Docker Management: fig, OpenStack

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Fig as a Container Orchestrator

- Fast, isolated development environments using Docker: http://orchardup.github.io/fig/
- Can also be used to run environments in production
- Useful to automatically deploy environment using multiple containers, with on-demand scaling

Using Fig

- Usage:
  - If you need to build an image with your code/ config/etc.
  - Write a fig.yml describing links between your containers
  - Run the environment
- Fig-managed apps have their own lifecycle
  - Build, Run, Scale, Stop
    - Build and Run grouped in Up

Fig Demo

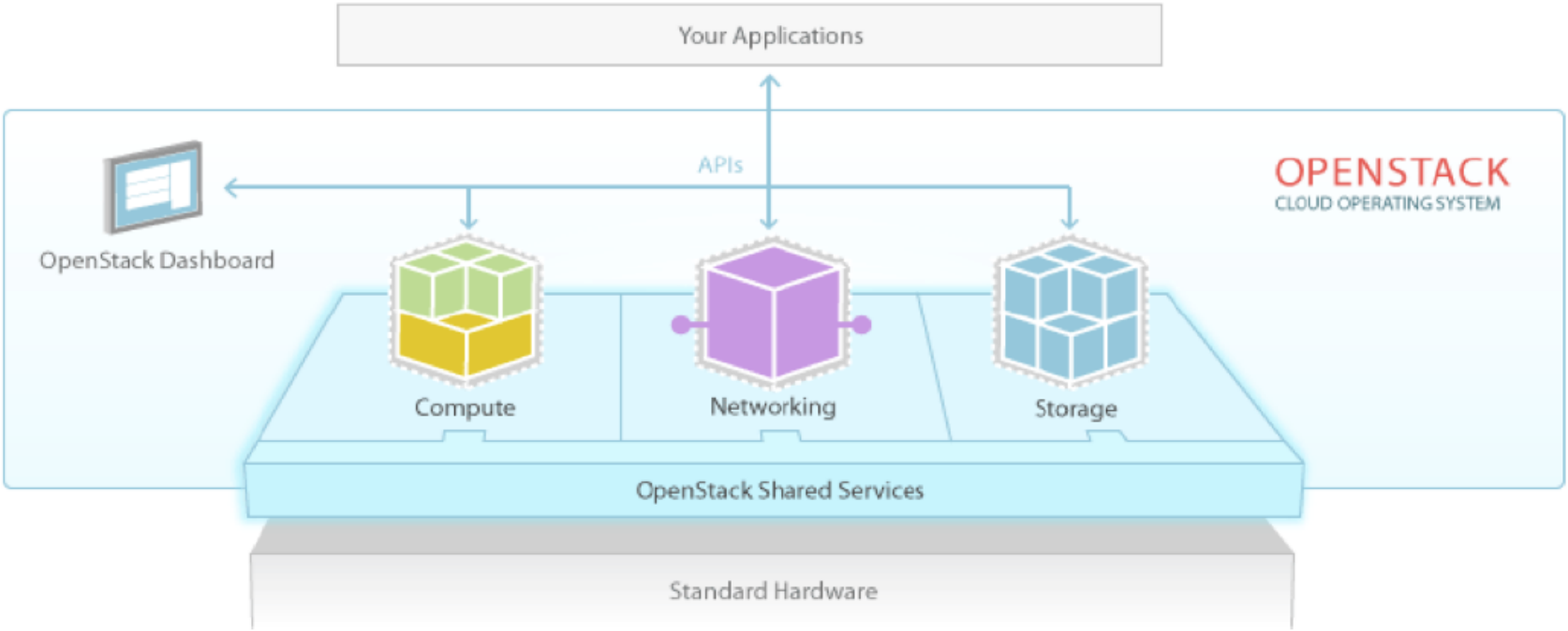
- Sample wordpress application
  - Two containers automatically linked

