GEC13 Demonstration

CRON: Cyber-infrastructure of Reconfigurable Optical Networks

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Project Website: http://www.cron.loni.org

Abstract

CRON is a cyber-infrastructure of reconfigurable optical networking environment that provides multiple virtual networking testbeds consisting of routers, delay links, and high-end workstation operating up to 10Gbps of bandwidth. Different application developers and networking researchers can use those virtual high-speed networking and computing environments without technical knowledge of network hardware and software. With the support of NSF (award #0821741) and GENI grants, the LANET network research group at Louisiana State University has developed and operated the CRON Testbed, which is based on the Emulab project.

CRON provides integrated and automated access to a wide range of high-speed networking configurations, such as NLR (National Lambda Rail), Internet2, LONI (Louisiana Optical Network Initiative), etc., and purely user-defined networks. Moreover, users can dynamically reconfigure all computing resources, such as operating system, middleware, and application, based on their specific demands. Due to the automated and reconfigurable characteristics, all types of experiments on CRON are repeatable and controllable. CRON is suitable for cloud computing experiments as well. Multiple cloud computing clusters can be created in a 10Gbps network environment. Customized Eucalyptus and Hadoop images are available for CRON users to launch large-scale distributed applications, such as computational biology applications.

Demo Scenario 1: We emulate the scenario of virtual machines from two physically distributed clouds aggregating into a large virtual cluster. We setup two separate NEuca-patched Eucalyptus Clouds that connect to each other via a 10 Gbps high-speed network with long delay. The VMs from the two clouds are configured to operate as one virtual cluster. We deploy the Hadoop MapReduce framework on the virtual cluster and measure the performance of Hadoop with several benchmarks.

Demo Scenario 2: We federate CRON Testbed with MAX PlanetLab Central to connect resources from both sites with the Omni tools. The data interfaces on both sides connect into the Internet2 through ION service. This demo illustrates the capability of CRON Testbed to cooperate with any other testbeds which are compatible with the GENI framework.