



Leveraging Your OpenStack Troubleshooting Tool Box

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Agenda

- Introduction
- Toolbox Environments
- External Tools
- Tracing CLI Commands
- Database Exploration
- Examining Logfiles with Lnav
- Troubleshooting Examples
- Next Steps
- Questions and Answers





Introduction

Introduction

The goal of this session is to provide tips and tricks to troubleshoot an OpenStack Cloud.

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Keith Berger

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Toolbox Environments

Toolbox Environments

The environments for this session are an OpenStack instance running a single node cloud built with SUSE OpenStack Cloud 8. This deployment is only meant for Demo purposes.

Each student will be given an IP address for the environment they will be using for this workshop. The login user and password are:

ardana/To01-8oX



Toolbox Environments

Once you are connected, please run the following command to setup your OpenStack environment variables.

```
~ $ source ./service.osrc
```





External Tools

External Tools

- `curl` - Simulate OpenStack API requests
- `ip netns` - Access neutron names spaces (`snat`, `qdhcp`, `qrouter`, `fip`, `haproxy`)
- `strace` - Generate system call traces
- `nc` - Test access to remote ports
- `tcpdump` - Capture packets on ovs ports and physical interfaces
- `qemu-nbd` - QEMU Disk Network Block Device Server
- `kpartx` - Create device maps from partition tables





Tracing the CLI

Tracing CLI commands

Using the “debug” option you can trace any OpenStack CLI command.

Example: Listing nova instances

```
~ $ nova --debug list
```

or

```
~ $ openstack --debug server list
```



Tracing CLI commands

The output looks like

```
DEBUG (session:248) REQ: curl -g -i --cacert
"/etc/ssl/certs/ca-certificates.crt" -X GET
https://192.168.23.11:8774/v2.1/3e3f9642620a4e6b8d10fdd76a022618/servers/det
ail -H "User-Agent: python-novaclient" -H "Accept: application/json" -H
"X-Auth-Token: {SHA1}ed0b3a780a2038e889f4761d01e31e0989c12fbe"
```



Tracing CLI commands

Create a token

```
~ $ openstack token issue
```

```
+-----+-----+
| Field      | Value                                     |
+-----+-----+
| expires    | 2018-05-15T03:13:06.200481Z           |
| id         | f24a70933dc04bd3ba1c4673c8a87dcd     |
| project_id | 3e3f9642620a4e6b8d10fdd76a022618     |
| user_id    | 2f9a6ee3affc4f56a5fdf65c1170f9e7     |
+-----+-----+
```



Tracing CLI commands

Run the curl directly

```
~ $ curl -g -i --cacert "/etc/ssl/certs/ca-certificates.crt" -X GET
https://192.168.23.11:8774/v2.1/3e3f9642620a4e6b8d10fdd76a022618/servers/detail
-H "User-Agent: python-novaclient" -H "Accept: application/json" -H
"X-Auth-Token: f24a70933dc04bd3ba1c4673c8a87dcd "
```





Database Exploration

Database Exploration

!!WARNING!! Making manual changes to the database can corrupt your OpenStack cloud.

To examine the data directly in the database, connect to mysql and view the tables. This would be useful when troubleshooting a cloud operation the errors and the logs show a “foreign key” error.



Database Exploration

!!WARNING!! Making manual changes to the database can corrupt your OpenStack cloud.

Example: Looking at the current set of glance images.

```
~ $ sudo mysql  
use glance;  
desc images;
```



Database Exploration

!!WARNING!! Making manual changes to the database can corrupt your OpenStack cloud.

