Oracle Databases of the Accelerator

This page describes the relational databases and related systems of the LCLS controls environment. These are presently exclusively ORACLE.

Date of last (real) update: 2009.

Attachments and External References

File	Modified
File Latest_Apex_400_Online_Model_From_SLACDEV.sql Online Model APEX application	Jan 30, 2009 by e grunhau
JPEG File schemas_and_apps.jpg Database data network data flows	Feb 11, 2009 by Greg White
JPEG File database overview.jpg Database schemas by network (simple view, distinguishing schema on dev and prod networks)	Feb 11, 2009 by Greg White
JPEG File database schemas and interfaces.jpg Database schemas by data interface (eg load script, JDBC etc)	Feb 11, 2009 by Greg White
Microsoft Word 97 Document database overview.doc Table of all controls "databases" current uses and plans	Feb 11, 2009 by Greg White
Microsoft Excel Sheet Controls Data Sizing.xls Data Sizing planning spreadsheet (draft for illustration)	Feb 11, 2009 by Greg White
PDF File lcls_elements_woodley_chgs.pdf Overall symbols and model database subschema	Apr 24, 2009 by G reg White
PDF File MADtoDBProcessFlow.pdf Process of creating a MAD symbols, creating an XAL beamline description, running it, and uploading the results. Full model creation system.	Apr 24, 2009 by G reg White
JPEG File ModelSubschema.jpg The Online model sub-subschema of the overall model subschema	Apr 24, 2009 by G reg White
JPEG File MainDatabasesOfLCLS.jpg Judy's overview diagram of all "databases" in use in LCLS	Apr 24, 2009 by G reg White
JPEG File DatabasePopulation.jpg Input XAL files and the tables to which they contribute data, for the LCLS online model	Apr 24, 2009 by G reg White
JPEG File RunningProbeModel.jpg Inputs and outputs of running (aka "Probing") an XAL model	Apr 24, 2009 by G reg White
JPEG File ModelMan.jpg Screen snapshot of Model GUI	Apr 24, 2009 by G reg White

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External References

Controls -> Database Infrastructure in sharepoint.
Model Database Conceptual Requirements and Design in sharepoint

Current Database Applications and Schema

Control System Application	Critical to ops	Description	Input /Load	UI /Output	Dependencies	Users	Accelerator	Responsible person	Schema@Instance	

LCLS Infrastructure		Multi-function database of LCLS devices and related data:
		• modelling deck
		• devices
		• polynomials
		• cabling data
		• laser device parameters
		• inventory, links to QA documents and drawings
		• web interface for IRMIS and Aida devices_and_attributes lists
			• APEX applications
			  ◦ excel spreadsheet upload
			  ◦ sql update (SQL Developer)
			  ◦ insert/update esaps
			• IRMIS devices_and_attributes list view
				• APEX query apps (for devices, etc.) with Excel spreadsheet export
				• Modelling app (Affects AIDA tables in schemas AIDADEV and AIDAPROD)
					AIDA Tables
					SID Tables
					DRAW Tables
					Database Links
					Firewall Rules
						Engineers
						CAD Designers
						Installation Physicists
						
						High Level Applicatons Operators
							LCLS	Andrea Chan, Elie Grunhaus	LCLS_INFRASTRUCTURE@SLACPROD
									
									LCLS_INFRASTRUCTURE@SLACDEV

CAPTAR		Racks, crates, cabling database	• Excel spreadsheet for initial upload • Data administrator uses Oracle Forms	web: cgi, asp, html		Engineers	LCLS PEPII NLCTA	Andrea Chan, Elie Grunhaus	CAPTAR@SLACPROD
CATER		Problem reporting and management application	APEX	APEX		Engineers Physicists Operators	LCLS PEPII NLCTA	Andrea Chan, et al	MCC_MAINT@SLACPROD
AIDA	x	"Accelerator Integrated Data Access" accelerator data interactions (get, put, control operations)	shell and perl scripts/cron jobs run daily, and after DBINSTALL	• matlab, bigtime • java applications (e.g. SCORE) • web: jsp • command line interface • all	Firewall Rules	Engineers Physicists	LCLS PEPII NLCTA	Greg White, Bob Hall	AIDAPROD@SLACPROD AIDADEV@SLACPROD

