  - Less interference
- Shared resources have safeguards so as not to allow one VO to dominate
- Spars servers ready to be reactive to emergency needs.
  - Dormant capacity
  - Disk server size in future an issue?
- Good Interaction with VO and Storage Experts to solve issues



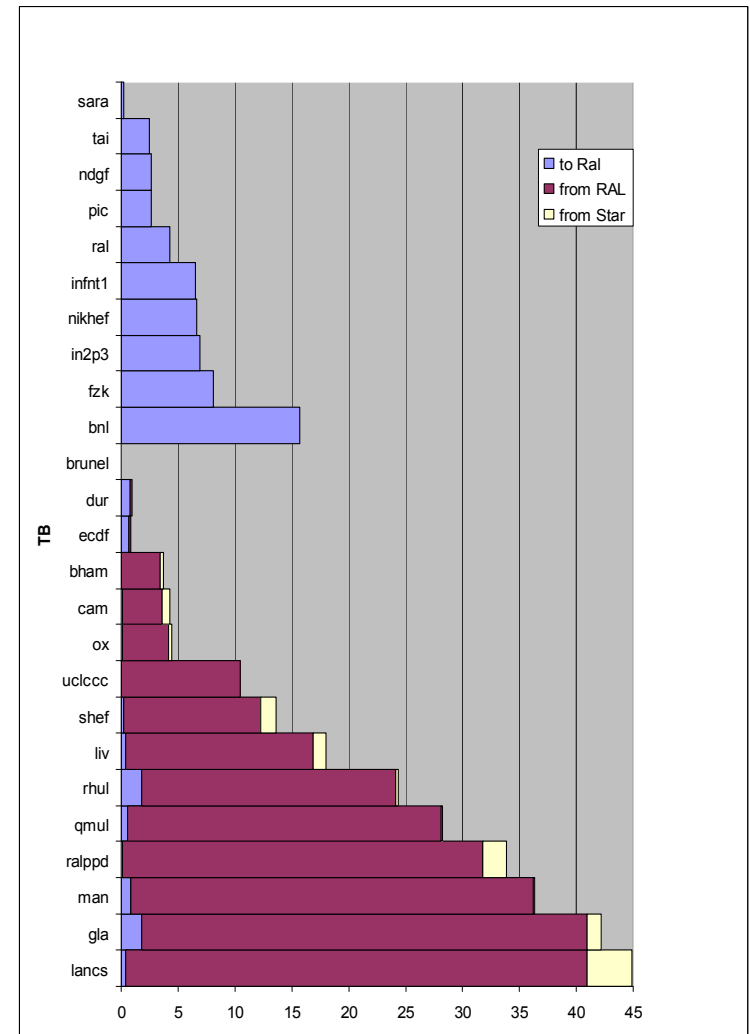
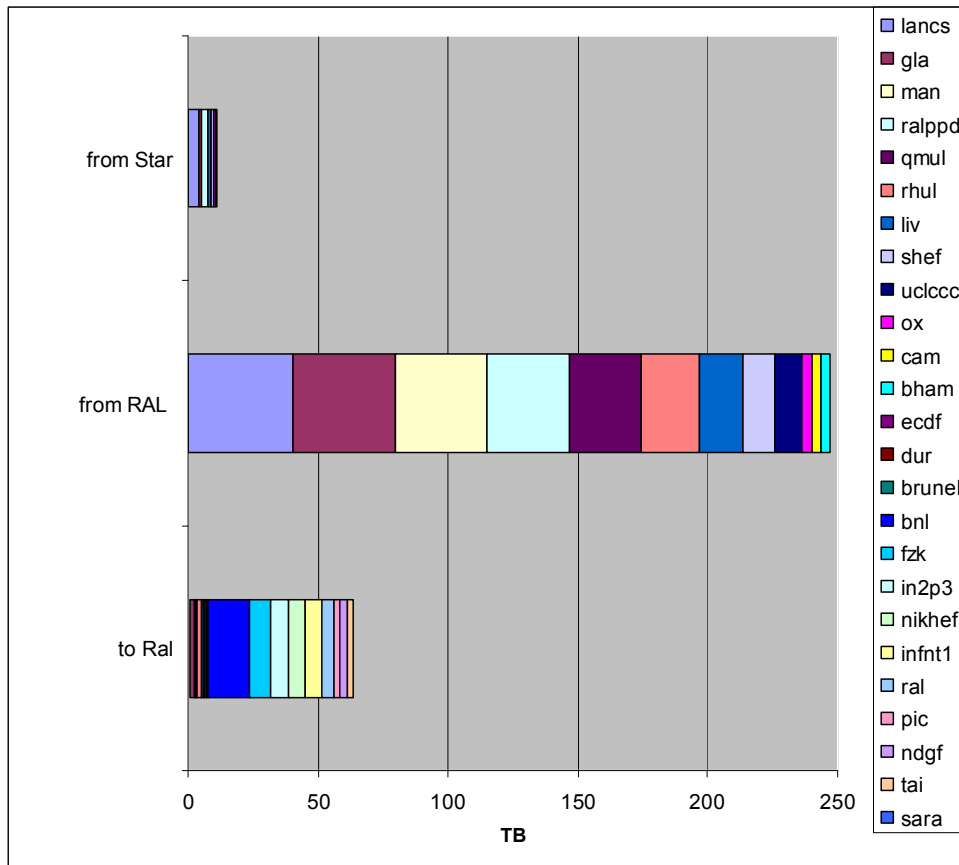
- Big ID
- BDII/LFC
- CE filled with 32k jobs by single user
  - Clean up not harsh enough
- Pilot roles could make this an increasing issue
- Drive dedication
- Stream Policy for tape writes
- No User Analysis ( benefit and curse??)
- Low farm filling...
- See blog for more details...
- BUT we solved (most of) them!
  - T1 group structure a benefit

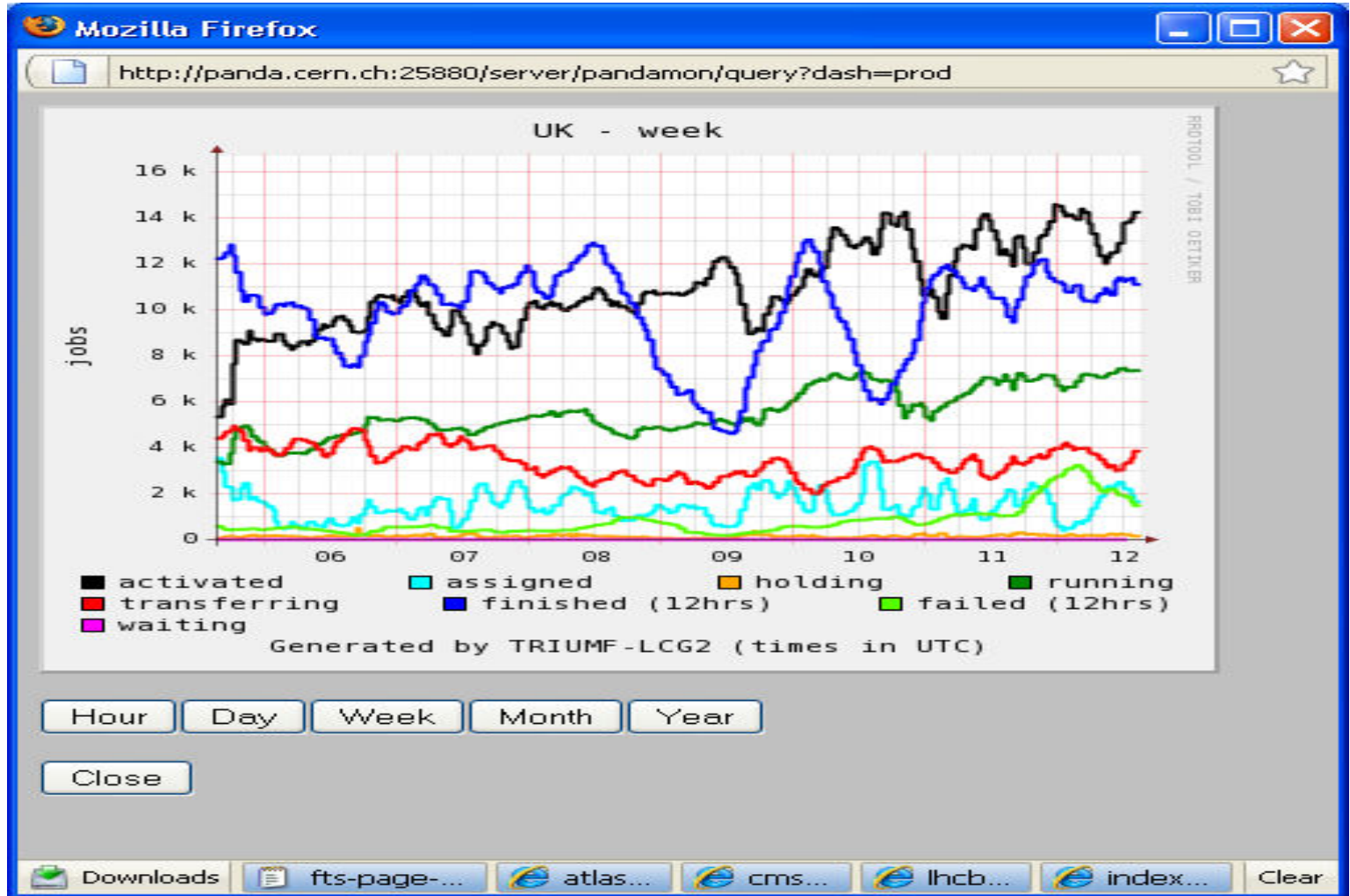
- Highest Rate 1.4GB/s



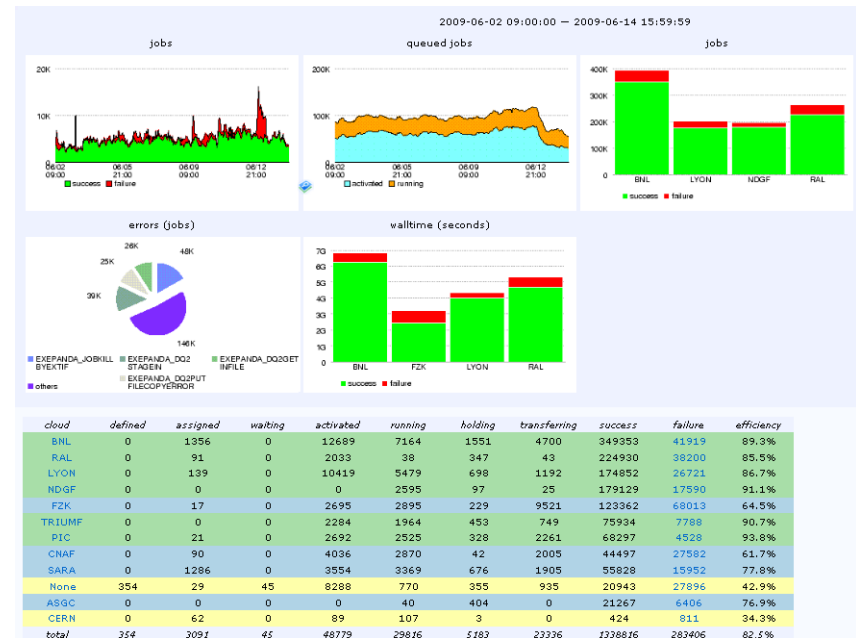
Activity Summary ('2009-06-08 10:30' to '2009-06-08 11:00')  
Click on the cloud name to view list of sites

Cloud	Transfers			Registrations		Errors			Services Grid
	Efficiency	Throughput	Successes	Datasets	Files	Transfer	Registration	Services	
ASGC	77%	247 MB/s	249	3	249	74	0	0	
BNL	82%	1226 MB/s	3156	96	3181	671	0	0	
CERN	100%	331 MB/s	285	0	285	0	0	0	
CNAF	93%	528 MB/s	364	8	359	29	0	0	
FZK	57%	1126 MB/s	1902	12	1907	1464	0	0	
LYON	100%	898 MB/s	679	343	679	0	0	0	
NDGF	98%	135 MB/s	109	3	108	2	0	0	
PIC	99%	431 MB/s	394	119	390	3	0	0	
RAL	98%	1398 MB/s	2071	232	2089	36	0	0	
SARA	91%	468 MB/s	391	19	389	40	0	0	
TRIUMF	100%	333 MB/s	505	14	503	0	0	0	