Field	Type	Null	Key	Default	Extra
id	varchar(36)	NO	PRI	NULL	
name	varchar(255)	YES		NULL	
size	bigint(20)	YES		NULL	
status	varchar(30)	NO		NULL	
created_at	datetime	NO	MUL	NULL	
updated_at	datetime	YES	MUL	NULL	
deleted_at	datetime	YES		NULL	
deleted	tinyint(1)	NO	MUL	NULL	
disk_format	varchar(20)	YES		NULL	
container_format	varchar(20)	YES		NULL	
checksum	varchar(32)	YES	MUL	NULL	
owner	varchar(255)	YES	MUL	NULL	
min_disk	int(11)	NO		NULL	
min_ram	int(11)	NO		NULL	
protected	tinyint(1)	NO		0	
virtual_size	bigint(20)	YES		NULL	
visibility	enum('private','public','shared','community')	NO	MUL	shared	



Database Exploration

!!WARNING!! Making manual changes to the database can corrupt your OpenStack cloud.

```
select name,disk_format from images;
```

```
+-----+-----+
| name                | disk_format |
+-----+-----+
| cirros-0.3.4-x86_64 | qcow2       |
| inst2-shelved       | qcow2       |
| octavia-amphora-x64-haproxy_hos-4.0.4 | qcow2       |
+-----+-----+
```

```
3 rows in set (0.00 sec)
```

```
quit
```





Using Lnav

Examining Logfiles with Lnav

- Lnav interleaves multiple log files based on time stamps
- E.g. Look at Nova and Glance logs to trace a boot image request:

```
~$ lnav /var/log/nova/nova-api.log \  
      /var/log/glance/glance-api.log
```

