

CHAPTER **4**

System Implementation

The primary focus of this document is the integration between Cisco PSC and Red Hat OpenShift PaaS. Most of this work involves development of PSC extensions leveraging PSC Request Center and ServiceLink components. Almost no changes occurred on the OpenShift side because the majority of management and monitoring operations are exposed via Restful management API on OpenShift Broker.

For this testbed, a fully built and configured CIAC 3.1.1 virtual appliance running Windows 2008R2 is used. Active Directory is set up and configured as part of the virtual appliance.

For the infrastructure, a fully populated UCS 5108 chassis connected to UCS 6248UP Fabric Interconnects are used. Up links on FIs are connected to the Nexus 5K switch. Two VLANs are used to the servers group—a management VLAN with subnet 172.29.87.224/28 and a public VLAN with subnet 172.29.87.240/28.

Note

User familiarity with UCS hardware configuration via UCS Manager is required so documents that detail UCS Manager configurations only are referenced.

Red Hat OpenStack Deployment

The following configurations were used in Red Hat OpenStack testbed deployment.

- Controller Node Configuration, page 4-1
 - Installing and Configuring Controller Node, page 4-2
 - Installing OpenStack Identity, page 4-3
 - Installing OpenStack Image Service, page 4-4

Controller Node Configuration

The following instructions provide guidance for configuring controller node.

The controller node is assigned to node01.ctocllab.cisco.com (172.29.87.229).

Configure the network interfaces on controller node:

```
Interface eth0: ifcfg-eth0
DEVICE=eth0
TYPE=Ethernets
ONBOOT=yes
NM_CONTROLLED=no
```

BOOTPROTO=static IPADDR=172.29.87.229 PREFIX=28 GATEWAY=172.29.87.225 DNS1=172.29.74.154 DOMAIN=ctocllab.cisco.com DEFROUTE=yes Interface eth1: ifcfg-eth1 DEVICE=eth1 TYPE=Ethernet ONBOOT=yes NM_CONTROLLED=no BOOTPROTO=none PROMISC=yes

Installing and Configuring Controller Node

The following instructions provide guidance for installing and configuring controller node.

The controller node is assigned to [node01.ctocllab.cisco.com (172.29.87.229)].

Register system with Red Hat Network for a pre-registered user id.

```
#> subscription-manager register
```

List available or consumed subscriptions for registered system.

#> subscription-manager list [--available|--consumed]

Attach the system to a given Pool Id for RHOS 4 (Havana).

```
Subscription Name: Red Hat Cloud Infrastructure Business Partner Self-Supported NFR
(4-sockets)
Provides
                   Red Hat OpenStack
                   JBoss Enterprise Application Platform
                   Red Hat Enterprise Linux Server
                   Red Hat OpenStack Beta
                   Red Hat Enterprise Virtualization
                   Red Hat Enterprise MRG Messaging 2
                   Red Hat CloudForms
                   Red Hat Enterprise Linux 7 Public Beta
                   Red Hat Beta
SKU:
                   . . .
Contract:
                   . . .
Account:
                   . . .
Serial:
                   . . .
                   <pool-id>
Pool ID:
```

#> subscription-manager attach --pool=<pool-id>

Install yum-utils to enable relevant openstack rpms for openstack-4.0.

Install and configure the Database server.

#> yum install -y mysql-server
#> service mysqld start

#> chkconfig mysqld on

Configure firewall to allow tcp traffic for msql (add the following line to /etc/sysconfig/iptables).

"-A INPUT -p tcp -m multiport --dports 3306 -j ACCEPT" #> service iptables restart

Set the database administrator password.

#> /usr/bin/mysqladmin -u root password "PASSWORD"

Install and configure the Message Broker (qpid).

#> yum install -y qpid-cpp-server qpid-cpp-server-ssl

Register qpid users.

```
#> saslpasswd2 -f /var/lib/qpidd/qpidd.sasldb -u QPID cinder
#> saslpasswd2 -f /var/lib/qpidd/qpidd.sasldb -u QPID neutron
#> saslpasswd2 -f /var/lib/qpidd/qpidd.sasldb -u QPID nova
#> sasldblistusers2 -f /var/lib/qpidd/qpidd.sasldb
```

Configure firewall to allow tcp traffic for qpid (add the following line to /etc/sysconfig/iptables).

```
"-A INPUT -p tcp -m tcp --dport 5672 -j ACCEPT"
#> service iptables restart
```

Start the service.

#> service qpidd start

#> chkconfig qpidd on

Installing OpenStack Identity

The following instructions provide guidance for installing the OpenStack identity service.

Keystone Configuration (/etc/keystone/keystone.conf).

```
[DEFAULT]
admin_token = 12de4ec0f1a924f3b20e
bind_host = 172.29.87.229
compute_port = 8774
debug = False
verbose = False
[sql]
connection = mysql://keystone:<passwd>@172.29.87.229/keystone
[identity]
driver = keystone.identity.backends.sql.Identity
[catalog]
driver = keystone.catalog.backends.sql.Catalog
[token]
driver = keystone.token.backends.sql.Token
[signing]
token format = UUID
[auth]
methods = password, token
password = keystone.auth.plugins.password.Password
token = keystone.auth.plugins.token.Token
```

Certain python package dependencies for openstack-keystone need to be explicitly installed.

```
#> yum install python-setuptools
#> easy_install pip
#> pip install six
#> pip install sqlalchemy
```

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Configure firewall (add the following line to /etc/sysconfig/iptables).

```
"-A INPUT -p tcp -m multiport --dports 5000,35357 -j ACCEPT"
#> service iptables restart
```

Installing OpenStack Image Service

The following instructions provide guidance for installing OpenStack image service.

Glance configuration

(/etc/glance/glance-api.conf)

```
[DEFAULT]
default_store = file
bind_host = 0.0.0.0
bind_port = 9292
backlog = 4096
sql_idle_timeout = 3600
workers = 1
registry_host = 0.0.0.0
registry_port = 9191
registry_client_protocol = http
qpid_notification_exchange = glance
qpid_notification_topic = notifications
qpid_hostname = localhost
qpid_port = 5672
qpid_username =
qpid_password =
qpid_sasl_mechanisms =
qpid_reconnect_timeout = 0
qpid_reconnect_limit = 0
qpid_reconnect_interval_min = 0
qpid_reconnect_interval_max = 0
qpid_reconnect_interval = 0
qpid_protocol = tcp
qpid_tcp_nodelay = True
delayed_delete = False
scrub_time = 43200
sql_connection = mysql://glance:<passwd>@172.29.87.229/glance
[keystone_authtoken]
auth_host = 172.29.87.229
auth_port = 35357
auth_protocol = http
admin_tenant_name = services
admin_user = glance
admin_password = <passwd>
[paste_deploy]
flavor = keystone
(/etc/glance/glance-registry.conf)
[DEFAULT]
bind_host = 0.0.0.0
bind_port = 9191
backlog = 4096
sql_idle_timeout = 3600
api_limit_max = 1000
limit_param_default = 25
```

```
sql_connection = mysql://glance:<passwd>@172.29.87.229/glance
[keystone_authtoken]
auth_host = 172.29.87.229
auth_port = 35357
auth_protocol = http
admin_tenant_name = services
admin_user = glance
admin_password = <password>
[paste_deploy]
flavor = keystone
```

Configure firewall (add the following line to /etc/sysconfig/iptables).

"-A INPUT -p tcp -m multiport --dports 9292 -j ACCEPT" #> chown -R glance:glance /var/log/glance/registry.log

Verify Glance service installation.

Download image and add to glance.

```
#> wget http://cdn.download.cirros-cloud.net/0.3.1/cirros-0.3.1-x86_64-disk.img
#> glance image-create --name="CirrOS 0.3.1" --disk-format=qcow2
--container-format=bare --is-public=true < cirros-0.3.1-x86_64-disk.img
#> glance image-list
-----+
| ID
                   Name
                                      Disk Format
| Container Format | Size | Status |
                        +----+----
-+----+
e71d8b33-d737-47d3-b5ed-32b085d0b47f | CirrOS 0.3.1
                                      | qcow2
bare
    | 13147648 | active |
*-----
-+----+
```

Installing OpenStack Compute Service

Refer to Installing the OpenStack Compute Service.

Install and Configure VNC Proxy.

```
#> yum install -y openstack-nova-novncproxy
#> yum install -y openstack-nova-console
(/etc/nova/nova.conf)
novncproxy_host = 172.29.87.229
novncproxy_port=6080
novncproxy_base_url=http://172.29.87.229:6080/vnc_auto.html
vncserver_listen=0.0.0.0
vnc_enabled=true
vnc_keymap=en-us
```

Configure firewall (add the following line to /etc/sysconfig/iptables).

