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LIGO S5 Reduced Data Set Generation
March 2007


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What are the RDS frames?

- RDS frames are subsets of the raw data, with some channels downsampled
- **Level 1 RDS** (/archive/frames/S5/L1; type == RDS_R_L1)
  - separate frames for LHO and LLO:
    - LHO: 131 H1 channels and 143 H2 channels
    - LLO: 181 L1 channels
- **Level 3 RDS** (/archive/frames/S5/L3; type == RDS_R_L3)
  - DARM_ERR, STATE_VECTOR, and SEGNUM; separate frames for LHO and LLO.
- **Level 4 RDS** (/archive/frames/S5/L4; type == [H1|H2|L1]_RDS_R_L1)
  - DARM_ERR downsampled by a factor 4, STATE_VECTOR, and SEGNUM; separate frame for H1, H2 and L1 data.

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LIGO Data Products

	Data Rate		Disk Space 1 Yr		Tape Archiving @ 186 GBs/tape; Dual Copy 1 Yr		Comp. Ratio	Look-back
LHO raw	9.063	MB/s	272	TBs	1800	tapes	1.7 on tape	~1 Month
LHO Level 1 RDS	1.391	MB/s	42	TBs	460	tapes	1.2 in files	~most S5*
LHO Level 3 RDS	0.117	MB/s	3.5	TBs	39	tapes	1.2 in files	all S5
LHO Level 4 RDS	0.029	MB/s	0.87	TBs	10	tapes	1.2 in files	all S5
LHO h(t)	0.266	MB/s	8.0	TBs	88	tapes	--	all S5
LHO SFTs	0.032	MB/s	0.96	TBs	11	tapes	--	all S5
LLO raw	4.406	MB/s	133	TBs	970	tapes	1.5 on tape	~2 Months
LLO Level 1 RDS	0.750	MB/s	23	TBs	249	tapes	1.2 in files	~most S5*
LLO Level 3 RDS	0.059	MB/s	1.8	TBs	20	tapes	1.2 in files	all S5
LLO Level 4 RDS	0.015	MB/s	0.45	TBs	5	tapes	1.2 in files	all S5
LLO h(t)	0.133	MB/s	4.0	TBs	44	tapes	--	all S5
LLO SFTs	0.016	MB/s	0.48	TBs	5	tapes	--	all S5
Totals:	16.3	MB/s	490	TBs	3701	tapes	as above	all at CIT!

* All of Level 1 RDS will not necessary fit on cluster node disks and/or inside the tape library at the sites. A copy of all data of all types is stored at the sites on tape, either in the tape library or off-line in tape cabinets.

Channel Lists

Level 1:
http://ldas.ligo-wa.caltech.edu/ldas_outgoing/createrds/dsorun/contrib/createrds/S5_L1/adcdecimate_H-RDS_R_L1-S5.txt
http://ldas.ligo-la.caltech.edu/ldas_outgoing/createrds/dsorun/contrib/createrds/S5_L1/adcdecimate_L-RDS_R_L1-S5.txt

Level 3:
http://ldas.ligo-wa.caltech.edu/ldas_outgoing/createrds/dsorun/contrib/createrds/S5_L3/adcdecimate_H-RDS_R_L3-S5.txt
http://ldas.ligo-la.caltech.edu/ldas_outgoing/createrds/dsorun/contrib/createrds/S5_L3/adcdecimate_L-RDS_R_L3-S5.txt

Level 4:
http://ldas.ligo-wa.caltech.edu/ldas_outgoing/createrds/dsorun/contrib/createrds/S5_H1_L4/adcdecimate_H-H1_RDS_R_L4-S5.txt
http://ldas.ligo-wa.caltech.edu/ldas_outgoing/createrds/dsorun/contrib/createrds/S5_H2_L4/adcdecimate_H-H2_RDS_R_L4-S5.txt
http://ldas.ligo-la.caltech.edu/ldas_outgoing/createrds/dsorun/contrib/createrds/S5_L4/adcdecimate_L-RDS_R_L4-S5.txt

```
Level 1:
L1:LSC-AS_Q                    1
L1:LSC-AS_I                    2
L1:LSC-POB_Q                   2
...
L1:LSC-DARM_CTRL               1
L1:LSC-DARM_ERR                1
...
L0:PEM-EY_BAYMIC               1
L0:PEM-EX_BAYMIC               1
...
```

```
Level 3:
H2:LSC-DARM_ERR                1
H2:IFO-SV_STATE_VECTOR         1
H2:IFO-SV_SEGNUM               1
H1:LSC-DARM_ERR                1
H1:IFO-SV_STATE_VECTOR         1
H1:IFO-SV_SEGNUM               1

Level 4:
H2:LSC-DARM_ERR                4
H2:IFO-SV_STATE_VECTOR         1
H2:IFO-SV_SEGNUM               1
```

Note that one fast channel for 1 yr of S5 data can take up ~ 2 TBs of disk space and cost ~ $2000 to archive.

