EXTERNAL ACCESS TO ALICE CONTROLS CONDITIONS DATA

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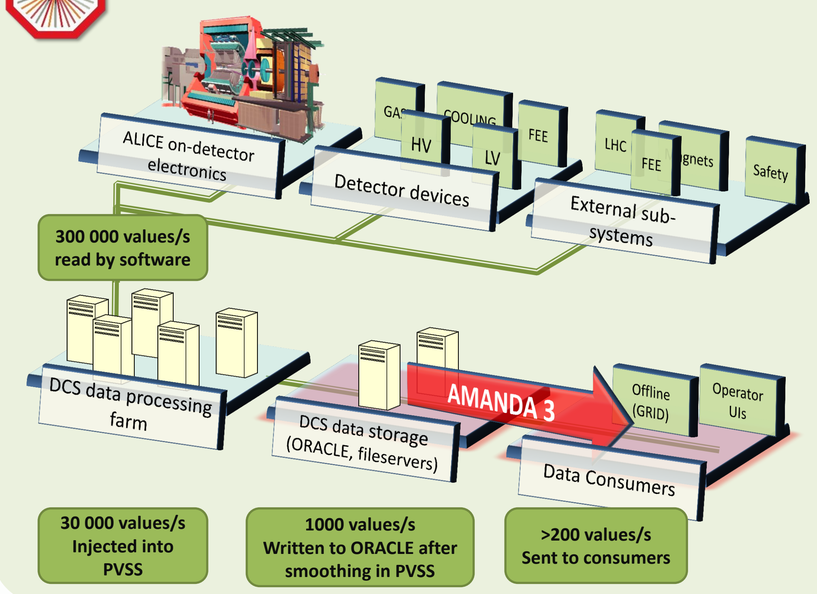
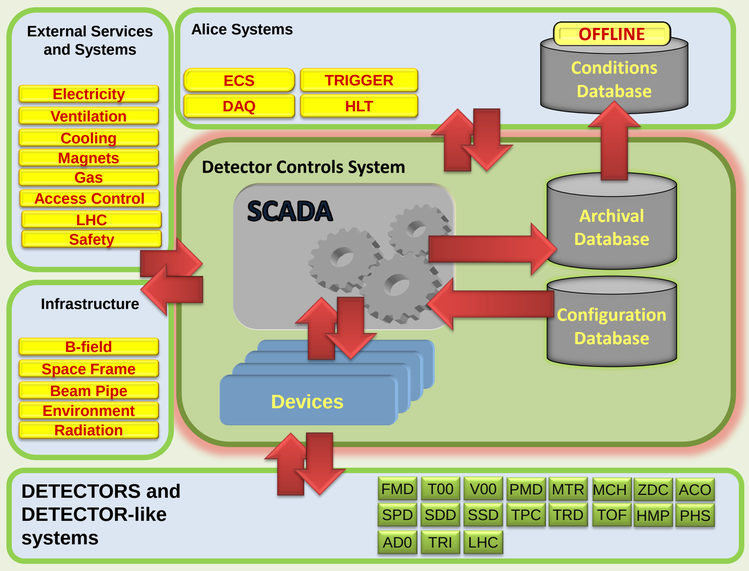
ABSTRACT - ALICE Controls data produced by commercial SCADA system WINCCOA is stored in ORACLE database on the private experiment network. The SCADA system allows for basic access and processing of the historical data. More advanced analysis requires tools like ROOT and needs therefore a separate access method to the archives. The present scenario expects that detector experts create simple WINCCOA scripts, which retrieves and stores data in a form usable for further studies. This relatively simple procedure generates a lot of administrative overhead - users have to request the data, experts needed to run the script, the results have to be exported outside of the experiment network. The new mechanism profits from database replica, which is running on the CERN campus network. Access to this database is not restricted and there is no risk of generating a heavy load affecting the operation of the experiment. The developed tools presented in this paper allow for access to this data. The users can use web-based tools to generate the requests, consisting of the data identifiers and period of time of interest. The administrators maintain full control over the data - an authorization and authentication mechanism helps to assign privileges to selected users and restrict access to certain groups of data. Advanced caching mechanism allows the user to profit from the presence of already processed data sets. This feature significantly reduces the time required for debugging as the retrieval of raw data can last tens of minutes. A highly configurable client allows for information retrievalby passing the interactive interface. This method is for example used by ALICE Offline to extract operational conditions after a run is completed. Last but not least, the software can be easily adopted to any underlying database structure and is therefore not limited to WINCCOA.