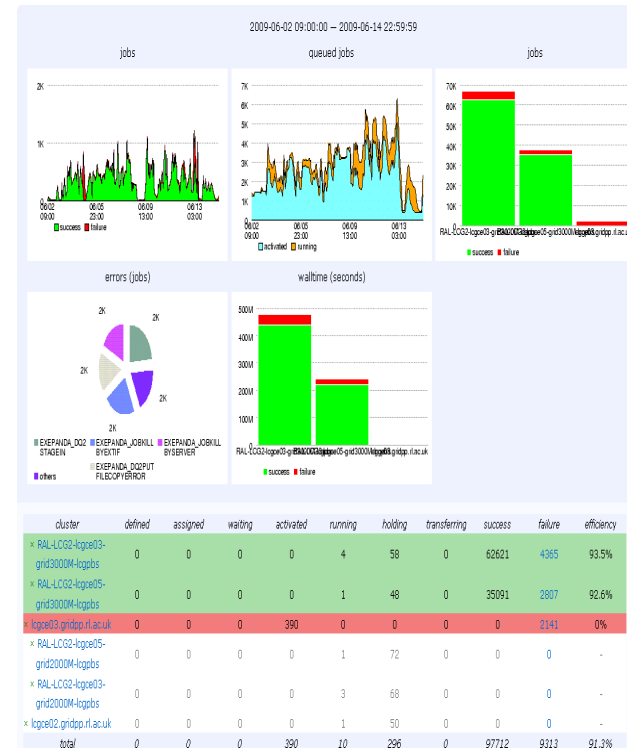




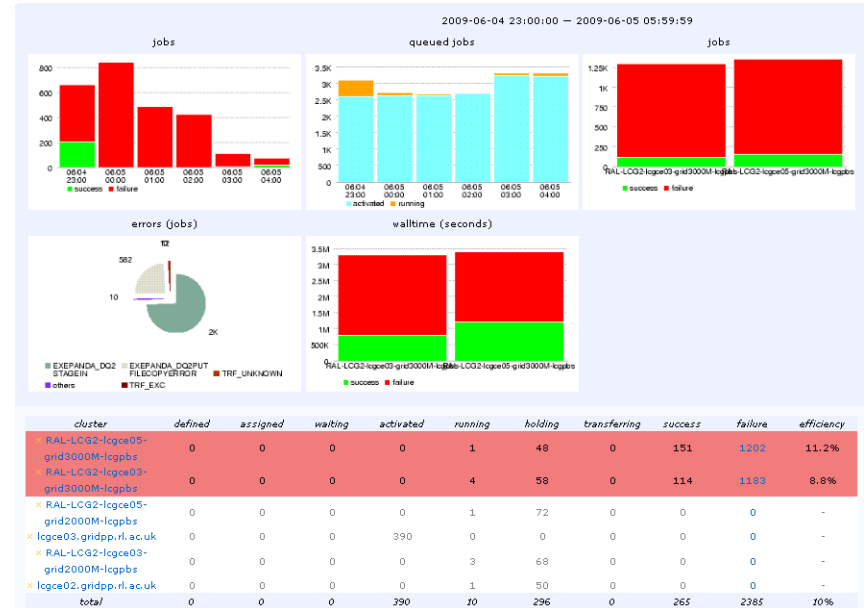
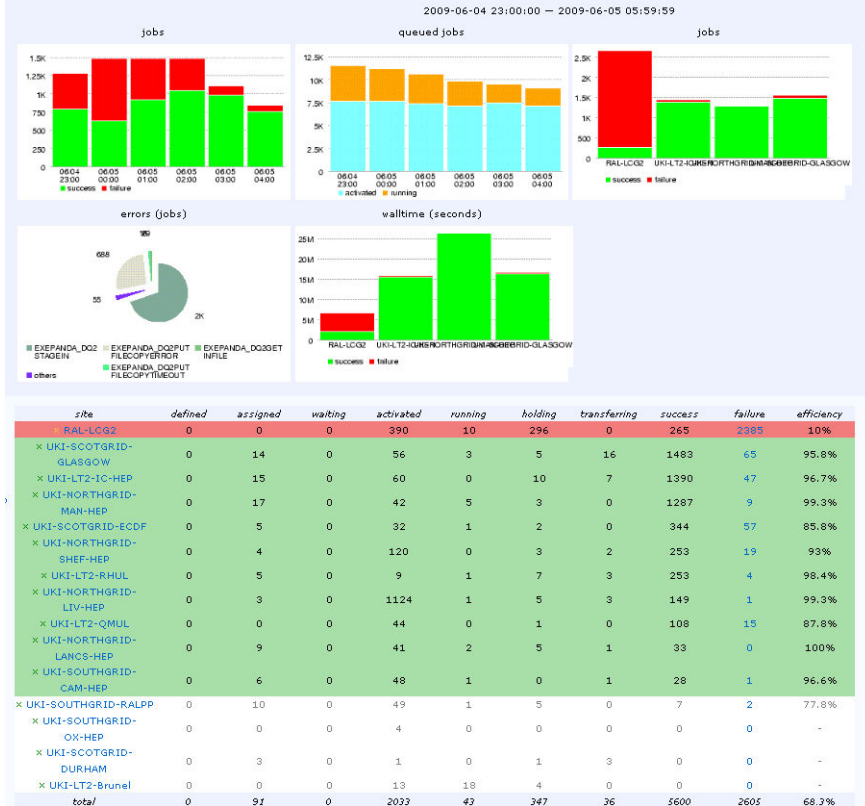
- UK Overall did well with
- 16.8% of ATLAS Successes
- 13.5% of ATLAS Failures
- 85.5% Successful in UK
  - 2 “Events” cause majority of Failures
    - “Big ID” CASTOR event
    - BDII/FC event
- 64% of Failures occurred in 7% of Wall Time
  - Success rate increases to 94% if event periods removed.



- UK Overall



## • Big ID “Event” – 7 Hours



## • Mainly T1 Issue

## • BDII/LFC “Event” 13 Hours





- How much space in space tokens
  - How quickly will space tokens be filled
  - 3.75 weeks of STEP would fill Allocations completely (for 2009 Pledges)
- Network requirements per job slot
  - 200 Mb/s ?
  - LAN network requirements/bottlenecks
- Network needs for Wan: is 1Gb/s enough
- Job types
  - I/O vs. CPU limited
  - Sparse vs. Full reading
  - ATLAS WMS vs. Pilot
- SL5 upgrade schedule
- Use of any of Tier 2 Storage Resources by LHCb ( Tier3/Users)
- Use of Non-dedicated CMS Tier-2 sites as CMS Tier3s?
- Dark Data Removal
- FTS channel limits ( rebalancing required?)
- Decommissioning old SEs
- Draining/load balancing DPMs
- Hot Files
- File:// protocol Usage
  - Especially for STORM/Lustre
- No perceived problems for ALICE/CMS/LHCb during STEP09
  - User accounting an issue for all VOs, shares/quotas an issue for CMS

- See UKI-NORTHGRID-LANCS-HEP and UKI-SCOTGRID-GLASGOW reports for more details about individual issues and general issue seen at many T2s in UK.

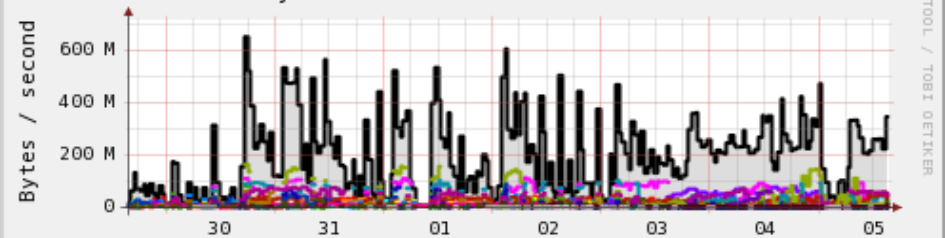
Token	Share (%)	Volume (TB)	Reserved (TB)	Headroom (TB)	DS complete	nFiles	Actual (TB)
UKI-LT2-QMUL_DATADISK	5	5.6	75.2	69.6	685/685	2649	6
UKI-LT2-RHUL_DATADISK	23	25.8	94.6	68.8	3126/3126	12496	28
UKI-LT2-UCL-CENTRAL_DATADISK	10	11.2	17.6	6.4	1363/1363	5150	11.8
UKI-NORTHGRID-LANCS-HEP_DATADISK	30	33.6	59.4	25.8	4075/4075	20213	42.8
UKI-NORTHGRID-LIV-HEP_DATADISK	15	16.8	33	16.2	2018/2018	6485	15.6
UKI-NORTHGRID-MAN-HEP1_DATADISK	15	16.8	18.7	1.9	2041/2041	7430	17.1
UKI-NORTHGRID-MAN-HEP2_DATADISK	15	16.8	25.3	8.5	2041/2041	10642	22.3
UKI-NORTHGRID-SHEF-HEP_DATADISK	10	11.2	16.5	5.3	1363/1363	6302	13.6
UKI-SCOTGRID-GLASGOW_DATADISK	40	44.8	70.4	25.6	5359/5359	16720	40
UKI-SOUTHGRID-BHAM-HEP_DATADISK	5	5.6	13.2	7.6	685/685	2027	5
UKI-SOUTHGRID-CAM-HEP_DATADISK	5	5.6	16.5	10.9	685/685	2008	5
UKI-SOUTHGRID-OX-HEP_DATADISK	2	2.2	22	19.8	277/277	1533	3.2
UKI-SOUTHGRID-RALPP_DATADISK	25	28	35	7	3355/3360	14965	32.4
Totals	200	224	497.2	273.2	175.6		

UKI-LT2-QMUL_MCDISK	150	1488
UKI-LT2-RHUL_MCDISK	100	400
UKI-LT2-UCL-CENTRAL_MCDISK	50	128
UKI-NORTHGRID-LANCS-HEP_MCDISK	100	656
UKI-NORTHGRID-LIV-HEP_MCDISK	150	760
UKI-NORTHGRID-MAN-HEP1_MCDISK	150	890
UKI-NORTHGRID-MAN-HEP2_MCDISK	150	890
UKI-NORTHGRID-SHEF-HEP_MCDISK	50	200
UKI-SCOTGRID-GLASGOW_MCDISK	250	1912
UKI-SOUTHGRID-BHAM-HEP_MCDISK	10	308
UKI-SOUTHGRID-CAM-HEP_MCDISK	50	152
UKI-SOUTHGRID-OX-HEP_MCDISK	75	1152
UKI-SOUTHGRID-RALPP_MCDISK	100	1020

ANALY_BHAM	10	308
ANALY_CAM	50	152
ANALY_GLASGOW	250	1912
ANALY_LANCS	100	656
ANALY_LIV	150	760
ANALY_MANC1	150	890
ANALY_MANC2	150	890
ANALY_OX	75	1152
ANALY_QMUL	150	1488
ANALY_RALPP	100	1020
ANALY_RHUL	100	400
ANALY_SHEF	50	200
ANALY_UCLCENT	0	128

Channel Name	alike	atlas	cms	dteam	lhcb	ops	Total	Streams
Total files with RALLCG2 as source	22	90	197	57	22	39	427	403
Total files with RALLCG2 as dest	36	206	159	55	82	47	585	647
Total files with RALLCG2 as third-party (STAR-)	22	190	85	64	22	25	408	408
Total files	80	486	441	176	126	111	1420	1458
Total files with RALLCG2-T1s		0						
Total files with RALLCG2-T2s		90						
Total files with T1s-RALLCG2		116						
Total files with T2s-RALLCG2		90						

-LCG2 Tier-1 FTS Bytes Transferred (RALLCG2 as source/destination)

