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Data reduction for S3

I Leonor (UOregon), P Charlton (CIT), S Anderson (CIT), K Bayer (MIT), M Foster (PSU), S Grunewald (AEI), B Johnson (LHO), S Koranda (UWM), D Kozak (CIT), G Mendell (LHO), H Pulapaka (CIT), I Yakushin (LLO)

LSC Meeting, LIGO Hanford Observatory, Nov 9-13
Detector Characterization Session

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Tools: Data Reduction

- RDS is being made by submitting ***createRDS*** user commands to LDAS via ***createrdsGUI.tcl***, a graphical interface to LDAS ***createRDS*** (non-GUI version also available)
- LDAS can perform channel cuts, decimation and merging of LHO/LLO frame files. These operations are supported by the RDS scripts
- RDS scripts are designed to run 24/7 with minimal supervision, will continue to run through LDAS downtime
- Provides visual feedback of RDS progress, error states, web monitoring, email notices
- With current optimisation and hardware upgrades, performance at sites is sufficient to reduce data in better than real-time
- When necessary, scripts can run many *createRDS* threads in parallel for high-speed reduction
- S3 RDS scripts use 2 threads for L1 (>4x real-time @ LHO, >5x real-time @ LLO) and 1 thread for L2, L3 (>10x real-time)


Data Reduction Progress: Raw data Excluded RDS data New RDS data In progress Error
Seconds Of Data Reduced/Elapsed Wall Time: 5.3
Last Job Submission Response:
{1 Your job is running as: "BOX-I360462" you will be e-mailed at: "131.215.114.149:38925" when your job is completed, with information on how to retrieve your results. (box-i running LDAS version 0.9.2) }
Last Job Completion Response:
Subject: BOX-I360460 results Your results: H-RDS_R_L1-731499920-16.gwf H-RDS_R_L1-731499936-16.gwf H-RDS_R_L1-731499952-16.gwf H-RDS_R_L1-731499968-16.gwf H-RDS_R_L1-731499984-16.gwf can be found at: http://131.215.114.21/usr1/lcldsk/ldas_outgoing/frames/S2/LHO/rds/H-RDS_R_L1-7314 ========== ========== 'LDAS API' 'CLOCK TIME(seconds)' ========== Wait Time(que ue): 0.36 frameAPI: 3.80 diskcacheAPI: 0.68 managerAPI: 0.30 ----------
Job Monitor:
Started at : Thu Nov 6 16:12:40 2003
Current time : Thu Nov 6 16:12:51 2003
Elapsed time : 0h 0m 11s
IFO(s) : H
Number of jobs completed : 1
Number of failed jobs : 0
Time processed this run : 80 seconds
Grand total time processed : 3584 seconds
Next job will work on data starting : 731500512 (Mar 12 2003 10:34:59 UTC)
Job 1 of 2
Job ID : BOX-I360462
Job times : 731500256-731500511 (256 seconds)
Status : running
Runtime : 1 seconds
Job 2 of 2
Job ID : BOX-I360461
Job times : 731500000-731500255 (256 seconds)
Status : running
Runtime : 7 seconds
Settings
Channels
Refresh Diskcache
Log
Start
Stop
Exit
Abort
Help
Running (65.57% done)

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Tools: Data Propagation

- Lightweight Data Replicator (LDR), developed by Scott Koranda, is being used to propagate data from LHO/LLO to CIT and from CIT to Tier 2 centres (MIT, PSU, UWM, AEI)
- Helper applications (Pulapaka/Koranda/Johnson):
  - Script for moving data from framebuilder to LDAS tape archive
  - LDRLockedSegments.tcl - script which retrieves information about locked time segments for each IFO from LDAS
  - RDS-publish.py - script for verifying RDS files (FrCheck) and publishing meta-data to the LDR database
  - Local Storage Module - plugin to LDR which organises data into user-defined locations
- See Scott Koranda's talk for more details

