

# Managing operational documentation in the ALICE Detector Control System



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## Detector Control System

- ALICE (A Large Ion Collider Experiment) is one of the big LHC (Large Hadron Collider) experiments at CERN.
- It is composed of 18 sub-detectors controlled by an integrated Detector Control System (DCS) that is implemented using the commercial SCADA package PVSSII.
- The DCS includes over 1200 network devices, over 1,000,000 monitored parameters and numerous custom made software components that are prepared by over 100 developers from all around the world.
- The system is controlled by a single operator via a central user interface.

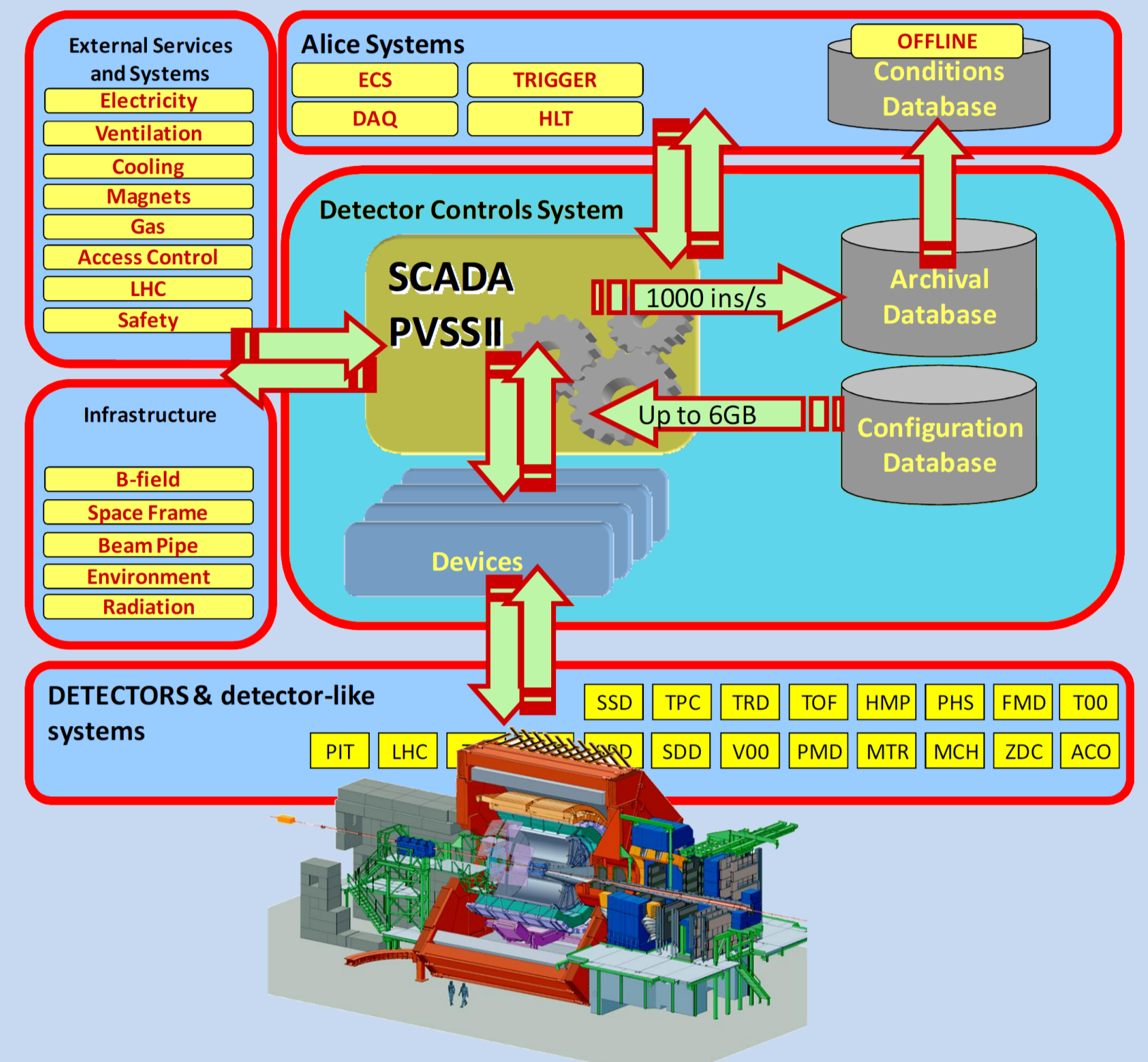


Fig. 1: Detector control system in ALICE

## DCS documentation

The extensive documentation is prepared to transfer the knowledge of how to operate the DCS to different groups of users.

- Classical, printed documentation (DCS Guide) is used for static instructions.
- Temporary procedures and known issues are stored in TWIKI.
- Instructions displayed on the panels improves efficiency and reduce risk of human errors.

