Large Scale Access Tests and Online Interfaces to ATLAS Conditions Databases

A Toroidal LHC ApparatuS (ATLAS/CERN)

A. Amorim, L. Lopes, P. Pereira, J.Simões, (SIM and FCUL, University of Lisbon)
I. Soloviev (*Petersburg PNPI*)
Doris Burckhart CERN
J. G. V. Der Schmitt (MPI Phy, Garching)
M. Caprini (*IFIN/HH Bucharest*)
S. Kolos (*U. Cal., Irvine (UCI)*)

ATLAS T/DAQ ⟺ Offline Databases

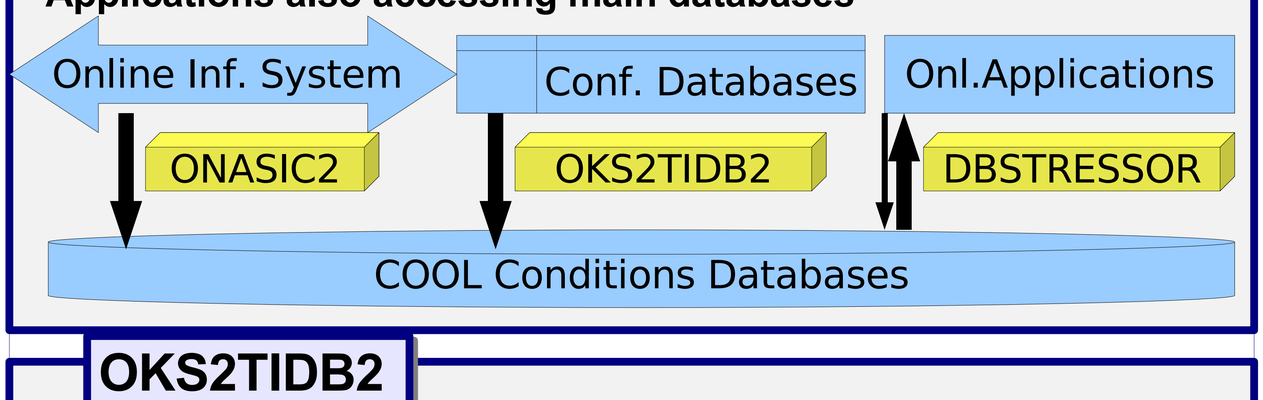
ATLAS Offline and prompt reconstruction:
- **unique ATHENA** framework: transient classes + Conversion Services
- databases:
  Conditions; Detector description, online control, monitoring data, etc.
  COOL and **CORAL** as defaults.

Object definition in ATHENA

ATLAS online DAQ and Trigger processing:
- O(1000) nodes under a common state machine.
- Cope with:
  - Very fast LVL 1 and LVL2
  - Rather complete and complex Event Filter
- **Online communication and control services**
- **Online Configuration databases**
- **Run control state machine**
- **Applications also accessing main databases**

