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Integration and validation testing for PhEDEx, DBS and DAS with the PhEDEx LifeCycle agent

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The ever-increasing amount of data handled by the CMS dataflow and workflow management tools poses new challenges for cross-validation among different systems within CMS experiment at LHC. To approach this problem we developed an integration test suite based on the LifeCycle agent, a tool originally conceived for stress-testing new releases of PhEDEx, the CMS data-placement tool. The LifeCycle agent provides a framework for customising the test workflow in arbitrary ways, and can scale to levels of activity well beyond those seen in normal running. This means we can run realistic performance tests at scales not likely to be seen by the experiment for some years, or with custom topologies to examine particular situations that may cause concern some time in the future.

The LifeCycle agent has recently been enhanced to become a general purpose integration and validation testing tool for major CMS services (PhEDEx, DBS, DAS). It allows cross-system integration tests of all three components to be performed in controlled environments, without interfering with production services.

In this paper we discuss the design and implementation of the LifeCycle agent. We describe how it is used for small-scale debugging and validation tests, and how we extend that to large-scale tests of whole groups of sub-systems. We show how the LifeCycle agent can emulate the action of operators, physicists, or software agents external to the system under test, and how it can be scaled to large and complex systems.

Summary

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