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Distributed cluster testing using new virtualized framework for XRootD

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The Extended ROOT Daemon (XRootD) is a distributed, scalable system for low-latency clustered data access. XRootD is mature and widely used in HEP, both standalone and as core functionality for the EOS system at CERN, and hence requires extensive testing to ensure general stability. However, there are many difficulties posed by distributed testing, such as cluster initialization, synchronization, orchestration, inter-cluster communication and controlled failure handling.

A three-layer master/hypervisor/slave model is presented to ameloirate these difficulties by utilizing libvirt and QEMU/KVM virtualization technologies to automate spawning of configurable virtual clusters and orchestrate multi-stage test suites. The framework also incorporates a user-friendly web interface for scheduling and monitoring tests.

The framework has been used successfully to build new test suites for XRootD and EOS with existing unit test integration. It is planned for the future to sufficiently generalize the framework to encourage usage by potentially any distributed system.

Summary

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