

# ATLAS DB Client Library and Relation to 3D



## LCG 3D Meeting

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## Exercising Computing Model

Two major ATLAS activities in 2004

- Combined Test Beam (priority)
  - Five presentations at CHEP'04
- Data Challenge 2 (DC2)
  - Four presentations at CHEP'04
- Valuable lessons learned on data flow for database-resident data
- A new set of requirements for remote database access was collected in DC2 operations



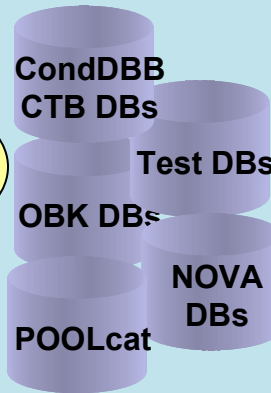


# ATLAS Combined Test Beam

Data acquisition programs



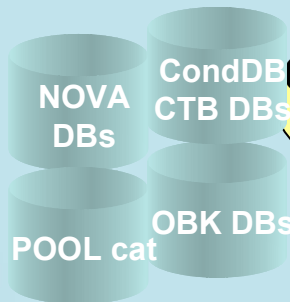
Online server  
(atlobk01)



DB replication



Offline server  
(atlobk02)



Browsing applications,  
Athena programs  
(Other Browsing applications)

