Enabling the Creation of Dynamic Globus Endpoints on AWS via CloudyCluster

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Outline

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Motivation

- Many researchers do not have adequate access to HPC resources exactly when they need it
- Steep learning curve associated with Cloud Providers researchers do not have time to learn how to use these services
- Data transfer to Cloud Provider Resources can be complex for researchers with little system administration experience
Amazon Web Services (AWS) Overview

- Amazon Web Services (AWS) are a collection of services that allow users to allocate resources within the Amazon cloud.
- Provide a number of different computing services such as database systems, virtual servers, identity and access management, data storage, and many others.
- Pay-as-you-go services so that the user only pays for what they use.
- Most services are charged on an hourly basis.
CloudyCluster Overview

- Simple Web Based UI for creating dynamic fully operational HPC Clusters on demand within AWS without in depth knowledge of AWS
- Medium size clusters can be created within 20 minutes
- Standard suite of HPC Software pre-configured and installed
- Automated Globus Endpoint Creation for easy data transfer to and from the Cluster
- High availability OrangeFS Parallel Filesystem and/or a Scratch Filesystem preconfigured and automatically mounted
New Cluster Setup

Provide the following information and then select a cluster creation method.

Select the cluster region

```plaintext
us-west-2
```

Select the instance ssh key to use for instances in this cluster

```plaintext
ccDemo
```

Select the Cluster availability zone

```plaintext
us-west-2a
```

Cluster Information

Select your preferred CloudyCluster version.

```plaintext
Current Version
```

Enter a Name for the Cluster.

```plaintext
globusWorldCluster
```

Next you will create three sets of instances
- Utility (Scheduler, Access Instances, etc.)
- Working Storage (Scratch)
- Compute Groups

Select a method to create a cluster:

- Quick Start Clusters
- Advanced Configuration
Quick Start

Select one of the following cluster configurations.

- 1 Job-Scaling Compute Group (ccq and Torque Scheduler)
  4 OrangeFS File System Instances, 1 Standby
  1 Login Instance, 1 Scheduler, and 1 NAT Instance

- 4 Dedicated Compute Instances in 1 Compute Group
  Amazon Elastic File System - EFS - (configured below)
  1 Login Instance, 1 Scheduler, and 1 NAT Instance

- 4 Dedicated Compute Instances in 1 Compute Group
  4 OrangeFS File System Instances, 1 Standby
  1 Login Instance, 1 Scheduler, and 1 NAT Instance

- 8 Dedicated Compute Instances in 1 Compute Group
  4 OrangeFS File System Instances, 1 Standby
  1 Login Instance, 1 Scheduler, and 1 NAT Instance

Amazon Elastic File System:

Amazon EFS provides a low-latency, shared access fully-managed NFS file system.

- Enable EFS
  EFS Name: [Enter EFS Name]

Shared Software Installation Mount:

Shared Software Mount is a place to install software that can then be mounted on a cluster for

Dynamic Globus Endpoint Creation

- UI driven Dynamic Globus Endpoint Creation
- All the user has to do is enter their Globus credentials in the CloudyCluster UI and activate the endpoint in Globus
- Endpoints are created within 3-5 minutes
- Allows transfer of data directly to the Cluster’s shared filesystem(s)
- Allows researchers with little Globus administration experience to utilize all of the Globus features on their own Cluster
Dynamic Globus Endpoint Creation

- Globus Endpoints are created on a per Cluster basis
- Extra Globus transfer nodes can be added for faster parallel transfers
- All AWS Security Group and firewall entries are created dynamically
- Utilizes OAuth for Globus Endpoint Activation and all authentication is done locally on the Cluster
Conclusion

- Allow researchers access to on demand HPC clusters exactly when they need it
- Clusters and Globus Endpoints are available in minutes
- Minimal AWS knowledge required for creating HPC Clusters within AWS
- Dynamic Globus Endpoint Generation allows for easy data transfer to and from the Cluster
- Researchers can now focus more on their research instead of how to obtain the HPC environment that they need
Questions?

Thank you!
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