- For convenience run

```
~$ ~/run_lnav.sh
```

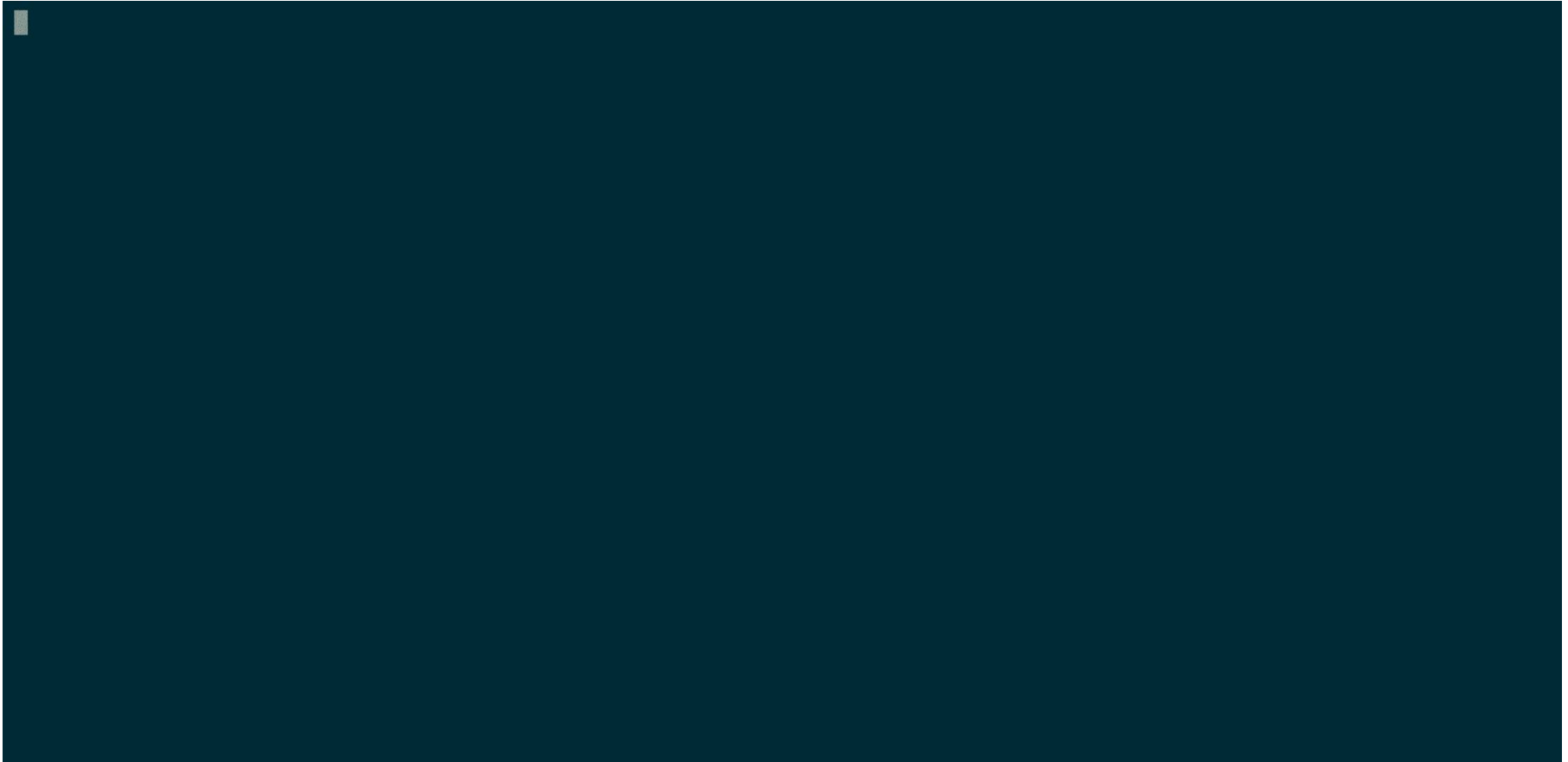


Examining Logfiles with Lnav

SPACE, j, k, b	Page down, line down, line up, page up
h, Shift + h, Shift + l, l	Page left, 10 col. left, 10 col. right, page right
/	Search regexp
n, Shift + n	Next/previous search hit
<, >	Previous/next search hit (horizontal)
1 - 6, Shift + 1 - 6	Next/previous n'th ten minute of the hour
Shift + p	Switch to/from the pretty-printed view of the displayed log or text files



Examining Logfiles with Lnav





Troubleshooting Examples

Troubleshooting Examples

Cinder - Examining Allocation Ratios

Keystone - Exploring user permissions

Swift - Finding an object

Glance - Modifying a glance image

Nova - Tracing a boot sequence

Neutron - Using network namespaces



Troubleshooting Examples: Cinder

```
~ $ openstack volume create --size 8 bigvol
```

Property	Value
attachments	[]
availability_zone	nova
bootable	false
consistencygroup_id	None
created_at	2018-05-17T22:08:57.000000
description	None
encrypted	False
id	287feb4f-b098-489a-a109-73fcc18a0041
metadata	{}
multiattach	False
name	bigvol
os-vol-tenant-attr:tenant_id	e528c5752a4c4d64bcc07c6bb07d8f9c
replication_status	None
size	8
snapshot_id	None
source_volid	None
status	creating
updated_at	None
user_id	3849f5221d6c4b3d9aae9c3f5f9e27b3
volume_type	None



Troubleshooting Examples: Cinder

```
~ $ cinder list
```

ID	Status	Name	Size	Volume Type	Bootable	Attached to
287feb4f-b098-489a-a109-73fcc18a0041	error	bigvol	8	-	false	
8ba8c572-4911-4671-b966-ac12789fa22e	available	CirrosBFV	1	-	true	

Look for the request ID using `lnav` and search for “**bigvol**”

