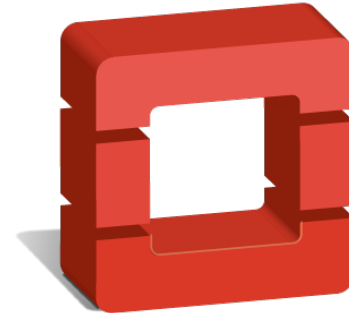


docker



openstack™

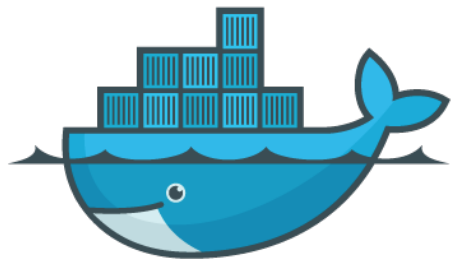
Docker plugin for Heat

Orchestrate containers with OpenStack Heat

by Sam Alba
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What is Docker?

“ Docker is an open-source project to easily create lightweight, portable, self-sufficient containers from any application. ”



docker

Source: <http://www.docker.io>

Example: run a container

```
$ docker run ubuntu /bin/echo hello world  
Pulling repository ubuntu  
8dbd9e392a96: Download complete  
hello world
```

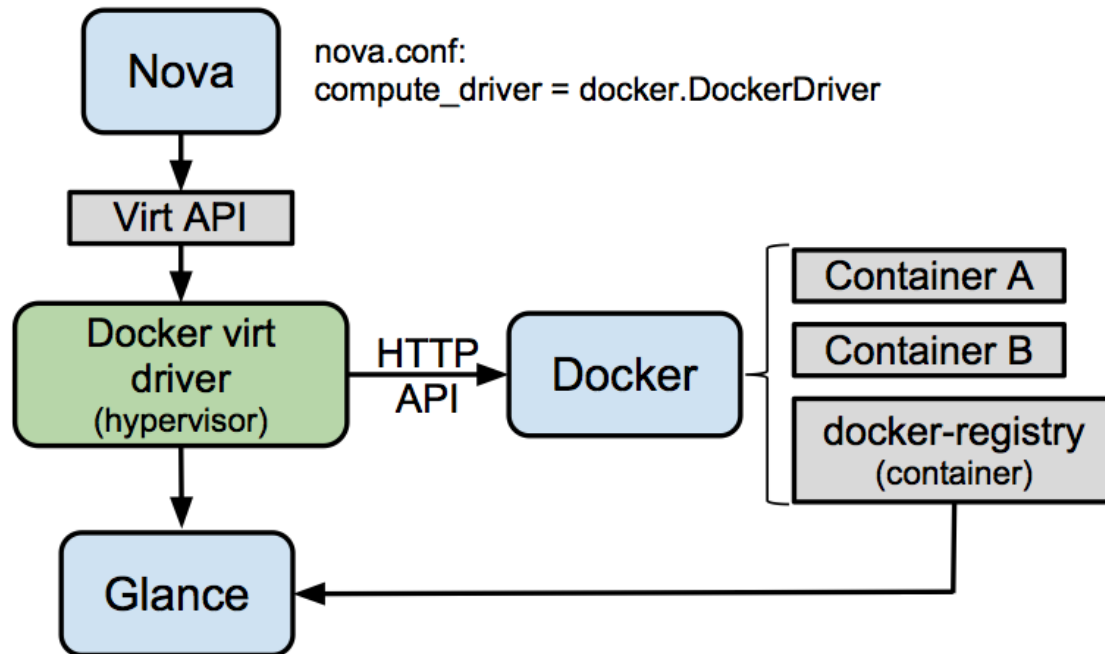
Docker:

- downloaded the base image from the public docker index
- created a new Linux Container
- allocated a filesystem for it
- allocated a virtual network interface with a new IP address
- executed a process and captured the output

Docker in OpenStack Havana

Nova supports Docker as a new hypervisor starting with the Havana release

→ Deploy containers instead of VM with the same API (Nova)