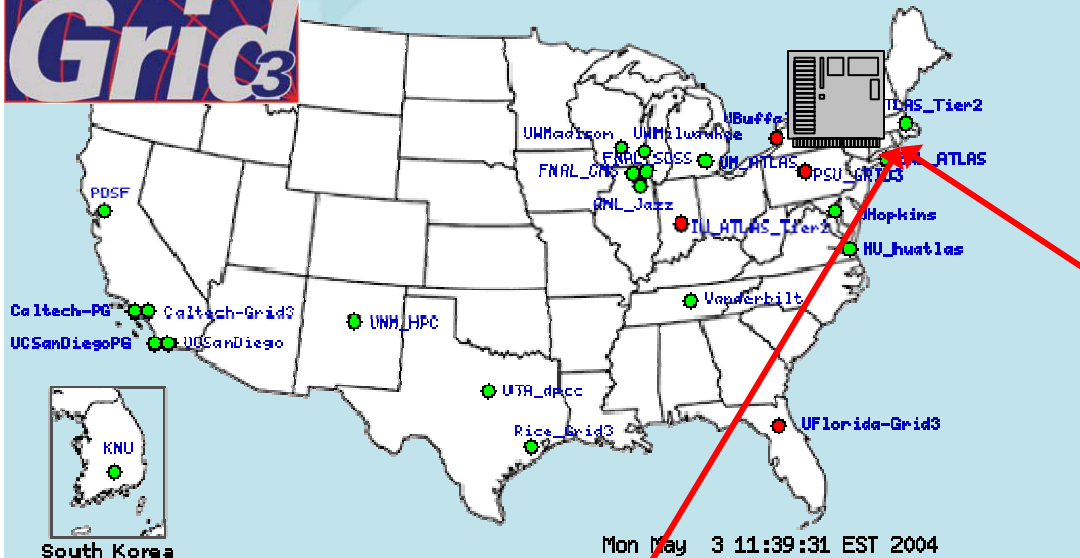


- Lisbon ConditionsDB implementation works well
- Now part of POOL

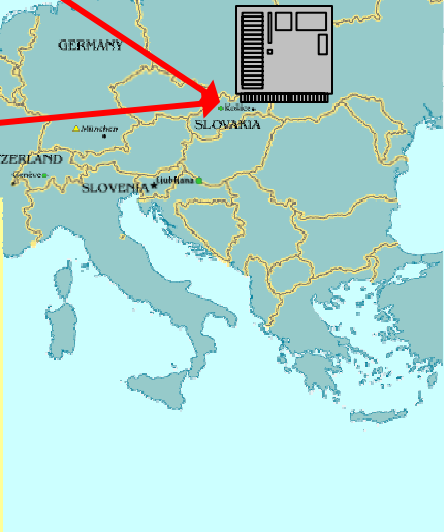
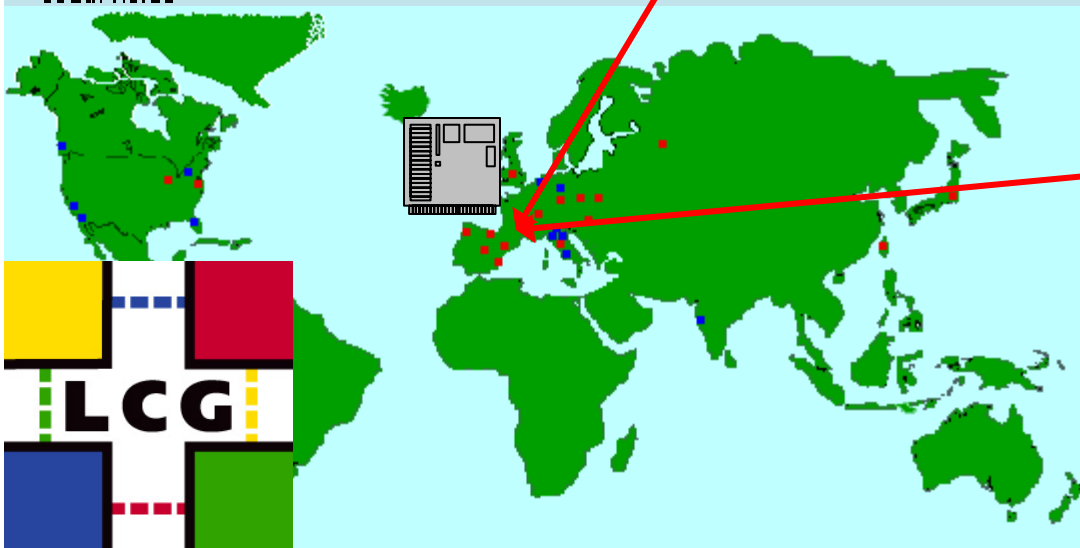