"-A INPUT -m state --state NEW -m tcp -p tcp --dport 6080 -j ACCEPT"

- #> service iptables restart
- #> service openstack-nova-consoleauth start
- #> chkconfig openstack-nova-consoleauth on
- #> service openstack-nova-novncproxy start
- #> chkconfig openstack-nova-novncproxy on

Create Compute Service Database and Identity Records.

Install Compute packages.

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#> yum install -y openstack-nova-api \ openstack-nova-conductor openstack-nova-scheduler \ python-cinderclient * Change file ownership: #> chown -R root:nova api-paste.ini #> chown -R root:nova nova.conf #> chown -R root:nova policy.json #> chown -R root:nova rootwrap.conf #> chown -R nova:nova /var/log/nova/nova-api.log * Start messagebus #> service messagebus start #> service messagebus status #> chkconfig messagebus on (/etc/nova/nova.conf) [DEFAULT] rpc_backend = nova.openstack.common.rpc.impl_qpid my_ip = 172.29.87.229 auth_strategy =keystone sql_connection = mysql://nova:<passwd>@172.29.87.229/nova enabled_apis=ec2,osapi_compute osapi_compute_listen=172.29.87.229 osapi_compute_listen_port=8774 metadata_listen=0.0.0.0 metadata_listen_port=8700 api_paste_config=/etc/nova/api-paste.ini service_neutron_metadata_proxy=True neutron_metadata_proxy_shared_secret=cisco123 novncproxy_host = 172.29.87.229 novncproxy_port=6080 network_api_class=nova.network.neutronv2.api.API metadata host=172.29.87.229 neutron_url=http://172.29.87.229:9696 neutron_admin_username=neutron neutron_admin_password=cisco123 neutron_admin_tenant_name=services neutron_admin_auth_url=http://172.29.87.229:35357/v2.0 security_group_api=nova debug=true qpid_hostname = 172.29.87.229 qpid username = nova qpid_password = cisco123 $qpid_port = 5672$ scheduler_default_filters=AllHostsFilter firewall_driver=nova.virt.libvirt.firewall.IptablesFirewallDriver allow_same_net_traffic=true libvirt_vif_driver=nova.virt.libvirt.vif.LibvirtHybridOVSBridgeDriver novncproxy_base_url=http://172.29.87.229:6080/vnc_auto.html vncserver_listen=0.0.0.0 vnc enabled=true vnc kevmap=en-us [keystone_authtoken] $auth_host = 172.29.87.229$ auth_protocol = http auth_port = 35357 admin_user = nova admin_tenant_name = services admin_password = <password>

Compute Services to start and chkconfig.

- #> service openstack-nova-api restart
- #> service openstack-nova-conductor restart
- #> service openstack-nova-console restart

#> service openstack-nova-consoleauth restart #> service openstack-nova-metadata-api restart #> service openstack-nova-novncproxy restart #> service openstack-nova-scheduler restart #> chkconfig openstack-nova-api on #> chkconfig openstack-nova-conductor on #> chkconfig openstack-nova-console on #> chkconfig openstack-nova-consoleauth on #> chkconfig openstack-nova-metadata-api on #> chkconfig openstack-nova-novncproxy on #> chkconfig openstack-nova-scheduler on

Openstack Block Storage.

Install and Configure Block Storage.

Volume Service Specific Configuration: The block storage driver used in this configuration is LVM. It uses a file mounted via a loop device where a LVM has been created.

Create a new logical volume.

```
#> lvcreate -L 800G -n lv_vol_ephemeral vg_node01
  lv_vol_ephemeral vg_node01 -wi-ao---- 800.00g
#> mkfs -t ext4 /dev/vg_node01/lv_vol_ephemeral
#> mkdir /os_scratch
```

Add entry in /etc/fstab.

```
"/dev/vg_node01/lv_vol_ephemeral /os_scratch ext4 defaults 1 3"
#> mount /os_scratch
#> dd if=/dev/zero of=/os_scratch/cinder-volumes bs=1 count=0 seek=800G
#> losetup -fv /os_scratch/cinder-volumes
```

Check the loop device associated with /os_scratch/cinder-volumes.

#> losetup -a
/dev/loop0: [fd02]:13 (/os_scratch/cinder-volumes)

Create the volume group associated with it.

#>	vgcreate cinde	er-vo	olume	es /o	dev/loop	, 0 c	
#>	vgs						
	VG	#PV	#LV	#SN	Attr	VSize	VFree
	cinder-volumes	1	4	0	wzn-	800.00g	715.00g
	vg_node01	1	3	0	wzn-	931.02g	77.02g
#> #> #> #>	echo "include yum install so service tgtd s chkconfig tgto	/eto csi-t start d on	c/cir carge	nder, et-ui	/volumes tils	5/*" >> ,	/etc/tgt/targets.conf

(/etc/cinder.conf).

```
[DEFAULT]
auth_strategy = keystone
rpc_backend = cinder.openstack.common.rpc.impl_qpid
qpid_hostname = 172.29.87.229
qpid_username = cinder
qpid_password = <passwd>
sql_connection = mysql://cinder:<passwd>@172.29.87.229/cinder
service_down_time=180
volume_group=cinder-volumes
volume_driver=cinder.volume.drivers.lvm.LVMISCSIDriver
[keystone_authtoken]
auth_host = 172.29.87.229
admin_tenant_name = services
```

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```
admin_user = cinder
admin_password = <passwd>
```

Validate the setup.

```
#> cinder create --display-name vol-test 1
+-----
     Property
                              Value
 attachments
                               []
 availability_zone
                               nova
    bootable
                              false
 created_at 2014-02-06T17:42:16.996571
display_description None
display_name vol-test
id dea6e442-69af-4925-bb58-4decf301a13e
                     2014-02-06T17:42:16.996571
       id
     metadata
                                { }
       size
                                1
    snapshot_id
                               None
    source_volid
                               None
      status
                             creating
    volume type
                              None
+------
#> lvs
 LV
                                     VG
                                                 Attr
                                                         LSize Pool
Origin Data% Move Log Cpy%Sync Convert
 volume-dea6e442-69af-4925-bb58-4decf301a13e cinder-volumes -wi-ao---- 1.00g
```

Installing and Configuring Neutron Services

The neutron plugin used in this configuration is Open vSwitch (openstack-neutron-openvswitch). L3 agent abstracts the router that can connect to provide gateway services for L2 networks. The Compute node in this configuration hosts the network services for L3 agent, DHCP agent, and the neutron metadata agent that proxies to the nova metadata service. The neutron server is hosted on the Controller node and the L3-agent, L2-agent, DHCP agent and Metadata agent run on the compute node.

Installing Networking Pre-requisites on the Controller

The following instructions provide guidance for installing networking pre-requisites on the controller.

[Create the Openstack Networking

Databasel[https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux_OpenStack _Platform/4/html/Installation_and_Configuration_Guide/sect-Networking_Prerequisite_Configuration. html]]

[Create the Networking identity Records/https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux_OpenStack_ Platform/4/html/Installation_and_Configuration_Guide/Creating_the_Service_Endpoint.html]

Common Networking Configuration.

Disable Network Manager.

Install the relevant packages.

```
#> yum install -y openstack-neutron \
    openstack-utils \
    openstack-selinux
```

Configure the firewall (add entry to /etc/sysconfig/iptables).

"-A INPUT -p tcp -m multiport --dports 9696 -j ACCEPT"

```
#> service iptables restart
(/etc/neutron/neutron.conf).
    [DEFAULT]
   auth_strategy = keystone
   rpc_backend = neutron.openstack.common.rpc.impl_qpid
   qpid_hostname = 172.29.87.229
   qpid username = neutron
   qpid_password = <passwd>
   core_plugin = neutron.plugins.openvswitch.ovs_neutron_plugin.OVSNeutronPluginV2
   ovs_use_veth = True
   allow_overlapping_ips = True
   debug = True
   dhcp_lease_duration = 604800
   dhcp_lease_time = 604800
    [quotas]
   [agent]
   root_helper = sudo neutron-rootwrap /etc/neutron/rootwrap.conf
   [keystone_authtoken]
   auth_host = 172.29.87.229
   admin_tenant_name = services
   admin_user = neutron
   admin_password = <passwd>
    [database]
    [service_providers]
   Launch Networking Service
   service neutron-server start
   chkconfig neutron-server on
```

Installing Horizon Dashboard

The following instructions provide guidance for installing Horizon Dashboard.

#>	yum install -y mod_wsgi httpd
#>	yum install -y memcached python-memcached
#>	yum install -y openstack-dashboard
#>	service httpd start
#>	chkconfig httpd on

Check if httpd is running.

#> service --status-all | grep httpd

Configure connections and logging.

Edit /etc/openstack-dashboard/local_settings.

Configure local memory cache settings.

