Red Hat Reference Architecture Series

DRAFT

OpenShift on OpenStack

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Introduction

Goals

The goal of this document is to demonstrate the installation of OpenShift in an OpenStack environment with highlights on those places where OpenShift can make special use of OpenStack resources.

Ordinarily a service running on OpenStack wouldn't be aware of that fact and shouldn't need to be. OpenShift requires and provides several services that could work in concert with OpenStack to improve the quality of the user experience for operators, application developers and for application users.

This document will concentrate on using those OpenStack resources to create and run OpenShift. It will become clear that most of the actual installation process will be handled by orchestration systems, *Heat* and *Ansible*. The challenge is in choosing the correct parameters and initial environment so that the result matches expectations. Where it is useful we will show the commands which are run to execute the installation beneath the surface. We will also show how to determine that the integrated service is working as expected.

OpenShift and OpenStack

OpenShift is a premier open source *Platform as a Service* (PaaS) system. It offers developers a consistant self-service resource for containerized applications. For production services it is a stable application publication system. It has characteristics that make *High Availablity* (HA) and scaling of applications under load relatively automatic.

OpenShift offers enterprise quality control and management of containerized services.

OpenStack is the leading private cloud *Infrastructure as a Service* (IaaS) system. It puts computational, networking and storage resources under software control. Using *virtual machines* (VM) as the unit of computation, *Software Defined Networks* (SDN) to connect the VMs together and with the outside world and networked filesystems such as Ceph and Gluster, OpenStack overlays a set of abstractions that allow the creation of large-scale highly flexable computer environments.

In most cases OpenShift uses the resources OpenStack provides in a totally transparent way. OpenShift is installed on VMs within the OpenStack service just as if they were on hardware. The components communicate over the network and write to storage just as if it were hardware as well. When this holds, OpenShift is entirely unaware that it is running on OpenStack. This is the purpose of OpenStack.

There are several cases though, where OpenShift offers services to its own users, OpenShift can make direct use of OpenStack resources.

