

CZAR: Jefferson Lab's Archiving System

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EPICS Collaboration

Controls Group

Buzzword Conformance

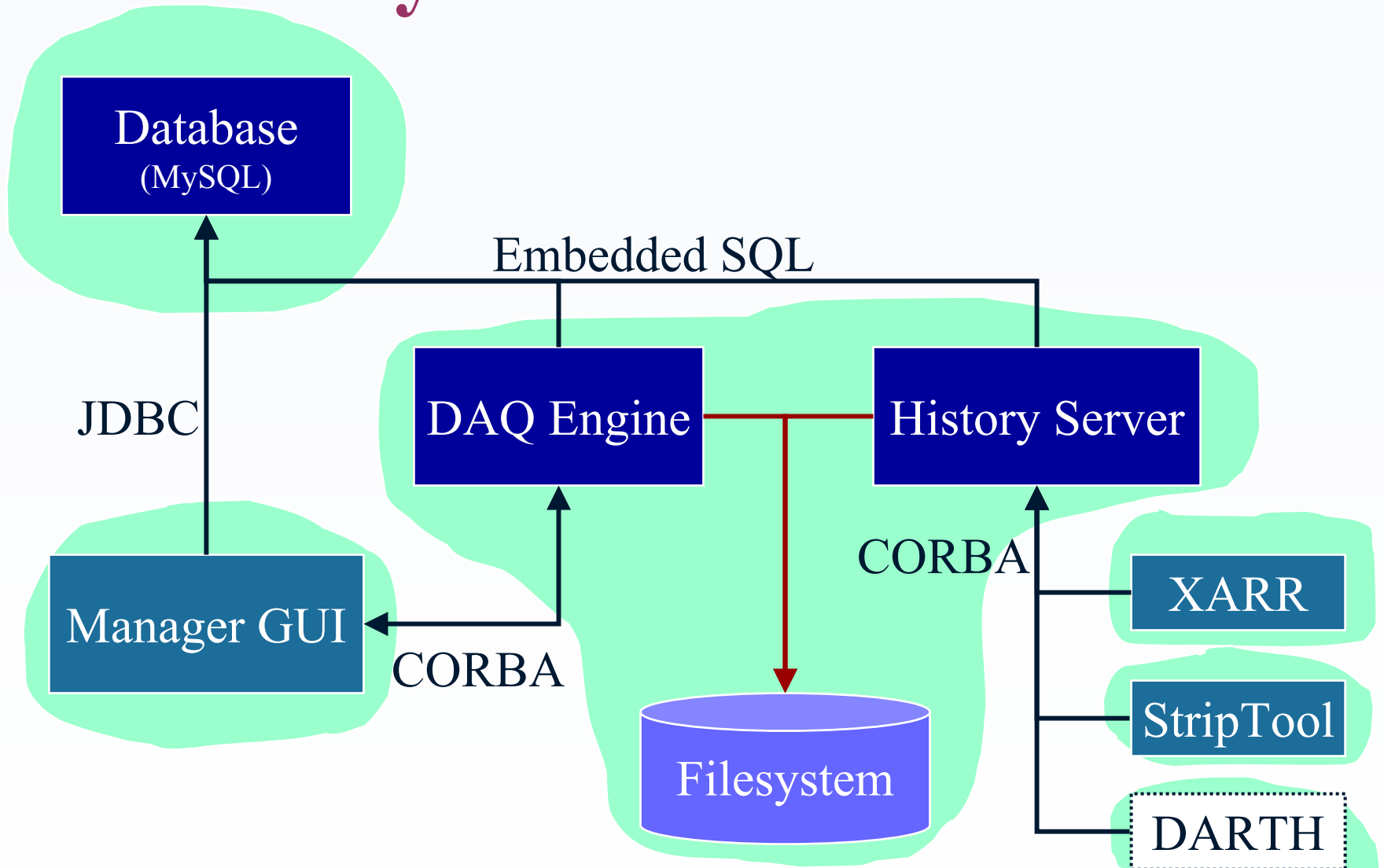
- **Relational Database**
- **SQL**
- **CORBA**
- **Java, Swing, JDBC, XML**
- **Distributed System**
- **Multi-threaded**
- **Plug-ins**
- **C++, Standard Library**