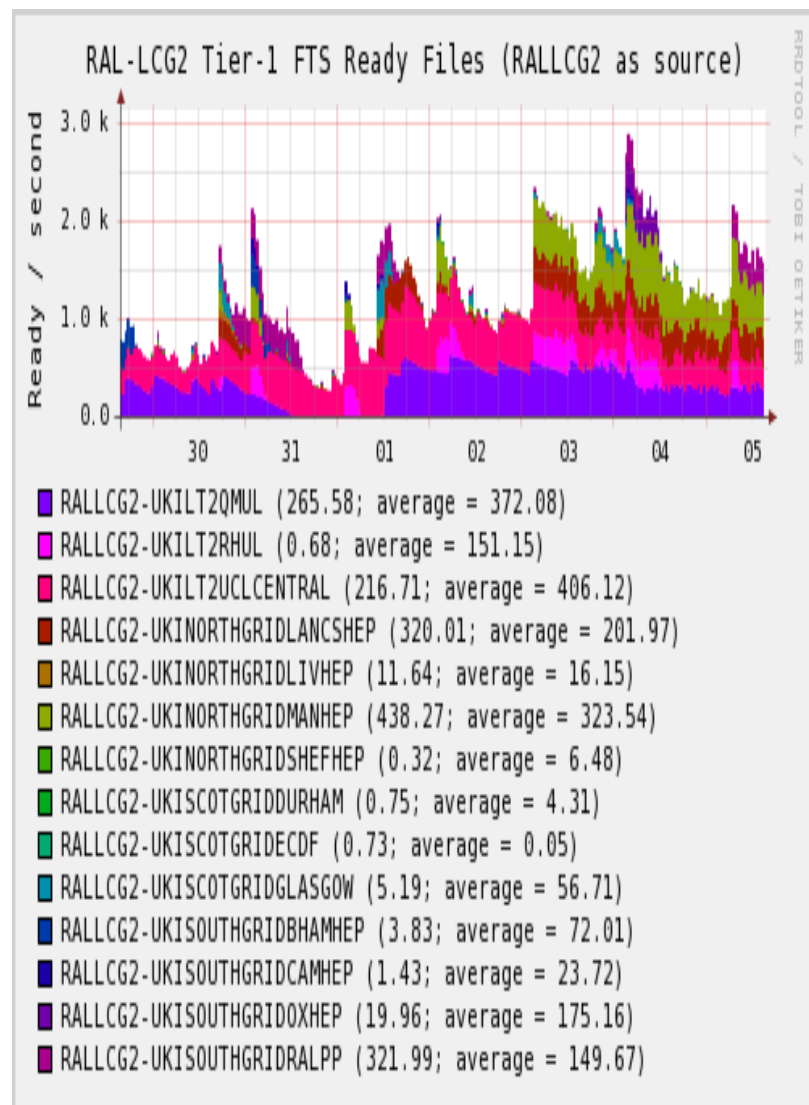
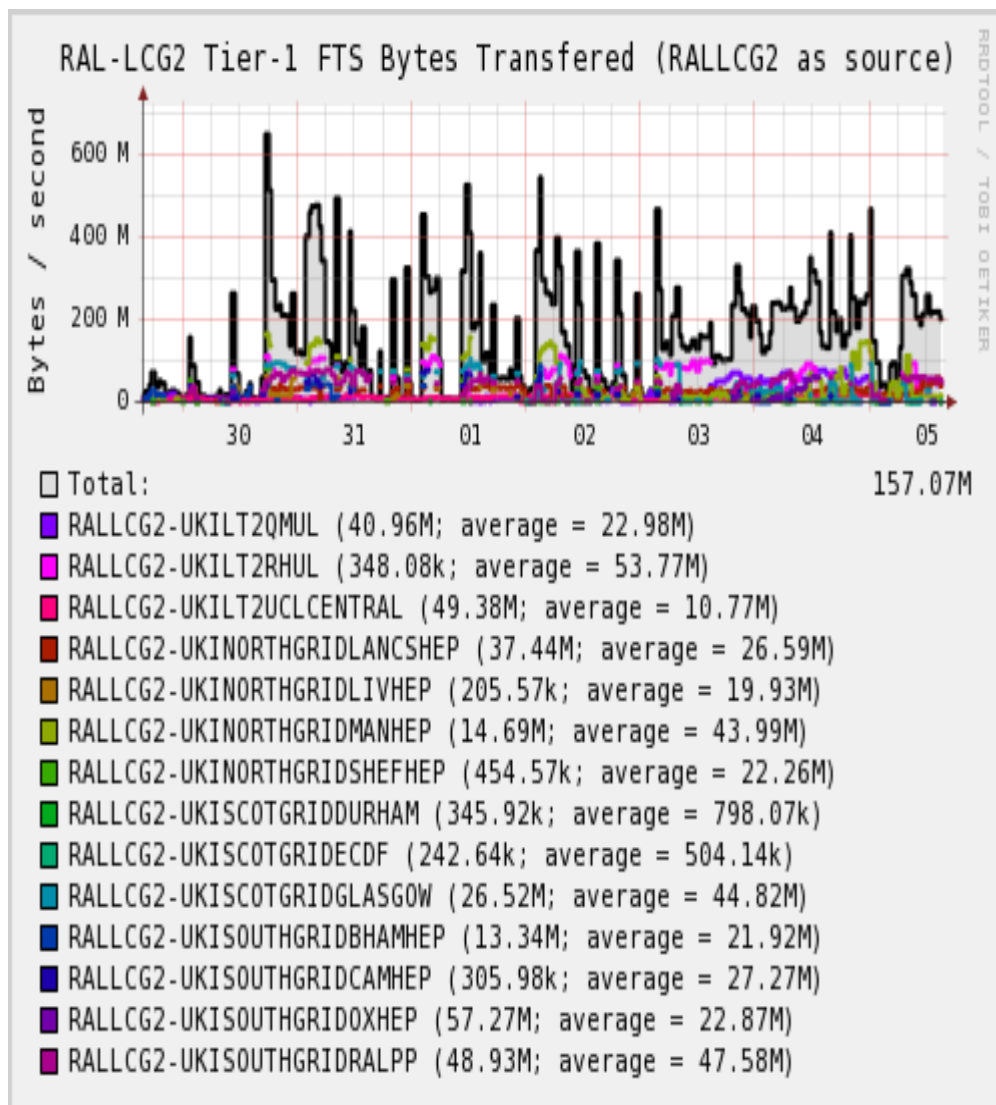


Channel	Bytes Transferred	Average
Total:	197.38M	
BNLLCG2-RALLCG2	206.67k; average = 17.17M	
FZKLCG2-RALLCG2	14.61M; average = 12.34M	
IN2P3CC-RALLCG2	20.89M; average = 15.48M	
INFNT1-RALLCG2	2.08M; average = 8.49M	
NDGFT1-RALLCG2	25.74M; average = 9.14M	
NIKHEFELPROD-RALLCG2	16.05M; average = 18.38M	
PIC-RALLCG2	15.14M; average = 7.73M	
RALLCG2-UKILT2QMUL	40.96M; average = 22.98M	
RALLCG2-UKILT2RHUL	348.08k; average = 53.77M	
RALLCG2-UKILT2UCLCENTRAL	49.38M; average = 10.77M	
RALLCG2-UKINORTHGRIDLANCSHEP	37.44M; average = 26.59M	
RALLCG2-UKINORTHGRIDLIVHEP	205.57k; average = 19.93M	
RALLCG2-UKINORTHGRIDMANHEP	14.69M; average = 43.99M	
RALLCG2-UKINORTHGRIDSHEFHEP	454.57k; average = 22.26M	
RALLCG2-UKISCOTGRIDDURHAM	345.92k; average = 798.07k	
RALLCG2-UKISCOTGRIDECDF	242.64k; average = 504.14k	
RALLCG2-UKISCOTGRIDGLASGOW	26.52M; average = 44.82M	
RALLCG2-UKISOUTHGRIDBHAMHEP	13.34M; average = 21.92M	
RALLCG2-UKISOUTHGRIDCAMHEP	305.98k; average = 27.27M	
RALLCG2-UKISOUTHGRIDOXHEP	57.27M; average = 22.87M	
RALLCG2-UKISOUTHGRIDRALPP	48.93M; average = 47.58M	
SARAMATRIX-RALLCG2	2.69M; average = 2.00M	
TAIWANLCG2-RALLCG2	11.43M; average = 4.19M	
TRIUMFLCG2-RALLCG2	25.49M; average = 9.62M	
UKILT2BRUNEL-RALLCG2	615.70k; average = 430.97k	
UKILT2QMUL-RALLCG2	204.30k; average = 295.34k	
UKILT2RHUL-RALLCG2	815.38k; average = 1.41M	
UKINORTHGRIDLANCSHEP-RALLCG2	1.36M; average = 864.61k	
UKINORTHGRIDLIVHEP-RALLCG2	760.07k; average = 924.53k	
UKINORTHGRIDMANHEP-RALLCG2	20.70k; average = 797.66k	
UKINORTHGRIDSHEFHEP-RALLCG2	191.71k; average = 297.21k	
UKISCOTGRIDDURHAM-RALLCG2	1.33M; average = 1.74M	
UKISCOTGRIDECDF-RALLCG2	524.05k; average = 941.29k	
UKISCOTGRIDGLASGOW-RALLCG2	3.70M; average = 2.75M	
UKISOUTHGRIDCAMHEP-RALLCG2	304.07k; average = 110.23k	
UKISOUTHGRIDOXHEP-RALLCG2	70.31k; average = 344.69k	
UKISOUTHGRIDRALPP-RALLCG2	70.31k; average = 344.69k	

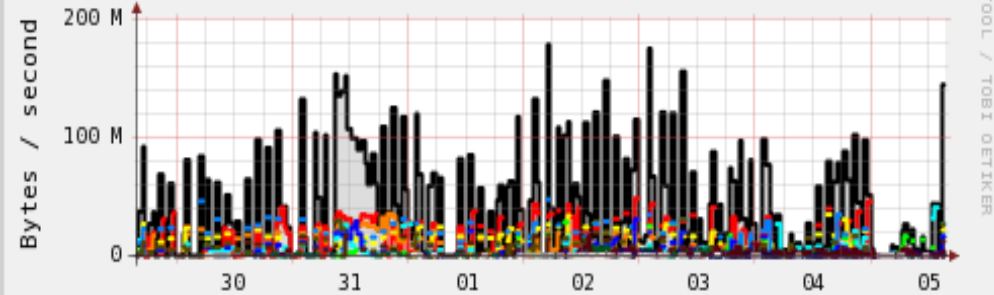
-LCG2 Tier-1 FTS Failed Transfers (RALLCG2 as source/destination)



Channel	Failed Transfers	Average
BNLLCG2-RALLCG2	0.14; average = 0.28	
FZKLCG2-RALLCG2	0.11; average = 0.04	
IN2P3CC-RALLCG2	0.00; average = 0.01	
INFNT1-RALLCG2	3.37; average = 0.72	
NDGFT1-RALLCG2	0.03; average = 0.01	
NIKHEFELPROD-RALLCG2	0.05; average = 0.03	
PIC-RALLCG2	0.02; average = 0.00	
RALLCG2-UKILT2QMUL	0.02; average = 0.40	
RALLCG2-UKILT2RHUL	0.02; average = 0.11	
RALLCG2-UKILT2UCLCENTRAL	0.17; average = 0.22	
RALLCG2-UKINORTHGRIDLANCSHEP	0.13; average = 0.47	
RALLCG2-UKINORTHGRIDLIVHEP	0.14; average = 0.16	
RALLCG2-UKINORTHGRIDMANHEP	0.12; average = 0.65	
RALLCG2-UKINORTHGRIDSHEFHEP	0.15; average = 0.03	
RALLCG2-UKISCOTGRIDDURHAM	0.02; average = 0.00	
RALLCG2-UKISCOTGRIDECDF	0.03; average = 0.22	
RALLCG2-UKISCOTGRIDGLASGOW	0.07; average = 0.13	
RALLCG2-UKISOUTHGRIDBHAMHEP	0.02; average = 0.01	
RALLCG2-UKISOUTHGRIDCAMHEP	0.18; average = 0.11	
RALLCG2-UKISOUTHGRIDOXHEP	0.01; average = 0.00	
RALLCG2-UKISOUTHGRIDRALPP	0.58; average = 0.26	
SARAMATRIX-RALLCG2	0.18; average = 0.18	
TAIWANLCG2-RALLCG2	0.06; average = 0.00	
TRIUMFLCG2-RALLCG2	0.76; average = 0.11	
UKILT2BRUNEL-RALLCG2	0.07; average = 0.01	
UKILT2QMUL-RALLCG2	0.16; average = 0.98	
UKILT2RHUL-RALLCG2	0.04; average = 0.28	
UKINORTHGRIDLANCSHEP-RALLCG2	0.75; average = 1.53	
UKINORTHGRIDLIVHEP-RALLCG2	0.90; average = 1.61	
UKINORTHGRIDMANHEP-RALLCG2	0.36; average = 0.92	
UKINORTHGRIDSHEFHEP-RALLCG2	0.07; average = 1.05	
UKISCOTGRIDDURHAM-RALLCG2	0.12; average = 0.01	
UKISCOTGRIDECDF-RALLCG2	0.19; average = 1.64	
UKISCOTGRIDGLASGOW-RALLCG2	0.02; average = 1.43	
UKISOUTHGRIDCAMHEP-RALLCG2	0.07; average = 0.37	
UKISOUTHGRIDOXHEP-RALLCG2	0.20; average = 0.22	
UKISOUTHGRIDRALPP-RALLCG2	0.44; average = 1.27	

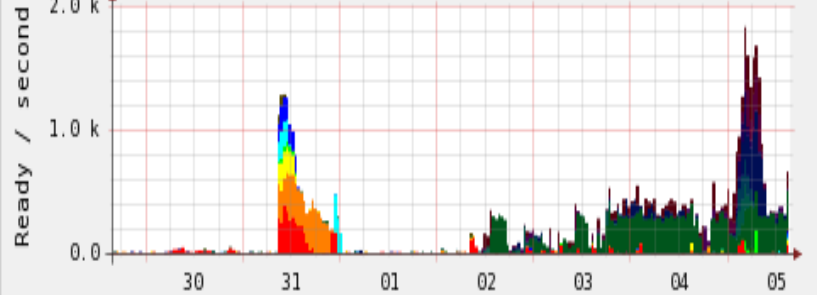


RAL-LCG2 Tier-1 FTS Bytes Transferred (RALLCG2 as destination)



- Total: 40.31M
- BNLLCG2-RALLCG2 (206.67k; average = 17.17M)
- FZKLCG2-RALLCG2 (14.61M; average = 12.34M)
- IN2P3CC-RALLCG2 (20.89M; average = 15.48M)
- INFNT1-RALLCG2 (2.08M; average = 8.49M)
- NDGFT1-RALLCG2 (25.74M; average = 9.14M)
- NIKHEFELPROD-RALLCG2 (16.05M; average = 18.38M)
- PIC-RALLCG2 (15.14M; average = 7.73M)
- SARAMATRIX-RALLCG2 (2.69M; average = 2.00M)
- TAIWANLCG2-RALLCG2 (11.43M; average = 4.19M)
- TRIUMFLCG2-RALLCG2 (25.49M; average = 9.62M)
- UKILT2BRUNEL-RALLCG2 (615.70k; average = 430.97k)
- UKILT2QMUL-RALLCG2 (204.30k; average = 295.34k)
- UKILT2RHUL-RALLCG2 (815.38k; average = 1.41M)
- UKINORTHGRIDLANCSHEP-RALLCG2 (1.36M; average = 864.61k)
- UKINORTHGRIDLIVHEP-RALLCG2 (760.07k; average = 924.53k)
- UKINORTHGRIDMANHEP-RALLCG2 (20.70k; average = 797.66k)
- UKINORTHGRIDSHEFHEP-RALLCG2 (191.71k; average = 297.21k)
- UKISCOTGRIDDURHAM-RALLCG2 (1.33M; average = 1.74M)
- UKISCOTGRIDECDF-RALLCG2 (524.05k; average = 941.29k)
- UKISCOTGRIDGLASGOW-RALLCG2 (3.70M; average = 2.75M)
- UKISOUTHGRIDCAMHEP-RALLCG2 (304.07k; average = 110.23k)
- UKISOUTHGRIDRALPP-RALLCG2 (70.31k; average = 344.69k)