Use-Case: Load-Balanced environment with Fig

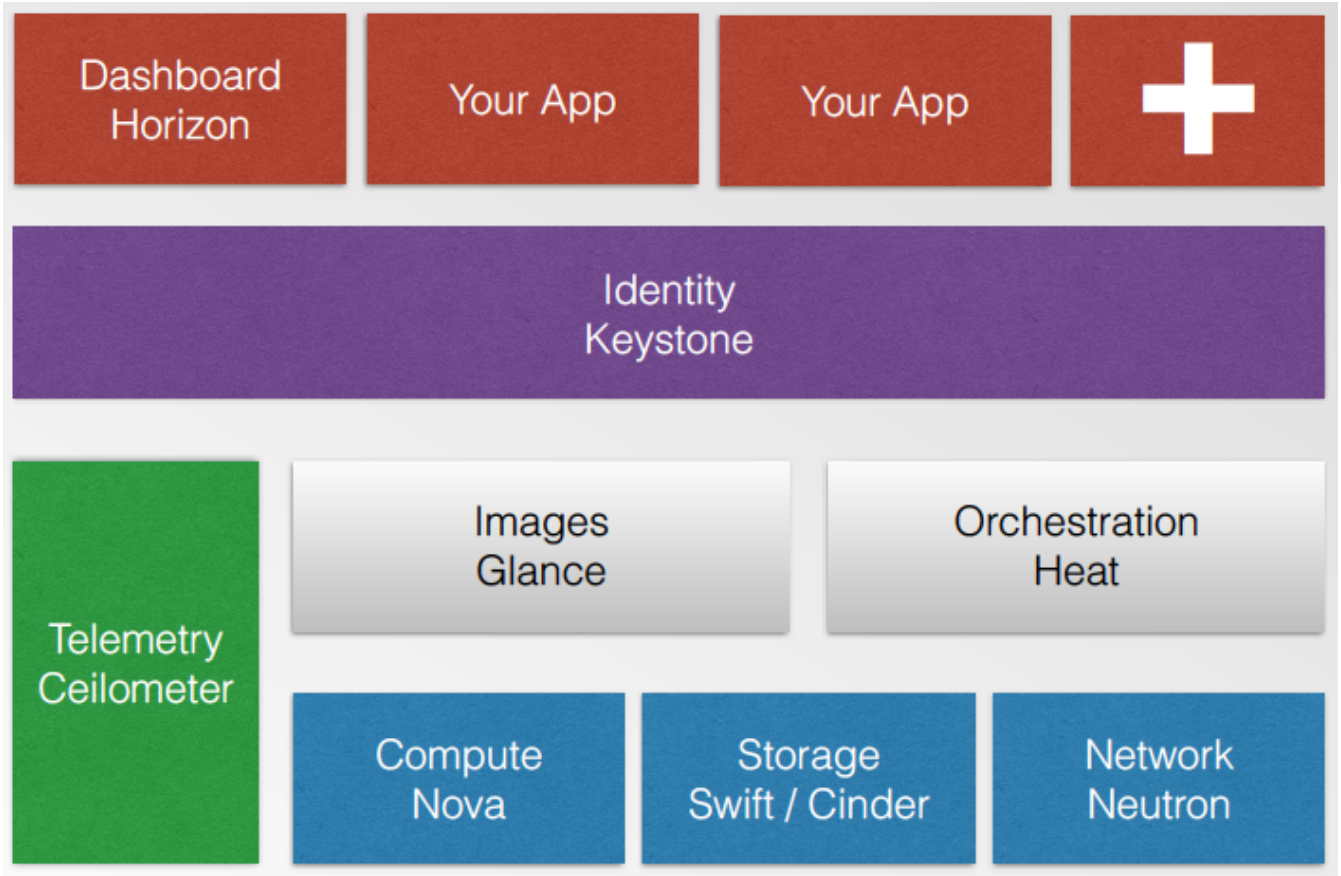
- Automatically managed Load-balanced application using HAProxy and Serf
  - HAProxy is a Load Balancer
  - Serf is a decentralized solution for cluster membership, failure detection and orchestration
- Fig allows the duplication of containers from an app (scaling)
- Serf can automate the additions of new containers to the LB configuration
- Lifecycle: fig up (initial), fig scale web==5

