
External access to the ALICE DCS archives

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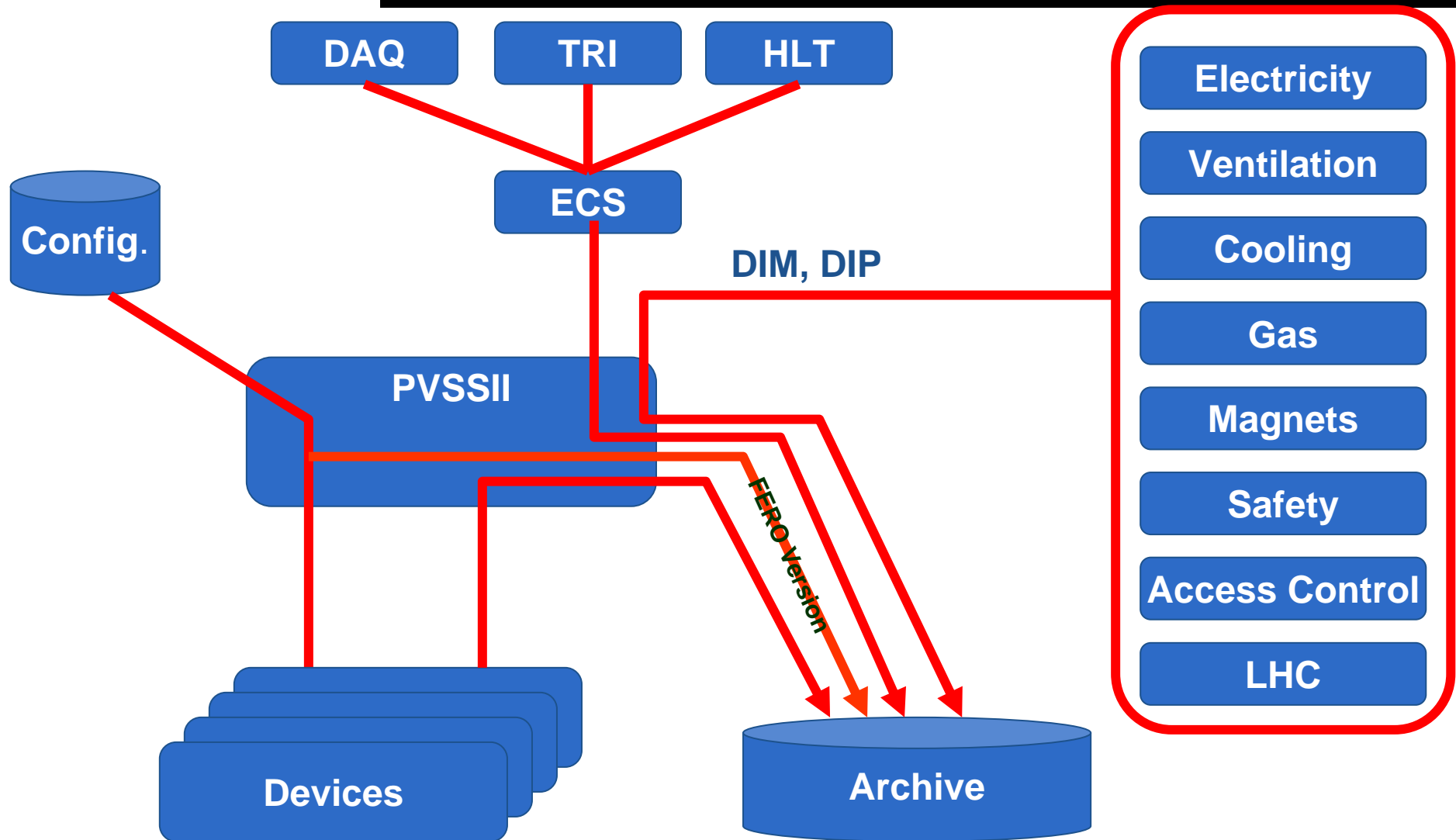
ALICE Offline Week, October 04, 2005

- DCS data flow
- DCS and the condition data
- Implementation of the DCS archive and present status
- AMANDA
- Additional developments of the DCS archive interface