RAL-LCG2 Tier-1 FTS Ready Files (RALLCG2 as destination)



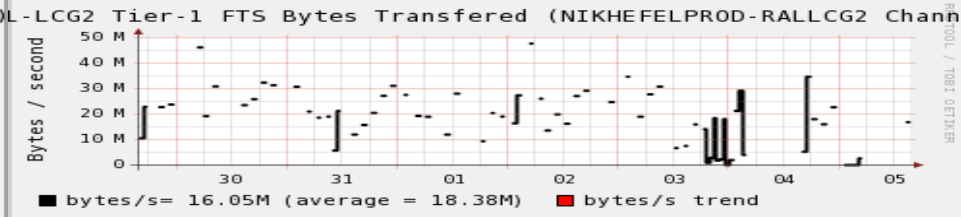
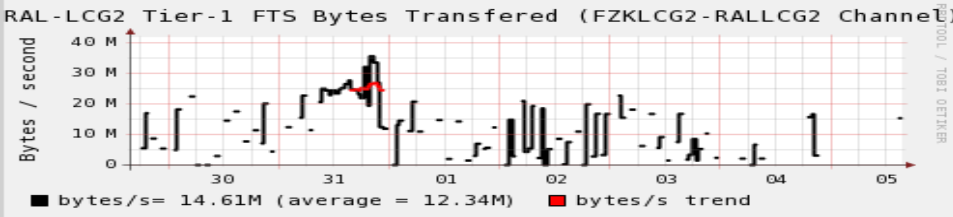
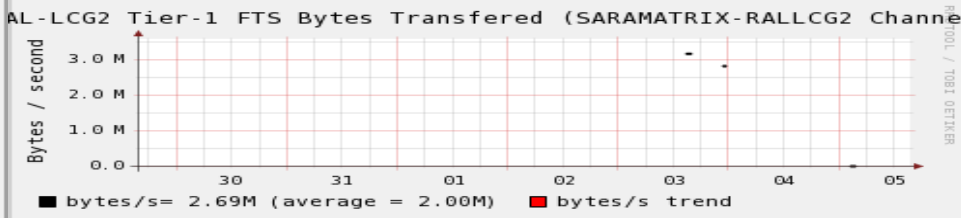
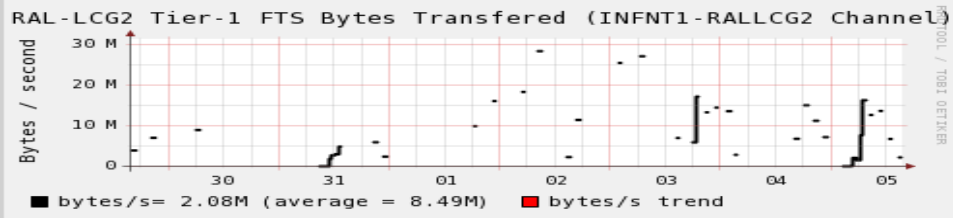
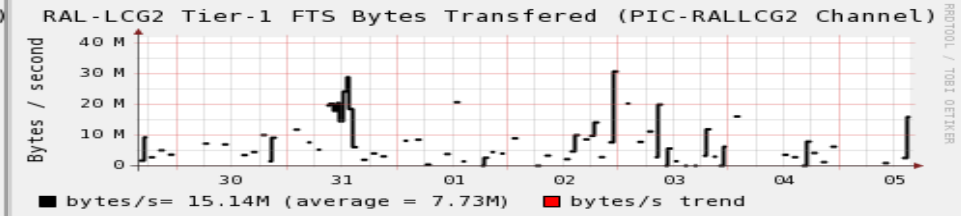
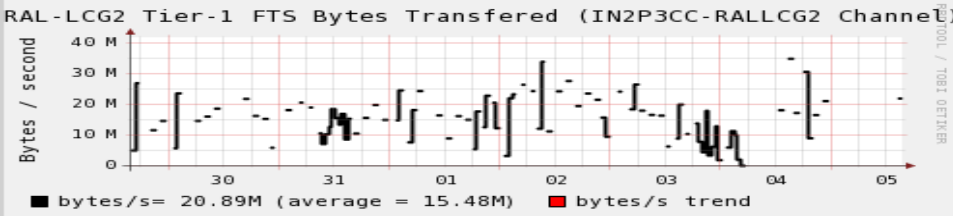
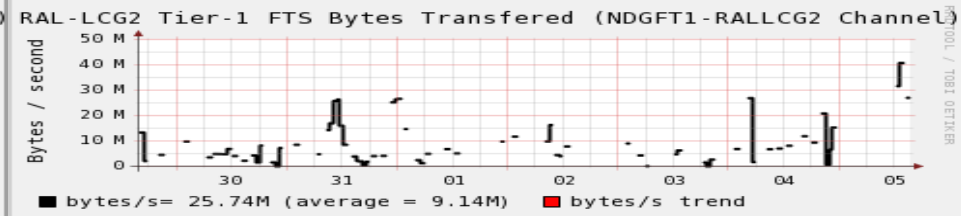
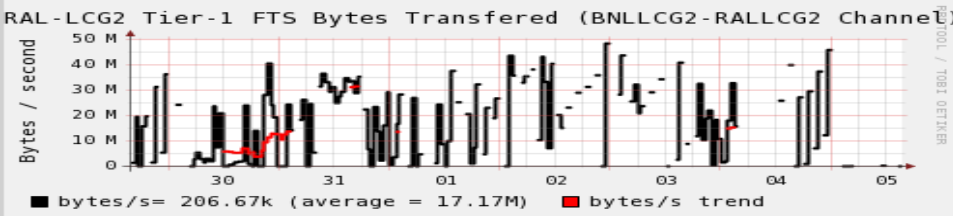
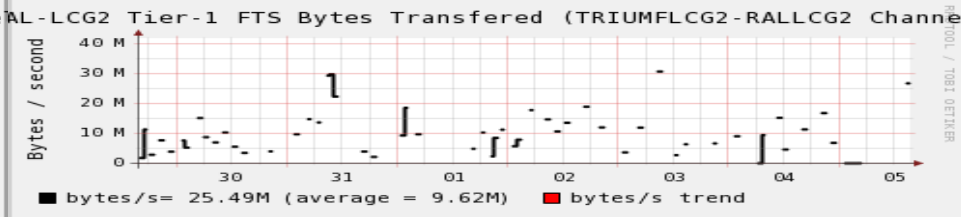
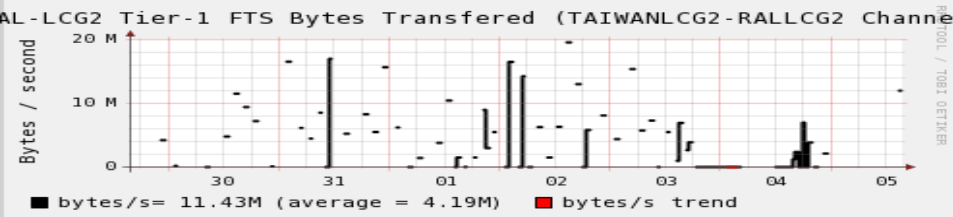
- BNLLCG2-RALLCG2 (68.26; average = 32.05)
- FZKLCG2-RALLCG2 (5.27; average = 54.03)
- IN2P3CC-RALLCG2 (41.04; average = 15.67)
- INFNT1-RALLCG2 (185.29; average = 15.79)
- NDGFT1-RALLCG2 (3.23; average = 29.37)
- NIKHEFELPROD-RALLCG2 (37.96; average = 1.52)
- PIC-RALLCG2 (21.68; average = 17.79)
- TAIWANLCG2-RALLCG2 (8.38; average = 0.63)
- TRIUMFLCG2-RALLCG2 (8.67; average = 4.63)
- UKILT2BRUNEL-RALLCG2 (1.32; average = 1.56)
- UKILT2QMUL-RALLCG2 (24.59; average = 7.30)
- UKILT2RHUL-RALLCG2 (313.75; average = 155.39)
- UKINORTHGRIDLANCSHEP-RALLCG2 (15.66; average = 27.92)
- UKINORTHGRIDLIVHEP-RALLCG2 (11.88; average = 21.70)
- UKINORTHGRIDMANHEP-RALLCG2 (29.99; average = 74.70)
- UKINORTHGRIDSHEFHEP-RALLCG2 (4.15; average = 16.97)
- UKISCOTGRIDDURHAM-RALLCG2 (17.50; average = 24.85)
- UKISCOTGRIDECDF-RALLCG2 (7.80; average = 63.83)
- UKISCOTGRIDGLASGOW-RALLCG2 (127.09; average = 78.46)
- UKISOUTHGRIDCAMHEP-RALLCG2 (3.15; average = 0.99)
- UKISOUTHGRIDRALPP-RALLCG2 (0.45; average = 0.08)

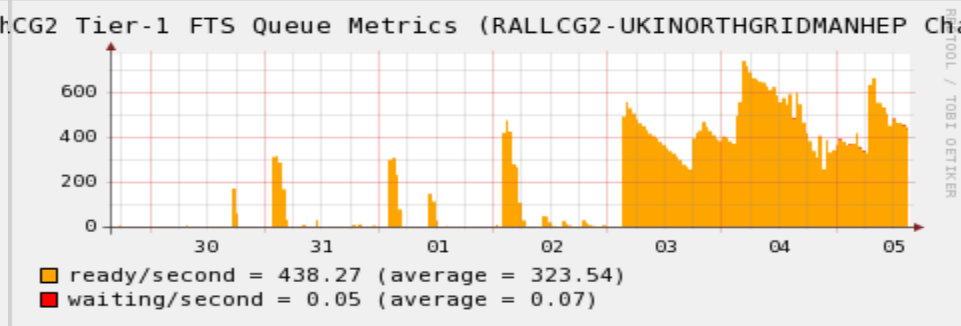
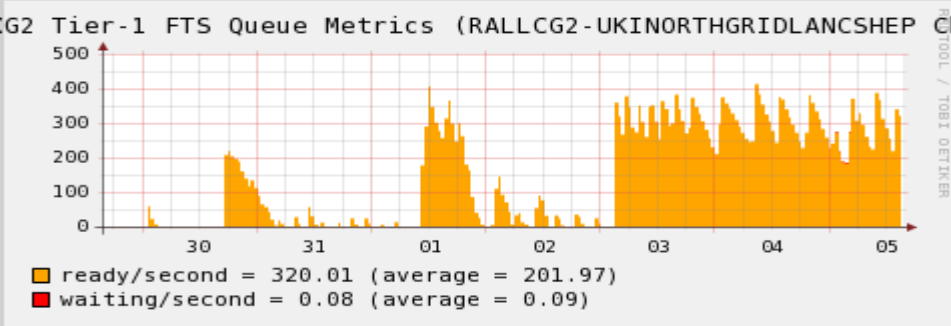
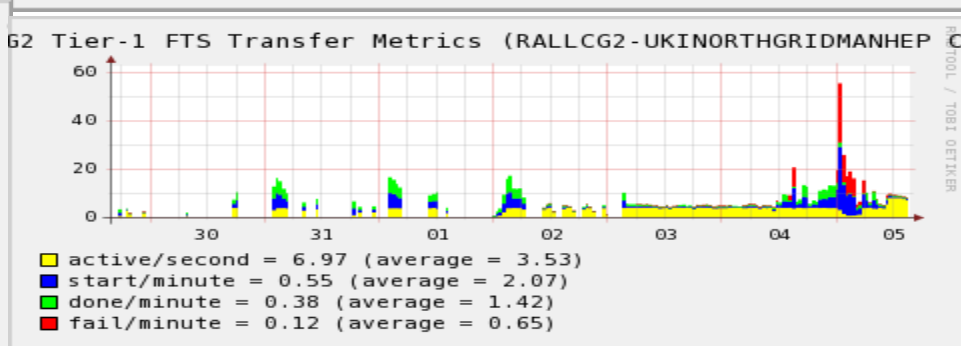
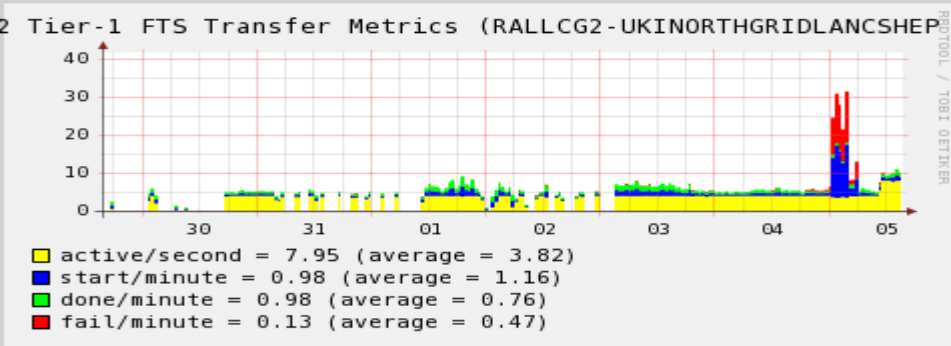
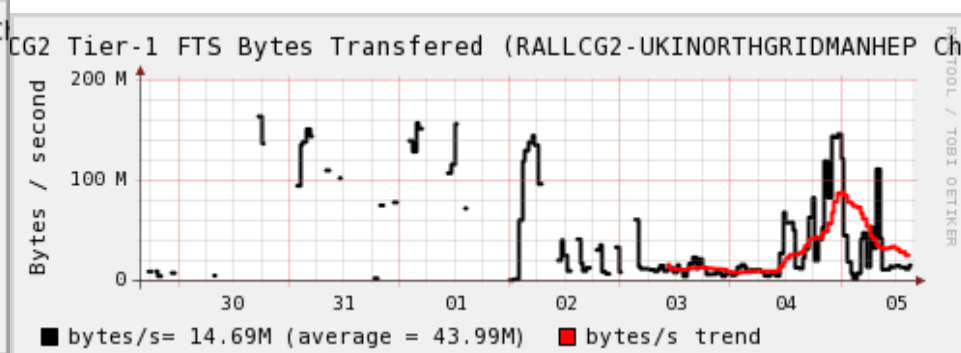
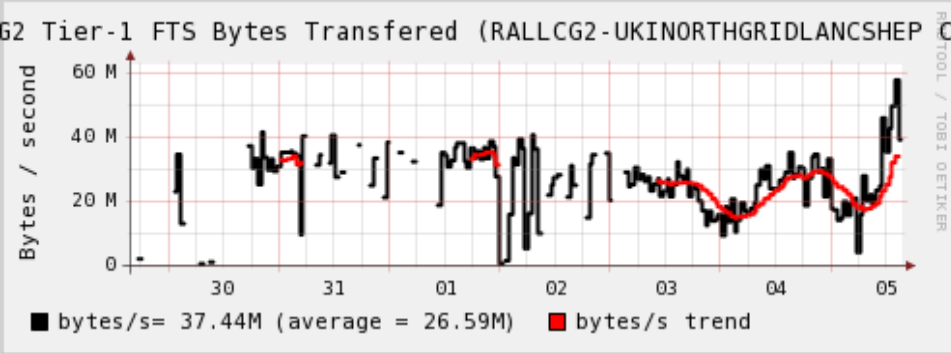