# Database Deployment for DC2



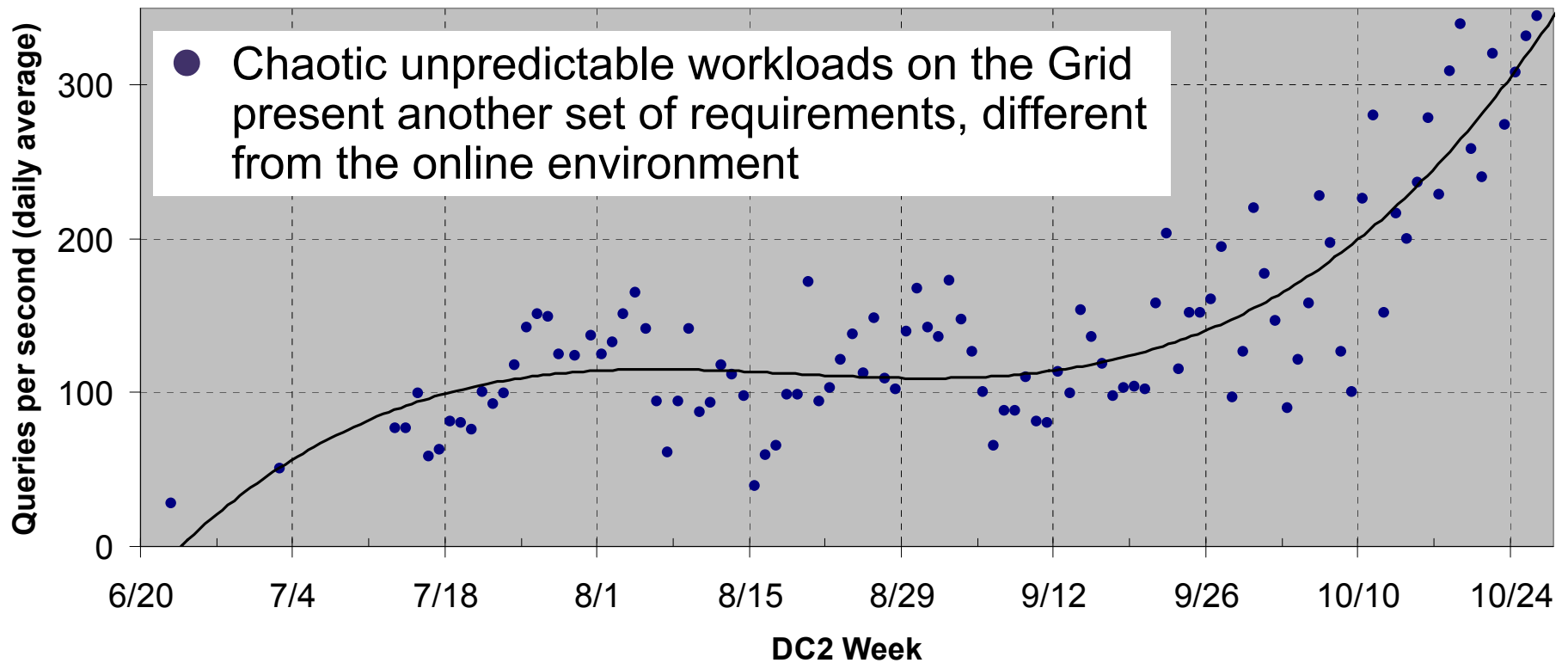
- Site capacity: CPUs
- 1 - 10
  - 10 - 20
  - 30 and more
  - planned





# DB Access on the Grid

atlasdbpro server load





# Database Client Library

- ATLAS data processing model requires access to many database applications: GeometryDB, ConditionsDB, CalibrationsDB, etc
- Our DC2 production experience provided new set of database access requirements, different from online
- ATLAS Database Client Library is developed to address the new requirements of distributed database access
- The Library serves as a **unique layer** for enforcing policies, following rules, establish best practices and encode logic to deliver efficient, secure and reliable database connectivity to applications in a heterogeneous distributed database services environment





# ATLAS Database Project

<http://atlas.web.cern.ch/Atlas/GROUPS/DATABASE/project/services>



## Client Library

[Document](#)

N	2004/09/16 Web page set up
E	
W	

### General Information

ATLAS Database Project Project plan prioritizes rationalization and cleanup of how server specification is done in applications which access database servers. The distributed database services client library implements a consistent strategy for database server access. The client library serves as a unique layer for enforcing policies, following rules, establish best practices and encode logic to deliver efficient, secure and reliable database connectivity to applications in a heterogeneous distributed database services environment.

### Activities and people

WBS	Area	Names
.11.5	Distributed database services client	Yulia Shapiro (main developer)





# Client Library Document

- As a first step in our project we collected these and other requirements in the Client Library Document
  - Connection Management
  - Indirection Layer
  - Robust Remote Access
  - Scalability
  - Lightweight
  - etc



ATLAS Database Project

## DISTRIBUTED DATABASE SERVICES CLIENT

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Authors: Yulia Shapiro, Alexandre Vaniachine (editor), Torre Wenaus

Date: July 8, 2004

Project: ATLAS Database

Activity: 11. Distributed Database Services

Document link: <http://atlas.web.cern.ch/Atlas/GROUPS/DATABASE/project/services/client.pdf>

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**Abstract:** This document defines the database client library software layer for distributed database services access in ATLAS Database Project. The Project plan prioritizes rationalization and cleanup of how server specification is done in applications which access database servers. The client library implements a consistent strategy for database server access. The Distributed Database Services client library serves as a unique layer for enforcing policies, following rules, establish best practices and encode logic to deliver efficient, secure and reliable database connectivity to applications in a heterogeneous distributed database services environment. This document collects requirements, outlines architecture and the workplan. The implementation responsibilities are also discussed.