```
CACHES = {
    'default': {
        'BACKEND' : 'django.core.cache.backends.locmem.LocMemCache'
    }
}
OPENSTACK_HOST = "172.29.87.229"
OPENSTACK_KEYSTONE_URL = "http://%s:5000/v2.0" % OPENSTACK_HOST
OPENSTACK_KEYSTONE_DEFAULT_ROLE = "admin"
```

Restart httpd service.

#> service httpd restart

Configure SELinux.

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Allow connections from httpd service to the Identity server if SELinux is configured in 'Enforcing or 'Permissive' mode

```
#> getenforce
Enforcing
#> setsebool -P httpd_can_network_connect on
```

Configure firewall (add the following line to /etc/sysconfig/iptables).

```
"-A INPUT -p tcp --dport 443 -j ACCEPT"
#> service iptables restart
```

Validate dashboard installation: http://172.29.87.229/dashboard.

Install Openstack Orchestration Service.

Install Openstack Telemetry Service (Ceilometer).

Install and Configure Compute and Network Node (node02.ctocllab.cisco.com (172.29.87.230).

Installing and Configuring Compute Node

The following instructions provide guidance for installing and configuring compute node.

Register system with Red Hat Network for a pre-registered userid.

#> subscription-manager register

List available or consumed subscriptions for registered system.

#> subscription-manager list [--available]--consumed]

Attach the system to a given Pool Id for RHOS 4 (Havana).

```
Subscription Name: Red Hat Cloud Infrastructure Business Partner Self-Supported NFR
(4-sockets)
Provides:
                   Red Hat OpenStack
                   JBoss Enterprise Application Platform
                   Red Hat Enterprise Linux Server
                   Red Hat OpenStack Beta
                   Red Hat Enterprise Virtualization
                   Red Hat Enterprise MRG Messaging 2
                   Red Hat CloudForms
                   Red Hat Enterprise Linux 7 Public Beta
                   Red Hat Beta
SKU:
                   . . .
Contract:
                   . . .
Account:
                   . . .
Serial:
                   . . .
Pool ID:
                   <pool-id>
#> subscription-manager attach --pool=<pool-id>
```

Install yum-utils to enable relevant openstack rpms for openstack-4.0.

Check hardware virtualization support by checking presence of svm or vmx CPU extensions.

#> grep -E 'svm|vmx' /proc/cpuinfo

Verify kvm modules are loaded.

#> lsmod | grep kvm

Output must include kvm_intel or kvm_amd.

Check prerequisites.

#>	yum install ntp
#>	service ntpd start
#>	chkconfig ntpd on
#>	service libvirtd status
lik	ovirtd (pid 2276) is running
#>	service messagebus status

Install nova-compute.

```
#> yum install openstack-nova-compute
```

#> chown root:nova /etc/nova/nova.conf

(/etc/nova/nova.conf).

```
[DEFAULT]
rpc_backend = nova.openstack.common.rpc.impl_qpid
my_{ip} = 172.29.87.230
auth_strategy =keystone
sql_connection = mysql://nova:<passwd>@172.29.87.229/nova
enabled_apis=ec2,osapi_compute,metadata
metadata_listen=0.0.0.0
metadata_listen_port=8775
api_paste_config=/etc/nova/api-paste.ini
service_neutron_metadata_proxy=True
neutron_metadata_proxy_shared_secret=<passwd>
novncproxy_port=6080
glance_host=172.29.87.229
glance_api_servers=$glance_host:$glance_port
network_api_class=nova.network.neutronv2.api.API
metadata_host=$my_ip
metadata_port=8775
neutron_url=http://172.29.87.229:9696
neutron_admin_username=neutron
neutron admin password=<passwd>
neutron_admin_tenant_name=services
neutron_admin_auth_url=http://172.29.87.229:35357/v2.0
security_group_api=neutron
debug=true
qpid_hostname = 172.29.87.229
qpid_username = nova
qpid_password = <passwd>
qpid_port = 5672
firewall_driver=nova.virt.firewall.NoopFirewallDriver
allow_same_net_traffic=true
libvirt_vif_driver=nova.virt.libvirt.vif.LibvirtHybridOVSBridgeDriver
novncproxy_base_url=http://172.29.87.229:6080/vnc_auto.html
vncserver_listen=0.0.0.0
vncserver_proxyclient_address=172.29.87.230
vnc_enabled=true
vnc_keymap=en-us
instance_usage_audit = True
instance_usage_audit_period = hour
notify_on_state_change = vm_and_task_state
notification_driver=nova.openstack.common.notifier.rpc_notifier
notification_driver = ceilometer.compute.nova_notifier
[keystone_authtoken]
```

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```
auth_host = 172.29.87.229
auth_protocol = http
auth_port = 35357
admin_user = nova
admin_tenant_name = services
admin_password = <password>
```

Start the compute service.

#> service openstack-nova-compute start

#> chkconfig openstack-nova-compute on

Install and Configure Network.

```
#> yum install openstack-neutron openstack-neutron-openvswitch
```

#> yum install bridge-utils -y

Verify that openvswitch package is installed.

```
#> rpm -qa | grep openvswitch
Start openvswitch service
#> service openvswitch start
#> chkconfig openvswitch on
```

The host running Open vSwitch agent requires that the ovs bridge named br-int be created.

```
#> ovs-vsctl add-br br-int
```

Configure external network access by creating an external bridge.

#> ovs-vsctl add-br br-ex

The external bridge to the interface on the compute node (ensure it is running in promiscuous mode).

```
Interface eth1 config: ifcfg-eth1
DEVICE=eth1
TYPE=Ethernet
ONBOOT=yes
NM_CONTROLLED=no
BOOTPROTO=none
PROMISC=yes
```

#> ovs-vsct1 add-port br-ex eth1

(/etc/neutron/plugins/openvswitch/ovs_neutron_plugin.ini)

```
[securitygroup]
firewall_driver =
neutron.agent.linux.iptables_firewall.OVSHybridIptablesFirewallDriver
[OVS]
tenant_network_type = vlan
network_vlan_ranges = physnet1:885:886:887
bridge_mappings = physnet1:br-ex
[DATABASE]
sql_connection = mysql://neutron:<passwd>@172.29.87.229/ovs_neutron
[SECURITYGROUP]
firewall_driver =
neutron.agent.linux.iptables_firewall.OVSHybridIptablesFirewallDriver
/etc/neutron/13-agent.ini
[DEFAULT]
debug = False
interface_driver = neutron.agent.linux.interface.OVSInterfaceDriver
ovs_use_veth = True
use_namespaces = True
metadata_ip = 172.29.87.229
metadata_port = 8700
```

```
(/etc/neutron/dhcp-agent.ini)
[DEFAULT]
debug = True
interface_driver = neutron.agent.linux.interface.OVSInterfaceDriver
dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq
enable_isolated_metadata = True
root_helper = sudo neutron-rootwrap /etc/neutron/rootwrap.conf
(/etc/neutron/metadata.ini)
[DEFAULT]
debug = True
auth_url = http://172.29.87.229:35357/v2.0
auth_region = regionOne
admin_tenant_name = services
admin_user = neutron
admin_password = <passwd>
nova metadata ip = 172.29.87.229
nova_metadata_port = 8700
metadata_proxy_shared_secret = <passwd>
(/etc/neutron/neutron.conf)
[DEFAULT]
auth_strategy = keystone
rpc_backend = neutron.openstack.common.rpc.impl_qpid
qpid_hostname = 172.29.87.229
qpid_username = neutron
qpid_password = <passwd>
core_plugin = neutron.plugins.openvswitch.ovs_neutron_plugin.OVSNeutronPluginV2
ovs_use_veth = True
allow_overlapping_ips = True
debug = True
[quotas]
[agent]
root_helper = sudo neutron-rootwrap /etc/neutron/rootwrap.conf
[keystone_authtoken]
auth_host = 172.29.87.229
admin_tenant_name = services
admin_user = neutron
admin_password = <passwd>
[database]
[service_providers]
```

Start the network services and chkconfig on.

