

The Memory of MICE, the Configuration Database

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The configuration database (CDB) is the memory of the Muon Ionisation Cooling Experiment (MICE). Its principle aim is to store temporal data associated with the running conditions of the experiment. These data can change on a per run basis (e.g. magnet currents, high voltages), or on long time scales (e.g. cabling, calibration, and geometry). These data are used throughout the life cycle of experiment, from running the experiment through to data analysis and reconstruction.

The CDB has expanded from its initial use to form an essential part of the MICE state machine as used by the controls and monitoring system. The state of MICE: off, testing, running, etc., dictates the possible states of a hierarchy of sub-systems. The CDB stores information about allowed combinations of states along with allowed settings for all controls for every state.

Master and slave CDBs have been set up in different parts of the site to increase resilience. Both machines have multiple mirrored pair raid arrays, with the data stored on one mirrored pair and the transaction logs stored on another mirrored pair of each machine. Off site backups of the data are also kept. Access to the CDB is via a Python API, which communicates with a WSDL interface provided by a web-service on the CDB.

The priority is to ensure availability of the CDB to the control room systems. The master CDB is located in the control area where it is only used by the running experiment. In the event of the failure of the master, the slave can be promoted and the control room services can be switched to use the new master. Read only access to the CDB for data analysis and reconstruction is provided by the slave which has an up to the minute copy of the data.

MICE is a precision experiment, it is imperative that we minimize our systematic errors; the CDB will ensure reproducible and documented running conditions in a highly resilient manner. This information is crucial to the running of the experiment and understanding the experimental data.