

# IMPLEMENTATION OF AN OVERALL DATA MANAGEMENT AT THE TOMOGRAPHY STATION AT ANKA

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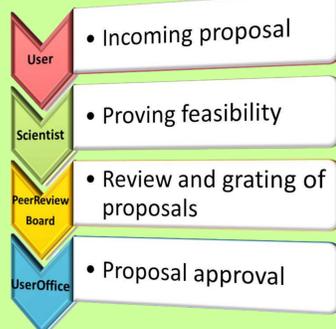
## ABSTRACT

New technologies and research methods increase the complexity of data management at the beamlines of a synchrotron radiation facility. The diverse experimental data such as user and sample information, beamline status and parameters and experimental datasets, has to be interrelated, stored and provided to the user in a convenient way. The implementation of these requirements leads to challenges in fields of data life-cycle, storage, format and flow. At the tomography station at the ANKA a novel data management system has been introduced, representing a clearly structured and well organized data flow. The first step was to introduce the Experimental Coordination Service ECS, which reorganizes the measurement process and provides automatic linking of meta-, logging- and experimental-data. The huge amount of data, several TByte/week, is stored in NeXus files. These files are subsequently handled regarding storage location and life cycle by the WorkspaceCreator development tool.

## THE DATA MANAGEMENT CONCEPT

### THE EXPERIMENT PROPOSAL SYSTEM ANNA

ANNA is the follower proposal system of the Scientific Management Information System (SMIS), which was the proposal system at ANKA over years.



- JAVA application using Grails framework
- Generating most of the user's meta-data
- Convenient, intuitive web interface
- Generating unique ID at the Authentication Authorization Infrastructure (AAI)

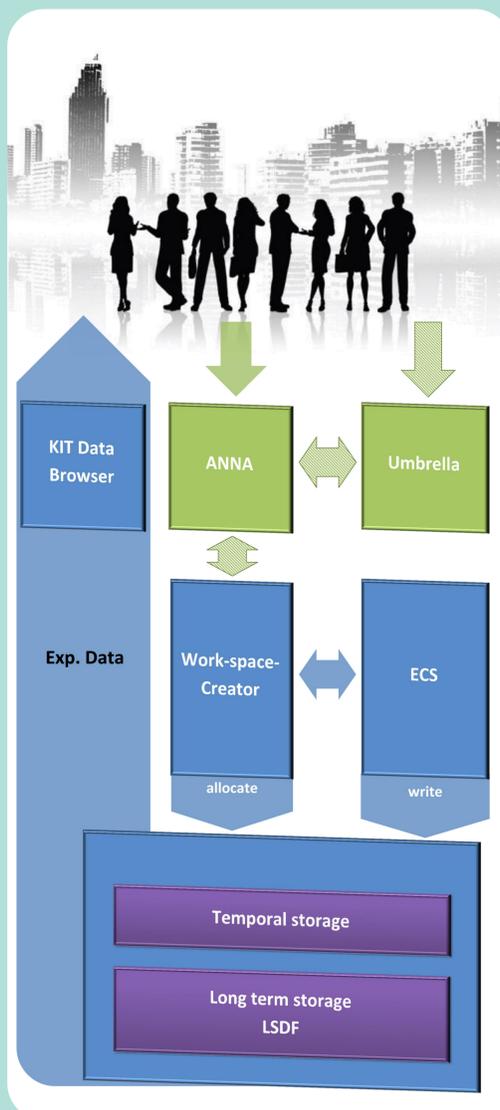
### THE RESOURCE MANAGEMENT TOOL WORKSPACECREATOR

The WorkspaceCreator is responsible for claiming the necessary resources and initialising the life cycle for each ANKA data set.

- C++ written Tool embedded into the Tango environment
- Creates out of the meta-data of ANNA a workspace to store the data
- Offers a MySQL database
- Initialize the data life cycle

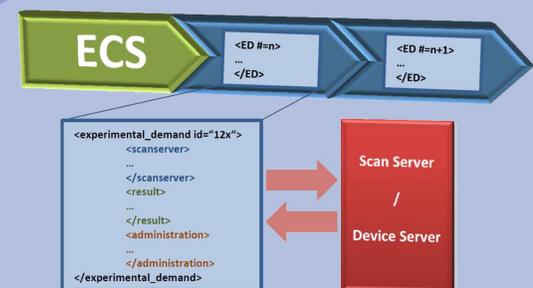
Each data set gets a status to make the data life cycle and data management transparent and consistent:

- Mutable
- Immutable
- Complete
- Archived
- Archived-removable



### THE EXPERIMENT STATE MACHINE ECS

The Experimental Control Service ECS is a Tango-server written in C++. It is responsible for managing and coordinating the experimental measurement process.



- Collecting experimental demands (ED-Tags)
- Saving the ED-Tags in an XML file
- Queue of ED-Tags is taken down in a FIFO principle
- Organizing storing experimental- and meta-data to the preassigned storage location

### SUMMARY OF THE WHOLE DATA MANAGEMENT CONCEPT

At ANKA different software components control the dataflow. The whole concept is designed to contribute a convenient data handling for an experiment at the Topo-Tomo beamline. The dataflow is regulated during registering, performing and storing an experiment.



- Beamtime proposal via ANNA
- User is holding an unique ID from AAI
- WorkspaceCreator is claiming necessary resources and initialising life cycle
- ECS is controlling the experiment (state machine)
- KIT Data Manager provides the data to the user

## OUTLOOK

Remaining challenges are to introduce the Umbrella single sign on system and the data catalogue ICAT, which are appropriate to the European PaNdata project. Currently ANKA is working on the full integration of all components in proper and stable way.