OpenStack vs. Ganeti

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Session Overview

- OpenStack quick overview
- Ganeti overview
- Ganeti walk-through
- Comparing both
About me

Lance Albertson
Director, OSU Open Source Lab (OSUOSL)
  Provide infrastructure hosting for FOSS projects
  Linux Foundation, Python Software Foundation, Drupal, etc
Ops guy
Ganeti user since 2009
OpenStack user since 2013
http://osuosl.org
Virtualized Computing Resources

Each organization has different needs
Some are small and simple
Others are more complex and larger
Cost is also a major factor (both in licenses and staff maintenance)
Typical Solutions

VMWare
VirtualBox
OpenStack
[insert favorite solution]
OpenStack is all the hype

Designed to scale and be an AWS replacement (almost)
Everyone is investing in it
Still maturing as a project
Includes a wide-array of features, many of which most people don't need
OpenStack Overview
OpenStack Pros

Standard Cloud API
Fast VM deployment and tear down
Very elastic computing needs
Large community support
Fast growing and new features constantly
OpenStack Cons

- Extremely difficult to deploy and maintain
- Lots of moving parts
- Project is still maturing and unstable
- Fits a very specific use-case (Cloud)
- Requires more than one machine to effectively use
So what about Ganeti?
First, what is Ganeti?

- Cluster management tool for virtual compute resources
- IaaS solution that uses either KVM or Xen hypervisors
- Provides fast and simple recovery from hardware failures
- Primarily CLI driven, sysadmin focused
- Supports live migration cluster re-balancing
What isn't Ganeti?

Not an entire cloud-platform by itself (primarily only provides compute)

Doesn't provide object/image storage by default

Not meant to be directly interfaced with users
Ganeti Overview

virtual machine failover/migration

master role
Project Background

Google funded project
Used widely internally at Google
Active community, mailing list and IRC
Started before libvirt/OpenStack
Primarily written in Python / Haskell
No central relational database
GanetiCon - Sept 15-17, 2015 - Prague (third developer summit)
Ganeti Goals

Low Entry Level

   Easy to install, manage and upgrade
   Architecture is fairly easy to understand

Enterprise Scale

   Manage 1 to 200 within a single cluster

Open Source Citizen

   Design and code discussions are open to the community
   Welcome third-party projects
Clusters are comprised of nodes, one of which is master
Nodes can be split up into logical groups
Instances (guests) run on nodes
Ganeti Terminology

Node: Virtualization host
Instance: Virtual Machine Guest
Cluster: Set of nodes, managed as a collective
Node Group: homogeneous set of nodes (i.e. rack of nodes)
Job: Ganeti operation
Storage in Ganeti

Disk templates
LVM, DRBD
RBD
File (both local and shared via NFS)
External storage provider for SAN's
Designed to be flexible
Instances always run on primary node
Uses secondary node for replication when using DRBD template
Also works with RBD, ext and shared file templates
Ganeti Walk-through

root@node1:~# gnt-node list
Node              DTotal DFree MTotal MNode MFree Pinst Sinst
node1.example.org  26.0G 25.5G   744M  186M  587M     0     0
node2.example.org  26.0G 25.5G   744M  116M  650M     0     0

root@node1:~# gnt-os list
Name
image+cirros
image+default

root@node1:~# gnt-instance add -n node1 -o image+cirros -t plain -s 1G --no-start instance1
Thu Jun  7 06:05:58 2015 * disk 0, vg ganeti, name 780af428-3942-4fa9-8307-1323de416519.disk0
Thu Jun  7 06:05:58 2015 * creating instance disks...
Thu Jun  7 06:05:58 2015 adding instance instance1.example.org to cluster config
Thu Jun  7 06:05:58 2015  - INFO: Waiting for instance instance1.example.org to sync disk
Thu Jun  7 06:05:58 2015  - INFO: Instance instance1.example.org's disks are in sync.
Thu Jun  7 06:05:58 2015 * running the instance OS create scripts...

root@node1:~# gnt-instance list
Instance              Hypervisor OS           Primary_node      Status     Memory
instance1.example.org  kvm        image+cirros node1.example.org ADMIN_down     -
Ganeti Walk-through (Instance Info)

```
root@node1:~# gnt-instance info instance1
Instance name: instance1.example.org
UUID: bb87da5b-05f9-4dd6-9bc9-48592c1e091f
Serial number: 1
Creation time: 2015-06-07 06:05:58
Modification time: 2015-06-07 06:05:58
State: configured to be down, actual state is down
  Nodes:
    - primary: node1.example.org
    - secondaries:
  Operating system: image+cirros
  Allocated network port: 11000
  Hypervisor: kvm
    - console connection: vnc to node1.example.org:11000 (display 5100)
...
Hardware:
  - VCPUs: 1
  - memory: 128MiB
  - NICs:
    - nic/0: MAC: aa:00:00:dd:ac:db, IP: None, mode: bridged, link: br0
Disk template: plain
Disks:
  - disk/0: lvm, size 1.0G
    access mode: rw
    logical_id: ganeti/780af428-3942-4fa9-8307-1323de416519.disk0
    on primary: /dev/ganeti/780af428-3942-4fa9-8307-1323de416519.disk0 (252:1)
```
Ganeti Walk-through (Converting disk template)

root@node1:~# gnt-instance shutdown instance1
Waiting for job 11 for instance1.example.org ...