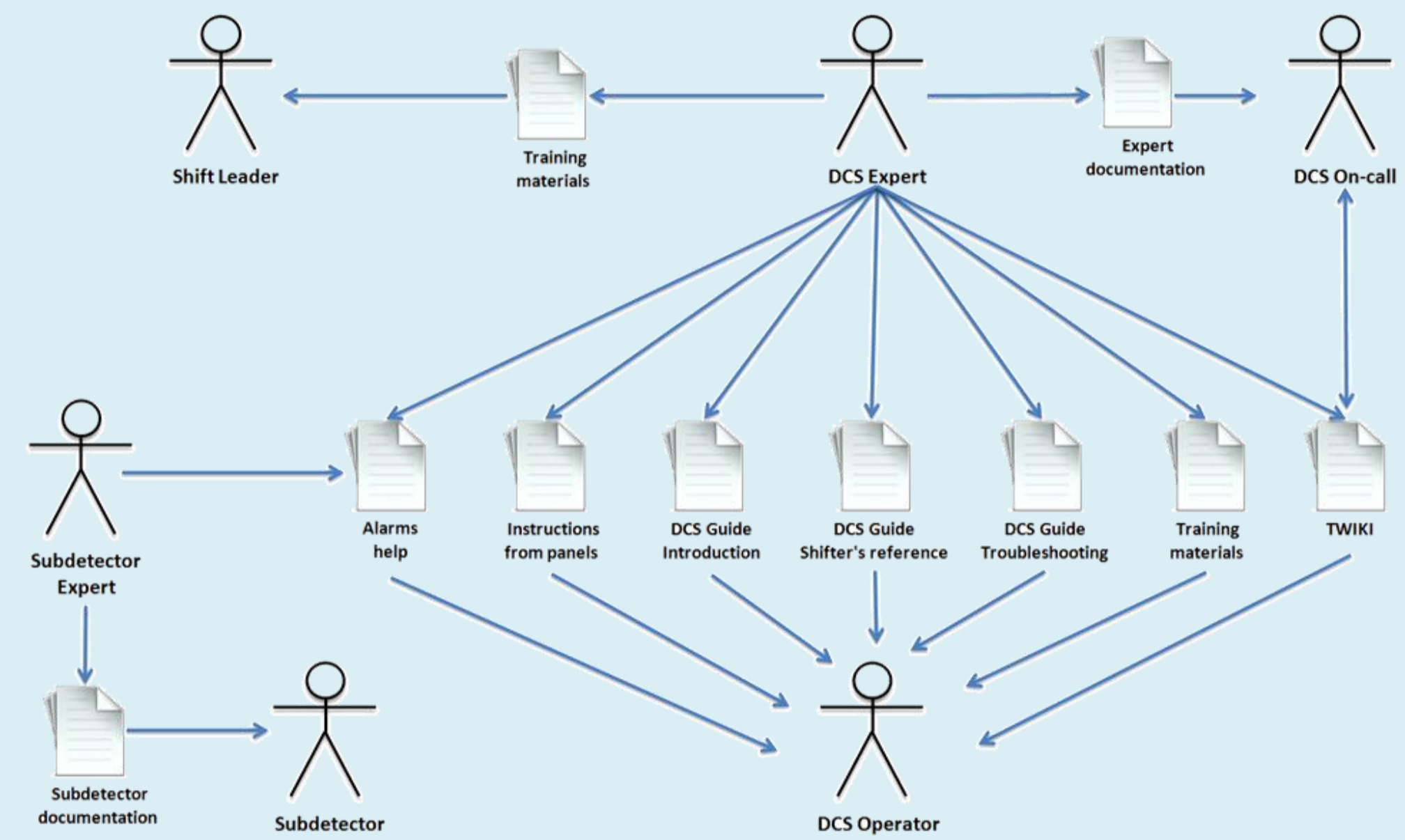


Fig. 2: Documentation flow in ALICE DCS

## Alarm help mechanism

One of the main tasks of the operator is recovery of anomalies and errors that may appear during the operation.

Acco	Dcs	Emc	Fmd	Hmp	Lhc
0 alerts 0 unack: 0 new	2 alerts 0 unack: 2 new 2011/12/14 14:40:54	1 alerts 0 unack: 0 new 2012/05/10 05:00:47	0 alerts 0 unack: 0 new	1 alerts 0 unack: 0 new 2012/05/08 23:58:40	2 alerts 0 unack: 0 new 2012/05/10 05:11:30
Mch	Mtr	Phs	Pmd	Sdd	Spd
3 alerts 0 unack: 0 new 2012/05/10 09:20:11	0 alerts 0 unack: 0 new	0 alerts 0 unack: 0 new	0 alerts 0 unack: 0 new	0 alerts 0 unack: 0 new	0 alerts 0 unack: 0 new
Ssd	To	Tof	Tpc	Trd	Trt
0 alerts 0 unack: 0 new	0 alerts 0 unack: 0 new	2 alerts 0 unack: 1 new 2012/05/06 11:10:30	1 alerts 0 unack: 1 new 2012/05/10 13:57:14	2 alerts 0 unack: 1 new 2012/05/10 13:54:09	0 alerts 0 unack: 0 new
V0	Zdc				
0 alerts 0 unack: 0 new	0 alerts 0 unack: 0 new				

Fig. 3: The central alarm screen panel and sample alarm instructions

**Alarm Help**  
LHC clock phase shift

LHC clock phase is drifting, the value can be corrected on the CTP side.