Limit the output to the request ID using `:filter-in <req-id>`

```
~ $ lnav /var/log/cinder/*.log
```

```
cinder-api.log:2018-05-17 18:29:24.949 11370 DEBUG cinder.volume.api [req-ca41f6ef-3317-4329-9d8b-15da99dbf30f
3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default default] Task
'cinder.volume.flows.api.create_volume.QuotaCommitTask;volume:create' (a548800c-d401-4f4c-a625-81e677225884) transitioned
into state 'SUCCESS' from state 'RUNNING' with result '{"volume_properties":
VolumeProperties(attach_status='detached',availability_zone='nova',cgsnapshot_id=None,consistencygroup_id=None,display_de
scription=None,display_name='bigvol',encryption_key_id=None,group_id=None,group_type_id=<?>,metadata={},multiattach=False
,project_id='e528c5752a4c4d64bcc07c6bb07d8f9c',qos_specs=None,replication_status=<?>,reservations=['f431ab64-50c2-4703-8b
2e-3a4c12701988','08900298-d7dd-42b2-81a4-7de0cdbca7f0'],size=8,snapshot_id=None,source_replicaid=None,source_valid=None,
status='creating',user_id='3849f5221d6c4b3d9aae9c3f5f9e27b3',volume_type_id=None)}' _task_receiver
/opt/stack/venv/cinder-20180424T164506Z/lib/python2.7/site-packages/taskflow/listeners/logging.py:18
```



Troubleshooting Examples: Cinder

```
cinder-scheduler.log:2018-05-17 18:29:25.262 10878 DEBUG cinder.scheduler.base_filter
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] Starting with 1 host(s) get_filtered_objects
```

```
cinder-scheduler.log:2018-05-17 18:29:25.263 10878 DEBUG cinder.scheduler.filters.capacity_filter
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] Checking if host ha-volume-manager@lvm-1#LVM_iSCSI can create a 8 GB volume
(58cd152c-84c2-4fa3-b912-f0fbe2b856dc) backend_passes
```

```
cinder-scheduler.log:2018-05-17 18:29:25.263 10878 DEBUG cinder.scheduler.filters.capacity_filter
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] Checking provisioning for request of 8 GB. Backend: host 'ha-volume-manager@lvm-1#LVM_iSCSI':free_capacity_gb:
4.71, total_capacity_gb: 4.75,allocated_capacity_gb: 1, max_over_subscription_ratio: 1.0,reserved_percentage: 0,
provisioned_capacity_gb: 1.0,thin_provisioning_support: True, thick_provisioning_support: False,pools: None,updated at:
2018-05-17 22:29:00.195509 backend_passes
```

```
cinder-scheduler.log:2018-05-17 18:29:25.263 10878 WARNING cinder.scheduler.filters.capacity_filter
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] Insufficient free space for thin provisioning. The ratio of provisioned capacity over total capacity 1.89 has
exceeded the maximum over subscription ratio 1.00 on host ha-volume-manager@lvm-1#LVM_iSCSI.
```

```
cinder-scheduler.log:2018-05-17 18:29:25.264 10878 DEBUG cinder.scheduler.base_filter
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] Filter CapabilitiesFilter returned 0 host(s) get_filtered_objects
```



Troubleshooting Examples: Cinder

```
cinder-scheduler.log:2018-05-17 18:29:25.265 10878 DEBUG cinder.scheduler.base_filter
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] Filtering removed all hosts for the request with volume ID '58cd152c-84c2-4fa3-b912-f0fbe2b856dc'. Filter
results: [('AvailabilityZoneFilter', [u'ha-volume-manager@lvm-1#LVM_iSCSI']), ('CapacityFilter', []),
('CapabilitiesFilter', [])] _log_filtration

cinder-scheduler.log:2018-05-17 18:29:25.266 10878 WARNING cinder.scheduler.filter_scheduler
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] No weighed backend found for volume with properties: None

cinder-scheduler.log:2018-05-17 18:29:25.296 10878 ERROR cinder.scheduler.flows.create_volume
[req-ca41f6ef-3317-4329-9d8b-15da99dbf30f 3849f5221d6c4b3d9aae9c3f5f9e27b3 e528c5752a4c4d64bcc07c6bb07d8f9c - default
default] Failed to run task cinder.scheduler.flows.create_volume.ScheduleCreateVolumeTask;volume:create: No valid backend
was found. No weighed backends available: NoValidBackend: No valid backend was found. No weighed backends available
```