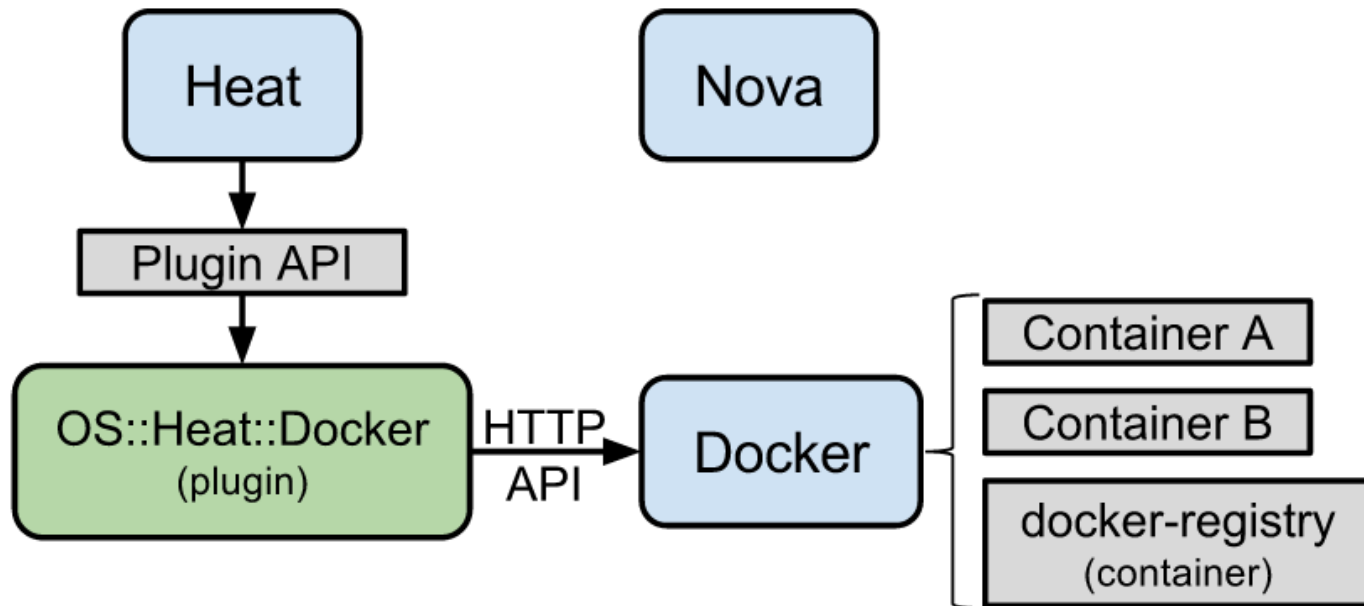
What is Heat?

“
Heat implements an orchestration engine to
launch multiple composite cloud applications
based on templates.”

Source: <https://wiki.openstack.org/wiki/Heat>

The Docker plugin for Heat

By using the plugin, Heat can talk directly to Docker



Why using Heat directly?

- Heat as a standalone project for orchestration
- It allows to use the whole Docker API from a Heat template

Resources:

Blog:

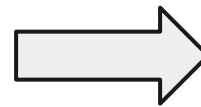
Type: OS::Heat::Docker

Properties:

Image: samalba/wordpress

Env:

- DB_PORT=42



```
{
  "Hostname": "",
  "User": "",
  "Memory": 0,
  "MemorySwap": 0,
  "AttachStdin": false,
  "AttachStdout": true,
  "AttachStderr": true,
  "PortSpecs": null,
  "Privileged": false,
  "Tty": false,
  "OpenStdin": false,
  "StdinOnce": false,
  "Env": null,
  "Cmd": [
    "date"
  ],
  "Dns": null,
  "Image": "ubuntu",
  "Volumes": {},
  "VolumesFrom": "",
  "WorkingDir": ""
}
```

Pros & Cons

Nova driver	Heat plugin
Integration with other services Nova features (quota, auth, etc...) Abstraction layer for other hypervisor	Closer to the Docker workflow Easier maintenance over time Easier deployment

- Both approaches are simply different
- One does not replace the other

How to use it?

1. Install Heat with DevStack: <https://wiki.openstack.org/wiki/Heat/GettingStartedUsingDevstack>
2. Install the Docker plugin

Clone the repos

```
git clone git@github.com:dotcloud/openstack-heat-docker.git
```

Link the plugin so Heat can find it

```
ln -sf $(cd openstack-heat-docker/plugin; pwd) /usr/lib/heat/docker
```

Demo time!

Example with Wordpress+MySQL

```
1  #!/highlight yaml
2  HeatTemplateFormatVersion: '2012-12-12'
3  Resources:
4    Blog:
5      Type: OS::Heat::Docker
6      Properties:
7        Image: samalba/wordpress
8        Env:
9          - {"Fn::Join": ["=", ["DB_HOSTNAME", {"Fn::GetAtt": ["Database", "NetworkIp"]}]]}
10         - {"Fn::Join": ["=", ["DB_PORT", {"Fn::GetAtt": ["Database", "NetworkTcpPorts"]}]]}
11         - {"Fn::Join": ["=", ["DB_PASSWORD", {"Fn::GetAtt": ["Database", "LogsHead"]}]]}
12    Database:
13      Type: OS::Heat::Docker
14      Properties:
15        Image: samalba/mysql
16  Outputs:
17    BlogURL:
18      Value:
19        {"Fn::Join": ["",
20          ["http://",
21            {"Fn::GetAtt": ["Blog", "NetworkIp"]}, ":",
22            {"Fn::GetAtt": ["Blog", "NetworkTcpPorts"}], "/"]
23        ]}
24    Description: Blog URL
```

Demo time!