root@node1:~# gnt-instance modify -t drbd -n node2 instance1
Thu Jun  7 06:09:07 2015 Converting template to drbd
Thu Jun  7 06:09:08 2015 Creating additional volumes...
Thu Jun  7 06:09:08 2015 Renaming original volumes...
Thu Jun  7 06:09:08 2015 Initializing DRBD devices...
Thu Jun  7 06:09:09 2015 - INFO: Waiting for instance instance1.example.org to sync disk
Thu Jun  7 06:09:11 2015 - INFO: - device disk/0: 5.10% done, 20s remaining (estimated)
Thu Jun  7 06:09:31 2015 - INFO: - device disk/0: 86.00% done, 3s remaining (estimated)
Thu Jun  7 06:09:34 2015 - INFO: - device disk/0: 98.10% done, 0s remaining (estimated)
Thu Jun  7 06:09:34 2015 - INFO: Instance instance1.example.org's disks are in sync.
Modified instance instance1
- disk_template -> drbd
Please don't forget that most parameters take effect only at the next start of the instan
Ganeti Walk-through (Live migration)

```
root@node1:~# gnt-instance start instance1
Waiting for job 14 for instance1.example.org ...

root@node1:~# gnt-instance migrate -f instance1
Thu Jun  7 06:10:38 2015 Migrating instance instance1.example.org
Thu Jun  7 06:10:38 2015 * checking disk consistency between source and target
Thu Jun  7 06:10:38 2015 * switching node node1.example.org to secondary mode
Thu Jun  7 06:10:38 2015 * changing into standalone mode
Thu Jun  7 06:10:38 2015 * changing disks into dual-master mode
Thu Jun  7 06:10:39 2015 * wait until resync is done
Thu Jun  7 06:10:39 2015 * preparing node1.example.org to accept the instance
Thu Jun  7 06:10:39 2015 * migrating instance to node1.example.org
Thu Jun  7 06:10:44 2015 * switching node node2.example.org to secondary mode
Thu Jun  7 06:10:44 2015 * wait until resync is done
Thu Jun  7 06:10:44 2015 * changing into standalone mode
Thu Jun  7 06:10:45 2015 * changing disks into single-master mode
Thu Jun  7 06:10:46 2015 * wait until resync is done
Thu Jun  7 06:10:46 2015 * done
```
Common Use Cases for Ganeti

- Cheap, stable and reliable virtual compute resources
- Hosting web sites and other misc services in a private
- Useful for hosting "pet" virtual machines
- Need a highly reliable IaaS
- Small to medium size organizations with few sysadmins
Ganeti Pros

- Architecture is fairly easy to deploy and understand
- Requires a minimal staff to maintain and upgrade
- Scales well for small/medium organization needs
- Highly customizable backend
- Built-in redundancy
- It just works!
Ganeti Cons

No GUI frontend by default (third party projects do have some)

API isn't very cloud compatible

API not intended to be open to general users of the platform

Management becomes slower the larger the cluster gets (although, its improving)
Ganeti + Synnefo = OpenStack-ish

Synnefo is a complete open source IaaS cloud stack written in Python that provides Compute, Network, Image, Volume and Object Storage services

https://www.synnefo.org

Manages multiple Ganeti clusters
Provides API/Accounting/Quota/Block/Object storage
Written in Python by GRNET
Transforms Ganeti into an OpenStack/AWS-like platform
How the OSL is using Ganeti

Hosting all of the "Pet" VMs we still need
Project specific VM(s)
Mix of shared web infrastructure (load balancers, web frontends, backend services)
OpenStack controller node (yes!)
Whenever we want to host something that needs to have high reliability
How the OSL is using OpenStack

Two clusters: OSL-internal x86 / Public POWER8 based

OSL-internal
  - Chef cookbook integration testing
  - Developer staging/development VMs
  - Multi-node testing

POWER8
  - FOSS project ppc64/ppc64le porting efforts
  - POWER8 software testing
OpenStack / Ganeti side-by-side

OpenStack:

   Pro: Great for quickly creating test vms for integration testing
   Con: Extremely complicated to setup and maintain

Ganeti:

   Pro: Extremely fault tolerant and stable VM hosting and easy to use/maintain
   Con: Doesn't scale well for cloud-specific needs
Future plans

Open up OpenStack cluster to our hosted projects later this year
Continue using Ganeti along-side OpenStack
Research using ManageIQ as an interface between both
Continue supporting both platforms long term
Final Summary

Both fill a specific niche in the ecosystem.

OpenStack will eventually mature and become more stable.

Give Ganeti a look, might be what you're looking for if OpenStack is too complicated.

Make sure you experiment with both and fully understand their maintenance needs.
Questions?

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