Components

- **Configuration Database**
- **Data logging engine**
- **Data store**
- **History data server**
- **Configuration management GUI**
- **Engine control / monitor GUI**
- **History data retrieval clients**

System Overview



Configuration Database

- **Arbitrary relationships between PVs**
 - * **administrative groupings**
 - * **logical groupings**
 - * **convenience groupings**
- **“Stream” associates PV with DAQ specs**
 - * **journal configuration changes**
 - * **multiple, evolving, specs per PV**

Data Acquisition Engine

- **Multi-threaded CA client**
 - * runs CA task in separate thread
- **SQL client**
 - * reads configuration information from database
- **CORBA server**
 - * exposes control API
 - * pushes status events into CosEventService
- **DAQ plug-in modules**

DAQ Engine Remote API

- **Activate / Deactivate streams**
- **Query stream status**
 - * **bytes written, when connected, buffer status**
- **Asynchronous status events**
 - * **engine state, bytes written, CA activity**

Data Store

➤ Engine

- * streams raw data to disk

➤ Converter

- * runs periodically, or on-demand
- * “cooks” raw data (convert, compress, index)

➤ Database

- * connection history
- * data directory
- * file status

History Data Server

- **Multi-threaded CORBA server**
- **Accesses data store via CADATAStore API**
- **Consults database for data summary**
- **Flushes Engine buffers on demand**
- **Reads data from file system shared with Engine**
- **Converts spooled but unprocessed data on demand**

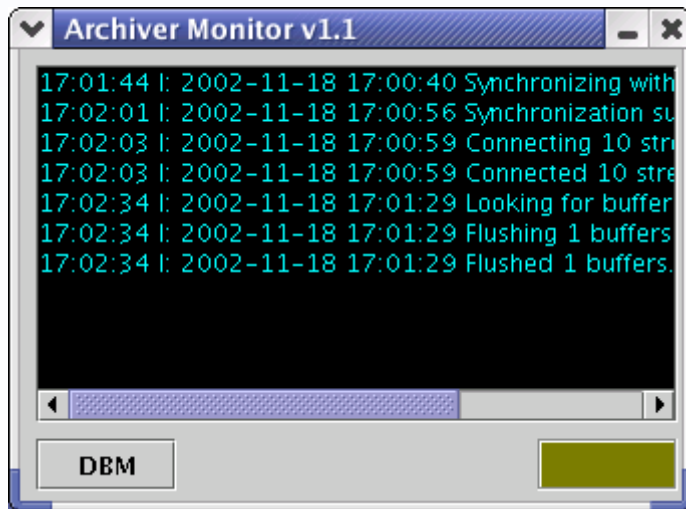
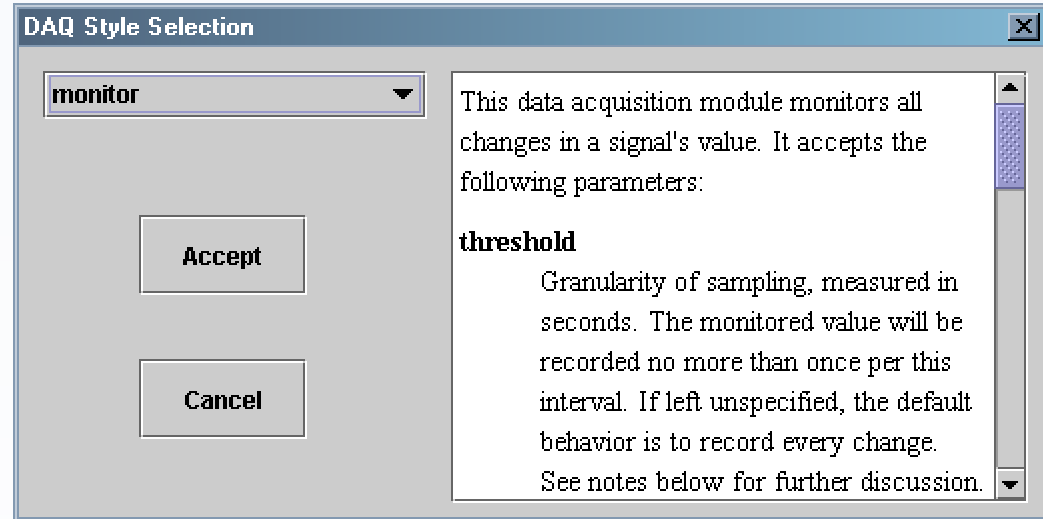
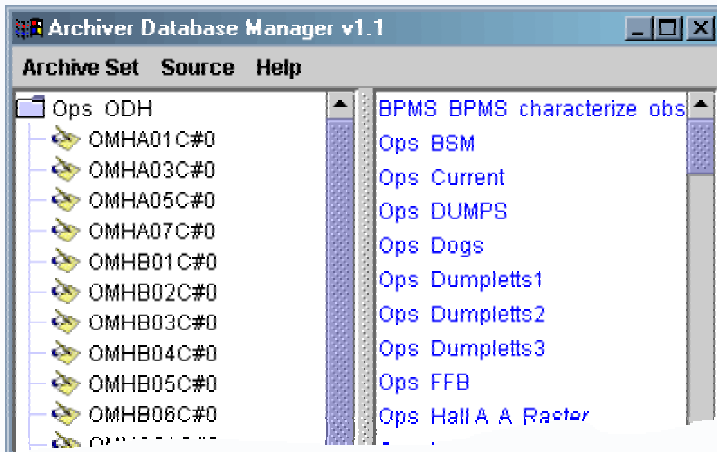
History Server Remote API