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Tools: Monitoring

- RDS GUI visual alerts
- LDAS Search Summary Pages on the Web
  - LDAS CIT web page - http://ldas-cit.ligo.caltech.edu
  - createrds - HTML version of GUI visual alerts, logs
  - datamon - monitors how long it takes before reduced data from IFO sites is visible in LDAS at CIT, MIT
- Email alerts - sent to designated email addresses in case of errors eg.
  - LDAS job submission errors, job failures
  - RDS data generation rate falling behind
  - LDAS RDS data visibility falling behind

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Tools: Validation

- Prior to Mock Data Challenge:
  - Installed pre-release LDAS-0.8.0 at LHO, LLO, CIT
  - Installed updated LDR w/ new GLOBUS toolkit, LDR helper apps
  - Installed RDS GUI, web monitoring
- RDS MDC, Oct 6-17 2003
  - L1, L2, L3 RDS data generated at LHO, LLO
  - Tapes shipped to CIT
  - Data reduced at CIT starting 9 Oct
  - LDR began moving data from LHO Oct 10, but not “near real-time”
- E10 used as a re-run of the MDC with LDAS-0.8.0

MDC did not achieve all goals but many problems were solved!
Far fewer problems in E10, all resolved before S3

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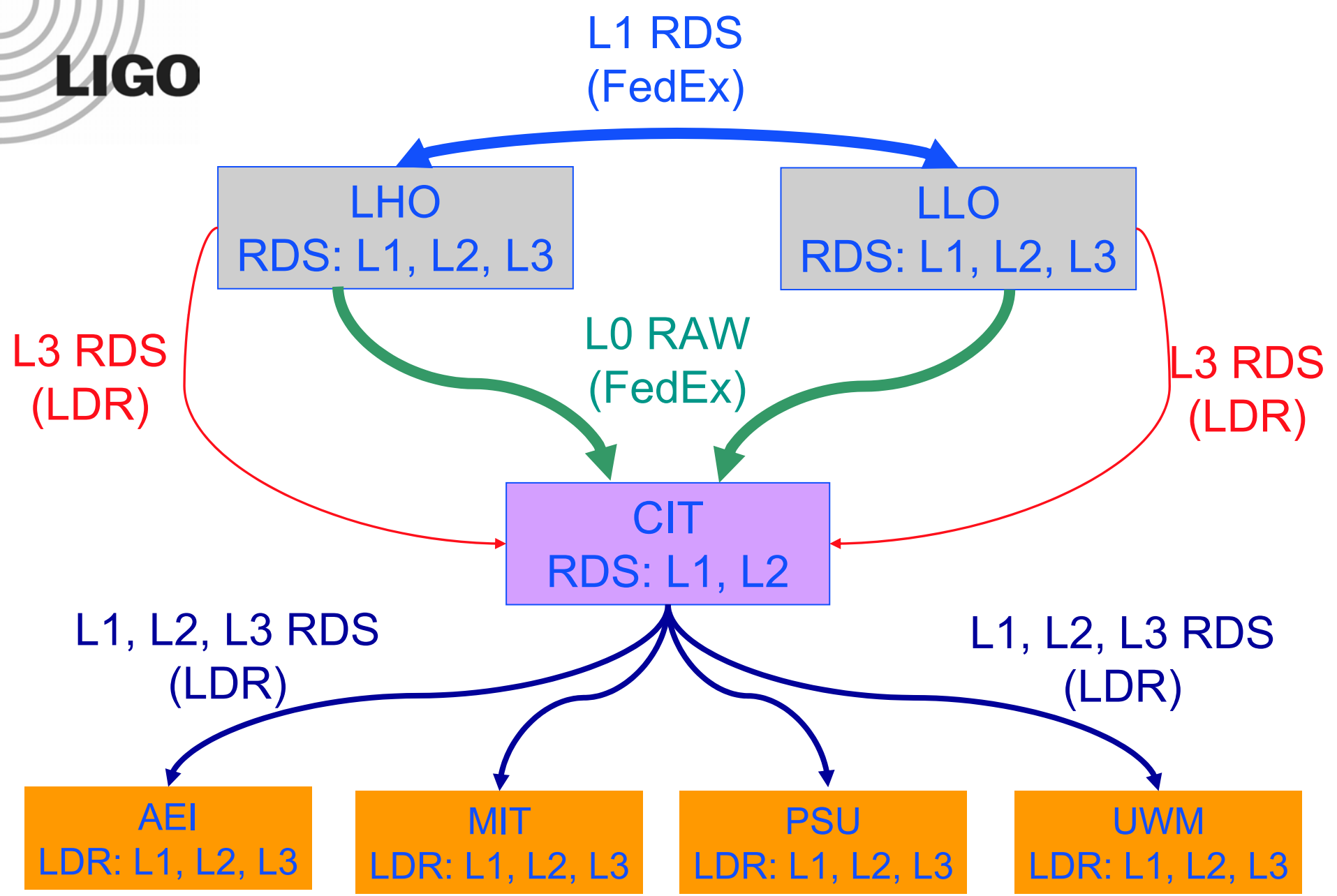
S3 Reduced Data Set

