

FireSignal – Data Acquisition and Control System Software

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Control of fusion devices requires good, non-ambiguous, easy to use user-interfaces to configure hardware devices. To solve this problem a highly generic system for data control and acquisition has been developed. Among the main features it allows remote hardware configuration, shot launching, data sharing between connected users and experiment monitoring.

The system is fully distributed: the hardware driver nodes, clients and server are completely independent from each other and might be running in different operating systems and programmed in different languages. All the communication is provided through the Common Object Request Broker Architecture (CORBA) protocol.

FireSignal was designed from the beginning to be as independent as possible from any kind of constraints as it's a plugin based system. Database, data viewers and the security system are some examples of what can easily be changed and adapted to the target machine's needs.

All hardware is described in eXtendend Markup Language (XML) and from this information the FireSignal client application can build automatically Graphical User Interfaces (GUI) and validate the user's parameter configuration. Any type of hardware can be integrated in the system as long as it is described in XML and the respective driver is developed. Any modern programming language can be used to develop these drivers, and currently we use Python and Java generic drivers.

All data storage and indexing is time stamped event-based. Nodes are responsible for tagging the acquired samples with the absolute time stamps and to react to machine events.

FireSignal is currently being used to control the ISTTOK/PT and CASTOR/CZ tokamaks.