- #> service neutron-dhcp-agent start
- #> service neutron-13-agent start
- #> service neutron-metadata-agent start
- #> service neutron-openvswitch-agent start
- #> chkconfig neutron-dhcp-agent on
- #> chkconfig neutron-13-agent on
- #> chkconfig neutron-metadata-agent on
- #> chkconfig neutron-openvswitch-agent on

Red Hat OpenShift Deployment

The ability to spin up OpenShift Node infrastructure on-demand forms the basis for advanced features such as auto-scaling the PaaS infrastructure.

When deployed on OpenStack, OpenShift is able to provision and de-provision Node VMs without manual provisioning steps using Heat templates.

L

This provides the ability to auto-scale up and down. Currently scaling decisions are made within the broker using platform agnostic scaling scripts. OpenShift applies a push approach in which it initiates the scale events based on the information is has already gathered.

As the Node comes on line and starts the MCollective service, it becomes available to pick up messages from the broker.

Installing the Broker and Node Infrastructure

The following instructions provide guidance for installing the broker and node infrastructure.

Download the latest qcow2 RHEL 6.5 Guest Image from RHN.

Red Hat Common (for RHEL 6 Server x86_64).

Download the latest heat templates for OpenShift Enterprise (Broker and Node).

Use diskimage-builder to prepare the RHEL 6.5 image.

#> git clone https://github.com/openstack/diskimage-builder.git

The heat templates used to spin up the broker and the node will require enterprise licenses and pool ids for subscriptions to register the systems for the broker and the node at the time of instantiation.

Prepare to run diskimage-builder.

#> mkdir \$HOME/tmp

Export path to the do DIB elements for OpenShift Enterprise.

#> export
ELEMENTS_PATH=heat-templates/elements:heat-templates/openshift-enterprise/dib/elements

Host the downloaded file on a local httpd server since builder uses an http endpoint to download the image and remote image locations on RHN tend to update the ISO images on frequently.

#> export DIB_CLOUD_IMAGES=http://localhost/ #> export DIB_RHSM_OSE_POOL=<ose-pool-id> #> export DIB_RHSM_POOL=<ose-pool-id> #> export DIB_RHSM_USER=<registered user> #> export DIB_RHSM_PASSWORD=<password> #> export TMP_DIR=\$HOME/tmp #> export DIB_IMAGE_SIZE=10 #> export DIB_OSE_VERSION=2.0 #> export DIB_YUM_VALIDATOR_VERSION=2.0

Do not set DIB_RHSM_USER and DIB_RHSM_PASSWORD. It fails during subscription manager register phase. The OSE Pool Id should suffice.

Unit subscriptions do not get removed from systems that fail builds in the midst. The outcome is that at some point, the build will exhaust them and error out with no more subscriptions available from pool.

Remove subscriptions attached to the build server from https://access.redhat.com/management/consumers (All Units)

Bug tracked at https://bugzilla.redhat.com/show_bug.cgi?id=1004483

Run the diskimage-builder for the broker to generate a rhel image using DIBs for openshift-enterprise-broker

```
#> diskimage-builder/bin/disk-image-create --no-tmpfs -a amd64 vm rhel
openshift-enterprise-broker -o RHEL65upgraded-x86_64-broker-v3
```

Run the diskimage-builder for the node to generate a rhel image using DIBs for openshift-enterprise-node.

```
#> diskimage-builder/bin/disk-image-create --no-tmpfs -a amd64 vm rhel
openshift-enterprise-node -o RHEL65-x86_64-node-v2
Upload the Broker image (RHEL65upgraded-x86_64-broker-v3.gcow2) to the target
OpenStack deployment
#> glance image-create --name=RHEL65upgraded-x86_64-broker-v3.qcow2
--disk-format=qcow2 --container-format=bare --is-public=true <
RHEL65upgraded-x86_64-broker-v3.qcow2
Upload the Node image (RHEL65-x86_64-node-v2.qcow2) to the target OpenStack deployment
#> glance image-create --name=RHEL65-x86_64-node-v2 --disk-format=qcow2
--container-format=bare --is-public=true < RHEL65-x86_64-node-v2.qcow2
Console root login has been disabled for the images. Used virt-sysprep to inject the
passward at first-boot. The virt-sysprep utility is part of the ibguestfs-tools-c
package.
#> virt-sysprep --firstboot <script-file.sh> -a <image-filename>
At the end of the image build, the umount2: Invalid argument, umount:
/root/tmp/image.BK17ZzO2: not mounted error can be ignored
```

Openstack VM boot time console logs do not show up, and needs to be added to grub command line in the image, however grub is currently not enabled on rhel 6.5, but is in progress.

Openstack Metadata service is exclusively used by cloud-init scripts in the broker/node images to run user data passed on during boot time. Enabling config drive has no effect. In fact, the broker wait conditions also exclusively use the Metadata service of Openstack to communicate cloud-init completion.

Automated Deployments using Heat Templates

Spin up the broker and the node instances using subscription manager on a given network with heat cli

```
#> heat create openshift-1
--template-url=http://172.29.87.229/heat-templates/OpenShift-1B1N-neutron-cisco.yaml \
--parameters="key_name=<keypair>;prefix=<domain name>;upstreamDNS=<dns ip address>;\
broker_image_name=RHEL65upgraded-x86_64-broker-v2;node_image_name=RHEL65-x86_64-node-v
2;\
BrokerHostname=ose-broker-1.ctocllab.cisco.com;NodeHostname=ose-node-1.ctocllab.cisco.
com; \
ConfInstallMethod=rhsm;ConfSMRegName=<rhn-register-user>;ConfSMRegPass=<password>;\
ConfSMRegPool=<ose-poold-id>;private_net_id=<uuid-of-internal-neutron-network>;\
public_net_id=uuid-of-external-neutron-networ;private_subnet_id=<uuid-of-internal-neutron-network>;\
ose_version=2.0;yum_validator_version=2.0"
```

The broker and node will take several minutes to complete cloud-init configuration.

Once completed, access the VM via the VNC console and run oo-diagnostics on the broker and the node.

OpenShift AD Configuration

Perform the following procedure to configure OpenShift AD.

Step 1 Log on to the OpenShift broker server.

Step 2 Edit broker HTTPD configuration file at:

/var/www/openshift/broker/httpd/conf.d/openshift-origin-auth-remote-user.conf

Step 3 Add the following configuration:

```
LoadModule ldap_module modules/mod_ldap.so
LoadModule authnz_ldap_module modules/mod_authnz_ldap.so
<Location /broker>
AuthName "OpenShift"
AuthType Basic
AuthBasicProvider ldap
AuthLDAPURL
"ldap://<AD-SERVER>:389/DC=CISCODEMO,DC=local?sAMAccountName?sub?(objectClass=*)" NONE
AuthLDAPBindDN "Administrator@ciscodemo.local"
AuthLDAPBindPassword "PASSWORD"
require valid-user
```

Step 4 Restart OpenShift broker service:

#> service openshift-broker restart

```
Step 5 Edit console configuration file at:
/var/www/openshift/console/httpd/conf.d/openshift-origin-auth-remote-user.conf
```

Step 6 Add the following configuration:

```
LoadModule ldap_module modules/mod_ldap.so
LoadModule authnz_ldap_module modules/mod_authnz_ldap.so
<Location /console>
AuthName "OpenShift"
AuthType Basic
AuthBasicProvider ldap
AuthLDAPURL
"ldap://<AD-SERVER>:389/DC=CISCODEMO,DC=local?sAMAccountName?sub?(objectClass=*)" NONE
AuthLDAPBindDN "Administrator@ciscodemo.local"
AuthLDAPBindPassword "PASSWORD"
require valid-user
```

```
Step 7 Restart OpenShift console service:
```

#> service openshift-console restart

Creating OpenShift District

Districts define a set of node hosts within which gears can be reliably moved to manage the resource usage of those nodes. While not strictly required for a basic OpenShift installation, their use is recommended where administrators might ever need to move gears between nodes. It's also possible to create multiple districts and designate different security level on each district by leveraging network firewall and access control policies associated with node network address.

To use districts, the broker's MCollective plugin must be configured to enable districts.

Step 1 Edit the /etc/openshift/plugins.d/openshift-origin-msg-broker-mcollective.conf configuration file and confirm the following parameters are set:

```
DISTRICTS_ENABLED=true
NODE_PROFILE_ENABLED=true
DISTRICTS_REQUIRE_FOR_APP_CREATE=true
```

Step 2 Execute the following command on the broker host:

#> oo-admin-ctl-district -c create -n smal_district -p small

Where small_district is the name of the new district and small is the profile of the gears that will be provisioned on this district.