- Site-specific files (H and L), gzip compressed
- Level 0 – raw data, copied to LDAS tape archive at each site as it written by framebuilder
  - LHO: 9739 channels, 6.7 MB/s. LLO: 4435 channels, 2.9 MB/s
  - TOTAL: 14174 channels, 9.6 MB/s
- Level 1 – first level of reduction
  - LHO: 264 channels, ~0.9 MB/s. LLO: 139 channels, ~0.44 MB/s
  - TOTAL: 403 channels, 1.34 MB/s (~1/7 of L0)
- Level 2 – second level (requested by PULG)
  - AS_Q, DARM_CTRL, DARM_CTRL_EXC_DAQ, ETMX_EXC_DAQ, DARM_GAIN, ICMTRX_01, SV_STATE_VECTOR
  - LHO: 14 channels, 0.17 MB/s. LLO: 7 channels, 0.09 MB/s
  - TOTAL: 21 channels, 0.26 MB/s (~1/5 of L1)
- Level 3 – third level (AS_Q only)
  - LHO: H1 & H2 AS_Q, 0.11 MB/s. LLO: :L1 AS_Q, 0.06 MB/s
  - TOTAL: 3 channels, 0.17 MB/s (~2/3 of L2)


L1 RDS
(FedEx)
LHO
RDS: L1, L2, L3
LLO
RDS: L1, L2, L3
L3 RDS
(LDR)
L0 RAW
(FedEx)
L3 RDS
(LDR)
CIT
RDS: L1, L2
L1, L2, L3 RDS
(LDR)
L1, L2, L3 RDS
(LDR)
AEI
LDR: L1, L2, L3
MIT
LDR: L1, L2, L3
PSU
LDR: L1, L2, L3
UWM
LDR: L1, L2, L3

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S3 Data Reduction Rates

- Rate of RDS as a multiple of real-time
  - LHO: L1 - 4.8x, L2 - 18x, L3 - 23x
  - LLO: L1 - 6x, L2 - 11x, L3 - 13x
  - CIT: L1 - 3.5x, L2 - 23x
- Time between frame-file GPS time and reduction
  - LHO: L1 - 15 min, L2 - 30 min, L3 - 50 min
  - LLO: L1 - 5 min, L2 - 15 min, L3 - 35 min
- GridFTP Transfer rates
  - LHO->CIT 4 MB/s, LLO->CIT 0.1 MB/s
  - CIT->MIT 1 MB/s, CIT->UWM 4 MB/s
- Delay in L0->L1->L2->L3->CIT->MIT pipeline:

Total Level 3 RDS Delay to Tier 2: 2-3 hours