Information Services, etc

Data loaded in configure state

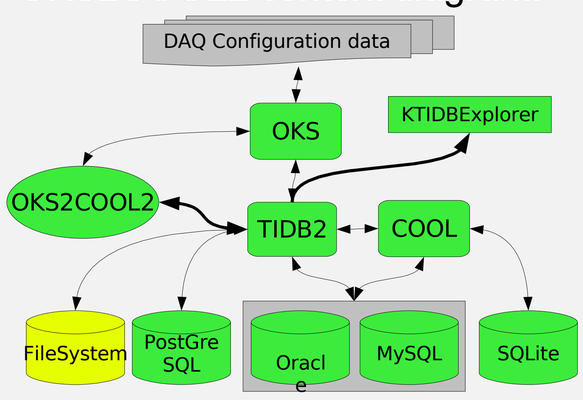


OKS2TIDB2

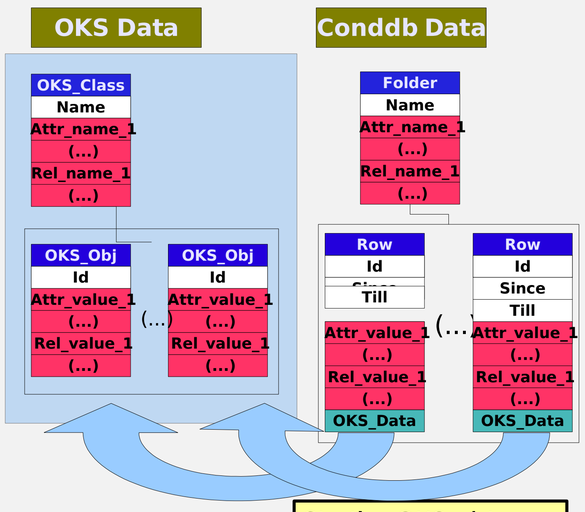
•Interface to store Configurations databases (OKS) into Conddb each time TDAQ configuration changes – usually at booted.
•(with OKS2CORAL) form the interfaces to store TDAQ setups with time of validity and persist data to be browsed in future.

Main features:
- Uses a simple API to load OKS objects into COOL (TIDB2OKSPlugin)
- It's core module for ONASIC2
- Uses **TIDB2 (Temporal Instrumentation Database 2)**
- Handles schema changes- **storing the oks binnary object**

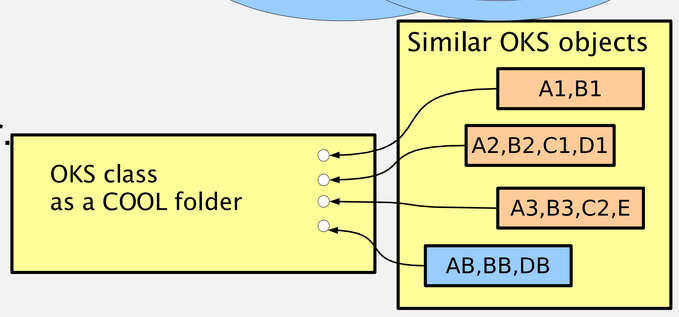
OKS2COOL2 context diagram:



OKS2COOL Data Mapping:



- Schema can change any time due to the embedded object in DB
- Keeps historical evolution easy to track, because data with different schema can be stored on the same folder.
- Only relevant attributes can be showed, later we can change our mind and show more attributes.
- OKS2COOL2 stores all info to be bidirectional.