Step 3 Add node host to small_district that was created:

#> oo-admin-ctl-district -c add-node -n small_district -i node.example.com

It is important to note that the server identity (node.example.com here) is the node's hostname as configured on that node, which could be different from the PUBLIC_HOSTNAME configured in /etc/openshift/node.conf on the node. The PUBLIC_HOSTNAME is used in CNAME records and must resolve to the host via DNS; the hostname could be something completely different and may not resolve in DNS at all.

CIAC Configuration

CIAC needs to be configured to create services and portals outlined in the design section. The following instructions lay out the necessary configurations.

Active Directory Integration

Perform the following procedure to create integrate active directory.

- **Step 1** Launch Cisco Service Portal in browser with administration user.
- **Step 2** Sample URL: http://<PSC-HOST>/RequestCenter.
- **Step 3** From the Administration module in the module selection drop down, click **Directories**.
- **Step 4** Click Add to add a new data source.
- **Step 5** Enter a name for Data Source Name.
- **Step 6** Select LDAP for the Protocol.
- **Step 7** Select MS Active Directory for Server Product.
- **Step 8** Set the connection information, as shown in Figure 4-1.

Figure 4-1	AD Connection

Connection Information			
* Authentication Method	Simple	* Mechanism	Non SSL 🗸
* BindDN	Administrator@ciscodemo.local	* Host	10.81.109.162
* Port Number	389	* Password	••••••••
* User BaseDN	DC=CISCODEMO,DC=local		
Optional Filter	objectClass=*		205722

- **Step 9** Click the Mappings tab (right side).
- **Step 10** Enter a mapping name.

Configure manning attributes

Step 11 Configure mapping attributes, as shown in Figure 4-2.

Figure 4-2 Configure Mapping Attributes

Person Data	Mapped Attributes
* First Name	givenName
* Last Name	sn
* Login ID	sAMAccountName
* Person Identification	sAMAccountName
* Email Address	expr:#mail#=(.+)?(#mail#):noemail
* Home Organizational Unit	expr:#givenName#=(.+)?(cvd):cvd
* Password	sAMAccountName
Optional Person Data Mappings	
Update Cancel	

- **Step 12** Click the Events tab (right side).
- **Step 13** Click Edit at Login event.
- **Step 14** Add the steps as shown in Figure 4-3.

Figure 4-3 Add Event Steps

Step 1 External Authentication V Step 2 Person Search V Step 3 Import Person V	
Step 2 Person Search Step 3 Import Person	
Step 3 Import Person	
Add step Remove step	96724

a. For Step 1, click Options and set the value as shown in Figure 4-4.

Figure 4-4 Set Values for Step 1

Options for Step1	
EUABindDN	CISCODEMO\#LoginId#
Close	

b. For Step 3, click Options and set the value as shown in Figure 4-5.

	Figure 4-5 S	Set Values for Step 3	
	Options for Step3		
	Refresh Person Profile	V	
	Refresh Period (Hours)	0 (Leave blank to refresh every import)	
	Do Not Create Group/OU	Organizational Unit Group	
	Remove Existing Associa	tions 🔄 Business Unit 📄 Service Team 📄 Group 📄 Role	
	Close		295726
Step 15	Click the Settings	tab (on the top).	
Step 16	Turn on directory i Update.	integration by selecting the radio button, as shown in Figure 4	-6, and then click
	Figure 4-6 T	urn on Directory Integration	

			evenues to vert	
۲	0	Directory Integration	Enable the Directories feature that searches for and impo Default is off.	295727

Creating a New "PAAS Application" Service

Perform the following procedure to create a new PAAS application service.

Create a dictionary using the interface shown in Figure 4-7. Step 1

Figure 4-7 Create a Dictionary

Name	Туре	1	laximum	Decimals
PAAS_APP_Name	Text	✓ 50	D	D
Web_Platform_Type	Text	✓ 50	D	0
Size_of_Gear	Text	✓ 50	D	0
Scaling	Text	✓ 50	D	0
Addon_Cartridge	Text	✓ 50	D	0
Min_number_gears	Text	✓ 50	D	D
Max_number_gears	Text	✓ 50	D	0
Total_Cost	Text	✓ 50	D	0
domainName	Text	✓ 50	D	0
ApplicationId	Text	✓ 50	D	0
publicURL	Text	✓ 50	D	0
SSHcommand	Text	✓ 50	D	0
SSHError	Text	✓ 50	00	0
CreateApplicationError	Text	✓ 50	00	0
ExtendedCartridgesError	Text	5	00	0

Step 2 Create the necessary Javascripts as shown in Figure 4-8, Figure 4-9, and Figure 4-10.

ſ



Figure 4-8 Create the Necessary Javascripts 1

Figure 4-9 Create the Necessary Javascripts 2

	General Libraries Active Form Components
Scripts	JavaScript fetchCartridges
Scripts	JavaScript fetchCartridges Title: fetchCartridges Add this script to the following events on all forms: When the form is loaded (browser-side) When the form is loaded (browser-side) JavaScript Functions Function Arguments fetchCartridges(){ //alert("hello in fetchCartridges"); // var serverName="172.29.87:236"; var restApiUniForCartridges = "https://"+serverName+"/broker/rest/cartridges"; //var restApiUniForCartridges = "https://"+serverName+"/broker/rest/cartridges"; //var restApiUniForCartridges = "https://"> //var restApiUniForCartridges = "https://"
SeleaseCalculation	// alert('after getJsonResponseby URL'); var cartridgesData = responseJsonOfCartridges.data;
services	In varical induces Data = jone, unee, two j,
lictionaries	
Active Form Components	
Scripts	

I



Figure 4-10 Create the Javascripts Needed 3

Creating an Active Form Component

Perform the following procedure to create an active form component.

- **Step 1** Add the dictionary that was created in the first step.
- **Step 2** Set the display properties of each field.
- **Step 3** Set the Active Form behavior; add the scripts (that were created in the previous step), as shown in Figure 4-11:

Figure 4-11 Add Scripts

		pt functions (written using the Scripts option).
	Behavior	Triggering Event
fatabDAACariaina	Rules	When the form is loaded (browser-side)
letchPAASphicing		When the form is unloaded (browser-side)
a Scripts	JavaScript	After the form in submitted (server side)
fetchCartridges		Before the form is loaded (server-side)
createOpenShift 1		
oroatoopononin_1	- 10	
fetchWebCartridg fetchCartridges createOpenShift_	Image: Second	After the form is submitted (server-side)

Creating a Service

Perform the following procedure to create a service.

Step 1 Create a service with desired name and set the description as shown in Figure 4-12.

Figure 4-12 Create a Service

	General Offer Pro	esentation Form Plan Authorizations	Permissions
Services	Service Create a new P/	AAS Application	
Hide Inactive Search New	Name:	Create a new PAAS Application	Status:
∃MultiCloud Services ^	Service Group:	OpenShift	Orderable Service:
∃ — OpenShift	Reportable:	No 🗸	Entitlement:
Create a new PAAS Application	Service ID:	300	
Physical Server Request Extensions	Description:		
Physical Server Requests	Choose a web programmere ceives security update	ning cartridge. You can add cartridges to enable add s and upgrades automatically	ditional capabilities like databases
E Cerver Operations		e and apgrades datemationly.	
Extensions Extensions	Service Level Description	£	
∃ Custom			
E Cystem Setup			
System Setup Extensions	Standard Duration:	0.0 hours	Display Units:
🗄 🦳 Tenant Management	Forecasting Method:	Do not forecast Due Date	



Figure 4-13 Add Active Form Component



Step 3 Set the delivery plan, as shown in Figure 4-14.