# Technology Choices

- We evaluated many technologies for heterogeneous DB access: JDBC, ODBC, ROOT&RDBC, Qt, POOL
- Qt has been chosen as a most advanced and versatile to build the first proof-of-the-principle prototype (both with Qt 3.3 and Qt 4.0) to achieve the first Milestone of the project – capability to connect to Oracle and MySQL from the same program via plugin libraries
- Most of the technologies evaluated do not address concerns of the distributed database services
  - A closest match was C-JDBC: Java access to cluster of databases: <http://c-jdbc.objectweb.org>





# Implementation Decision

- After consultations with ATLAS Database Project management and other considerations
  - minimal dependencies
  - licensing (e.g. Qt)
  - features we need most

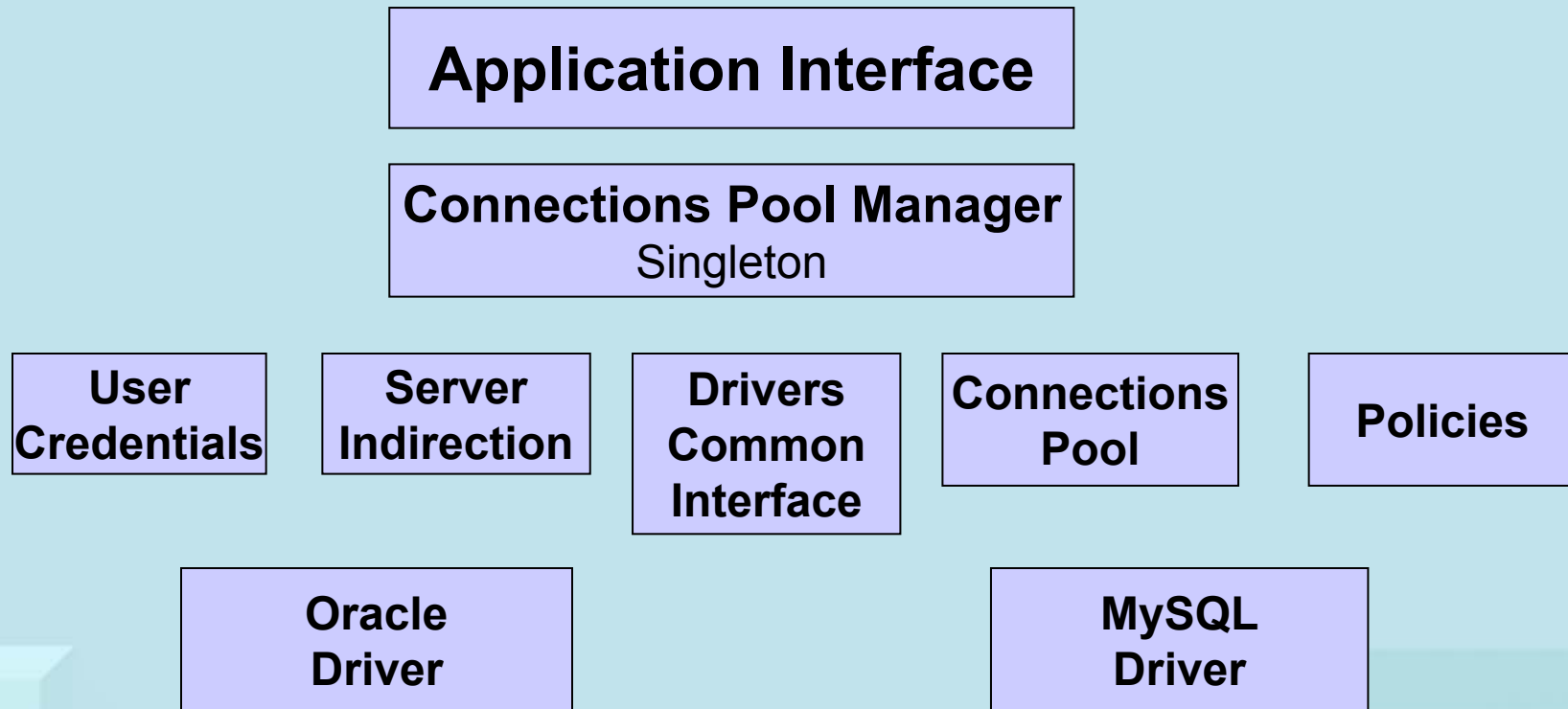
we decided that instead of wrapping other's code we should proceed with our own code base written in C++