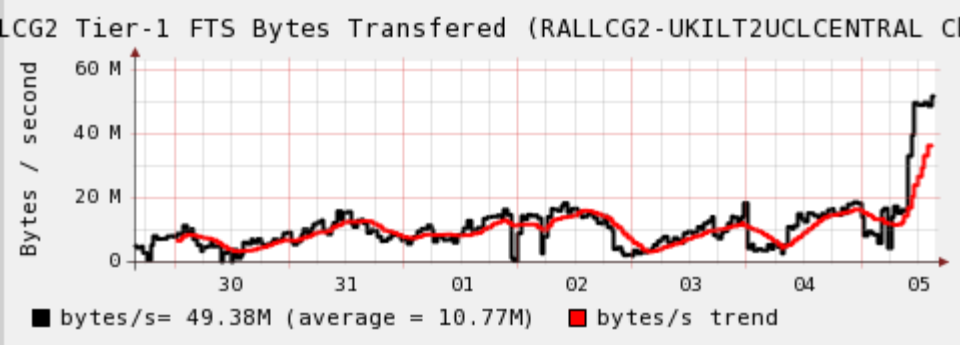
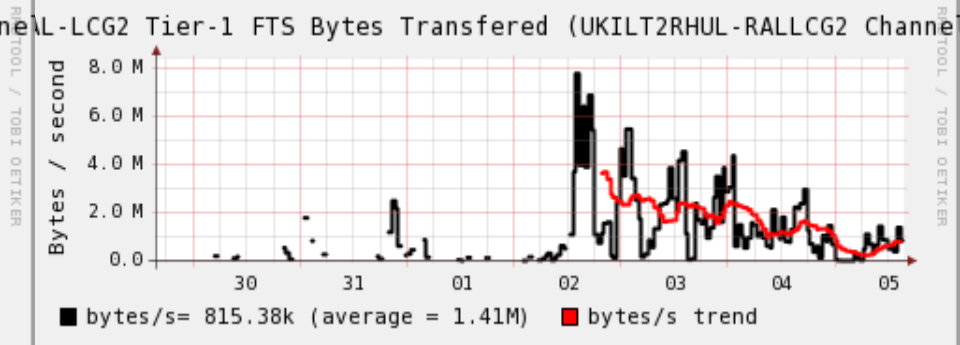
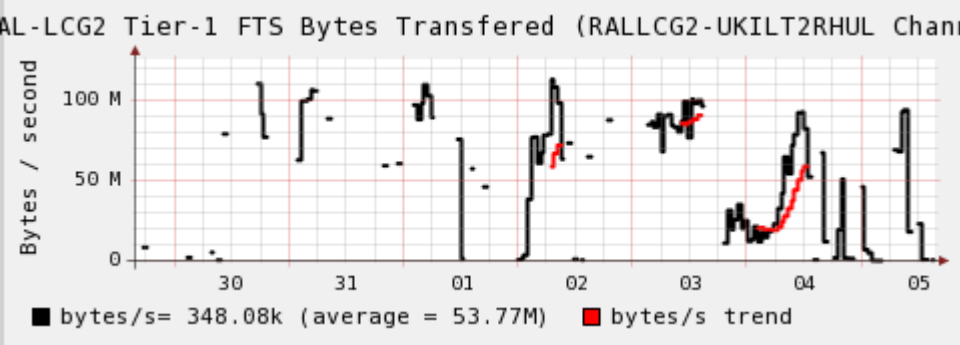
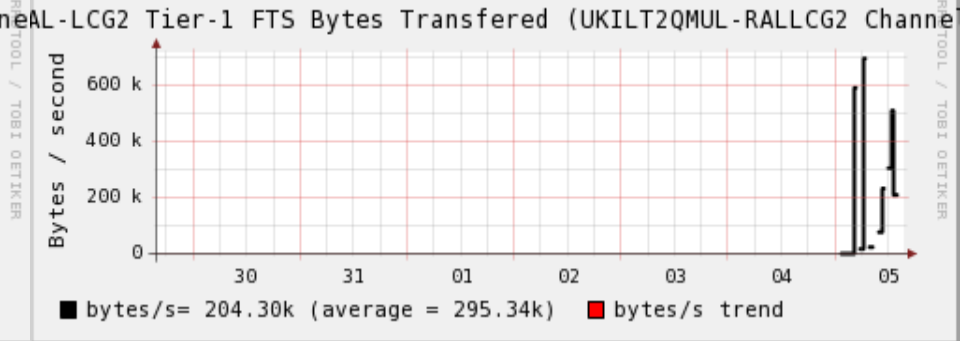
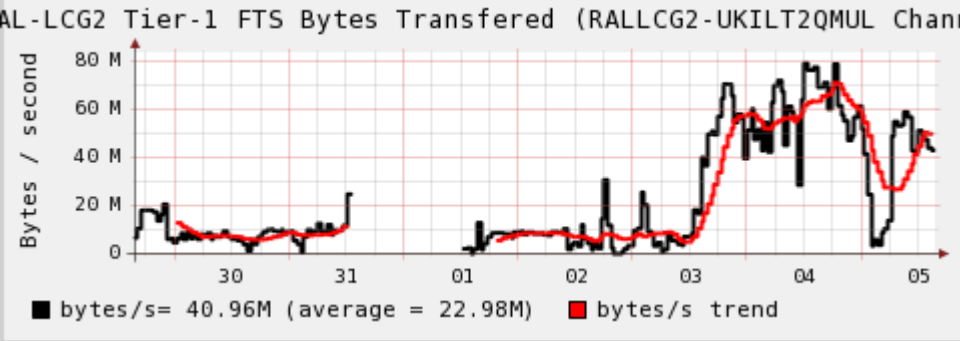
UK_PANDA	SUBMITTED	RUNNING	COMPLETED	FAILED	Efficiency	# Files Expected	# Files Processed
ANALY_CAM	0	0	3045	1656	0.65	10805	?
ANALY_BHAM	181	0	2640	275	0.91	5624	?
ANALY_MANC1	0	0	5033	2915	0.63	10159	?
ANALY_MANC2	0	1	3567	5780	0.38	8695	?
ANALY_GLASGOW	0	3	73726	1314	0.98	189702	?
ANALY_SHEF	830	0	5106	1436	0.78	11701	?
ANALY_RHUL	0	0	14657	3220	0.82	36759	?
ANALY_LANCS	3	0	3472	2339	0.6	7929	?
ANALY_UCLCENT	241	0	0	123	0	0	?
ANALY_LIV	1	3	7642	1660	0.82	27628	?
ANALY_OX	169	0	0	128	0	0	?
ANALY_RALPP	0	8	1612	907	0.64	5713	?
ANALY_QMUL	0	0	1475	2619	0.36	3397	?
<b>TOTAL</b>	<b>1425</b>	<b>15</b>	<b>121975</b>	<b>24372</b>	<b>0.83</b>	<b>318112</b>	<b>?</b>

UK	SUBMITTED	RUNNING	COMPLETED	FAILED	Efficiency	# Files Expected	# Files Processed
UKI-NORTHGRID-LANCS-HEP_MCDISK	0	0	405	903	0.31	1472	1311
UKI-SCOTGRID-DURHAM_MCDISK	0	0	22	532	0.04	163	154
UKI-LT2-UCL-CENTRAL_MCDISK	0	0	105	665	0.14	612	435
UKI-SOUTHGRID-BHAM-HEP_MCDISK	102	11	439	363	0.55	2294	2011
UKI-LT2-QMUL_MCDISK	298	31	853	13335	0.06	2268	772
UKI-NORTHGRID-SHEF-HEP_MCDISK	0	0	5	570	0.01	36	36
UKI-NORTHGRID-LIV-HEP_MCDISK	189	286	1267	995	0.56	9707	9705
UKI-SOUTHGRID-OX-HEP_MCDISK	140	8	3891	739	0.84	30128	29006
UKI-SCOTGRID-GLASGOW_MCDISK	376	594	2669	817	0.77	14398	13161
UKI-LT2-RHUL_MCDISK	158	28	6849	5532	0.55	29077	23287
UKI-SOUTHGRID-CAM-HEP_MCDISK	0	0	576	630	0.48	5288	3973
UKI-SOUTHGRID-RALPP_MCDISK	113	181	6634	797	0.89	40356	38965
<b>TOTAL</b>	<b>1376</b>	<b>1139</b>	<b>23715</b>	<b>25878</b>	<b>0.48</b>	<b>135799</b>	<b>122816</b>

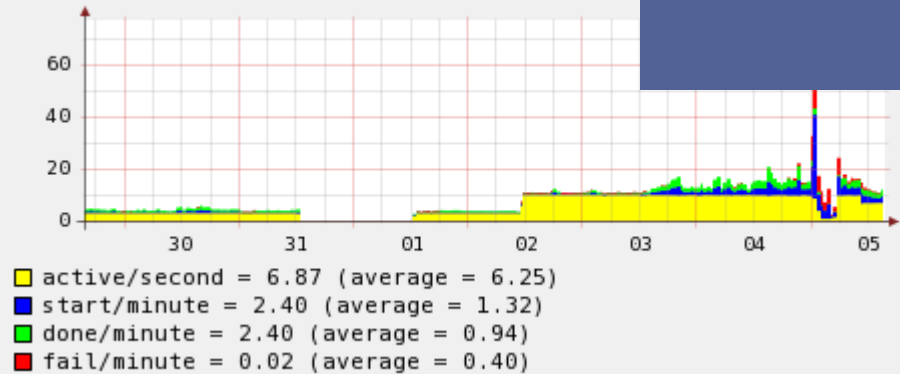




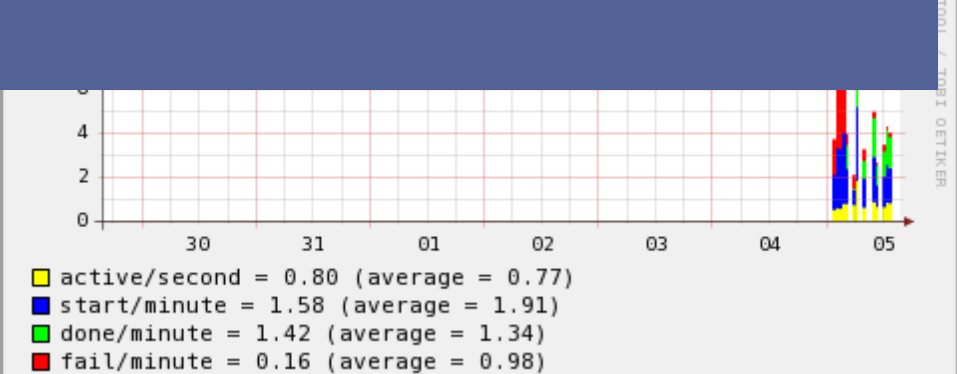




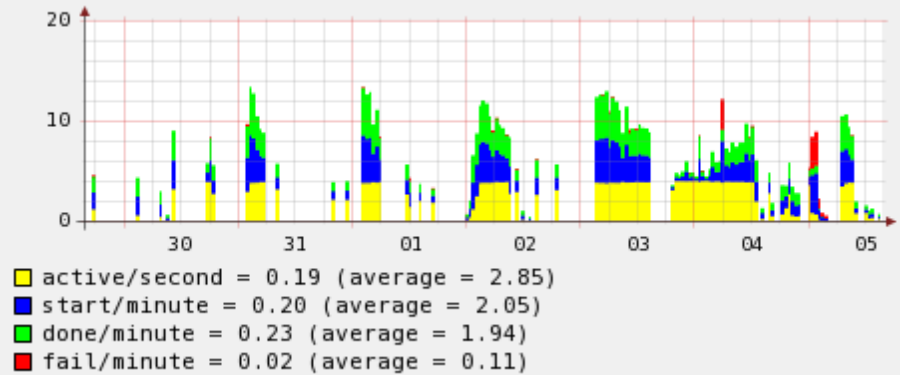
L-LCG2 Tier-1 FTS Transfer Metrics (RALLCG2-UKILT2RHUL Channel)