Figure 4-14 Set Delivery Plan

Services	Delivery P	lan For Service Create	a new PAAS Application	
Hide Inactive Search New V	Tasks	Escalations	Graphical Designer	
MultiCloud Services	Project N	lanager:	assign from a position	
Create a new PAAS Application	Subject f	for plan monitoring task: I tasks execute:	Monitor plan for #Name#	Start and
Physical Server Requests	N-176		Neer	Allow fut
Server Operations	Notity wi	nen plan cancelled:	None	v
Server Operations Server Operations Extensions steve_Custom	Working The value durations	hours per day: hours per day: of Working hours per day option instead, Request C	8.0 is used to estimate delivery duration only if enter uses the actual performers' calendars	you choose the "Approximate
Server Operations Server Operations Extensions Steve_Custom System Setup System Setup System Setup Extensions	Working The value durations	en pian cancelled: hours per day: of Working hours per day option instead, Request C	8.0 V	you choose the "Approximate 5.
Server Operations Server Operations Extensions Server Coperations Extensions System Setup System Setup System Setup Extensions Tenant Management Tenant Management Extensions	Votity Wi Working The value durations Task OpenShift	hen pian cancelled: hours per day: of Working hours per day option instead, Request C t create User and Names	None 8.0 v is used to estimate delivery duration only if enter uses the actual performers' calendary uppace	you choose the "Approximate as.
Server Operations Server Operations Extensions Server Coperations Extensions System Setup System Setup Extensions Tenant Management Tenant Management Extensions VDC	Task OpenShift CreateD	hen pian cancelleo: hours per day: of Working hours per day option instead, Request C t create User and Names en ShiftApplication	None 8.0 V is used to estimate delivery duration only if enter uses the actual performers' calendary space	you choose the "Approximate
Server Operations Server Operations Extensions Server Operations Extensions System Setup System Setup Extensions Tenant Management Tenant Management Extensions VDC VDC VDC VDC Extensions	Working The value durations ⁴ Task OpenShift CreateOp Add Exter	hen plan cancelled: hours per day: of Working hours per day option instead, Request C tcreate User and Names enShiftApplication nded Cartridges	B.0 V is used to estimate delivery duration only if enter uses the actual performers' calendars	you choose the "Approximate
Server Operations Server Operations Extensions steve_Custom System Setup System Setup Extensions Tenant Management Tenant Management Extensions VDC VDC VDC VDC VM Request Extensions	Task OpenShift CreateOp Add Exter	hen plan cancelled: hours per day: of Working hours per day option instead, Request C tcreate User and Names enShiftApplication nded Cartridges	B.D. V is used to estimate delivery duration only if enter uses the actual performers' calendary space	you choose the "Approximate

Step 4 Set permissions, as shown in Figure 4-15.

ſ

Figure 4-15 Set Permissions

	General Offer Presentation Form Plan Authorizations Permissions
Services	Permissions For Service Create a new PAAS Application
Hide Inactive Search New V	Permissions to: Order Service
B MultiCloud Services	Name
Create a new PAAS Application	Site Administrator Anyone
Physical Server Requests	Add Permissions
Server Operations Server Operations Extensions	
Bsteve_Custom	
B Contra Satur Satur	

ServiceLink Agent Configuration

Three ServiceLink agents need to be configured.

- OpenShift SSH Agent, page 4-24
- Creating an OpenShift Application Agent, page 4-25
- Add Extended Cartridges Agent, page 4-27

OpenShift SSH Agent

Perform the following procedure to configure OpenShift SSH Agent.

Step 1 Configure ServiceLink agent Outbound Properties, as shown in Figure 4-16.

Figure 4-16 Configure ServiceLink Agent Outbound Properties

gents	~	Configure Outbound Properties	
Manage Virtual Machine	~	Name	Value
Manage Virtual Snapshot		SSH2OutboundAdapter.HostName	171.71.29.24
	ir t	SSH2OutboundAdapter.Port	22
E General		SSH2OutboundAdapter.UserName	*******
Outbound Properties		SSH2OutboundAdapter.Password	********
Inbound Properties Outbound Request Parameters		SSH2OutboundAdapter.PrivateKey	******
Outbound Response Parameter	ers	SSH2OutboundAdapter.PrivateKeyPassphrase	********



2 Configure Outbound Request parameters, as shown in Figure 4-17.

Agents	«	nsXML elements +	Outbound Parameter Mappings	
⊳ 🧰 Manage Virtual Machine		Dictionaries +	Add Mapping Save Remove Select	ted
⊳ 🚞 Manage Virtual Snapshot	-	Prebuilt +	Service Data Manaina	Decemeter
MultiCloud Extended Virtual Server	ι	Functions	Service Data Mapping	Parameter
a 😋 Openshift SSH agent			#PAAS.SSHcommand#	SSHcommand
= General				
Outbound Properties				
Inbound Properties				
Outbound Request Parameters				
Outbound Response Parameters	3			
Inbound Parameters				
- ··- · · · · ·				

Figure 4-17 Configure Outbound Request Parameters



Figure 4-18 Configure Outbound Transformation Request

Agents Transformations Adap	ters		
Transformations 🔍	* Name:	OpenShift user creation	
Transformations			
AutoCloseRAPI Outbound Tra	* Description:	OpenShift user creation	
CCP Agent Inbound Transform			
Cloud Service Error Remediati			
Cloud SIL Generate Channel I			
E CPO Inbound			
CPO Refresh Metrics Outbour			
CreateOpenShiftApplication	Request Response		
CustomRequestRAPI Outbour	<xsl:styleshee< td=""><td>et version="2.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform"></td><td></td></xsl:styleshee<>	et version="2.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">	
⊒ DataAndParams	<xsl:strip-spar< td=""><td>ce elements="""/></td><td></td></xsl:strip-spar<>	ce elements="""/>	
DataAndParams Protected	5,551	<pre>cutput method= xmi version= 1.0 encoding= 01P-o indent= yes /> <xsl:template match="/"></xsl:template></pre>	
E MultiCloud Virtual Server Upda		<outbound-message></outbound-message>	
OpenShift user creation		<pre><command/><xsl:value-of select="//agent-parameteriname='SSHcommand']/value"></xsl:value-of></pre>	
E REX-OUT-AddOU		<command-timeout>100</command-timeout>	
E REX-OUT-AddPerson			
E REX-OUT-CreateQueue			
E REX-OUT-DeactivateOU	<td>et></td> <td></td>	et>	
E REX-OUT-DeleteQueue			g
REX-OUT-HTTPAgentProperti			14
RFX-OUT-RFXAgentPropertie			8

Creating an OpenShift Application Agent

Perform the following procedure to create an OpenShift application agent.

Step 1 Configure ServiceLink agent Outbound Properties, as shown in Figure 4-19.

ſ

Cisco Intelligent Au	tc	mation for Cloud 3.1.1	[Sate
Home Control Agents Manage	Inte	grations View Transactions	
Agents Transformations Adapted	rs		
Agents	~	Configure Outbound Properties	
a 😋 Agents		Name	Value
AddExtendedCartridges		HttpOutboundAdapter.WsdIURL	
Cloud Error Remediation		HttpOutboundAdapter.WsdIOperation	
Cloud License Manager		HttpOutboundAdapter.RoutingURL	http://localhost:8080/IntegrationServer/vzure/jsp/CreateApplication34.jsp
Cloud SIL Channel ID Generator		HttpOutboundAdapter.AcceptUntrustedURL	true
CloudSync Discovery Clounia Storage Request		HttpOutboundAdapter.ContentType	text/xml
Convert VM to Template		HttpOutboundAdapter.TimeOut	180000
CreateOpenShiftApplication		HttpOutboundAdapter.ProcessResponse	true
E General		HttpOutboundAdapter.RequestHeaders	&sampleHeader=sampleValue
Inbound Properties		HttpOutboundAdapter.AuthenticationScheme	ANONYMOUS
Outbound Request Paramete		HttpOutboundAdapter.AuthenticationScopeHost	
Outbound Response Parame		HttpOutboundAdapter.AuthenticationScopePort	
Inbound Parameters		HttpOutboundAdapter.AuthenticationScopeRealm	
Delete snapshot		HttpOutboundAdapter.Username	10211021
FSM State Transitions		HttpOutboundAdapter.Password	112211221

Figure 4-19 Configure ServiceLink Agent Outbound Properties

Step 2 Configure Outbound Request parameters, as shown in Figure 4-20.