**Warning**  
If the phase shift is > 0.75 to add the SL to warn the CTP shifter, because the clock phase is too high. If the phase goes to 1 sec, the LHC will become FATAL.

**Error**  
The LHC clock phase shift is too high. When the SL to call the CTP shifter at the next clock transition be should apply a correction to the LHC phase.

**Action for the Expert**

**Action for the Central Operator**  
The DCS shifter is only supposed to alert the SHEET LEADER, who will then call the CTP shifter. Please acknowledge the alert when you have informed the relevant person.

- Emergency procedures are delivered to the operator by the alarm help mechanism that is integrated with the central alert screen.
- The instructions are written in the XML files and stored within PVSSII projects. The XSL Transformation is used for formatting of final documents.

## New generic repository

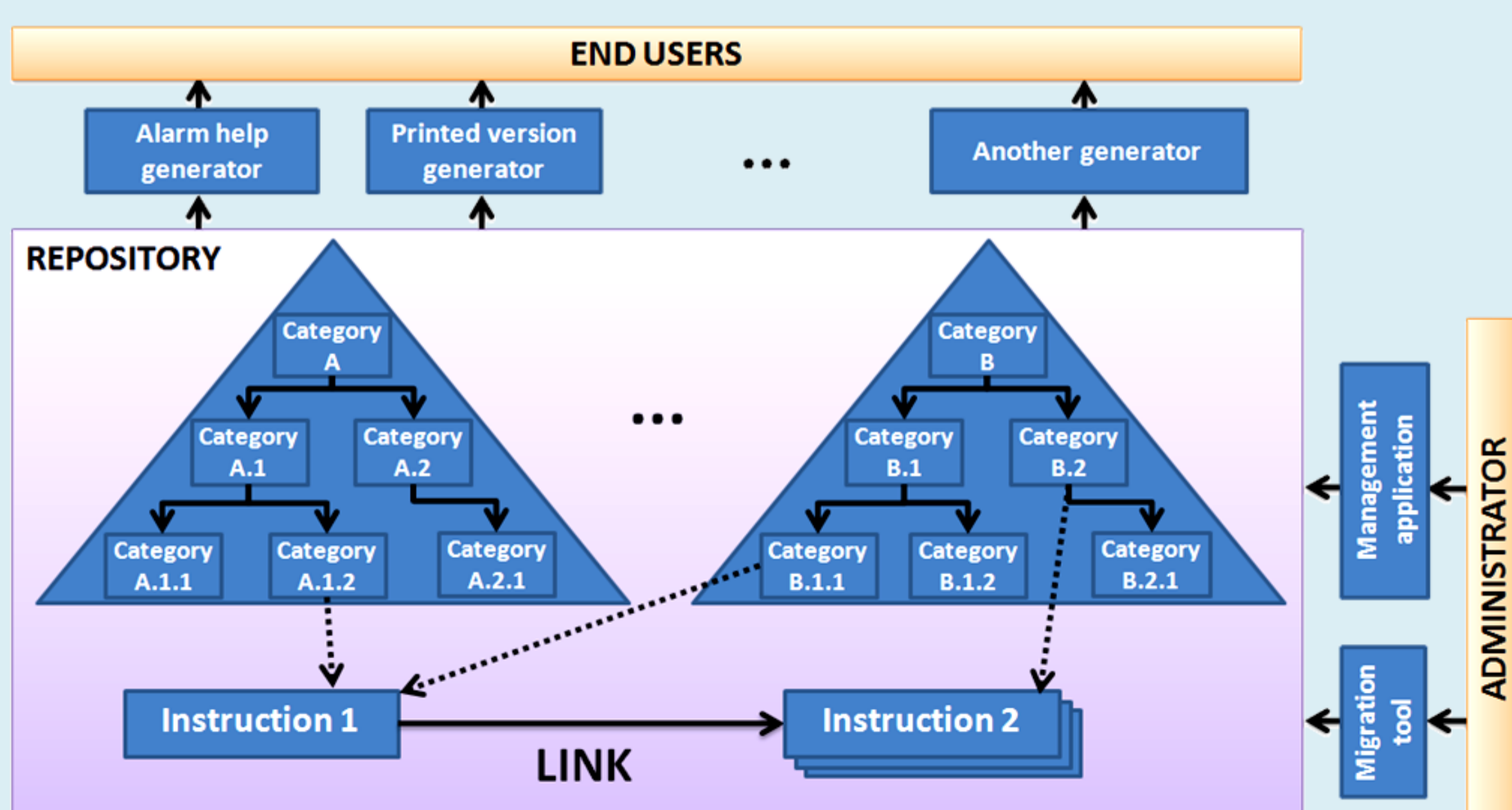


Fig. 4: The logical structure of new documentation repository

To reduce redundancy of documentation and improve its maintenance, a new generic storage, built on a relational database, is being implemented.

- The instructions can be assigned to many categories which improves classification capabilities and allows extension of repository for new types of documents.
- The mechanism of links allows tracking of relations between the procedures and helps to keep integrity of stored information.
- External tools can access the repository and automatically generate the final documents.

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