The DCS Archive and Conditions Data

- The *DCS archive* contains all measured values (tagged for archival)
 - Used by trending tools
 - allows for access to historical values, e.g. for system debugging
 - too big and too complex for offline data analysis (contains information which is not directly related to physics data such as safety, services, etc.)
- The main priority of the DCS is assure reliable archival of its data
- The *conditions database* contains a sub-set of measured values, stripped from the archive

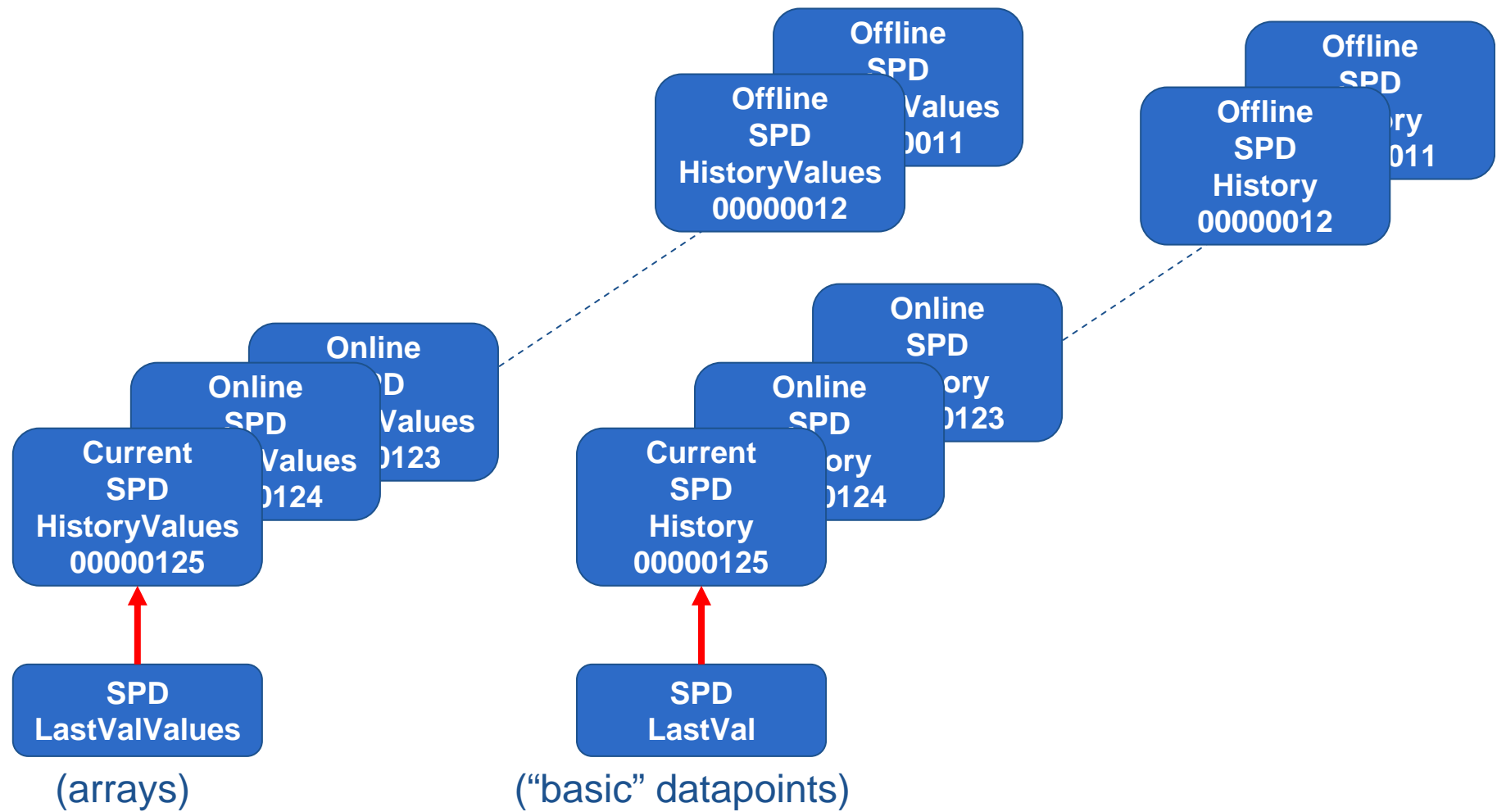
The DCS Data Flow



PVSS Archive Tables

- For each group of archived values a set of tables is generated
 - **LastVal** – input table storing the most recent value.
 - **Current** – a archive keeping a history record of measured values.
 - The archive is closed if it exceeds a predefined size and is replaced with a new one
 - The latest available values are copied to the new archive automatically
