The control and supervisory systems of the CMS experiment have a distributed, redundant architecture based on SIMATIC WinCC OA.

**Runtime database**

The hardware interfacing and persistence layer is implemented with a runtime database. It stores process variables using the concept of structured Datapoints.

**Limited data manipulation language**

CTRL language is an interpreted, procedural, C-like scripting language to program control scripts and user interfaces. It includes basic library functions to manipulate process variables.

**CTRL language**

The toolkit enables modern software engineering techniques:
- System entities modelling in classes.
- Design complex software architectures.
- Rapid implementation with a computer aided engineering tool.

**CMSfwClass**

CMSfwClass is a control systems development toolkit for WinCC OA to add Object Orientation and encapsulation down to the datapoint level.

**UML design**

The toolkit permits more direct translation of software design into algorithms and data models. It can also generate documentation from the implementation in the form of UML class diagrams.

**CASE UI**

A GUI guides developers during the process of creating classes and objects while encouraging consistency and best-practices with:
- Code generation.
- Syntax checking.
- Object management.

**Encapsulation**

Provides full encapsulation by putting together entity definitions and behaviour in a single source code file, describing how the model interacts with other classes and libraries.

**OO Architecture**

It provides many common OO programming features:
- Single inheritance.
- Method overriding.
- Interface definition.
- Subtyping polymorphism.
- Object serialization.

**Implementation details**

For every object there will be one datapoint per implemented class. The parent-child class hierarchy determines where to find a particular attribute.