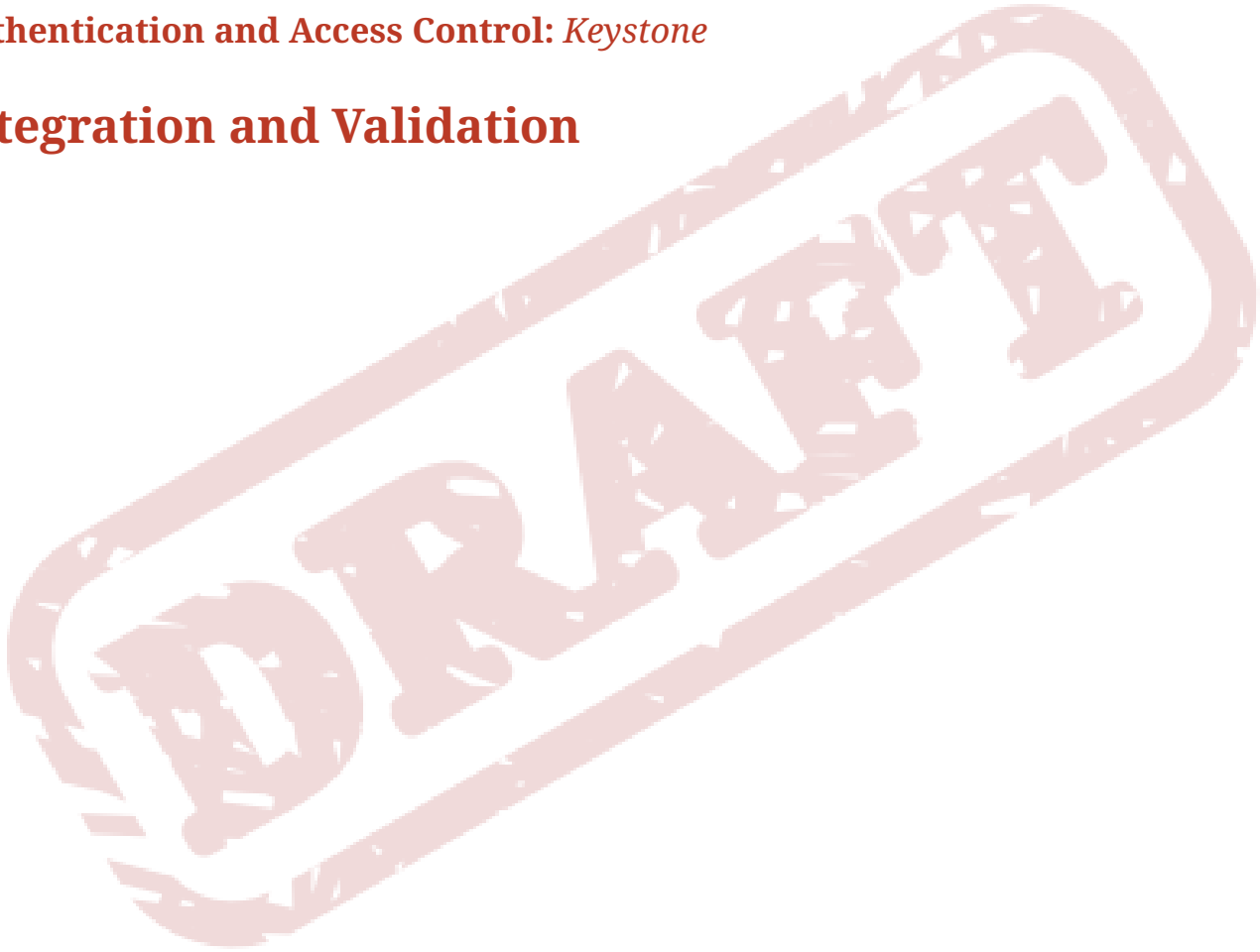
Installation/Orchestration: *Heat*

Container Networking: *Neutron* **and** *Flannel*

Block Storage: *Cinder*

Authentication and Access Control: *Keystone*

Integration and Validation



Architecture

OpenStack

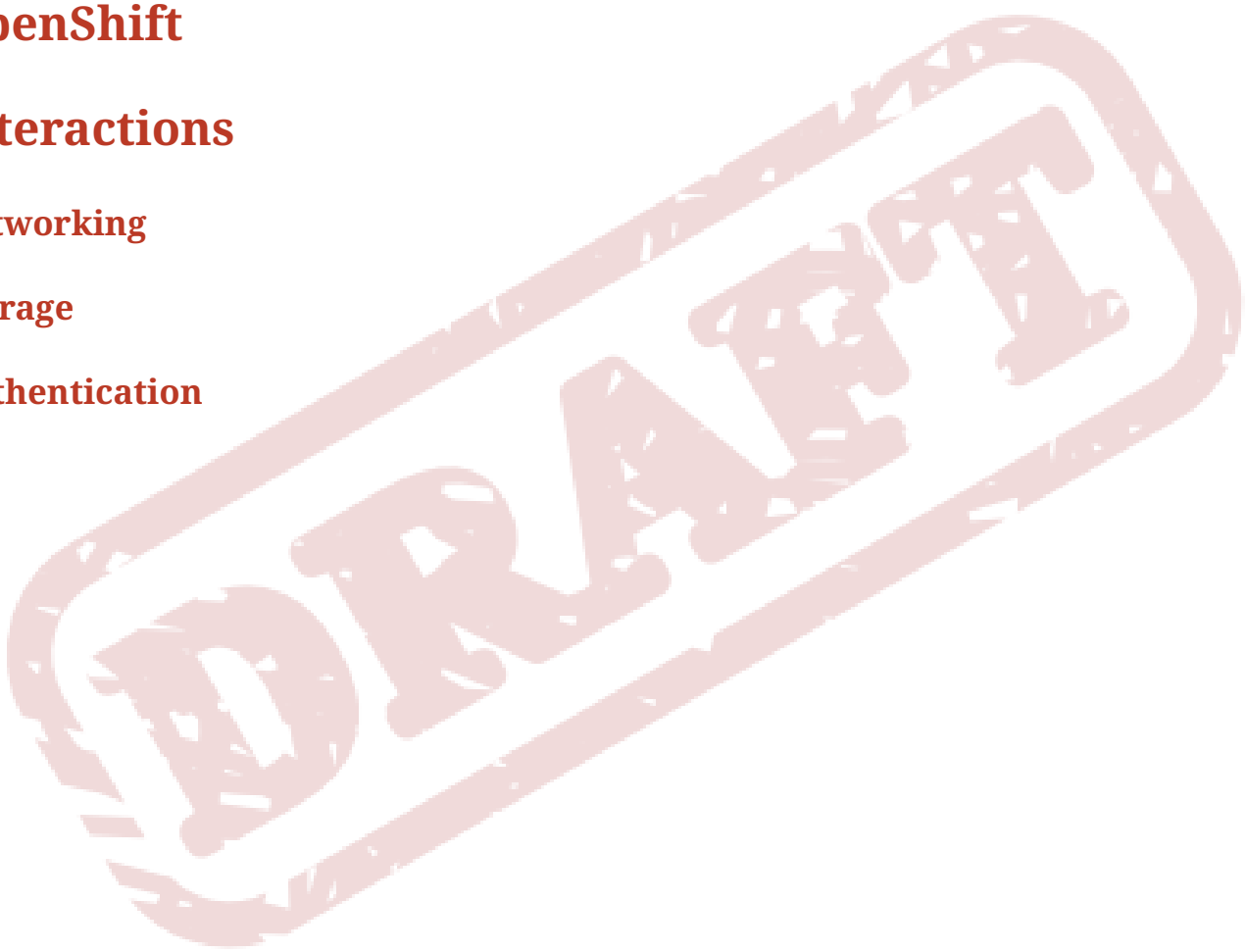
OpenShift

Interactions

Networking

Storage

Authentication



Preparation

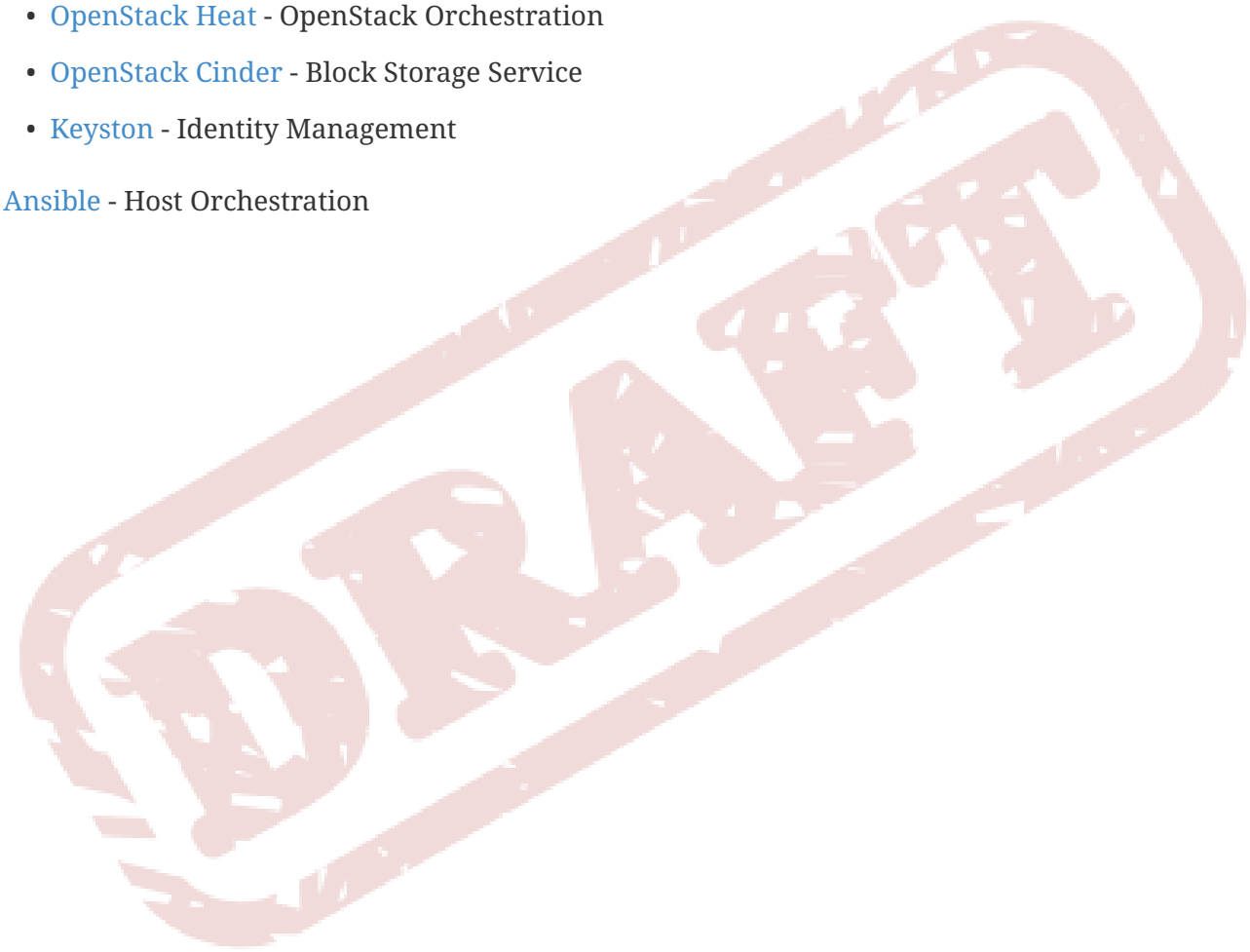
Installation

Visibility and Validation

Once Heat has done it's work and created the OpenShift service a user is going to want to verify that the installation has completed successfully and that the service is working as expected.

References

- OpenShift
- OpenStack
  - OpenStack Heat - OpenStack Orchestration
  - OpenStack Cinder - Block Storage Service
  - Keyston - Identity Management
- Ansible - Host Orchestration



Appendix