 - **Online** – a closed Current archive
 - **Offline** – an archive written to backup media and *not immediately available*
- For each Datapoint several parameters are stored:
 - Value
 - Timestamp
 - Flags (for example reliability)

Basic DCS archive architecture



DCS Archive implementation

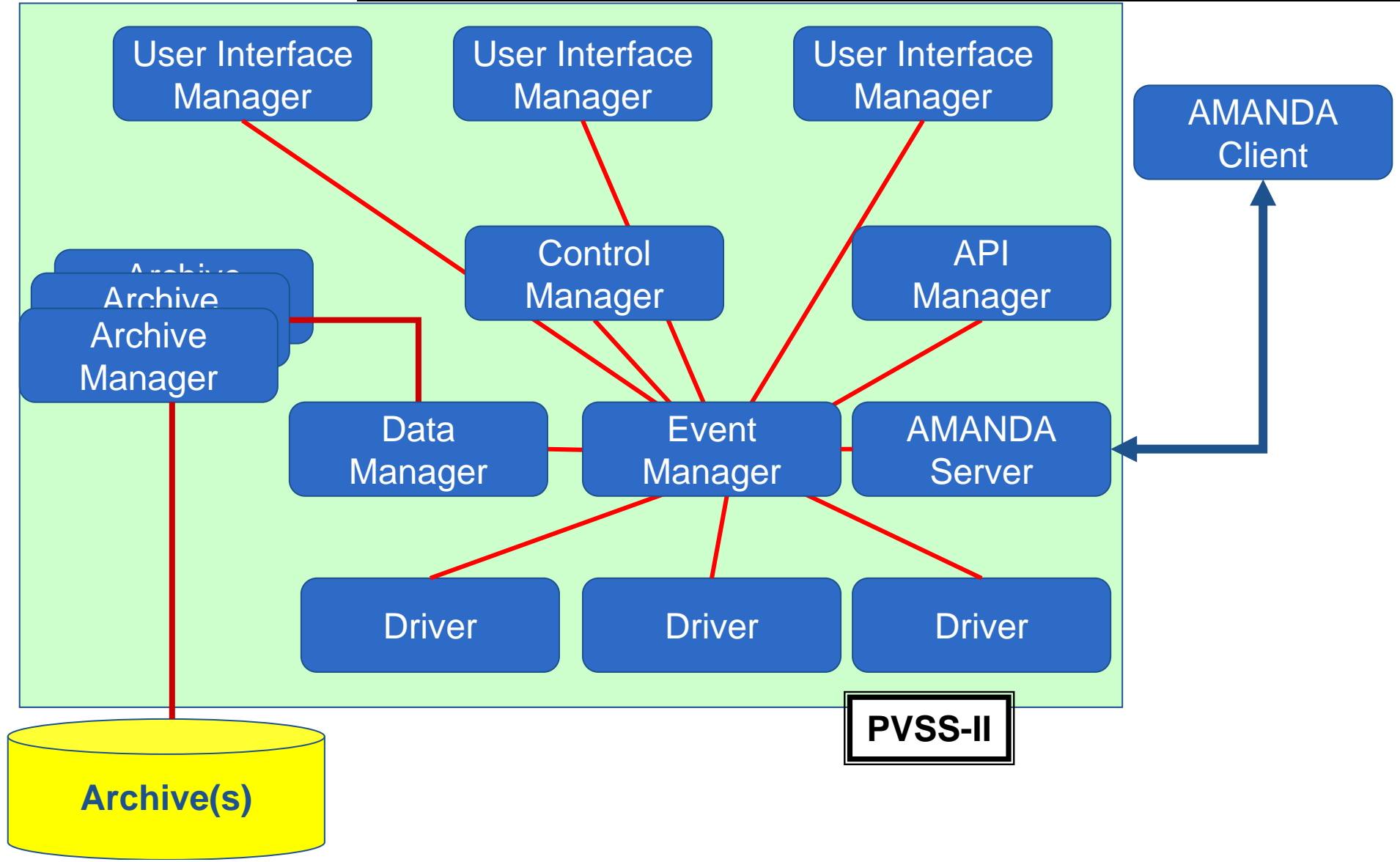
- Standard PVSS archival:
 - Archives are stored in local files (one set of files per PVSSII system)
 - OFFLINE archives are stored on backup media (tools for backup and retrieval are part of the PVSSII)
 - Problems with external access to archive files due to PVSS proprietary format
- The PVSS RDB archival:
 - is replacing the previous method based on local files
 - Oracle database server is required
 - Architecture resembles the previous concept based on files
 - ORACLE tablespace replaces the file
 - A library handles the management of data on the Oracle Server (create/close tables, backup tables...)