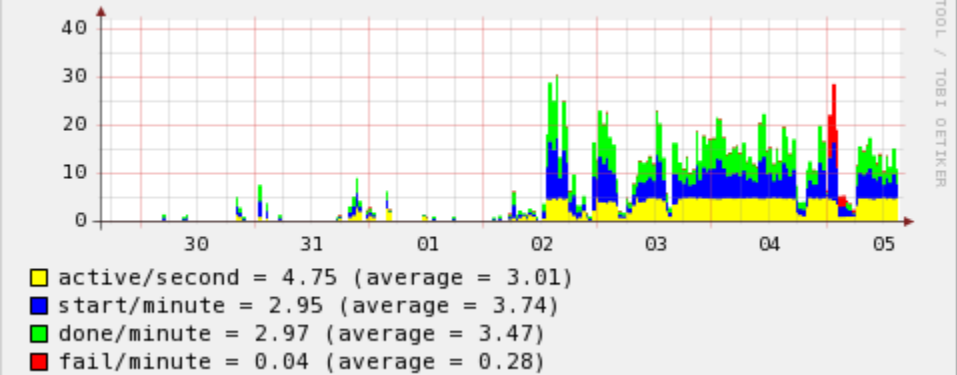
L-LCG2 Tier-1 FTS Transfer Metrics (UKILT2RHUL-RALLCG2 Channel)



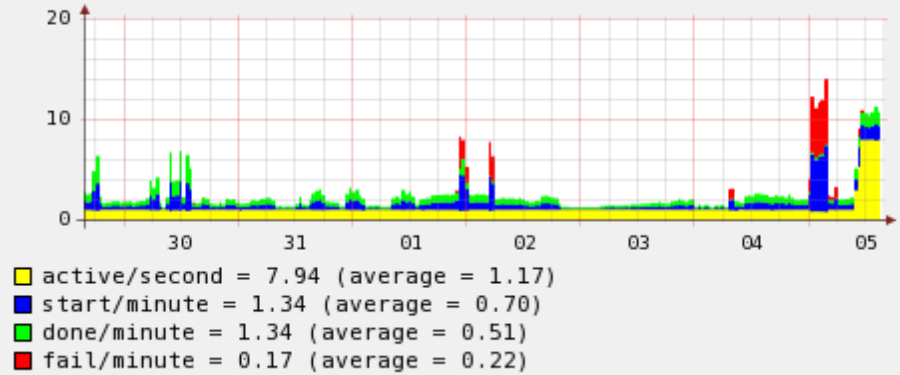
L-LCG2 Tier-1 FTS Transfer Metrics (RALLCG2-UKILT2RHUL Channel)

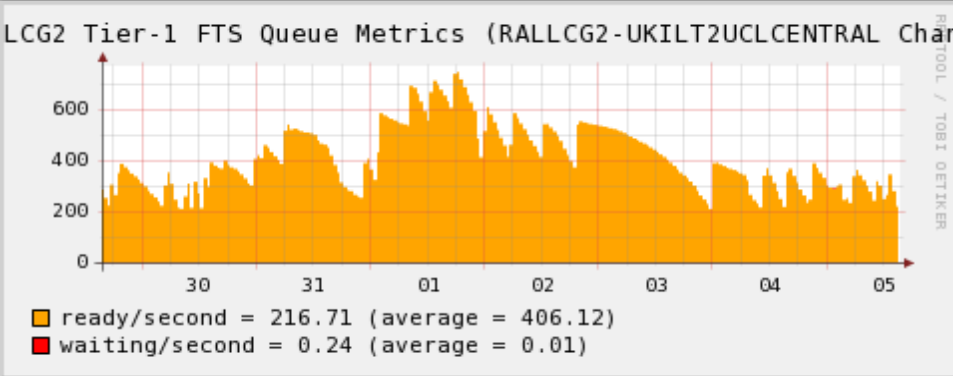
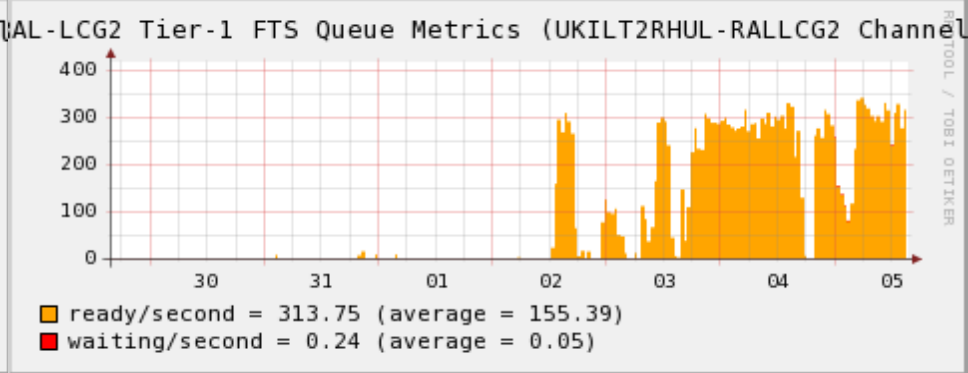
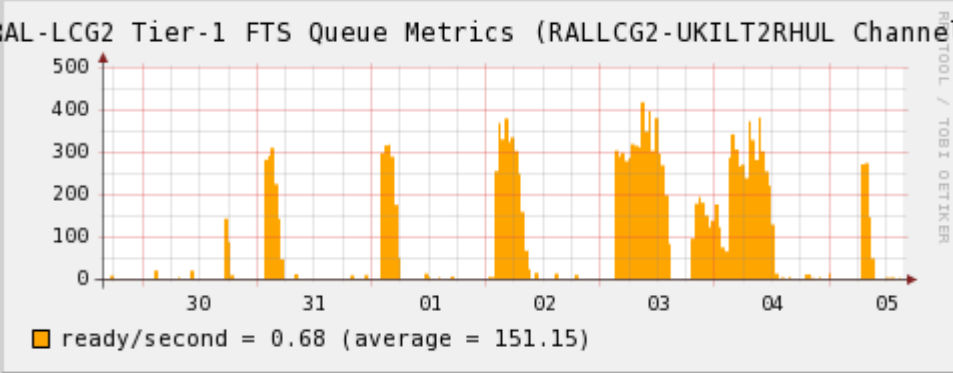
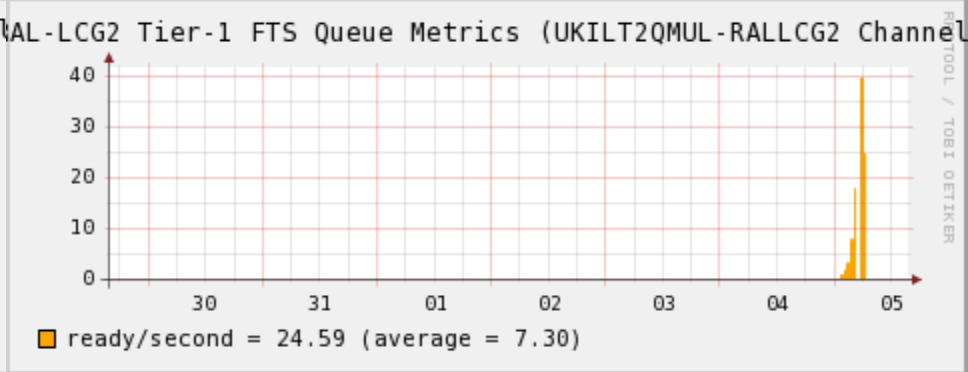
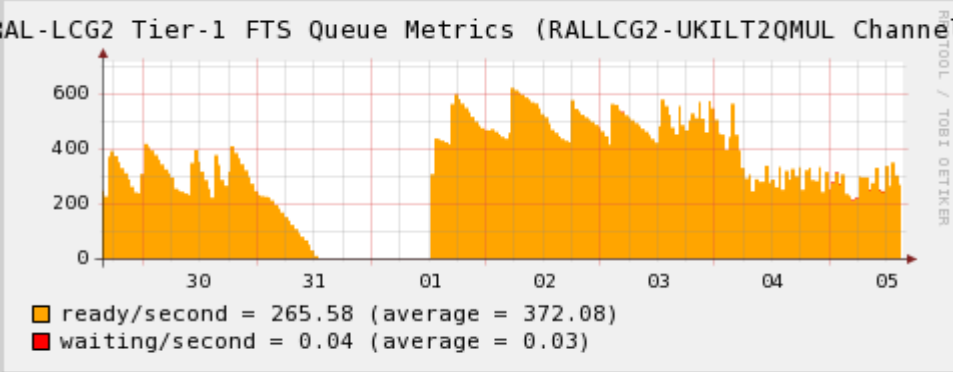


L-LCG2 Tier-1 FTS Transfer Metrics (UKILT2RHUL-RALLCG2 Channel)



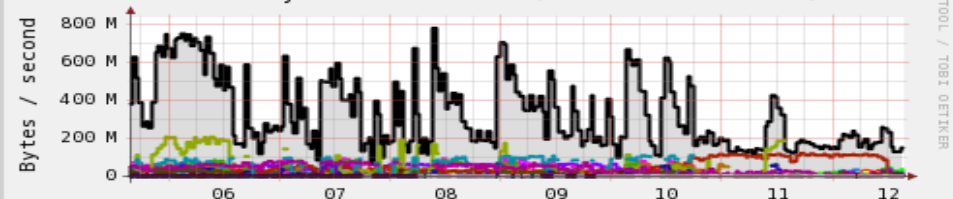
L-LCG2 Tier-1 FTS Transfer Metrics (RALLCG2-UKILT2UCLCENTRAL Channel)





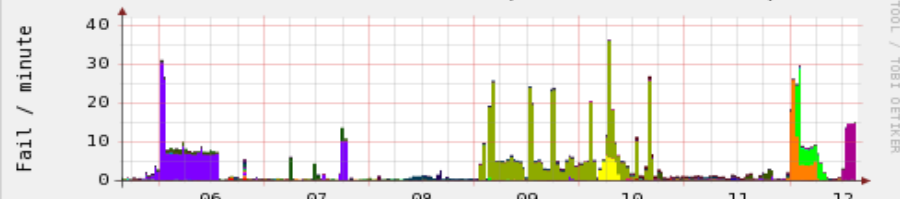


-LCG2 Tier-1 FTS Bytes Transferred (RALLCG2 as source/destination)



