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Enabling On-Demand Scientific Workflows on a Federated Cloud

Cooperative Research and Development Final Report

CRADA Number: FRA-2014-0002

FERMI Technical Contact: Gabriele Garzoglio

Summary Report
5 November 2014

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In accordance with Requirements set forth in Article XI.A(3) of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

CRADA number: FRA 2014-0002

CRADA Title: Enabling On-Demand Scientific Workflows on a Federated Cloud

Parties to the Agreement: Korean Institute of Science and Technology Information (KISTI) and Fermi Research Alliance

Abstract of CRADA work:

The Fermilab Grid and Cloud Computing Department and the KISTI Global Science experimental Data hub Center are working on a multi-year Collaborative Research and Development Agreement. With the knowledge developed in the first year on how to provision and manage a federation of virtual machines through Cloud management systems.

In this second year, we expanded the work on provisioning and federation, increasing both scale and diversity of solutions, and we started to build on-demand services on the established fabric, introducing the paradigm of Platform as a Service to assist with the execution of scientific workflows. We have enabled scientific workflows of stakeholders to run on multiple cloud resources at the scale of 1,000 concurrent machines. The demonstrations have been in the areas of (a) Virtual Infrastructure Automation and Provisioning, (b) Interoperability and Federation of Cloud Resources, and (c) On-demand Services for Scientific Workflows.

Summary of Research Results:

The collaboration between Fermilab and KISTI achieved the goals in the statement of work for the second year of the CRADA. Broadly, we have achieved two main results:

1. We have developed techniques and methods to increase the scale of resource provisioning to 1,000 VM and the complexity of on-demand services dynamically deployed in support of scientific computation;
2. We have automated and simplified the formatting and distribution of virtual machines across an increasingly broad federation of diverse Cloud providers.

05 November 2014

Subject Inventions listing: None

Report Date: 10/31/14

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