Troubleshooting Examples: Keystone

Audit logging enabled to

```
/var/audit/cinder/cinder.log
```

Policy rules located at

```
/opt/stack/service/cinder-api/etc/policy.json
```

```
~ $ openstack volume list
```

ID	Status	Name	Size	Volume Type	Bootable	Attached to
8ba8c572-4911-4671-b966-ac12789fa22e	available	CirrosBFV	1	-	true	

Run

```
~ $ lnav /var/audit/cinder/cinder-audit.log
```



Troubleshooting Examples: Keystone

```
{ "event_type": "audit.http.request", "timestamp": "2018-05-17 21:03:40.674803", "payload": { "typeURI": "http://schemas.dmtf.org/cloud/audit/1.0/event", "eventTime": "2018-05-17T21:03:40.673634+0000", "target": { "id": "cinderv3", "typeURI": "service/storage/block/volumes/detail", "addresses": [ { "url": "https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "admin" }, { "url": "https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "private" }, { "url": "https://192.168.102.3:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "public" } ], "name": "cinderv3", "observer": { "id": "target" }, "tags": [ "correlation_id?value=781e1705-e08c-5360-816f-40112157553e" ], "eventType": "activity", "initiator": { "typeURI": "service/security/account/user", "name": "admin", "credential": { "token": "****" }, "identity_status": "Confirmed", "host": { "agent": "python-cinderclient", "address": "192.168.102.228" }, "project_id": "e528c5752a4c4d64bcc07c6bb07d8f9c", "id": "3849f5221d6c4b3d9aae9c3f5f9e27b3" }, "action": "read/list", "outcome": "pending", "id": "c25c735c-7722-5b9a-b48e-44e6ad3efede", "requestPath": "/v3/e528c5752a4c4d64bcc07c6bb07d8f9c/volumes/detail", "priority": "INFO", "publisher_id": "cinder-api", "message_id": "c11bb740-26d2-4886-a125-c67116816db8" }
```

```
{ "event_type": "audit.http.response", "timestamp": "2018-05-17 21:03:41.151882", "payload": { "typeURI": "http://schemas.dmtf.org/cloud/audit/1.0/event", "eventTime": "2018-05-17T21:03:40.673634+0000", "target": { "id": "cinderv3", "typeURI": "service/storage/block/volumes/detail", "addresses": [ { "url": "https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "admin" }, { "url": "https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "private" }, { "url": "https://192.168.102.3:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "public" } ], "name": "cinderv3", "observer": { "id": "target" }, "tags": [ "correlation_id?value=781e1705-e08c-5360-816f-40112157553e" ], "eventType": "activity", "initiator": { "typeURI": "service/security/account/user", "name": "admin", "credential": { "token": "****" }, "identity_status": "Confirmed", "host": { "agent": "python-cinderclient", "address": "192.168.102.228" }, "project_id": "e528c5752a4c4d64bcc07c6bb07d8f9c", "id": "3849f5221d6c4b3d9aae9c3f5f9e27b3" }, "reason": { "reasonCode": "200", "reasonType": "HTTP" }, "reporterchain": [ { "reporterTime": "2018-05-17T21:03:41.151129+0000", "role": "modifier", "reporter": { "id": "target" } } ], "action": "read/list", "outcome": "success", "id": "c25c735c-7722-5b9a-b48e-44e6ad3efede", "requestPath": "/v3/e528c5752a4c4d64bcc07c6bb07d8f9c/volumes/detail", "priority": "INFO", "publisher_id": "cinder-api", "message_id": "5550b1ea-1c2d-4e72-89a7-9d38c3eef88d" }
```



Troubleshooting Examples: Keystone

```
{
  "admin_or_owner": "is_admin:True or role:cinder_admin or (role:admin and
is_admin_project:True) or project_id:%(project_id)s",

  "default": "rule:admin_or_owner",

  "admin_api": "is_admin:True or role:cinder_admin or (role:admin and
is_admin_project:True)",

  "volume:create": "",
  "volume:create_from_image": "",
  "volume:delete": "rule:admin_or_owner",
  "volume:force_delete": "rule:admin_api",
  "volume:get": "rule:admin_or_owner",
  "volume:get_all": "rule:admin_or_owner",
```



