The integration of web technologies and applications has been one of the major trends for the development of new services for Control Systems (CS) of particle accelerators and large experimental apparatuses. Nowadays, high performance web technologies exhibit some features that would allow their deeper integration in a CS and their employment in developing CS’ core components. We present a preliminary investigations of a new paradigm for a particle accelerators CS, named ICHAOS, and the associated machine data acquisition system based on a synergic combination of network distributed cache memory and a non-relational key/value database. The preliminary tests performed in a real environment and on real elements under control in the two accelerators, and the associated machine data acquisition system based on a synergic combination of network distributed cache memory and a non-relational key/value database.

![Diagram of ICHAOS](Image)

**ICHAOS** is designed in such a way to accommodate any kind of devices to reduce the hardware dependence and to drop the development time by exploiting the availability of many devices with embedded programmable CPU. Furthermore, the CS has to be able to control and - where needed - to acquire data with performance limited only by the hardware capability. This is guaranteed by the possibility to easily trigger the hardware and synchronize operations among distributed components.

Data serialization strategy adopted is BSON, a binary-encoded JSON (JavaScript Object Notation) document, optimized for fast storage performance. Two open-source software, which allow scalability and redundancy, are currently under tests as candidates: Memcached for the live data object caching and MongoDB for the history key-value database.

The aim of **ICHAOS** (Control System based on Highly Abstracted Operating Structure – but not a mess!) is to provide a solution that naturally allows:

- redundancy of all its parts
- intrinsic scalability
- minimization of points of failure
- hardware hot-integration and auto configuration.

**ICHAOS**, basically developed in C++, employs distributed object caching for real-time data access (Live Database) and a key-value database for data archiving (History Database), continuously filled by data pushed from acquisition hardware.

A Control Library (CL) completely manages data and commands flow, the control processes and the devices configuration. The device’s programmer is only asked to develop the driver for the specific controlled hardware, called Control Unit, that is the only part that instances the ICHAOS abstraction. The CL also provides the syntax and semantics for dataset and command to the Metadata Server that allows the correct information retrieval. The CL takes care of the data serialization, communication with databases, handling of system’s and client’s commands and standard services of CS.

**User Interface Toolkit** provides the client applications (display panels, measurement applications, etc.) with the interface to the CS framework retrieving configuration information from the Metadata Server, accessing live data (from cache db) and archived data (from history db), sending commands to devices, etc.