Horizon UI > Orchestration > Stacks

Select Template ✕

Template Source *

URL

Template URL

<https://raw.githubusercontent.com/dotcloud/openstack-heat-d>

Description:
Use one of the available template source options to specify the template to be used in creating this stack.

An external (HTTP) URL to load the template from.

Cancel Next

Demo time!

Configure the Stack (parameters of the Heat template)

Launch Stack

Stack Name *

Description:
Name of the stack to create with the provided values.

Creation Timeout (minutes) *

Rollback On Failure

Password for user "admin" *

Demo time!

Launch it

Stacks

Launch Stack

Delete Stacks

<input type="checkbox"/>	Stack Name	Created	Updated	Status	Actions
<input type="checkbox"/>	MyBlog	0 minutes	0 minutes	Create Complete	Delete Stack

Displaying 1 item

Stack Resources

Stack Resource	Resource	Stack Resource Type	Date Updated	Status	Status Reason
Database	e545305a59d4	OS::Heat::Docker	2 minutes	Create Complete	state changed
Blog	e4f09ef0db38	OS::Heat::Docker	2 minutes	Create Complete	state changed

Displaying 2 items

Demo time!

Topology

Overview

Resources

Events

Stack Overview

Info

Name

MyBlog

ID

c56d90a9-a8f3-4953-a164-9f23815096ea

Description

No description

Status

Created

1 minute

Last Updated

1 minute

Status

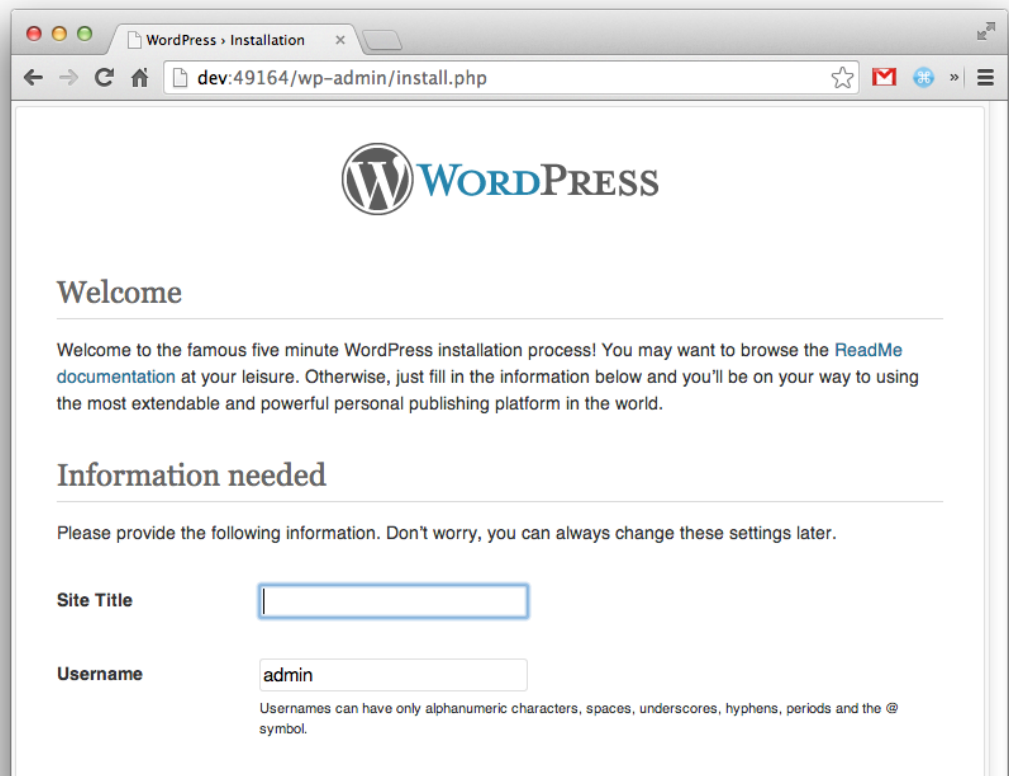
Create_Complete: Stack create completed successfully

Outputs

BlogURL

Blog URL

<http://172.17.42.1:49164/>



The screenshot shows a browser window titled "WordPress - Installation" with the address bar displaying "dev:49164/wp-admin/install.php". The page features the WordPress logo at the top, followed by a "Welcome" section. Below the welcome message, there is a section titled "Information needed" which prompts the user to provide site information. Two input fields are visible: "Site Title" (empty) and "Username" (containing "admin"). A note below the username field states: "Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods and the @ symbol."

What's next?

Design session: “Docker support in OpenStack”

→ Friday, 11am - AWE Level 2, Room 204-205

Project home page:

<https://github.com/dotcloud/openstack-heat-docker>