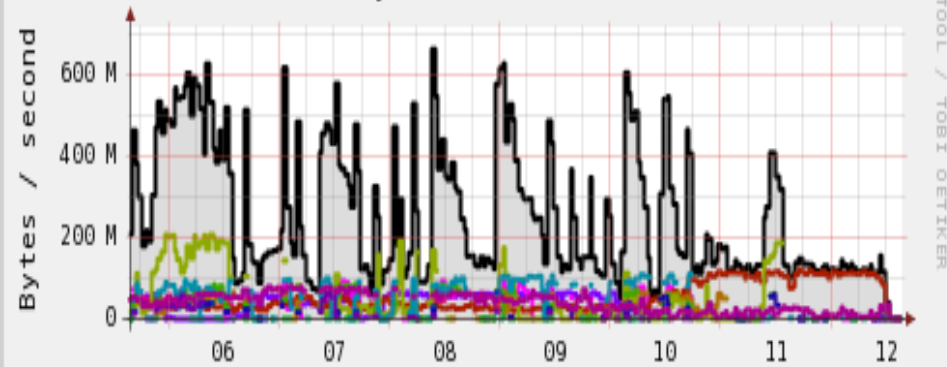
□ Total:	324.32M	■ BNLLCG2-RALLCG2 (26.21M; average = 24.78M)
■ FZKLCG2-RALLCG2 (17.30M; average = 11.67M)		
■ IN2P3CC-RALLCG2 (18.45M; average = 12.92M)		
■ INFNT1-RALLCG2 (34.02M; average = 18.76M)		
■ NDGFT1-RALLCG2 (20.28M; average = 9.79M)		
■ NIKHEFELPROD-RALLCG2 (17.90M; average = 16.12M)		
■ PIC-RALLCG2 (4.44M; average = 6.26M)		
■ RALLCG2-UKILT2QMUL (166.81k; average = 39.07M)		
■ RALLCG2-UKILT2RHUL (1.13M; average = 41.81M)		
■ RALLCG2-UKILT2UCLCENTRAL (31.03M; average = 43.29M)		
■ RALLCG2-UKINORTHGRIDLANCSHEP (2.77M; average = 52.64M)		
■ RALLCG2-UKINORTHGRIDLIVHEP (835.32k; average = 36.15M)		
■ RALLCG2-UKINORTHGRIDMANHEP (1.31M; average = 54.29M)		
■ RALLCG2-UKINORTHGRIDSHEFHHEP (59.14M; average = 53.50M)		
■ RALLCG2-UKISCOTGRIDDURHAM (482.94k; average = 628.09k)		
■ RALLCG2-UKISCOTGRIDECDF (851.76k; average = 538.06k)		
■ RALLCG2-UKISCOTGRIDGLASGOW (700.41k; average = 61.51M)		
■ RALLCG2-UKISOUTHGRIDBHAMHEP (26.57M; average = 28.65M)		
■ RALLCG2-UKISOUTHGRIDCAMHEP (189.00k; average = 21.47M)		
■ RALLCG2-UKISOUTHGRIDOXHEP (239.61k; average = 19.13M)		
■ RALLCG2-UKISOUTHGRIDRALPP (114.82k; average = 38.83M)		
■ SARAMATRIX-RALLCG2 (11.40M; average = 10.79M)		
■ TAIWANLCG2-RALLCG2 (11.37M; average = 6.21M)		
■ TRIUMFLCG2-RALLCG2 (3.23M; average = 13.26M)		
■ UKILT2QMUL-RALLCG2 (3.41M; average = 1.53M)		
■ UKILT2RHUL-RALLCG2 (1.80M; average = 1.73M)		
■ UKINORTHGRIDLANCSHEP-RALLCG2 (407.78k; average = 1.01M)		
■ UKINORTHGRIDLIVHEP-RALLCG2 (796.38k; average = 808.83k)		
■ UKINORTHGRIDMANHEP-RALLCG2 (652.31k; average = 940.36k)		
■ UKINORTHGRIDSHEFHHEP-RALLCG2 (1.65k; average = 561.15k)		
■ UKISCOTGRIDDURHAM-RALLCG2 (313.55k; average = 1.71M)		
■ UKISCOTGRIDECDF-RALLCG2 (1.31M; average = 1.27M)		
■ UKISCOTGRIDGLASGOW-RALLCG2 (4.03M; average = 2.72M)		
■ UKISOUTHGRIDCAMHEP-RALLCG2 (408.86k; average = 325.26k)		
□ UKISOUTHGRIDOXHEP-RALLCG2 (596.13k; average = 298.48k)		
□ UKISOUTHGRIDRALPP-RALLCG2 (164.44k; average = 321.52k)		

-LCG2 Tier-1 FTS Failed Transfers (RALLCG2 as source/destination)



■ BNLLCG2-RALLCG2 (0.02; average = 0.02)
■ FZKLCG2-RALLCG2 (0.04; average = 0.49)
■ IN2P3CC-RALLCG2 (0.31; average = 0.24)
■ INFNT1-RALLCG2 (0.05; average = 0.82)
■ NDGFT1-RALLCG2 (0.05; average = 0.02)
■ NIKHEFELPROD-RALLCG2 (0.00; average = 0.01)
■ PIC-RALLCG2 (0.02; average = 0.00)
■ RALLCG2-UKILT2QMUL (0.14; average = 1.23)
■ RALLCG2-UKILT2RHUL (0.06; average = 0.02)
■ RALLCG2-UKILT2UCLCENTRAL (0.09; average = 0.01)
■ RALLCG2-UKINORTHGRIDLANCSHEP (0.10; average = 0.01)
■ RALLCG2-UKINORTHGRIDLIVHEP (0.13; average = 0.07)
■ RALLCG2-UKINORTHGRIDMANHEP (0.03; average = 2.35)
■ RALLCG2-UKINORTHGRIDSHEFHHEP (0.03; average = 0.01)
■ RALLCG2-UKISCOTGRIDDURHAM (0.16; average = 0.01)
■ RALLCG2-UKISCOTGRIDECDF (0.02; average = 0.04)
■ RALLCG2-UKISCOTGRIDGLASGOW (0.45; average = 0.02)
■ RALLCG2-UKISOUTHGRIDBHAMHEP (0.11; average = 0.01)
■ RALLCG2-UKISOUTHGRIDCAMHEP (0.04; average = 0.11)
■ RALLCG2-UKISOUTHGRIDOXHEP (0.02; average = 0.02)
■ RALLCG2-UKISOUTHGRIDRALPP (14.63; average = 0.35)
■ TAIWANLCG2-RALLCG2 (0.02; average = 0.00)
■ TRIUMFLCG2-RALLCG2 (0.03; average = 0.00)
■ UKILT2QMUL-RALLCG2 (0.01; average = 0.27)
■ UKILT2RHUL-RALLCG2 (0.00; average = 0.09)
■ UKINORTHGRIDLANCSHEP-RALLCG2 (0.03; average = 0.00)
■ UKINORTHGRIDLIVHEP-RALLCG2 (0.06; average = 0.01)
■ UKINORTHGRIDMANHEP-RALLCG2 (0.17; average = 0.10)
■ UKINORTHGRIDSHEFHHEP-RALLCG2 (0.04; average = 0.01)
■ UKISCOTGRIDDURHAM-RALLCG2 (0.10; average = 0.04)
■ UKISCOTGRIDECDF-RALLCG2 (0.03; average = 0.01)
■ UKISCOTGRIDGLASGOW-RALLCG2 (0.02; average = 0.02)
■ UKISOUTHGRIDCAMHEP-RALLCG2 (0.10; average = 0.16)
□ UKISOUTHGRIDOXHEP-RALLCG2 (0.24; average = 0.00)
□ UKISOUTHGRIDRALPP-RALLCG2 (0.05; average = 0.00)

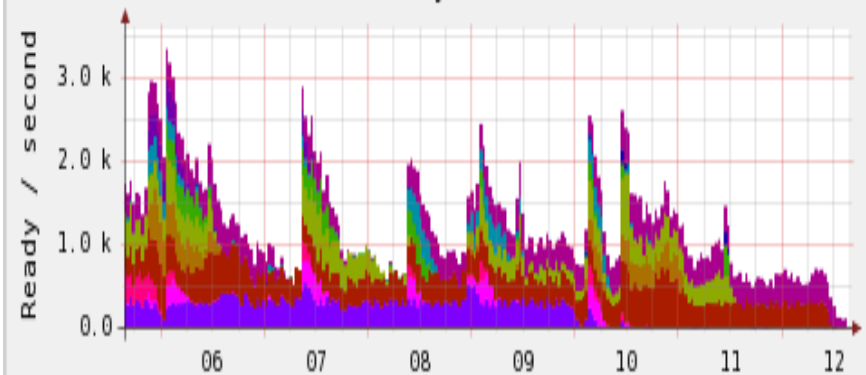
RAL-LCG2 Tier-1 FTS Bytes Transferred (RALLCG2 as source)



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- Total: 252.99M
- RALLCG2-UKILT2QMUL (166.81k; average = 39.07M)
  - RALLCG2-UKILT2RHUL (1.13M; average = 41.81M)
  - RALLCG2-UKILT2UCLCENTRAL (31.03M; average = 43.29M)
  - RALLCG2-UKINORTHGRIDLANCSHEP (2.77M; average = 52.64M)
  - RALLCG2-UKINORTHGRIDLIVHEP (835.32k; average = 36.15M)
  - RALLCG2-UKINORTHGRIDMANHEP (1.31M; average = 54.29M)
  - RALLCG2-UKINORTHGRIDSHEFHEP (59.14M; average = 53.50M)
  - RALLCG2-UKISCOTGRIDDURHAM (482.94k; average = 628.09k)
  - RALLCG2-UKISCOTGRIDECDF (851.76k; average = 538.06k)
  - RALLCG2-UKISCOTGRIDGLASGOW (700.41k; average = 61.51M)
  - RALLCG2-UKISOUTHGRIDBHAMHEP (26.57M; average = 28.65M)
  - RALLCG2-UKISOUTHGRIDCAMHEP (189.00k; average = 21.47M)
  - RALLCG2-UKISOUTHGRIDOXHEP (239.61k; average = 19.13M)
  - RALLCG2-UKISOUTHGRIDRALPP (114.82k; average = 38.83M)

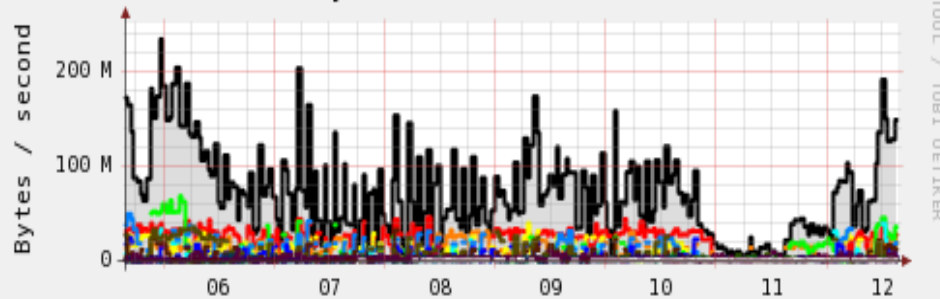
RAL-LCG2 Tier-1 FTS Ready Files (RALLCG2 as source)



RRD2TOOL / TOBI OETIKER

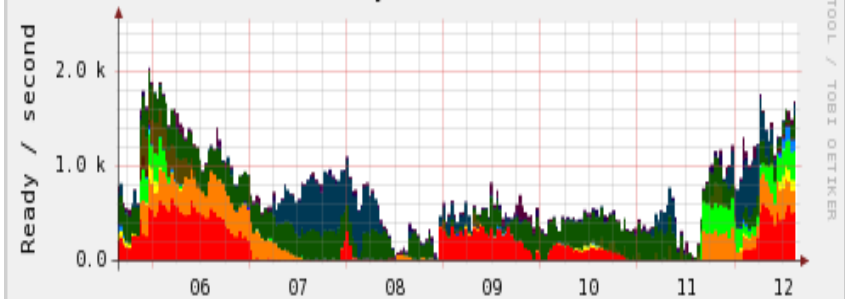
- RALLCG2-UKILT2QMUL (0.29; average = 260.03)
- RALLCG2-UKILT2RHUL (0.50; average = 82.97)
- RALLCG2-UKILT2UCLCENTRAL (0.17; average = 98.97)
- RALLCG2-UKINORTHGRIDLANCSHEP (39.39; average = 344.28)
- RALLCG2-UKINORTHGRIDLIVHEP (147.60; average = 171.59)
- RALLCG2-UKINORTHGRIDMANHEP (53.12; average = 251.62)
- RALLCG2-UKINORTHGRIDSHEFHEP (257.14; average = 145.14)
- RALLCG2-UKISCOTGRIDDURHAM (1.28; average = 0.48)
- RALLCG2-UKISCOTGRIDECDF (0.53; average = 0.09)
- RALLCG2-UKISCOTGRIDGLASGOW (1.34; average = 102.58)
- RALLCG2-UKISOUTHGRIDBHAMHEP (0.29; average = 12.81)
- RALLCG2-UKISOUTHGRIDCAMHEP (3.70; average = 17.22)
- RALLCG2-UKISOUTHGRIDOXHEP (1.55; average = 90.09)
- RALLCG2-UKISOUTHGRIDRALPP (93.91; average = 289.04)

RAL-LCG2 Tier-1 FTS Bytes Transferred (RALLCG2 as destination)

