



LDAS S1 Summary

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Using LDAS in E7

	Hanford LDAS	Livingston LDAS	MIT LDAS	CIT-TEST LDAS	TOTAL
Total Jobs	63600	48775	280	915	113570
Database Rows	4188188	2789132	1062	2096	6980478

- LDAS up entire run: Dec. 28th, 2001 - Jan. 14th, 2002
 - Approximately one job every 10 seconds (averaged).
 - Approximately five rows every second (averaged).
- Greater than 90% of jobs completed successfully
 - LHO roughly 92%; LLO roughly 95%; Not checked at CIT or MIT.



Using LDAS in S1 Run

Science Run I: 08/23/02 12:00:00 PDT - 09/10/02 12:00:00 PDT									
	LHO			LLO			MIT		
User Command	Submitted	Failed	%	Submitted	Failed	%	Submitted	Failed	%
createRDS	18538	187	1	18413	42	0.2	58974	64	0.1
dataPipelines	28744	1866	6.5	8095	1044	13	2031	634	31
inspiral	13706	873	6.4	2464	482	19	0	0	0
power	5417	106	2	2003	7	0.4	167	15	9
slope	4829	387	8	1885	354	19	215	22	10
tfcluster	4787	495	10	1739	197	11	560	27	4.8
stochastic	0	0	0	0	0	0	93	71	76
exttrig	0	0	0	0	0	0	715	468	65
cohere	0	0	0	0	0	0	244	9	3.7
wave	0	0	0	0	0	0	11	9	82
correlation	0	0	0	0	0	0	3	0	0
no dso	0	0	0	0	0	0	23	13	56
getMetaData	9030	23	0.3	4987	111	2.2	67	0	0
putMetaData	24202	12	0.1	9725	15	0.2	0	0	0
All Jobs	109253	3949	3.5	49311	2252	4.4	63103	1332	2.1

Database	LHO	LLO	MIT	Total
Rows Inserted	2864599	4442117	797	7307513
Rows Queried	18090	8453	94	26637

- Averaged approximately *one job every 5 seconds* (twice E7 rate)
- Averaged approximately *five rows inserted each second* (same as E7)
- Total failure rate roughly a third of that seen in E7
- 99% of failures due to usage, not software



Primary Failure Modes

- Raw Frames not available for user request
- Fatal errors in DSO search codes (LAL)
 - Segmentation faults
- Too many events being generate by DSOs
 - $\sim 10,000$ rows / job / IFO every 360 seconds!
 - Several jobs at LLO generated > 1 GB of output / job
- Syntax error in jobs commands
- Power outage at LLO



Details of Failures in S1

- **LHO:**
- LAL/LALwrapper search code segmentation faults: 924 jobs
- Requests for GPS times that data not collected by DAQ: 931 jobs
- Syntax mistakes in user commands: 35 jobs
- DB2 database server performance exceeded in user requests: 0 jobs
- **Other problems (LDAS specific): 4 jobs**
 - » Duplicate row Ids in DB2: 2 jobs
 - » Data socket transmission failures: 1 job
 - » XML data resource file not found: 3 jobs
- **TOTAL LDAS SPECIFIC: 6 job failures out of ~113,000 jobs!**
- **LLO:**
- LAL/LALwrapper search code segmentation faults: 445 jobs
- Requests for GPS times that data not collected: 529 jobs
- Syntax mistakes in user commands: 11 jobs
- DB2 database server performance exceeded in user requests: 104 jobs
- **Other problems (LDAS specific): 13 jobs**
 - » MPI schema permissions: 2
 - » Memory allocations: 8
 - » Duplicate row IDs in DB2: 1
 - » mpirun failure on Node 2: 1
- **TOTAL LDAS SPECIFIC: 12 job failures out of ~51,000 jobs!**



Lessons Learned in S1

- Improvements in LDAS reliability directly resulted from using MDC test scripts as part of LDAS software release verification cycle.
- Preparation of search codes (LAL) run under LDAS major failure mode
 - » Increased communications with LSC committees on the impact of not being prepared.
- Most problematic component in LDAS is database
 - » Implemented timeout in DB2 server to prevent stalling system
 - » Implemented concurrent database connection channels to prevent single channel blocking
 - » Upgraded to DB2 server to new version, providing 30% performance improvement