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Operational Experience with the Frontier System in CMS

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The Frontier framework is used in the CMS experiment at the LHC to deliver conditions data to processing clients worldwide, including calibration, alignment, and configuration information. Each of the central servers at CERN, called a Frontier Launchpad, uses tomcat as a servlet container to establish the communication between clients and the central Oracle database. HTTP-proxy squid servers, located close to clients, cache the responses to queries in order to provide high performance data access and to reduce the load on the central Oracle database. Each Frontier Launchpad also has its own reverse-proxy squid for caching. The three central servers have been delivering about 10 million responses every day since the LHC startup, containing about 60 GB data in total, to more than one hundred Squid servers located worldwide, with an average response time on the order of 10 milliseconds. The squid caches deployed worldwide process many more requests per day, over 700 million, and deliver over 40 TB of data. Several monitoring tools of the tomcat log files, the accesses of the squid on the central Launchpad server, and the availability of remote squids have been developed to guarantee the performance of the service and make the system easily maintainable. Following a brief introduction of the Frontier framework, we describe the performance of this highly reliable and stable system, detail monitoring concerns and their deployment, and discuss the overall operational experience from the first two years of LHC data-taking.

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