IRMIS	x	EPICS database configuration data: • list of IOCs • IOC configuration data • list of PVs and configured fields • list of PVs by PV client	perl crawler scripts/cron jobs run daily	• java • web: jsp (now in development) • APEX query page (from LCLS Infrastructure app) • ad hoc queries (TOAD) • AIDA query scripts • pvlist query script • LCLS Infrastructure queries	Firewall Rules	AIDA pvlist Operators Engineers	LCLS PEPII NLCTA	Judy Rock	IRMISDB@SLACPROD IRMISDB@SLACDEV
e-log: • ELOG_OWNER • ELOG_READER • ELOG_WRITER • PVLOGGER	x	logging for accelerator operations	• web: php • tcl/tk application • unix watchdog • control system applications	• web: php • tcl/tk application		Operations Engineers Physicists	LCLS PEPII NLCTA	Bob Hall	ELOG_OWNER@MCCO ELOG_READER@MCCO ELOG_WRITER@MCCO PVLOGGER@SLACDEV
SCORE	x	save/restore ("configs") for accelerator operation setpoints and readbacks	• SCORE java application • APEX application: • excel spreadsheet upload	• SCORE java application • APEX query application • shell scripts for deleting data		Operations Engineers Physicists	LCLS	Debbie Rogind (UI), Elie Grunhaus, Judy Rock (DB)	SCORE@MCCO SCORE@SLACDEV
History Buffers wildcard PV select feature: pvlist table**	x	displays SLC history for selected signals. Signal selection can be done using wildcard characters in names, which are matched in the Oracle DB.	pv list load is ultimately from the IRMIS database	SCP		Operators Physicists	NLCTA	Terri Lahey (DB), Judy Rock (load jobs)	DEMODB VMS
Button macro database	x	stores SCP button macros	SCP	SCP		Operators Physicists	PEPII NLCTA LCLS	Terri Lahey	MCCDB
pvlists databases owned by Oracle users • nlcdev • nlcprod • pvudb • cd *these could probably be eliminated, with some work*	x	Databases of PV names assembled from IRMIS and PEPII-specific ascii file sources: • nlcprod.pmu_list is used for the Artemis pmu selection lists. • pvudb.pvu_rec contains PV names used as for AIDA batch load.	load scripts	• AIDA update scripts • Remedy snapshot for Artemis		AIDA scripts	PEPII NLCTA LCLS	Judy Rock	NLCDEV@SLACPROD NLCPROD@SLACPROD PVUDB@SLACPROD CD@SLACPROD NLCDEV@SLACDEV NLCPROD@SLACDEV PVUDB@SLACDEV CD@SLACDEV
BPM Orbit Display	x	BPM Orbit Display	Java application	Java application		Operators Engineers Physicists	LCLS	Mike Zelazny	MACHINE_MODEL@SLACPROD

Model DB	x	MAD and Online model data ERD	Java application	Java application	LcLs Tables AIDA Tables Database Links Firewall Rules	Operators Engineers Physicists	LCLS	Paul Chu	MACHINE_MODEL@ SLACPROD

Future plans

Timeframe	Application	footnote (below)	Uses Model data	Descr.	Input /Load	UI /Output	Users	Accelerator	Responsible person	Instance
Longer Term	Save/restore phase II			implement phase II, with features as listed in the Save /Restore specs doc	*see above - existing app*	*see above - existing app*	*see above - existing app*	*see above - existing app*	Debbie Rogind, Greg White	see above - existing app
?	Message Log (Ron MacKenzie)	1			Applications: • channel watcher • IOCs • alarm handler • SCP messages • java programs (using ERR)	APEX application jcmlog UI	Operations Engineers Multiple applications	LCLS PEPII NLCTA	?	MCCO
Short/Long Term	LCLS Infrastructure			Enhance for XAL	*see above - existing app, and additional apps below*	*see above - existing app, and additional apps below*	*see above - existing app, and additional apps below*	*see above - existing app, and additional apps below*	Andrea Chan, Elie Grunhaus	*see above - existing app, and additional apps below*
Shortterm	CAPTAR								Andrea Chan, Elie Grunhaus	
Feb, 2008 there are 2 more stages	MPS			"... a relational database for MPS so that both generation of code and queries can be derived from this master list."	APEX App	APEX App	Engineers	LCLS	Stephen Norum, Andrea Chan, Elie Grunhaus	SLACPROD SLACDEV
Shortterm	Modelling			1. Model beamline and section definitions. An accelerator "section" is a part of the machine like the "injector spectrometer excursion" and is delineated by two so called "marker" points. (DGRP and beamline) 2. Model twiss and Rmat. The results of model runs, for at least the extant and design machine, will be put into the database. A model db access API must be developed. (done)	?	Model DB Access API	Physicists	LCLS	Paul	MCCO
Longterm	Emittance			see * below • M&A: For instance which wires are in included in an emittance setup • Configs: Canned M&A setups. • Results: Emittance calculation results	?	?	Physicists	LCLS	Debbie Rogind	MCCO
Longterm	Profile Monitor			• M&A: PVs used. sigma matrix, monitor screen coords and offsets etc • Configs: Canned M&A setups. • Results: profile images, fitting constants and fit results	?	?	Physicists Engineers Operations	LCLS	Mike Zelazny, Sergei Chevtsov	MCCO