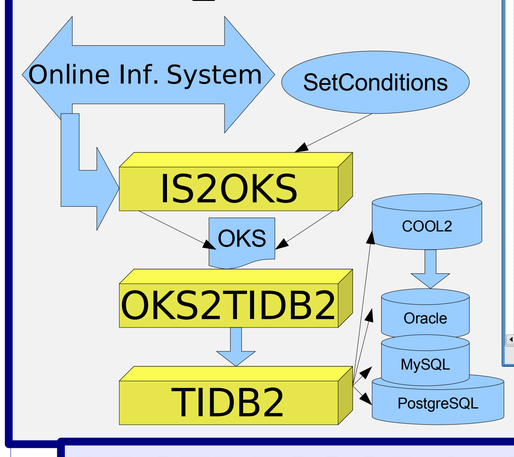
/nightly_oks2cool2 /Variable::TABLE

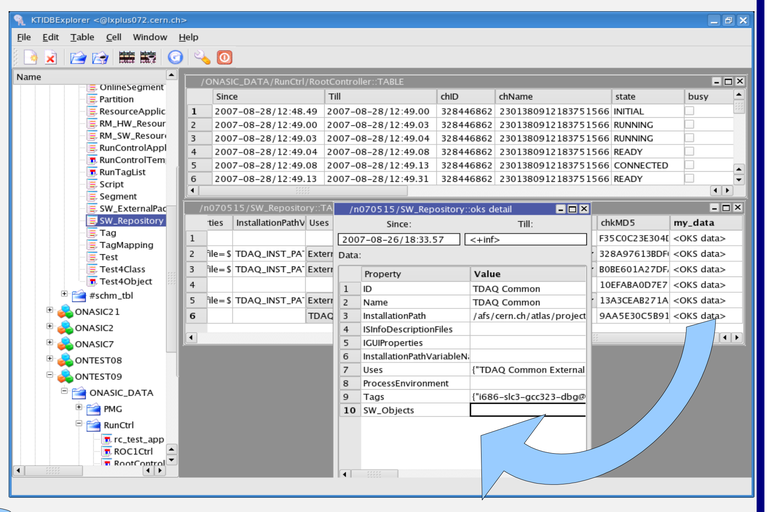
	Since	Till	chID	ID	Description	Name	Value	Ta	my_data
1	2007-03-24/19:40	<+inf>	84412011	AM_DB_HOST	Host where MyS	AM_DB_HOST	pcatd84		<OKS data>
2	2007-03-24/19:40	<+inf>	892255073	BOOST_HOME		BOOST_HOME	${LCG_PATH}/e:		<OKS data>
3	2007-03-24/19:40	<+inf>	4198560692	BOOST_VERSION		BOOST_VERSION	1.33.1		<OKS data>
4	2007-03-24/19:40	<+inf>	2308748442	COOL_HOME		COOL_HOME	${LCG_PATH}/a		<OKS data>
5	2007-03-24/19:40	<+inf>	2533548979	COOL_VERSION		COOL_VERSION	${COOL_config_		<OKS data>
6	2007-03-24/19:40	<+inf>	4058327067	CORAL_AUTH_P		CORAL_AUTH_P	/afs/cern.ch/atl		<OKS data>
7	2007-03-24/19:40	<+inf>	2662182075	CORAL_HOME		CORAL_HOME	${LCG_PATH}/a		<OKS data>
8	2007-03-24/19:40	<+inf>	2354715812	CORAL_VERSION		CORAL_VERSION	${CORAL_config		<OKS data>
9	2007-03-24/19:40	<+inf>	426543317	DAL_USE_PATH	When defined, tl	DAL_USE_PATH	1		<OKS data>
10	2007-03-24/19:40	<+inf>	1266039523	DEF_DB_NAME	Tells all applicat	TDAQ_DB_NAM	RDB		<OKS data>
11	2007-03-24/19:40	<+inf>	1141170346	DEF_DEBUG_STR	Destination and	TDAQ_ERS_DEB	lstdout		<OKS data>
12	2007-03-24/19:40	<+inf>	3844131946	DEF_ERROR_STR	Destination and	TDAQ_ERS_ERR	lstderr,mrs		<OKS data>
13	2007-03-24/19:40	<+inf>	2564358594	DEF_ERS_DEBUG	Debug level abc	TDAQ_ERS_DEB	0		<OKS data>
14	2007-03-24/19:40	<+inf>	2774812650	DEF_ERS_SIGNA	Install/deinstall t	TDAQ_ERS_NO_	1		<OKS data>
15	2007-03-24/19:40	<+inf>	841242404	DEF_FATAL_STR	Destination and	TDAQ_ERS_FAT	lstderr,mrs		<OKS data>
16	2007-03-24/19:40	<+inf>	1619881031	DEF_INFO_STRE	Destination and	TDAQ_ERS_INFO	lstdout,mrs		<OKS data>

ONASIC2 - Online Asynchronous Interface to COOL

Specifications:
- IS ➡ (OKS object files as temporary buffer) ➡ COOL
- **Avoiding back pressure** from database servers
- Steered trough **SetCondition** tool - configure ONASIC on-the-fly
- Full **IS object** also stored as an **extended object**
  - Easy schema evolution and of IS Infos and full data storage
- Flexible configuration
  - Enhancing ONASIC integration with **Monitoring WG**.

Architecture:
- **ONASIC_IS2OKS +**
- **ONASIC_OKS2COOL**





DBSTRESSOR / LST07 tests

•Set of tools to test CondDB access in a wide networking scale.
•DBStressor: *OnlineController* accessing DB at *ConfigureAction.*
•Uses IS both to rapidly *configure all controllers* and also to collect all individual results. It includes a versatile *tool to populate the db*.

Tests during LST07:

· Measure Oracle/COOL & LXSHARE Network Bandwidth
· Test Capability of Indexing of Oracle/COOL
· Measure Times to build Tables in COOL
· Test Performance of COOL's queries by ChannelID
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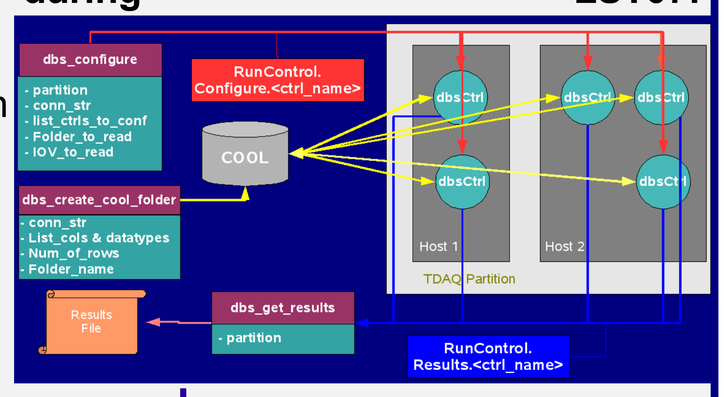
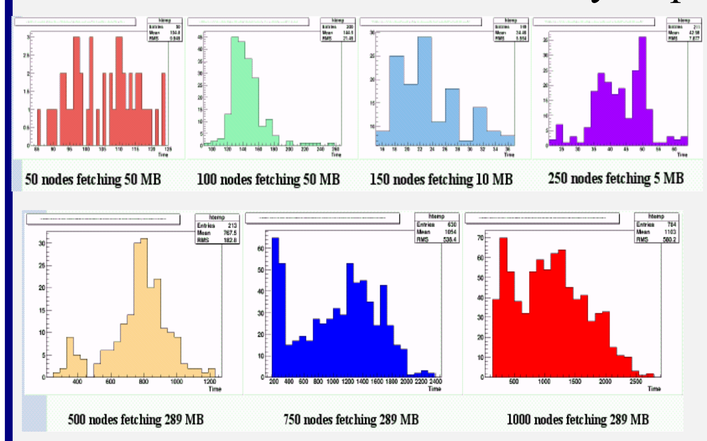
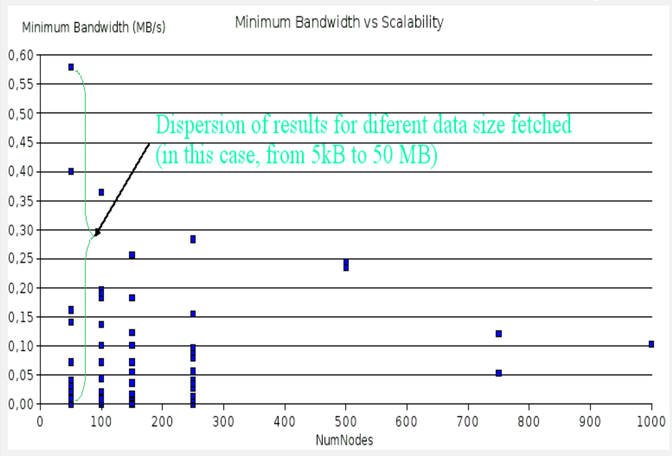


Overall results for each scalability step:

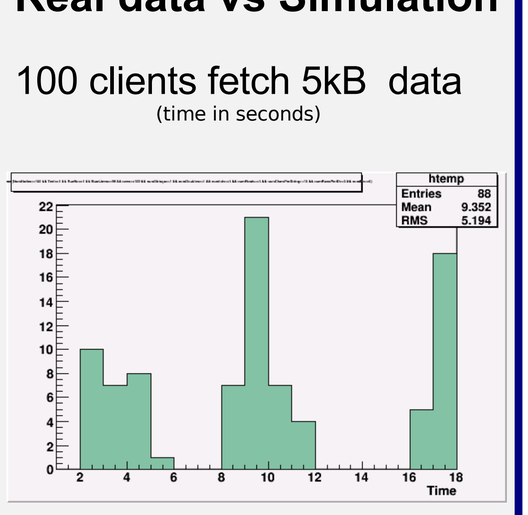


CondDB Bandwidth vs Scalability:

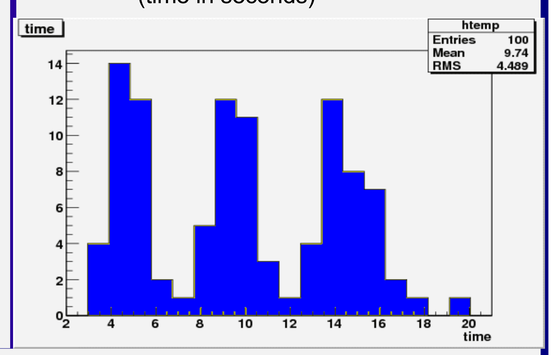


Real data vs Simulation

100 clients fetch 5kB data
(time in seconds)



Simul. 32 threads 5(±15%)s
(time in seconds)



António Amorim (SIM, FCUL – University of Lisbon, Lisbon, Portugal) – Antonio.Amorim@sim.fc.ul.pt