OpenStack

- Goal: Integrate Docker in a VM-oriented IaaS framework: OpenStack



OpenStack components



Docker from OpenStack Havana

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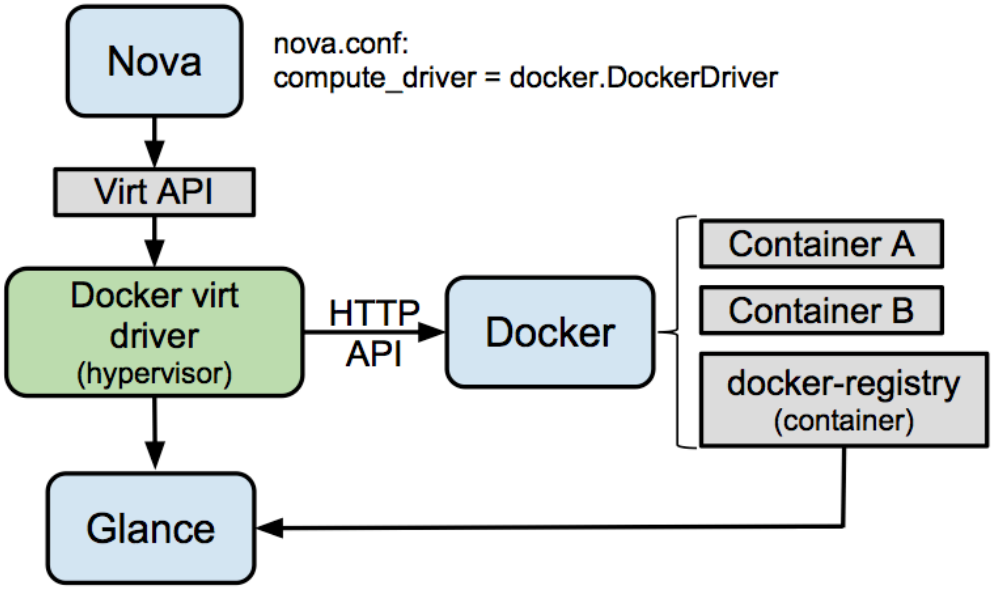
- **Nova** as a compute controller supports Docker as a new hypervisor since the Havana release
  - Deploy Containers instead of VM with the same API



Docker Nova

- Enables control of Docker via OpenStack:
  - Nova API
  - Horizon UI
- Supports: launch, terminate, reboot, snapshot, glance, neutron (new)
- Not supported yet: Cinder volumes, suspend/ resume, pause/unpause, Live-migration

Docker Nova Image management

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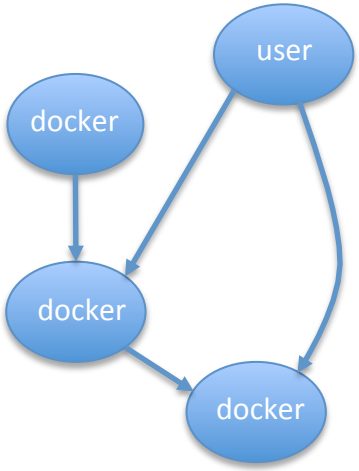
- docker-registry is a proxy
- users can upload through docker-registry or to glance directly
- docker pulls images through the docker-registry proxy



Features missing from Nova

- Link container networks
- Pass environment variables
- Specify working directories
- Create docker-volumes
- Share docker-volumes between containers
- Arbitrary commands

Docker from OpenStack Icehouse

- Since OpenStack Summit of Late 2013, Docker also supports to Heat as another interaction method with OpenStack.
- From the Icehouse release, a docker plugin is available for Heat and integrated into the core Heat release
- The nova hypervisor plugin for Docker has been moved to stackforge.