Figure 4-20 Configure Outbound Request Parameters

Agents Transformations Adapters					
Igents	«	nsXML elements +	Outbound Paramete	er Mappings	
a 😋 Agents		Dictionaries +	Add Mapping Save	Remove Selected	
AddExtendedCartridges AutoCloseRAPI		Prebuilt Functions +	Service Data Mapp	ng Parameter	
Cloud Error Remediation			#PAAS.PAAS_APP	Name# PAAS_APP_Name	
Cloud License Manager			#PAAS.Web_Platfor	m_Type# Web_Platform_Type	э
Cloud SIL Channel ID Generator			#PAAS.Scaling#	Scaling	
CloudSync Discovery			#PAAS.Size_of_Gea	r# Size_of_Gear	
Convert VM to Template			#PAAS.Max_numbe	r_gears# Max_number_gears	3
CreateOpenShiftApplication			#PAAS.domainNam	# domainName	
E General			171.71.29.24	openShiftHostName	3
Outbound Properties					
Inbound Properties					
Outbound Request Parameters					
Outbound Response Parameter	rs				
CustomRequestRAPI					
Delete snapshot			Edit Parameter Valu	es	
FSM State Transitions			Parameter:	PAAS_APP_Name	-
IPAM-IPAddresses			Sequine Date	#DAAS DAAS ADD Name#	
IPAM-ModifyNetwork			Mapping:		
IPAM-RemoveNetwork					
Lease Extend					- 5
Manage Physical Machine					1
Manage Virtual Machine					c c



gents	~	Dictionaries	+	Outbound Respons	e Parameter Mappings
😋 Agents		Prebuilt Functions	+	Add Mapping Save	Remove Selected
AddExtendedCartridges				Bernantes	Distingen Cirld
AutoCloseRAPI				Parameter	Dictionary Field
Cloud Error Remediation				ApplicationId	PAAS.ApplicationId
Cloud License Manager					
Cloud SIL Channel ID Generator					
CloudSync Discovery					
Cloupia Storage Request					
Convert VM to Template					
CreateOpenShiftApplication					
Concernal Concernal					
General					
General Cutbound Properties					
 General Outbound Properties Inbound Properties 					
General Outbound Properties Inbound Properties Outbound Request Parameters	5				
Cutbound Properties Inbound Properties Outbound Request Parameters Outbound Response Parameters	ers				
Conternal Control of the second sec	ers				
Centeral Controlmed Properties Inbound Properties Outbound Properties Outbound Request Parameter Outbound Response Parameter Inbound Parameters Outbound Parameters	ers			Edit Decometer Vol	
Contential Outbound Properties Inbound Properties Outbound Request Parameters Outbound Response Parameter Inbound Parameters Detets snapshot	:rs			Edit Parameter Valu	ies
Contential Control of the second se	ers			Edit Parameter Valu Parameter:	les ApplicationId
Control of the second sec	ers			Edit Parameter Valu Parameter:	kes
Control of the image of th	ers			Edit Parameter Valu Parameter: Dictionary Field:	ApplicationId
Contential Outbound Properties Outbound Properties Outbound Response Parameters Outbound Response Parameter Outbound Parameters Outbound Paramete	:rs			Edit Parameter Valu Parameter: Dictionary Field: Mapping:	ApplicationId

Figure 4-21 Configure Outbound Response Parameters

Add Extended Cartridges Agent

Perform the following procedure to add extended cartridges agent.

Step 1 Configure ServiceLink agent Outbound Properties, as shown in Figure 4-22.

Figure 4-22 Configure ServiceLink Agent Outbound Properties

gents	«	Configure Outbound Properties	
Agents	^	Name	Value
General		HttpOutboundAdapter.WsdIURL	
Outbound Properties		HttpOutboundAdapter.WsdlOperation	
Inbound Properties		HttpOutboundAdapter.RoutingURL	http://localhost:8080/IntegrationServer/vzure/jsp/AddExtendedCartridges7.jsp
Outbound Request Parameters		HttpOutboundAdapter.AcceptUntrustedURL	true
Outbound Response Parameter Inbound Parameters	rs	HttpOutboundAdapter.ContentType	text/xml
AutoCloseRAPI		HttpOutboundAdapter.TimeOut	180000
Cloud Error Remediation		HttpOutboundAdapter.ProcessResponse	true
Cloud License Manager Cloud SIL Chappel ID Generator		HttpOutboundAdapter.RequestHeaders	&sampleHeader=sampleValue
Cloud Size Originie in Secretator		HttpOutboundAdapter.AuthenticationScheme	ANONYMOUS
Cloupia Storage Request		HttpOutboundAdapter.AuthenticationScopeHost	
Convert VM to Template		HttpOutboundAdapter.AuthenticationScopePort	
CreateOpenShiftApplication CustomRequestRAPI		HttpOutboundAdapter.AuthenticationScopeRealm	
Delete snapshot		HttpOutboundAdapter.Username	*******
FSM State Transitions		HttpOutboundAdapter.Password	*******
PAM-IPAddresses		HttpOutboundAdapter.Host	
IPAM-ModifyNetwork DAM RemovaNetwork		HttpOutboundAdapter.Domain	



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Agents <u>Transformations</u> Adapters				
Agents	«	nsXML elements +	Outbound Parameter Mappi	ngs
4 😋 Agents		Dictionaries +	Add Mapping Save Remo	ve Selected
AddExtendedCartridges		Prebuilt +	Service Data Manning	Parameter
E General		Functions	Service Data mapping	Falallicici
Outbound Properties			#PAAS_ApplicationId#	PAAS_APP_ID
Inbound Properties			#PAAS.Addon_Cartridge#	EXT_CARTRIDGES
Outbound Request Parameters			171.71.29.24	openShiftHostName
Outbound Response Parameter	s			
Inbound Parameters				

Figure 4-23 Configure Outbound Request Parameters

Creating Portal Pages

Perform the following procedure to create portal pages.

- Step 1 Log in to Portal Designer module and create a new Portal Page Group.
- **Step 2** Set the permissions so that the Organization Unit has read and write permissions to all the pages in the Portal Page group.
- **Step 3** Create two Portal pages in this group (Figure 4-24).

Figure 4-24 Create Portal Pages

Home Portlets Portal Pages	Custom	Content JSR Portlets Portal Settings Reference		
Sateesh Arumbaka	ctions •	General Permissions		
4 🗁 Cisco IAC 3.1		Dermission Summany		
Cloud Service Errors	~~	Permission Summary		
Configuration Wizard		Name	Туре	Permission Type
E Manage Cloud Infrastructure		cvd	OU	Read all Pages in the Group
Manage MultiCloud Resources		cvd	OU	Read / Write all Pages in the Group
My Approvals		admin admin	Person	Read / Write
E My Orders		admin admin	Person	Read
My Servers				
My Virtual Data Centers				
Network Management				
E Order Cloud Services				
Organization Management				
POD Resource Capacity		O Add Permission # Delete		
System Health				
System Resource Capacity				
System Resource Usage				
 System Setup Liporade Wizard 				
E User Management				
TVDC Calculator				
Cloud Administrator Pages				
Custom				
End User Pages				
My Workspace				
G Order more Services				
E My Applications				
Order More Services				
🔉 直 System	~~			

Step 4 Create three portlets, as shown in Figure 4-25, Figure 4-26, and Figure 4-27.



Figure 4-25 Create Portlets 1



ome Portlets Portal Pages Custom	Content JSR Portlets	Portal Settings Reference		
Actions -	General View Filte	er Permissions Summary		
Homepage_Welcome	- Content Portlet Infor	nation		
Order_More_Services				
OrderPage_KnowledgeCenter	Status:		lactive	
OrderPage_OrderResource	*Display Name:	Display Name: My Applications		
OrgAdmin_UserManagement	thiome	My PAAS Applications		
E PrimeAssurance	-iname.	wy_rAA3_Applications		
SystemResourceCapacity_BladePie	Type:	[Core Content] General> JavaScrip	pt	
SystemResourceCapacity_PhysPie	Author	admin admin		
Upgrade_Wizard	Addiol.			
VDC_Calculator	Automatic Login:			
ZenossDemo	External Site:	×		
JavaScript				
Infrastructure_Discovery	Description:			
IPAMGroupFilterGrid				
IPAMNetworkCapacity				
Manage_MyErrorRemediations		Available Keywords	Selected Keywords	
Manage_MyServers				
Manage_My∨DCs		Administration	A	
MultiCloud_Cloupia_Infrastructure_Ma	Keyword:	Cloud		
MultiCloud_Infrastructure_Discovery	,	FAQ		
MultiCloud_Tabbed_Infrastructure_Dis		Knowledge		
My_PAAS_Applications		Setup	\sim	
Report_ViewCloudResourceUsage				
Report_ViewPodCapacity	0			
System_Health	Greated Date:	01/22/2014 2.45 PM		
SystemResourceCapacity_PODs	Created By:	admin admin	admin admin	
\Xi SystemResourceCapacity_UCSInfo 🧹				