- **Supplies archive accessor objects to clients**
- **Client initializes range in archive accessor**
 - * **data summary**
 - first, last point
 - before, after point
 - num points
 - * **range accessor object**
 - provides data pull interface
 - serves sequences of data in large chunks
 - timestamp, value, status, severity, control info

Management GUI

- **Java 1.3, Swing, JDBC, CORBA**
 - * truly platform-independent
- **View/manipulate hierarchical ordering**
- **Specify/modify DAQ parameters**
- **Enable/disable streams**
- **Monitor/control engine**
 - * flush streams
 - * display engine status

AMDM



History Clients

➤ XARR

- * Pure CORBA client

➤ hapiget command-line tool

- * Script applications

➤ StripTool

- * CORBA client in separate thread

➤ DARTH (Java)

- * Extensive configuration
- * Flexible display (graph, table, correlation)

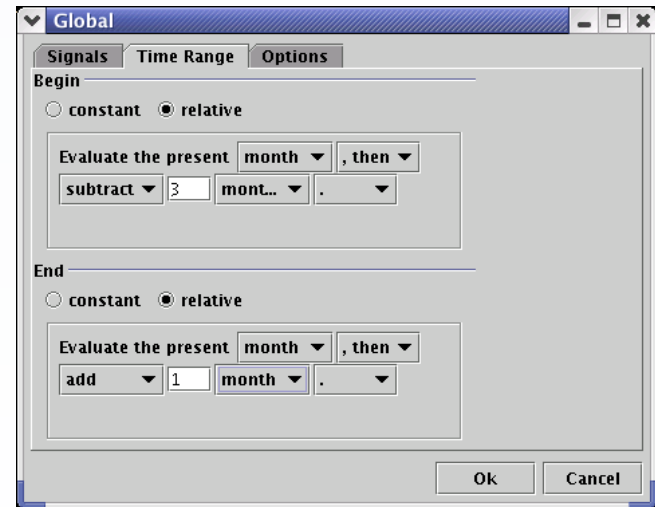
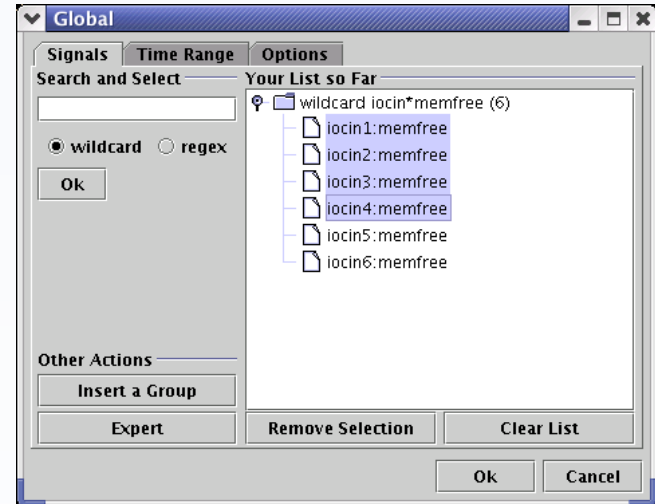
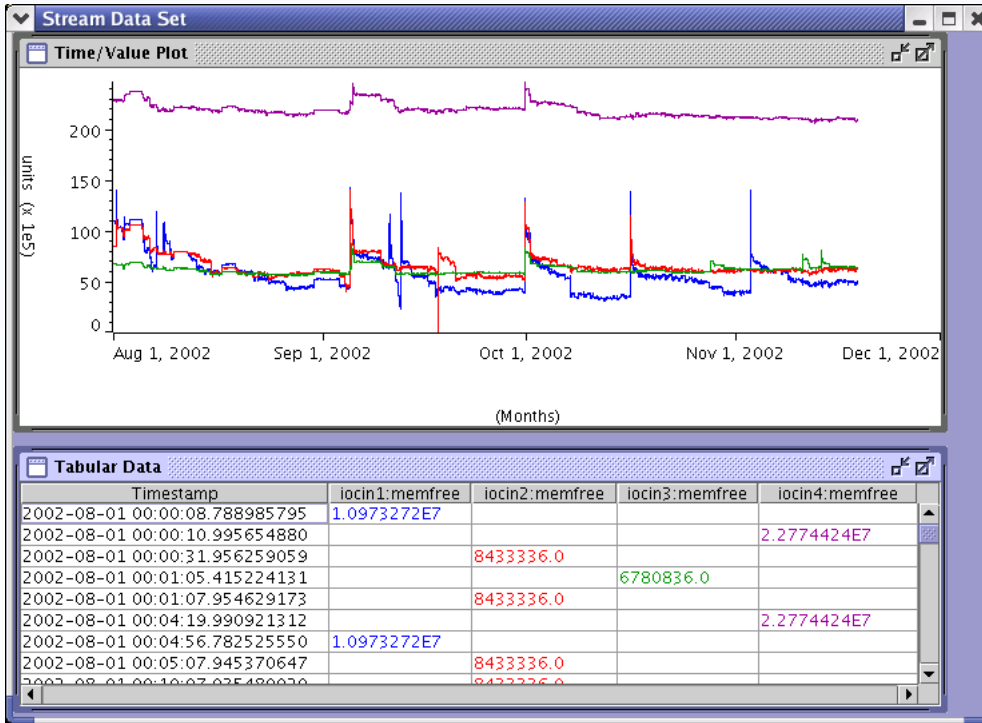


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DARTH



Status

- **Engine up since January 2002**
 - * ~ 21,000 signals
 - * ~ 2Gb / day raw; ~ 600Mb processed
- **Moved from HP-UX 11 ⇒ Solaris 8 in June**
- **Management GUI (amdmd) version 1.1**
- **MySQL ⇒ Oracle (December 2002)**

More Status

- **Import config files from ChannelArchiver, old AR**
- **New configuration and install scripts**
- **Init scripts for starting / stopping / inspecting entire system in standard unix fashion**
- **HP-UX 11 aCC, Solaris 8 CC, Linux (g++ 3.2)**
- **ACE/TAO 5.2.1**



Transportability

- **Entire system**
- **Engine**
- **History server**
 - * **CADataStore API**
 - * **CORBA API**

Scalability

- **Data store decoupled from data acquisition**
 - * multiple engines can spool data
- **Database indexes, summarizes data**
 - * fast lookup
- **File system stores data**
 - * easily shuffle data offline/online
 - * fast access to binary data
- **History server**
 - * reduce data before transporting



In the Works

- **Data transformation API**
- **Support for Oracle**
- **Specialized data compression (> 80%)**
- **Seamless integration with offline storage silo**
- **Integration with more clients**
- **Improvements, always improvements**



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