LDAS LLO Alarm Monitor

Alarm Monitors -- click on box for detailed page	Recent comments/instructions
Name: Archive Monitor **Status Updated:** Wed Aug 16 17:28:12 CDT 2006	
Name: Tape Space **Status Updated:** Wed Aug 16 17:15:01 2006	
Name: createRDS Monitor **Status Updated:** Wed A	
Name: Publishing + Seg **Status Updated:** 16 Aug	

Status last checked on: **16 Aug 22:28:**
Contents update every 15 seconds

RDS Monitoring

Links: LHO_RDS_MONITOR CIT_RDS_MONITOR MIT_RDS_MONITOR LLO_LDAS_API_STATUS LLO_LDAS_JOB_SUMMARY LHO_DATA_ARCHIVING LLO_DATA_ARCHIVING LHO_PUBLISHING_MONITOR LLO_PUBLISHING_MONITOR TIME_LAG_TO_CIT

LLO RDS MONITOR

GPS TIME	UTC TIME	LOCAL TIME
839802598	Aug 16 2006 22:29:44 UTC	Aug 16 2006 17:29:44 CDT

This page last updated on Wed Aug 16 17:29:44 CDT 2006

Job Status (status lights are clickable)

Directory		Process Status	JobID	Submit Time	Time Interval	Job Status
S5_L1	Current	GOOD	LDAS-LA5380529	839802586	839802112-839802176	GOOD
	Previous		LDAS-LA5380522	839802276	839802112-839802175	
S5_L3	Current	GOOD	LDAS-LA5380527	839802328	839801856-839802112	GOOD
	Previous		LDAS-LA5380526	839802328	839801856-839802111	
S5_L4	Current	GOOD	LDAS-LA5380499	839801468	839799808-839800832	GOOD
	Previous		LDAS-LA5380494	839801467	839799808-839800831	

Click here to get directory listing; browse for adc*.txt file to get channel lists

RDS Changes During S5

1. On Nov 4, H1:LSC-POY_DC was changed to H1:LSC-POBS_DC

2. On Nov 8, H2:LSC-SPOB_MON was changed to H2:LSC-SPOB_I

3. On Nov. 14, 2005 these channel were added at LLO:
L1:IFO-SV_SEGNUM
L1:LSC-AS_Q_1FSR
L1:LSC-AS_Q_0FSR

4. On Dec. 13, 2005 these channels were added at LLO:

L1:LSC-ETMX_CAL_EXC_DAQ	4
L1:LSC-ETMY_CAL_EXC_DAQ	4

- Changes are discussed in Run, LDAS, CDS, and DASWG meetings, and with run coordinators, after requests by individuals.
- Should discuss ways to set up standard procedures.

5. On June 15, 2006 new raw data channels were added to Level 1 RDS:

L0:PEM-RADIO_ROOF at LLO

H0:PEM-RADIO_LVEA_H1 at LHO

6. On Feb. 23, 2006 increased the sample rate of LSC-DARM_CTRL_EXC_DAQ in the Level 1 RDS frames from 4096 Hz to the full rate of 16384 Hz.

Request for more changes to RDS channels?

- Channels not in the RDS frames are at CIT in the raw frames on tape; can access in parallel in a few parallel streams from tape, it would take a while to process data from raw frames.

- Do we want to add/remove channels to Level 1 RDS? (Must consider disk space within the lab and at the LSC sites; access time to the data on tape; cost of archiving.)

- Do we want to regenerate Level 1 RDS, and/or regenerate a Level 2 RDS data set? (Note new h(t) frames may also carry extra channels for regenerating calibrated data.)

- Can also consider generating custom RDS data sets at CIT.

- Email proposed changes to gmendell@ligo-wa.caltech.edu

Proposed change to RDS compression

A proposal to the LSC and S5 run coordinators to consider changing the compression of the RDS frames from gzip to zero_suppress_int_float has been made at a recent S5 run meeting.

I have not heard if this was discussed further during the last run meeting: the issue is whether to implement this during S5 or after S5.

Both of these compression methods are already in the C and C++ frame libraries, but the latter is not in the fast frame library used by dtt.
I have already run tests that show that zero_suppress_int_float would reduce the size of the Level 1 frames by 30% and speed up output (and probably input) by around 20%.

END

How are RDS frames generated?