- Through emphasis on a practical approach, and by avoiding too much abstraction and flexibility at early stage we concentrate on solving actual problems of ATLAS operations workflow





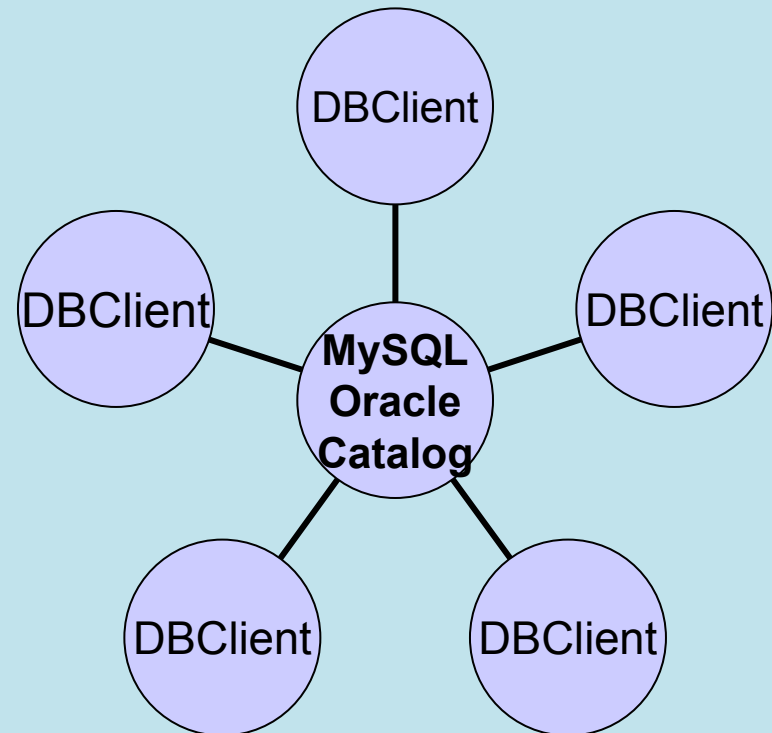
# Layered Architecture





# Indirection Mechanism

- Based on the POOL catalog indirection architecture
- MySQL & Oracle Catalogues hold logical/physical mapping - logical server names and its replicas
- Both catalogues are synchronized – change in one causes change in the other
- Per default time user application updates the XML Catalogue in its local working area from the central mysql/oracle catalogue



**A single point-of-control over server indirection**





# 3D Integration Proposal

----- Application stack -----	e.g., ATLAS Athena
POOL stack -----	technology-independent persistency layer
Object-relational mapping stack -----	creates SQL queries, converts SQL query results
Low-level SQL processing layer -----	POOL Relational Access Layer
Several implementation stacks for connection management and query processing -----	multiple plugins possible here: ATLAS client library, ROOT RDBC... OTL, mysql++
Plugin libraries for database drivers -----	e.g., ROOT libOracle.so, libMySQL.so ATLAS libMySQLConnectionLib.so and libOracleConnectionLib.so, libSQLite.so
Database client libraries stack -----	i.e., libclntsh.so, libmysqlclient.so,...
TCP/IP stack, SQLite -----	

We are interested in integration of ATLAS Client Library as a low-level part of 3D reference implementation