DCS Archival status

- Mechanism based on ORACLE was delivered by ETM and tested by the experiments
 - All PVSS-based tools are compatible with the new approach (we can profit from the PVSS trending etc.)
 - problems were discovered, ETM is working on improved version
 - ALICE main concern is the performance (~100 inserts/s per PVSS system) – which is not enough to handle an alert avalanche in a reasonable time
 - Architectural changes were requested – e.g. the archive switching process should be replaced by ORACLE partitioning, etc.
- DCS will provide file-based archival during the pre-installation phase and replace it with ORACLE as soon as a new version qualifies for deployment
 - Tools for later **conversion from files to the RDB** will be provided

- AMANDA is a PVSS-II manager which uses the PVSS API to access the archives
 - Manager and Win C++ client developed by Vlado Fekete
 - Root client and interface to the OFFLINE developed by Boyko Yordanov
 - Vlado and Boyko defined the communication protocol (see talk of Boyko in this workshop)
- Archive architecture is transparent to AMANDA
- AMANDA can be used as interface between the PVSS archive and non-PVSS clients
 - AMANDA returns data for requested time period

AMANDA – Alice Manager for DCS Archives



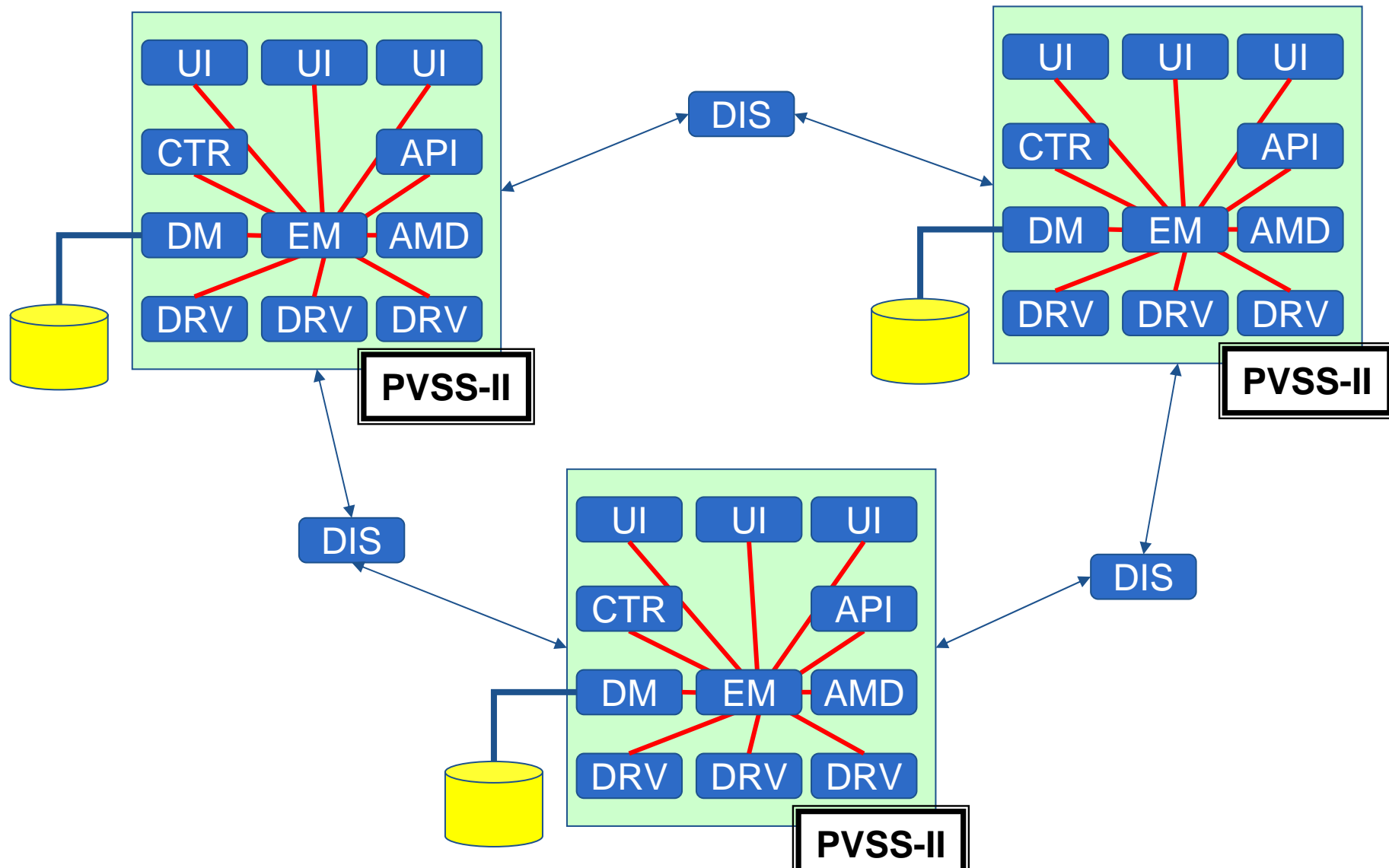
Operation of AMANDA

1. After receiving the connection request, AMANDA creates a thread which will handle the client request
2. Due to present limitations of PVSS DM the requests are served sequentially as they arrive (the DM is not multithreaded)
3. AMANDA checks the existence of requested data and returns an error if it is not available
4. AMANDA retrieves data from archive and sends it back to the client in formatted blocks
 - AMANDA adds additional load to the running PVSS system !
 - Final qualification of AMANDA for use in the production system depends on the user requirements