Home Portlets Portal Pages Custom	Content JSR Port	ets Portal Settings	Reference		
Actions -	General View	Filter Permissions	Summary		
HTML CloudAdmin_OrgManagement CloudAdmin_SystemSetup CloudAdmin_SystemSetup CloudLandngPage Configuration_Wizard CreateOpenShiftApplication	View Type: Web Auto Height: Height (px):	Page	Auto Scroll: Portlet State	V Normal V	Show Portlet ' Show Control
Homepage_vveicome Order_Age_KnowledgeCenter OrderPage_KnowledgeCenter OrderPage_CorderResource OrgAdmin_UserManagement PrimeAssurance SystemResourceCapacity_BladePie SystemResourceCapacity_PhysPie Upgrade_Wizard VOC_Calculator ZenossDemo JavaScript Reserved Portlets	HTML: «H	COCTYPE HTML PUBLIC * Copyright (°) * All rights resc * chead> * chead http-equ * style type="te }	2 "-//W3C//DTD HTML 4.01/ 2009-2013 Cisco Systems, erved. uiv="Content-Type" content uiv="X-UA-Compatible" con xt/css"> eboot2 fieldset { width: 400px; border.none; font-family:Arial ontentPane { background: tra opacity: 0.8; width: 48%; height: 100%; border.2px soli	/EN" "http://www.w3.org/TR/I .Inc. ="text/html; charset=UTF-8" / tent="IE=Edge,chrome=1" /> , Helvetica, sans-serif; nsparent; d #80898E;	ntm 4/strict.dtd">

Figure 4-27 Create Portlets 3

Step 5 Set the permissions on all three of the Portlets so that the Organization Unit has read and write permissions. Add these portlets to the portal pages, as shown in Figure 4-28 and Figure 4-29.

Figure 4-28 Add Portlets to Portal Pages 1

Cisco Intelligent Au	Itomat	tion for Cloud 3.	.1.1
Home Portlets Portal Pages	Custom C	Content JSR Portlets Po	rtal Settings Reference
Sateesh Arumbaka	Actions -	General Portlets Perm	issions Subscribed Users
Cisco IAC 3.1		Name	Label
Cloud Administrator Pages		My Applications	My Applications
Custom			
End User Pages			
My Workspace			
4 😑 Order more Services			
My Applications			
Order More Services			
System			
Tenant Administrator			

L

Home Portlets Portal Page	Custom C	Content	JSR Portlets	Portal Settings	Reference	
ateesh Arumbaka	Actions -	Genera	l Portlets	Permissions Su	ubscribed Users	
Cisco IAC 3.1		Na	ame		Label	Туре
Cloud Administrator Pages		O	der More Service	s	Order More Services	General
Custom		CreateOpenShiftApplication		CreateOpenShiftApplication	General	
End User Pages						
D My Workspace						
🔄 Order more Services						
My Applications						
\Xi Order More Services						
System						

Figure 4-29 Add Portlets to Portal Pages 2

Deploy Java Server Page (JSP)

Perform the following procedure to deploy a Java server page.

Step 1	Log on to the Cisco Prime Catalog server.
Step 2	Deploy the attached JSPs to the following locations:
	• C:\jboss-as-7.1.1.Final\standalone\deployments\RequestCenter.war\vzure\jsp

• C:\jboss-as-7.1.1.Final\standalone\deployments\ServiceLink.war\vzure\jsp

OpenShift Broker admin Script

Perform the following procedure to execute an OpenShift admin script.

Step 1 Log on to the Broker host.

Add osadmin to the openshift broker as a user

Step 2 Change osadmin user to allow a large number of domains and gears. All domains are going to be owned by osadmin. Domains for users are assigned to osadmin, and the user is granted edit access to the domains. This allows the user to create/delete/manage applications in their domain.

#set max domains and max gears
oo-admin-ctl-user -1 osadmin --setmaxdomains 10000
oo-admin-ctl-user -1 osadmin --setmaxgears 10000

- Step 3 Add the attaché oo-admin-user-profile profile creation scripts into the broker hosts—this is required for PSC to log into the broker host to create openshift users and assign them domains. This script does the following:
 - 1. Creates the user logins.

- **2.** Creates the domain.
- 3. Assigns the domain to osadmin.
- 4. Assigns the user edit access to the domain.
- 5. Limits the max number of gears for the user to 0.
- 6. Limits the max number of domains for the user to 0.

copy the script to openshift broker host

- scp oo-admin-cvd-user-profile root@<brokerhost>
- # edit the oo-admin-cvd-user-profile file to set the following parameters
- # OSADMIN="osadmin" # set this to the osadmin user as shown
- # OSPWD="<password>" # set this to the osadmin directory/ldap password # BROKER="
broker host ip address>" # set this to the public ip of the broker

Testing

The methodology used for testing and validating the functionality was based on test cases per use case for the use cases outlined in the System Overview section.

Use Case 1: Integrated Provisioning for IaaS and PaaS

The following procedure is performed for configuring integrated provisioning for IaaS and PaaS.

Step 1	Add users to the Active Directory installation in the specified OU of the implementation section.
Step 2	Log in to PSC.
Step 3	From the Portal selection dropdown, choose My Workspace.
Step 4	From the workspace, click the Order more services tab.
Step 5	On the Platform As A Service Portlet, click Create a new PAAS Application.

Results

The following results are observed.

- Able to log in with created credentials.
- Able to view Unified portal page with IaaS Cloud Services and PaaS Services.
- · Have permissions to order PaaS Application, which shows up, and order form ...

Use Case 2: Application Stack Creation

The following procedure is performed for configuring application stack creation.

Step 1 Verify the order form shows up after step 5 in Use Case 1: Integrated Provisioning for IaaS and PaaS, page 4-32.

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Step 2	Enter the application	name that you want	to create, e.g. rubyapp.
	11	2	, , , , , ,

- **Step 3** Choose platform type (eg.g python-2.7).
- **Step 4** Choose Gear Profile Small.
- **Step 5** Click False on the Scaling type.
- Step 6 Click Submit Order.
- **Step 7** Close the order confirmation form.

Results

The following results are observed.

- Able to choose different application stacks.
- Able to choose different resource profiles.
- Able to submit order for stack creation.
- Able to confirm order for stack creation.

Use Case 3: Single Pane Management of Application Stack

The following procedure is performed for configuring single pane management of application stack.

- **Step 1** On the workspace page, click the My Applications tab.
- **Step 2** On the list of applications, click the application name just created in Use Case 2: Application Stack Creation, page 4-32.
- **Step 3** In the Take Action section:
 - a. Click View App to take you to the application URL.
 - **b.** Click Stop application.
 - c. Click Start application.
- **Step 4** For scaled application type, click View Status.
- **Step 5** Use git clone to clone the application repository shown in the Application Details section.
- **Step 6** In the Take Action section, click Delete application.
- Step 7 Repeat Use Case 2: Application Stack Creation, page 4-32 steps, click Scaled Application, and submit order.
- **Step 8** Repeat Use Case 2: Application Stack Creation, page 4-32 steps and create a few different applications with different application stacks.
- **Step 9** On the list of applications, verify Steps 3 through 7 for each application.

Results

The following results are observed.

- Able to view list of applications created.
- Able to act on different actions like start, stop for each application stack.
- Able to delete application.
- Able to browse to application URL.

Use Case 4: Integrated Provisioning for IaaS and PaaS

The following procedure is performed for configuring integrated provisioning for IaaS and PaaS.

Step 1 Refer to Use Case 1: Integrated Provisioning for IaaS and PaaS, page 4-32 and Use Case 2: Application Stack Creation, page 4-32, where a direct order for both IaaS and PaaS resources can be placed from a single pane. Validate this use case.



Ordering of IaaS resources comes with the PSC solution and is not validated separately.

Results

See results for Use Cases 1, 2, and 3.

Use Case 5: Network-based Segmentation of PaaS Districts for Security

The following procedure is performed for configuring network-based segmentation of PaaS districts for security.

- **Step 1** Repeat steps 1, 2 and 3 in Use Case 2: Application Stack Creation, page 4-32.
- **Step 2** Choose Small-Secure* Gear profile.
- **Step 3** Submit order.
- Step 4 Repeat steps 1 through 8 in Use Case 3: Single Pane Management of Application Stack, page 4-33 for the secure network application.
- **Step 5** Log in to OpenShift node in secure network as admin/root via ssh and verify that application was created.

Results

The following results are observed.

- Able to choose a secure network profile for an application.
- Able to verify that the application got created in secure network.

Summary

The following recommended implementation was conducted:

- Use of OpenStack for IaaS.
- Deployment of OpenShift Enterprise into OpenStack using HEAT templates.
- Deployment of two separate network segments in OpenStack to house secure and standard OpenShift nodes.
- Creation of PaaS ordering Services that talk to OpenShift Broker in PSC.
- Creation of PaaS Application management portal pages in Prime Services Catalog.
- Binding OpenShift and OpenStack authentication to LDAP (AD) directory.

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