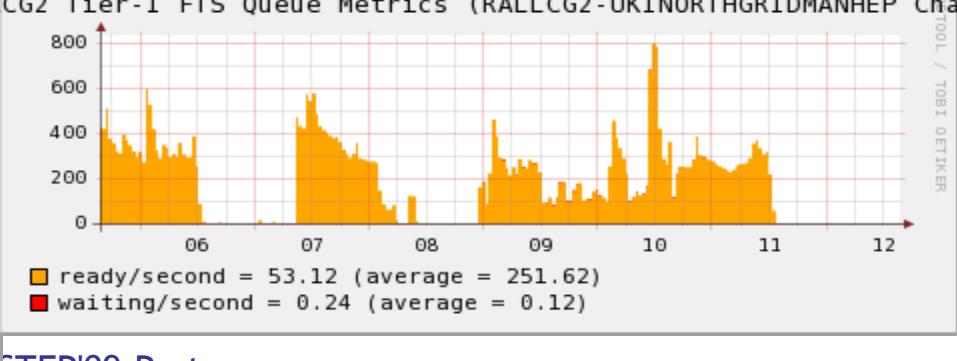
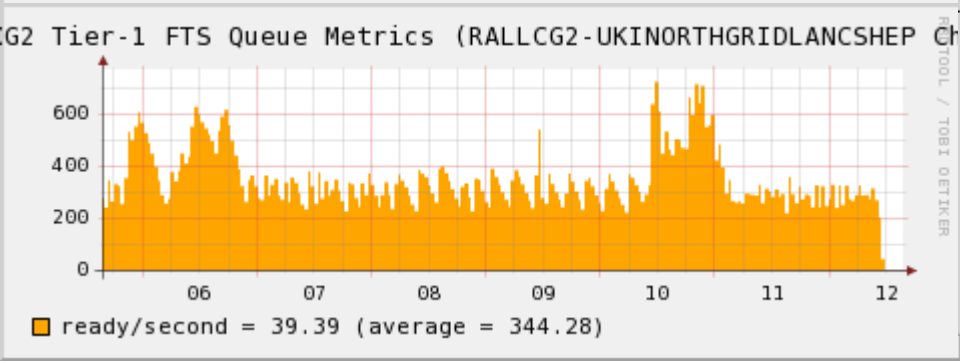
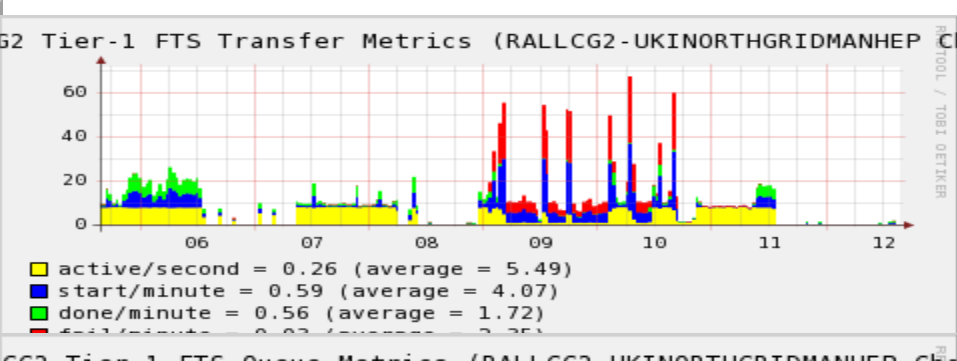
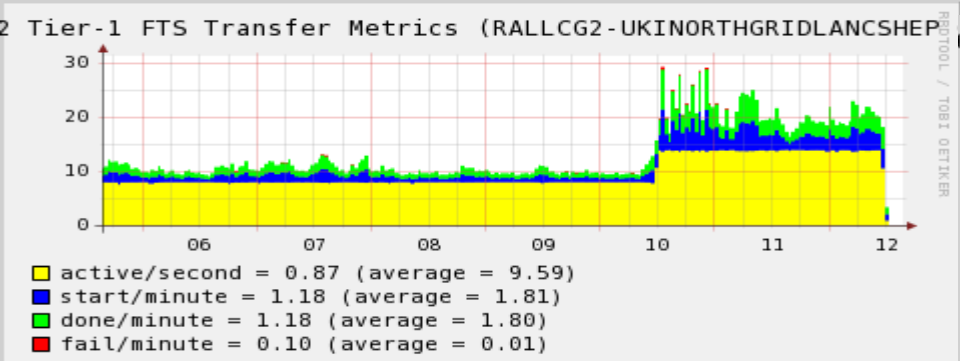
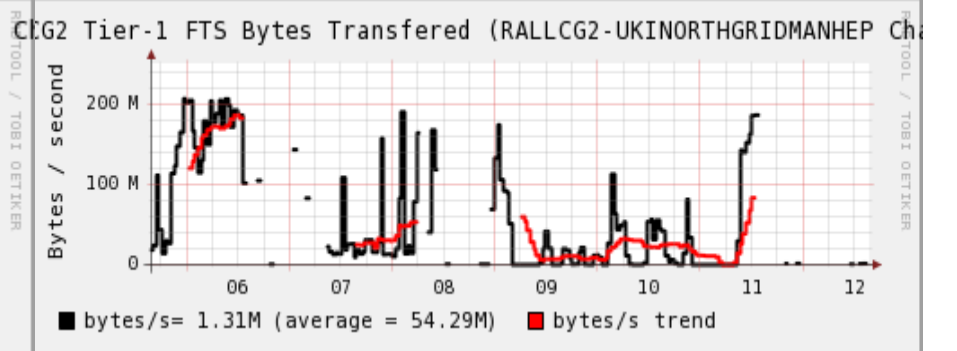
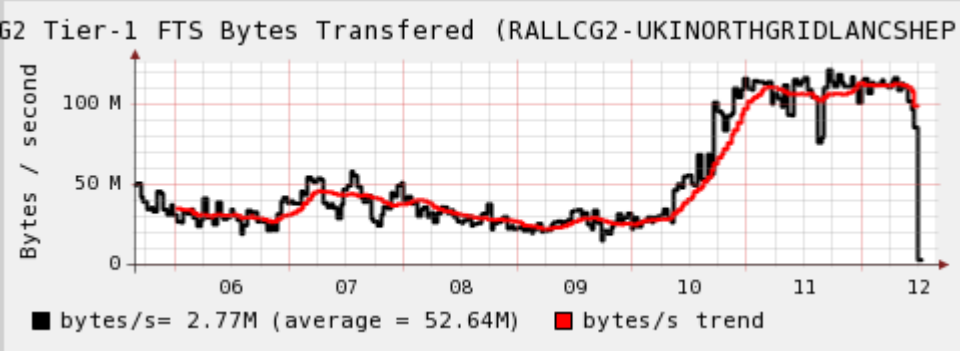


□ Total:	71.32M	■ BNLLCG2-RALLCG2 (26.21M; average = 24.78M)
■ FZKLCG2-RALLCG2	(17.30M; average = 11.67M)	
■ IN2P3CC-RALLCG2	(18.45M; average = 12.92M)	
■ INFNT1-RALLCG2	(34.02M; average = 18.76M)	
■ NDGFT1-RALLCG2	(20.28M; average = 9.79M)	
■ NIKHEFELPROD-RALLCG2	(17.90M; average = 16.12M)	
■ PIC-RALLCG2	(4.44M; average = 6.26M)	
■ SARAMATRIX-RALLCG2	(11.40M; average = 10.79M)	
■ TAIWANLCG2-RALLCG2	(11.37M; average = 6.21M)	
■ TRIUMFLCG2-RALLCG2	(3.23M; average = 13.26M)	
■ UKILT2QMUL-RALLCG2	(3.41M; average = 1.53M)	
■ UKILT2RHUL-RALLCG2	(1.80M; average = 1.73M)	
■ UKINORTHGRIDLANCSHEP-RALLCG2	(407.78k; average = 1.01M)	
■ UKINORTHGRIDLIVHEP-RALLCG2	(796.38k; average = 808.83k)	
■ UKINORTHGRIDMANHEP-RALLCG2	(652.31k; average = 940.36k)	
■ UKINORTHGRIDSHEFHEP-RALLCG2	(1.65k; average = 561.15k)	
■ UKISCOTGRIDDURHAM-RALLCG2	(313.55k; average = 1.71M)	
■ UKISCOTGRIDECDF-RALLCG2	(1.31M; average = 1.27M)	
■ UKISCOTGRIDGLASGOW-RALLCG2	(4.03M; average = 2.72M)	
■ UKISOUTHGRIDCAMHEP-RALLCG2	(408.86k; average = 325.26k)	
□ UKISOUTHGRIDOXHEP-RALLCG2	(596.13k; average = 298.48k)	
□ UKISOUTHGRIDRALPP-RALLCG2	(164.44k; average = 321.52k)	

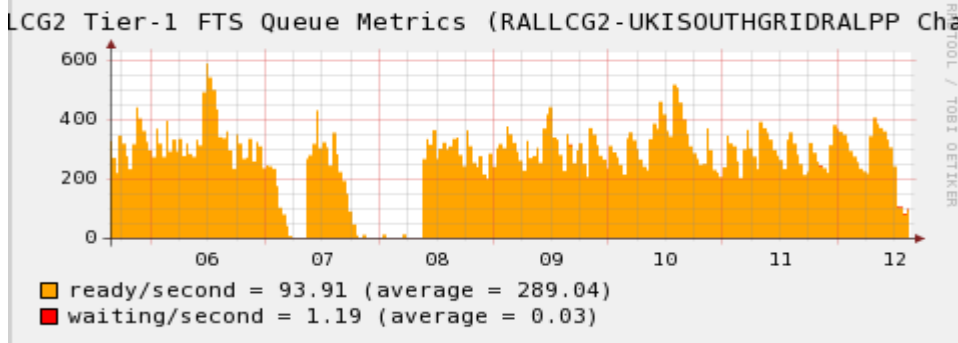
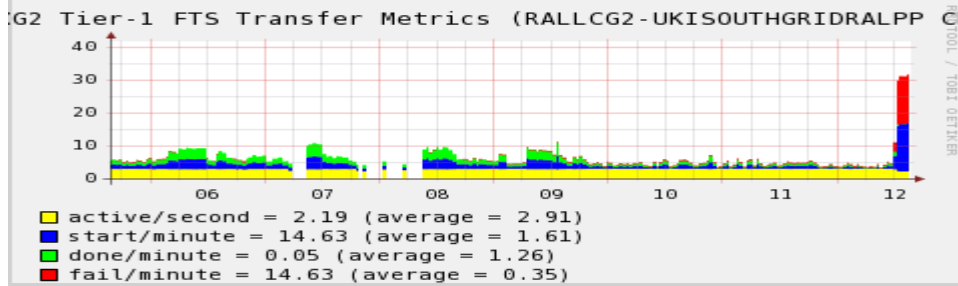
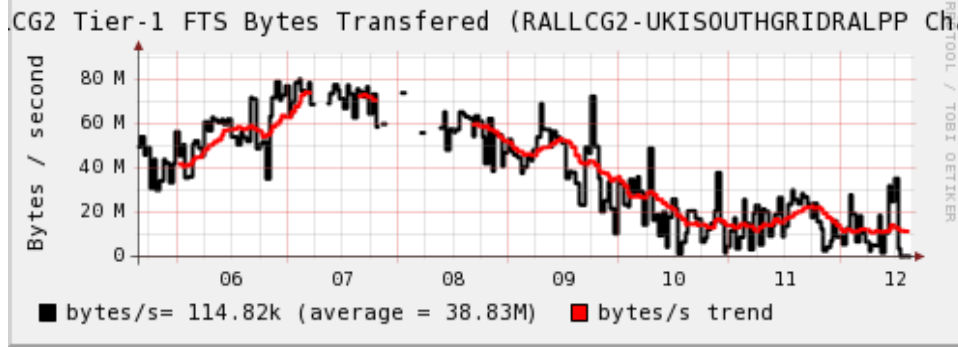
RAL-LCG2 Tier-1 FTS Ready Files (RALLCG2 as destination)



■ BNLLCG2-RALLCG2	(510.06; average = 213.44)
■ FZKLCG2-RALLCG2	(227.70; average = 132.76)
■ IN2P3CC-RALLCG2	(104.35; average = 16.22)
■ INFNT1-RALLCG2	(311.63; average = 120.69)
■ NDGFT1-RALLCG2	(13.74; average = 2.19)
■ NIKHEFELPROD-RALLCG2	(116.54; average = 11.59)
■ PIC-RALLCG2	(5.65; average = 2.54)
■ SARAMATRIX-RALLCG2	(1.15; average = 8.65)
■ TAIWANLCG2-RALLCG2	(14.36; average = 6.13)
■ TRIUMFLCG2-RALLCG2	(2.28; average = 56.69)
■ UKILT2QMUL-RALLCG2	(2.09; average = 35.76)
■ UKILT2RHUL-RALLCG2	(241.18; average = 222.87)
■ UKINORTHGRIDLANCSHEP-RALLCG2	(0.83; average = 4.17)
■ UKINORTHGRIDLIVHEP-RALLCG2	(0.54; average = 0.99)
■ UKINORTHGRIDMANHEP-RALLCG2	(121.16; average = 131.15)
■ UKINORTHGRIDSHEFHEP-RALLCG2	(5.45; average = 1.66)
■ UKISCOTGRIDDURHAM-RALLCG2	(0.24; average = 13.93)
■ UKISCOTGRIDECDF-RALLCG2	(2.19; average = 7.83)
■ UKISCOTGRIDGLASGOW-RALLCG2	(15.65; average = 20.15)
■ UKISOUTHGRIDCAMHEP-RALLCG2	(2.31; average = 1.07)
□ UKISOUTHGRIDOXHEP-RALLCG2	(1.98; average = 0.34)
□ UKISOUTHGRIDRALPP-RALLCG2	(0.76; average = 0.11)



- Joint ATLAS/CMS site



Lower FTS settings than other site but higher rate  
Slope unaccounted for  
FTS marker timeouts at the end.

## Un-sustained loading High rate