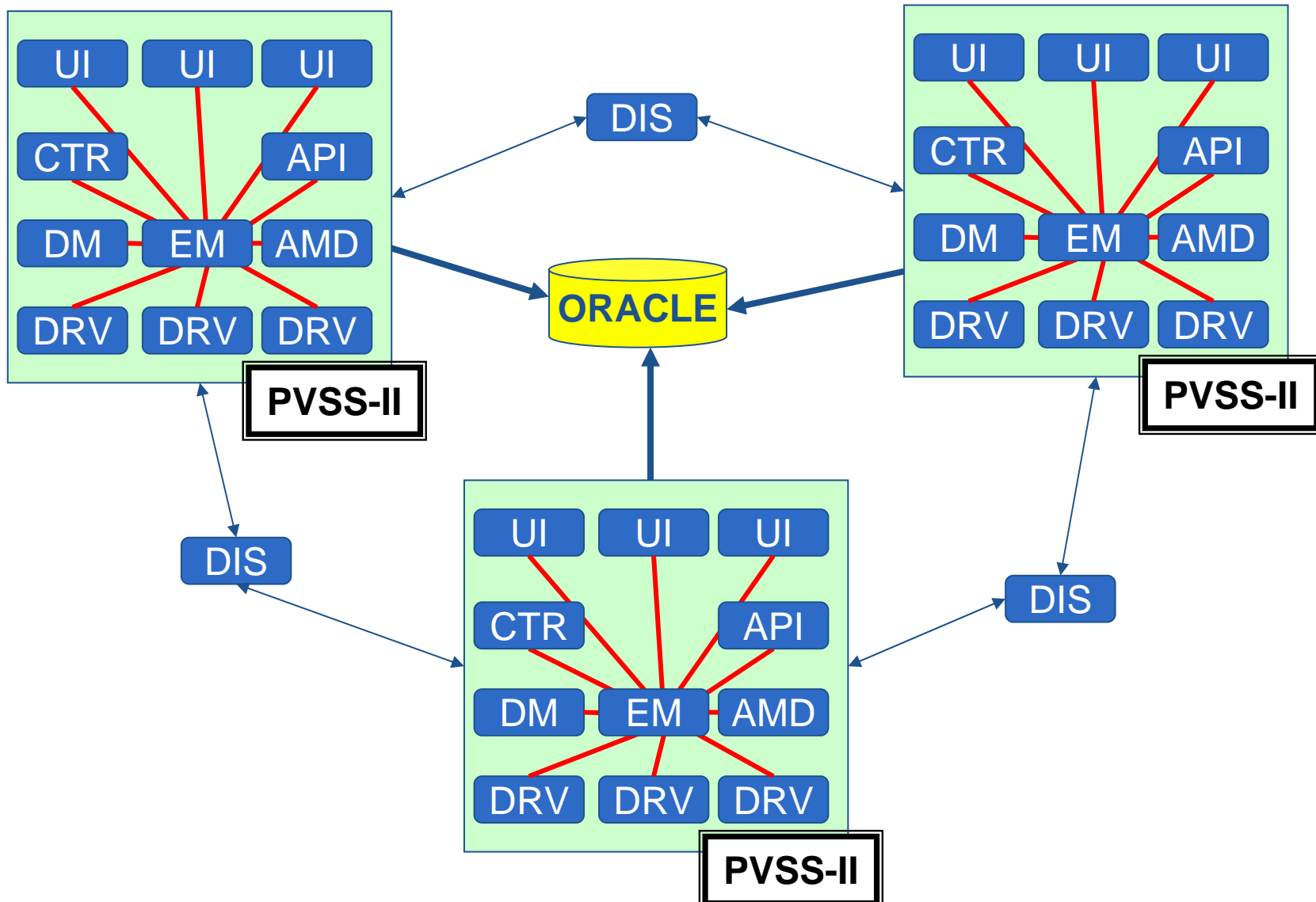
AMANDA in distributed system

- The PVSS can directly access only file-based data archives stored by its own data manager
- In a distributed system also data produced by other PVSS can be accessed, if the connection via DIST manager exists
 - In case of the file-based archival DM of the remote system is always involved in the data transfer
 - In case of RDB archival, the DM can retrieve any data provided by other PVSS within the same distributed system without bothering other DMs
- It is foreseen, that each PVSS system will run its own AMANDA
 - There will be at least one AMANDA per detector
 - Using more AMANDA servers overcomes some API limitations – some requests can be parallelized (clients need to know which sever has direct access to the requested data)

AMANDA in the distributed environment (archiving to files)



AMANDA in the distributed environment (archiving to ORACLE)



Additional CondDB developments

- Development of a new mechanism for retrieving data from the RDB archive has been launched (Jim Cook – ATLAS)
 - A separate process will access the RDB directly without involving the PVSS
 - this approach will overcome the PVSS API limitations
 - the data gathering process can run outside of the online DCS network
 - The conditions data will be described in the same database (which datapoints should be retrieved, what processing should be applied, etc.)
 - Configuration of the conditions will be done via PVSS panels by the DCS users – unified interface for all detectors
 - Data will be written to the desired destination (root files in case of ALICE, COOL for ATLAS, CMS and LHCb)
 - Parts of AMANDA client could be re-used
 - First prototype available

Conclusions

- The main access point to the DCS data is the DCS archive
- Present situation requires file-based archived to be used during the pre-installation phase
- AMANDA provides a method for accessing the DCS data from external clients
 - Archive implementation details are hidden by the PVSS API
- JCOP developments (at present carried out by ATLAS) will provide an efficient way for accessing the DCS archives
 - independent from the PVSS
 - requires RDB archival