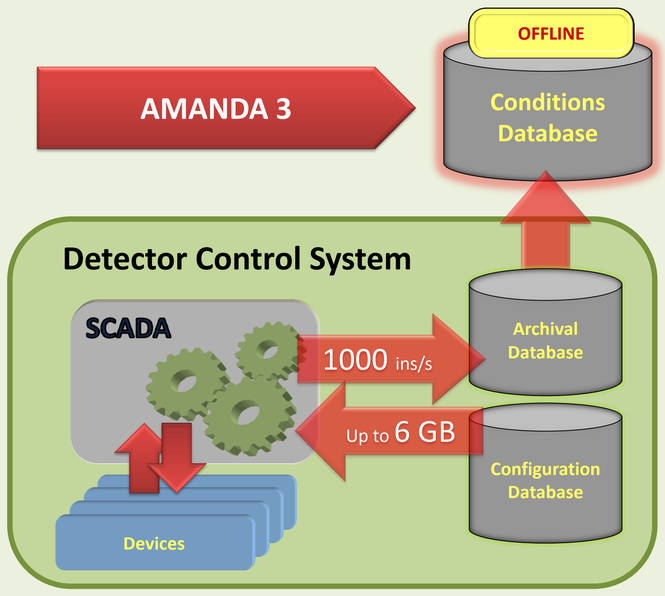
ALICE DCS COMPONENTS



ALICE DCS CONTEXT



ALICE CONDITIONS DATABASE IN DCS

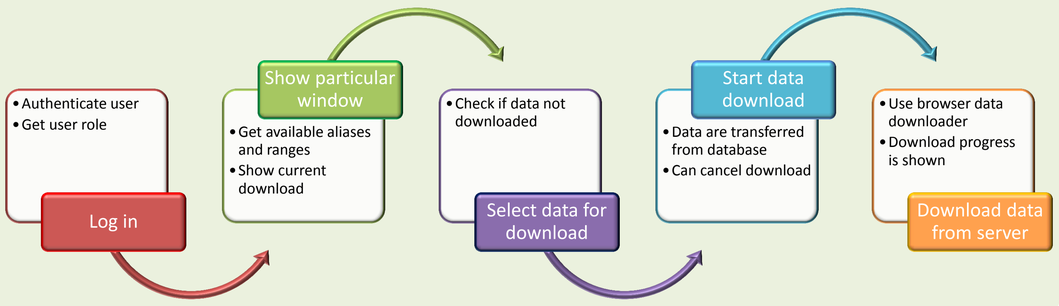


AMANDA 3 SOLUTION

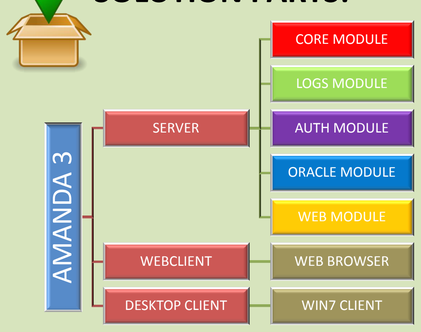
AMANDA 3 OVERVIEW

The developed software suite represents a new generation of components replacing the original “Alice MANager for Dcs Archives”, known as AMANDA. It aims to improve data availability for more users. The original (AMANDA 2) version successfully served its purpose - the conditions data exchange between the DCS and ALICE offline during the LHC RUN1. However, it was designed as a simple server/client tool without any ambition for wider use by interactive clients. The main design goal of the presented AMANDA 3 package is to provide a mechanism allowing for concurrent access to DCS archives using multiple clients. It extends the original data exchange functionality by advanced download possibilities, user management, security and logging. The main feature of the new system is the server’s decentralized architecture. Specific tasks are scattered across multiple computers, which allows for load balancing and system jam prevention. The web client removes the dependency on the operating system, but dedicated clients are available as well.