Docker Heat Architecture

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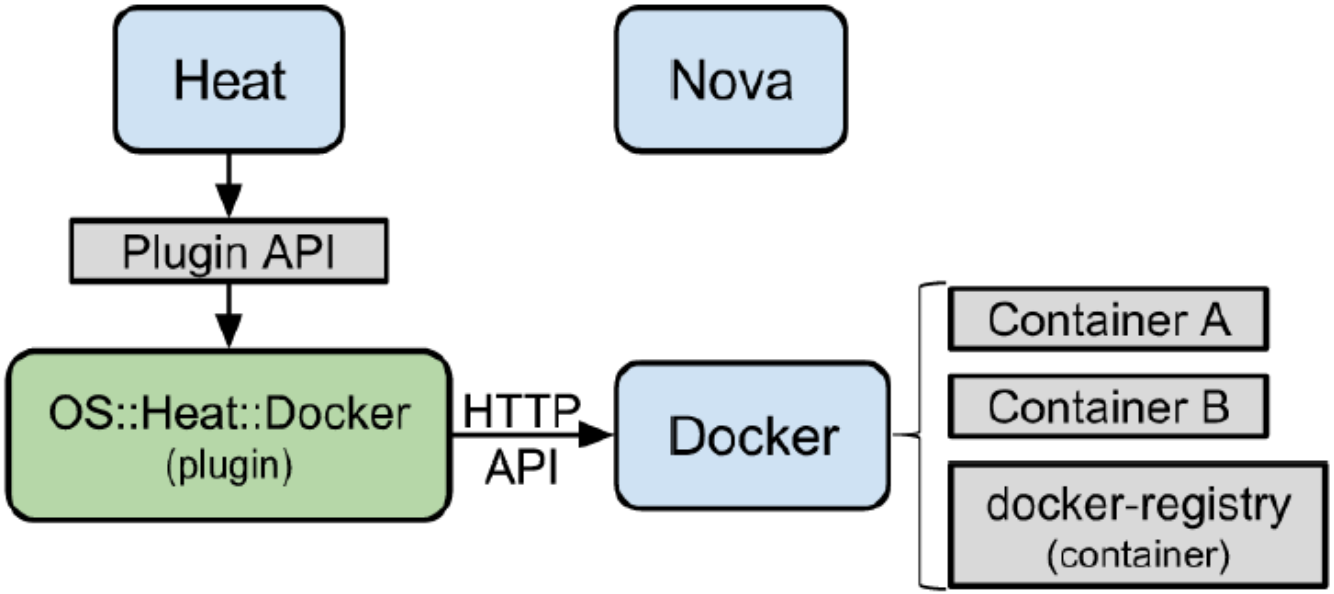
- Heat can now talk directly to Docker



Heat Template


```
heat_template_version: 2013-05-23
description: Single compute instance running cirros in a Docker container.
resources:
  my_instance:
    type: OS::Nova::Server
    properties:
      key_name: dudo
      image: ubuntu-trusty
      flavor: m1.small
      user_data: #include https://get.docker.io
  my_docker_container:
    type: DockerInc::Docker::Container
    properties:
      docker_endpoint: { get_attr: [my_instance, first_address] }
      image: cirros
```

Heat or Nova plugins?

Nova driver	Heat plugin
Integration with other services	Closer to the Docker Workflow
Nova features (quota, auth)	Hybrid-cloud compatible
Integrated scheduling	Microservices-friendly

- Different approaches
  - One does not replace the other though the officially integrated plugin is now Heat-only

References

- Docker Website
- Orchard Fig Website
- Docker and OpenStack
- Performance of Docker vs KVM in OpenStack
- Docker Presentation by Docker Inc.