Glint - Image Distribution in a Multi-Cloud Environment

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Glint - Image Distribution in a Multi-Cloud Environment

- Overview:
 - Who we are and what we do
 - Why did we develop Glint?
 - All about Glint
 - Summary

Glint - Who we are...

- High Energy Physics (HEP) research team at the University of Victoria.
- Developing computing and networking solutions for HEP
- Support other scientific disciplines, particularly those which leverage High Throughput Computing in a batch environment.
- Actively working on virtualization and cloud computing since 2006.



Glint - ... and what we do

High Energy Physics (Particle Physics) The area of physics that studies the fundamental particles of nature and their interactions.

- Primary interests are in the ATLAS and Belle-II experiments
- ATLAS discovering the source of mass; the Higgs Boson
- Belle-II probing why our universe is not made equally of matter and anti-matter

Glint – LHC, Geneva and ATLAS Detector Under Construction





Colin Leavett-Brown, University of Victoria

Glint – Belle-II Detector Under Construction



Glint – ATLAS production jobs on distributed cloud in 2014



- Monte Carlo simulation jobs
- Approximately 12 hours duration each
- 95%+ efficient
- 1.2 million jobs this year
- Three continents

Glint – Belle-II production jobs, worldwide



251,000 jobs in 30 days.

 UVic third highest producer at 8.6% of the total jobs run

Currently running 12,000 jobs per day

10+ clouds, including 3 • commercial

Generated on 2014-10-23 17:54:40 UTC

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Glint – Using clouds on three continents



Glint – High Throughput Computing work flow



Glint – High Throughput Computing work flow





Glint – High Throughput Computing work flow Job Scheduler







































Colin Leavett-Brown, University of Victoria

Automated cloud computing with manual image distribution



Manual image distribution is manageable with a few clouds and images, but...



Glint – Manual image distribution no longer practical



- Time Consuming
- Error prone:
 - UUIDs, AMIs, Names

OpenStack
Nimbus
EC2 & GCE

Glint - Why did we develop Glint?

 We needed something to transfer images to many sites

Glint - Why did we develop Glint?

- We needed something to transfer images to many sites
- Blueprints



Glint - Why did we develop Glint?

- We needed something to transfer images to many sites
- Blueprints abandoned 2014-02-07
- Looked at Staccato (John Bresnahan)

Ip Image Transfer Service : E × 0 ☆ = Log in / Register **OpenStack Image Registry and Delivery Service (Glance)** openstack Overview Blueprints Translations Answers Buas Image Transfer Service 🔓 This blueprint contains **Public** Glance » Blueprints » Image Transfer Service information Registered by 💂 John Bresnahan on 2013-02-25 Everyone can see this OpenStack could benefit from a service designed specifically for large data information. transfers. This service would be on both the source and the destination of an image transfer and be in a position to negotiate the best protocol (http, bittorrent, Edit subscription etc) and prevent the transfer from over using I/O resources (both disk and 🖶 Subscribe network). A beginning of these ideas can be found here: http://tropicaldevel. someone else wordpress.com/2013/01/11/an-image-transfers-service-for-openstack/ Subscribers Section 24 Jay Dobies 🚨 Jin Liu Blueprint information 🚨 John Bresnahan NetApp Related branches Status: Approver: 🚨 John Bresnahan Started **Related bugs** Priority: Drafter: Sprinte https://blueprints.launchpad.net/glance/+spec/image-transfer-service
Glint - Design objectives

- Reuse existing functionality, only develop missing pieces.
 - Keystone for authentication.
 - Glance data movement
 - Local Glance repository as "home" repository.
- Distribution/instantiation by image name.
- Pluggable architecture to allow support for other cloud types.
- Threaded to perform data movement in parallel.
- Security and data integrity.
- Use standard OpenStack development architecture.

Glint – Four components

- glint image distribution service
- glint-horizon horizon dashboard user interface
- glint-service installation scripts
- glint_backup stand-alone backup utility

Glint – Uses Glance (services, images and meta-data)



Glint – Uses Glance (services, images and meta-data)



Glint – Uses Horizon, Keystone and Glance



Glint – Uses Horizon, Keystone and Glance



Glint – Uses Horizon, Keystone and Glance



Glint – Has its own meta-data (and a cache)

Repositories

Cloud, URL, Type, Description



Glint – Has its own meta-data (and a cache)



Glint – Has its own meta-data (and a cache)



Glint – Distributing images Local Cloud **Remote Clouds** Keystone Keystone Horizon Glint (horizon) Glance Keystone Glance Glance Keystone Glint Cache Glance Glint (service)









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Glint – Horizon dashboard interface

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Glint – Horizon dashboard interface

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Glint – Horizon dashboard interface

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Glint – Backup utility

- Incremental backup of local Glance repository to local directory.
- Saves both images and metadata.
- Stand-alone utility run by cron under non-privileged user (requires keystone admin account)
- Simple JSON configuration:

{
 "glint_backup_admin_pw_key": "hiera_key_for_password_value",
 "glint_backup_admin_user": "admin_user_name",
 "glint_backup_admin_tenant": "admin_tenant_name",
 "glint_backup_auth_URL": "http://192.168.1.1:5000/v2.0",
 "glint_backup_dir": "/local/backup/glance",
 "glint_backup_hiera_config": "/usr/local/etc/glint/hieradata/hiera.yaml",
 "glint_backup_logfile": "/var/log/glint/glint_backup.logfile",
 "glint_backup_testing": "False"
}

Glint – Useful links

- https://github.com/hep-gc/glint
 - Source code repository for glint service and backup utility.
- https://github.com/hep-gc/glint-horizon
 - Source code repository for modified Horizon dashboard.
- https://github.com/hep-gc/glint-service
 - Repository for installation scripts.
- http://heprc.phys.uvic.ca
 - Team website: publications, reports, and presentations.

Glint – Command line interface

• New Feature (https://github.com/hep-gc/glint/issues/30):

Suggested utility/syntax: Usage: glint <subcommand> <parameters> (Note: Use an openrc.sh to establish authentication to a tenant on the local cloud prior to issuing the glint command.) Subcommands: repository-add --name <*repository name> --url <*authorization url> ---format <*cloud type | OpenStack> -description <*description> repository-delete --name <*repository name> repository-edit --name <*repository name> --url <authorization url> --format <cloud type | OpenStack> --description <description> repository-list credentials-add --name <*repository name> --tenant <*tenant name> --username <*user name> --password <*password>

Glint – How to try it

- 1) Get a copy of Glint's installation scripts (this is all you need) git clone https://github.com/hep-gc/glint-service.git.
- 2) "cd" into the "glint-service" directory.
- 3) Double check that ports 8080, 8483, and 9494 are open on your glint test machine.
- 4) Change the configuration files to match your installation (i.e., point glint installation to your current openstack deployment). These are the glint_services.yaml and glint_setup.yaml files.
- 5) Start Download, Install and Setup of glint using "sudo python glint_setup.py install" (this takes about 10-15 minutes).

Glint - Image Distribution in a Multi-Cloud Environment

- Summary:
 - We are continuing to develop and enhance it.
 - We believe it has applicability and general utility for a wider audien
 - We would like to see Glint incorporated into OpenStack.
 - Acknowledgements: UVic, IPP, CANARIE, and NSERC.

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