Troubleshooting Examples: Keystone

```
~ $ openstack volume service list
```

```
ERROR: Policy doesn't allow volume_extension:services:index to be performed. (HTTP 403)  
(Request-ID: req-bb59f1e3-5f95-4218-a3c6-ce2444e1cf36)
```

Run

```
~ $ lnav /var/audit/cinder/cinder-audit.log
```



Troubleshooting Examples: Keystone

Hints: To view the users project and roles, you can do the following

```
~ $ . ~/keystone.osrc
~ $ openstack user list
~ $ openstack project list
~ $ openstack role list
~ $ openstack role assignment list --names
```

The cinder service runs in its own project and this is not the admin project.



Troubleshooting Examples: Keystone

```
{ "event_type": "audit.http.request", "timestamp": "2018-05-17 21:04:07.755000", "payload": { "typeURI":  
"http://schemas.dmtf.org/cloud/audit/1.0/event", "eventTime": "2018-05-17T21:04:07.751676+0000", "target": { "id":  
"cinderv3", "typeURI": "service/storage/block", "addresses": [ { "url":  
"https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "admin"}, { "url":  
"https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "private"}, { "url":  
"https://192.168.102.3:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "public"} ], "name": "cinderv3"}, "observer":  
{ "id": "target"}, "tags": [ "correlation_id?value=c5c7ed0c-1b62-5d77-a56e-b165eebb73cb" ], "eventType": "activity",  
"initiator": { "typeURI": "service/security/account/user", "name": "admin", "credential": { "token": "****",  
"identity_status": "Confirmed"}, "host": { "agent": "python-cinderclient", "address": "192.168.102.228"}, "project_id":  
"e528c5752a4c4d64bcc07c6bb07d8f9c", "id": "3849f5221d6c4b3d9aae9c3f5f9e27b3" }, "action": "read", "outcome": "pending",  
"id": "763a8bf2-24ff-58f9-8195-3d5a40ed2447", "requestPath": "/v3/e528c5752a4c4d64bcc07c6bb07d8f9c/os-services",  
"priority": "INFO", "publisher_id": "cinder-api", "message_id": "17e2f8e9-3791-4b6e-bfd0-6c5826bbabef" }
```

```
{ "event_type": "audit.http.response", "timestamp": "2018-05-17 21:04:08.085307", "payload": { "typeURI":  
"http://schemas.dmtf.org/cloud/audit/1.0/event", "eventTime": "2018-05-17T21:04:07.751676+0000", "target": { "id":  
"cinderv3", "typeURI": "service/storage/block", "addresses": [ { "url":  
"https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "admin"}, { "url":  
"https://192.168.102.2:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "private"}, { "url":  
"https://192.168.102.3:8776/v3/e528c5752a4c4d64bcc07c6bb07d8f9c", "name": "public"} ], "name": "cinderv3"}, "observer":  
{ "id": "target"}, "tags": [ "correlation_id?value=c5c7ed0c-1b62-5d77-a56e-b165eebb73cb" ], "eventType": "activity",  
"initiator": { "typeURI": "service/security/account/user", "name": "admin", "credential": { "token": "****",  
"identity_status": "Confirmed"}, "host": { "agent": "python-cinderclient", "address": "192.168.102.228"}, "project_id":  
"e528c5752a4c4d64bcc07c6bb07d8f9c", "id": "3849f5221d6c4b3d9aae9c3f5f9e27b3" }, "reason": { "reasonCode": "403",  
"reasonType": "HTTP"}, "reporterchain": [ { "reporterTime": "2018-05-17T21:04:08.084559+0000", "role": "modifier",  
"reporter": { "id": "target" } } ], "action": "read", "outcome": "failure", "id": "763a8bf2-24ff-58f9-8195-3d5a40ed2447",  
"requestPath": "/v3/e528c5752a4c4d64bcc07c6bb07d8f9c/os-services", "priority": "INFO", "publisher_id": "cinder-api",  
"message_id": "73d92697-d063-4ac1-a63c-1dbc7e37bd13" }
```