AMANDA 3 WEBSERVER CLIENT LIFECYCLE



SOLUTION PARTS:



WEBSERVER MODULE – GATEWAY

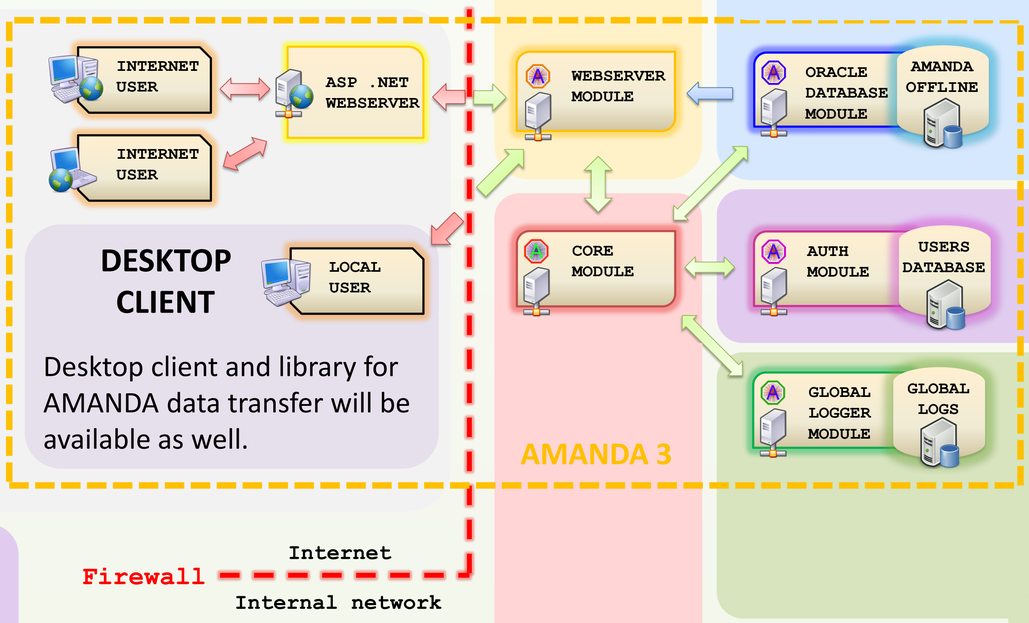
- separates ALICE databases from AMANDA clients
- shares a computer with the ASP.NET webserver
- all requests are checked for validity to prevent external access to databases except for clients
- informs clients about AMANDA 3 operational glitches

ORACLE DATABASE MODULE – THE SOURCE

- the only module with direct access to the AMANDA offline (conditions) database
- ORACLE procedures are used to ensure efficient data transfers
- downloaded data is sent directly to webserver service module
- separate & independent threads are used to process individual requests, i.e. multiple users can download data at once
- the module handles management of concurrent downloads, computes transfer statistics and estimate sizes of database data

WEB CLIENT MODULE

- client running on Web browser removes the host operating system dependency
- previously downloaded data is temporarily cached on server, and can be shared by several users
- caching significantly improves system performance in the interactive mode (users often tend to repeat the request with only slightly modified search criteria)
- user can log off, once the download has been launched
- downloads can be cancelled by users/admins
- data throughput per user can be controlled (number of sessions can be restricted)



AUTHENTIFICATION MODULE – WHO?

- integrated into the existing security and account system
- each user is assigned an unique login and role that grant them specific rights

GLOBAL LOGGING MODULE - LOGS

- all service modules support 3 types of logging :
  - log files stored on local computer
  - request processing logging
  - global logging
- the module is designed for global logging of information with higher-level (administrator) significance

DATA TRANSFER MANAGEMENT

- administrators use the web client for data transfer control and overall system management
- monitoring of AMANDA 3 is achieved by independent service modules
- the flexible architecture of the webpage-based manager allows for further extensions

CORE SERVICE MODULE – COORDINATOR

- handles and monitors requests from other services
- acknowledges every significant step of request processing
- the relevance of the module increases if separate computers or multiple services of the same type are involved

WCF AND WINDOWS SERVICE – INTERCONNECTION

- *Windows Communication Foundation* ensures fast and reliable communication between all internal modules

REFERENCES

P. Chochula, A. Augustinus, L. Jirden, S. Kapusta, P. Rosinsky: “Handling large amounts of data in ALICE”, Proc. of ICALEPCS’07, Knoxville, USA, 2007.
A. Augustinus, P. Chochula et al., “Computing architecture of the ALICE Detector Control System” Proc. of ICALEPCS’11, Grenoble, France, 2011
S. Kapusta et al.: “Data Flow in ALICE Detector Control System”, 11th Vienna Conference on Instrumentation – VCI 2007, Vienna, Austria, 2007

CONCLUSION AND PERSPECTIVES

A software suite has been developed which facilitates the transfer of large data blocks from the ALICE offline conditions database. Future steps of the application design include:

- finalization of the AMANDA 3 release version, performance tests with real data
- enhancement of the windows service mode with auto-restart and power event ability
- integration of multiple services of the same type, including backup services
- development of a web and desktop client (in cooperation with future users)

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