Longterm	Wire Scans			• M&A: normalization coeffs. PVs used. Z of wire. X,Y w.r.t BPM. Rate limit for wires. • Configs: Canned M&A setups. • Results: Calculated params (skew, ellipsoid axes), angular divergence etc.	?	?	Physicists Engineers Operations	LCLS	Sheng Peng	MCCO
Longterm	Orbit Correction			• Configs: Canned "power steering" setups. • M&A: bpm weights, offsets, whether each bpm /corrector should be in the fit minimization. • Results: Probably no need to store results.	?	?	Physicists Engineers Operations	LCLS	HLA group	MCCO
Longterm	Orbit Applications			• Configs: "Display groups" (should this be different to sections)? • M&A: Bpm offsets and corrections. Things that on SLC we would have called "STAT" bits (is there anything that its sensible to put in here as opposed to EPICS?) • Results: Orbit fitting coefficients?	?	?	Physicists Engineers Operations	LCLS	HLA group	MCCO
unlikely - holdover from VMS system	*BPM Sampler*			*Do we want a similar facility for LCLS. Is this a generalization of PV Logger?*	*?*	*?*	*Physicists Engineers Operations*	*LCLS*	*HLA group*	*MCCO*
Longterm	LEM			• Config: LEM Group Definitions (set of model sections) • M&A: LEM options, model section used. For each section; beam-code, z range • Results: energy fudge factors. • **will use the SCORE schema**	?	?	Physicists Engineers Operations	LCLS	HLA group	MCCO
Longterm	Multiknobs and bumps			• Configs: For each multiknob; "gain" coefficient, "turns" etc. • Devices in the multiknob • M&A: None • Results: none	?	?	Physicists Engineers Operations	LCLS	HLA group	MCCO
Longterm	Feedback			• feedback name • feedback rate • matrices: 2 per feedback (these are variable size arrays by the way) • matrix function name: 2 per feedback • some other scalar parameters, depending on the matrix calculation used by the feedback • feedback algorithm name: per feedback • Several lists of PV Names per feedback, grouped into Actuators, Measurements, States, StateSetpoints, Check PVs, Storage PVs, Control PVs • weighting values per measurement device per feedback • reference orbit, per feedback	?	?	Physicists Engineers Operations	LCLS	Diane Fairley	MCCO
May be shortterm	Start to End simulation	1		Predict FEL power	?	?	Physicists Engineers Operations	LCLS	HLA group	MCCO
Longterm	Button macro functions as saved scripts				?	?	Operations	LCLS	HLA group	MCCO

Longterm	Correlation Plots				java	java	Operations Engineers Physicists	LCLS	HLA Group	MCCO
Longterm	Matching				java	java	Operations Engineers Physicists	LCLS	HLA Group	MCCO
Longterm	Photon Applications			Applications to support the photon beam and its interaction with the electron beam	?	?	Operations Engineers Physicists	LCLS	?	?
Longterm	Electron system data to be shared with the photon system			Shared data (and api's?)	?	?	Operations Engineers Physicists	LCLS	?	?

Footnotes:

1. Predicted to produce large amounts of data.

Elements of HLA applications listed above:

- M&A = "Measurement", "Analysis" (M&A)
- "Configs" = stored sets of M&A setups, that can be configured and recalled interactively.
- Results

Issues to address:

- Need some mechanism for flagging large changes in production data that can affect (or break) existing applications.

Database Instance Hosts and Locations

Instance	Host	Location
SLACDEV	slac-oracle02	SCCS
SLACPROD	slac-oracle03	SCCS
MCCO	mccora2	MCC
MCCDB	mcc	MCC
DEMODB	mccdev	MCC
ORAP	?	SCCS