Troubleshooting Examples: Keystone

```
{
  "admin_or_owner": "is_admin:True or role:cinder_admin or (role:admin and
is_admin_project:True) or project_id:%(project_id)s",

  "default": "rule:admin_or_owner",

  "admin_api": "is_admin:True or role:cinder_admin or (role:admin and
is_admin_project:True)",

  ...

  "volume_extension:services:index": "rule:admin_api",
  "volume_extension:services:update" : "rule:admin_api",
```



Troubleshooting Examples: Swift

Finding the location and contents of an object in swift storage for a given tenant using swift-get-nodes

```
~ $ . ~/service.osrc
~ $ openstack container list
+-----+
| Name           |
+-----+
| Tbox_Container |
+-----+
~ $ openstack object list Tbox_Container
+-----+
| Name          |
+-----+
| tbox.txt      |
+-----+
```



Troubleshooting Examples: Swift

Find the tenant id of the admin tenant. This is the tenant in our example, but this could be a different OpenStack tenant

```
~ $ . ~/keystone.osrc  
~ $ openstack project list | grep admin
```



Troubleshooting Examples: Swift

```
~ $ sudo swift-get-nodes /etc/swift/object.ring.gz AUTH_<TENANT_ID> Tbox_Container tbox.txt
```

```
Account    AUTH_e528c5752a4c4d64bcc07c6bb07d8f9c
Container  Tbox_Container
Object     tbox.txt
```

```
Partition  2999
Hash       bb7c93fadd8cf1c487e16b2df206878
```

```
Server:Port Device    192.168.102.228:6000 lvm0
```

```
~ $ curl -g -I -XHEAD
"http://192.168.102.228:6000/lvm0/2999/AUTH_e528c5752a4c4d64bcc07c6bb07d8f9c/Tbox_Container/tbox.txt"
```

Use your own device location of servers:

```
such as "export DEVICE=/srv/node"
```

```
ssh 192.168.102.228 "ls -lah
```

```
${DEVICE:-/srv/node*}/lvm0/objects/2999/78b/bb7c93fadd8cf1c487e16b2df206878b"
```

note: `/srv/node*` is used as default value of `devices`, the real value is set in the config file on each storage node.

What is the contents of the object?



Troubleshooting Examples: Glance

```
~ $ wget
http://download.opensuse.org/repositories/Cloud:/Images:/Leap_42.3/images/op
enSUSE-Leap-42.3-OpenStack.x86_64.qcow2
...
...

Saving to: `openSUSE-Leap-42.3-OpenStack.x86_64.qcow2'

100%[=====
>] 501,996,032 11.3MB/s   in 3m 34s

2018-05-21 12:03:18 (2.24 MB/s) -
`openSUSE-Leap-42.3-OpenStack.x86_64.qcow2' saved [501996032/501996032]
```



Troubleshooting Examples: Glance

```
ardana@tbox-ctrl-c0-m1-mgmt ~ $ sudo qemu-nbd --connect=/dev/nbd0  
openSUSE-Leap-42.3-OpenStack.x86_64.qcow2  
ardana@tbox-ctrl-c0-m1-mgmt ~ $ sudo mkdir /tmp_mnt
```

```
ardana@tbox-ctrl-c0-m1-mgmt /dev $ sudo fdisk /dev/nbd0 -l  
Disk /dev/nbd0: 10 GiB, 10737418240 bytes, 20971520 sectors  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disklabel type: dos  
Disk identifier: 0x391faa48
```

Device	Boot	Start	End	Sectors	Size	Id	Type
/dev/nbd0p1	*	2048	20971519	20969472	10G	83	Linux



Troubleshooting Examples: Glance

```
ardana@tbox-ctrl-c0-m1-mgmt ~ $ sudo kpartx -a /dev/nbd0
```

```
ardana@tbox-ctrl-c0-m1-mgmt ~ $ ls -al /dev/mapper
```

```
...
```

```
...
```

```
lrwxrwxrwx 1 root root          8 May 21 12:10 nbd0p1 -> ../dm-11
```

```
ardana@tbox-ctrl-c0-m1-mgmt ~ $ sudo mount /dev/mapper/nbd0p1 /tmp_mnt
```

```
ardana@tbox-ctrl-c0-m1-mgmt ~ $ ls /tmp_mnt
```

```
bin  dev  home  lib  lost+found  opt  root  sbin  srv  tmp  var
boot etc  image lib64 mnt      proc  run  selinux  sys  usr
```

Now you can add extra ssh keys, enable password login, additional services,....



Troubleshooting Examples: Nova

```
~ $ . service.osrc
```

```
~ $ openstack image list
```

```
+-----+-----+-----+
| ID                | Name                | Status |
+-----+-----+-----+
| a4ba17bb-0754-4aae-aa9a-567aef00b5c0 | cirros-0.4.0-x86_64 | active |
+-----+-----+-----+
```

```
~ $ openstack flavor list
```

```
+---+-----+-----+-----+-----+-----+-----+
| ID | Name       | RAM | Disk | Ephemeral | VCPUs | Is Public |
+---+-----+-----+-----+-----+-----+-----+
| 1  | m1.tiny   | 512 | 1    | 0         | 1     | True      |
+---+-----+-----+-----+-----+-----+-----+
```

```
~ $ openstack network list
```

```
+-----+-----+
| ID                | Name                |
+-----+-----+
| 110dd274-7ac4-4231-bac4-4d74dbe4df46 | default-net        |
+-----+-----+
```



Troubleshooting Examples: Nova

```
~ $ openstack --debug server create \  
    --flavor m1.tiny --image cirros-0.4.0-x86_64 test  
~ $ openstack server show test
```

Note:

- `hypervisor_hostname`: **tbox-ctrl-c0-m1-mgmt**
- `instance_name`: **instance-00000008**
- `id`: **714c2b2e-6a7c-4b5d-8ade-51300872614d**
- `addresses`: **default-net=172.0.10.3**

We will follow the call trace of OpenStack in the log files.

```
~ $ ./run_lnav.sh
```



Troubleshooting Examples: Nova

- Find the following events in the logs:
- Verification of Nova flavor
- Request server creation
- Nova scheduler applies filters
- Nova claims resources for VM
- Neutron allocates IP address
- Neutron adds netns for default-net
- Nova creates libvirt domain



Troubleshooting Examples: Neutron

- Get console URL

```
~ $ openstack console url show --format value
```

```
https://192.168.102.3:6080/vnc_auto.html?token=56eea882-fb95-4ec9-9714-fb7d0767d699
```

- Establish ssh tunnel to novnc

```
$USER@$LAPTOP ~ $ ssh -L 6080:192.168.102.3:6080 ardana@$INSTANCE_IP
```

- Connect to console (with your browser)

```
https://localhost:6080/vnc_auto.html?token=56eea882-fb95-4ec9-9714-fb7d0767d699
```



Troubleshooting Examples: Neutron

- Use netns from log deep dive

```
~ $ ip netns list  
qdhcp-110dd274-7ac4-4231-bac4-4d74dbe4df46
```

- Allow for inbound ssh

```
~ $ openstack security group rule create \  
    --dst-port 22 --ingress fbe1d6f3-d39a-460d-88f8-08b3379cdba9
```

- SSH to cirros server

```
~ $ sudo ip netns exec qdhcp-110dd274-7ac4-4231-bac4-4d74dbe4df46 \  
    ssh cirros@172.0.10.10
```





Questions



We adapt. You succeed.