

OpenStack Cinder Deep Dive

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Cinder's Mission

To implement services and libraries to provide on-demand, self-service access to Block Storage resources via abstraction and automation on top of other block storage devices.

Cinder drivers

Cinder is an abstraction layer for around 80 storage backends:

- ▶ Open: LVM, GlusterFS, Ceph, NFS. . .
- ▶ Proprietary: NetApp, SolidFire, Dell, EMC, HPE, Fujitsu, Hitachi, IBM, Lenovo, VMWare, Violin, Quobyte, Scality, Tegile. . .
- ▶ Protocols: iSCSI, NFS, RBD, Fiber Channel, proprietary. . .
- ▶ Backup: Swift, RBD, GlusterFS, NFS, IBM TSM

Required features

- ▶ Volume Create/Delete
- ▶ Volume Attach/Detach
- ▶ Snapshot Create/Delete
- ▶ Create Volume from Snapshot
- ▶ Get Volume Stats
- ▶ Copy Image to Volume
- ▶ Copy Volume to Image
- ▶ Clone Volume
- ▶ Extend Volume

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- ▶ *Replication*
 - ▶ Low number of supporting drivers
 - ▶ Replication v1 - single volume replication
 - ▶ Replication v2 - backend-level replication

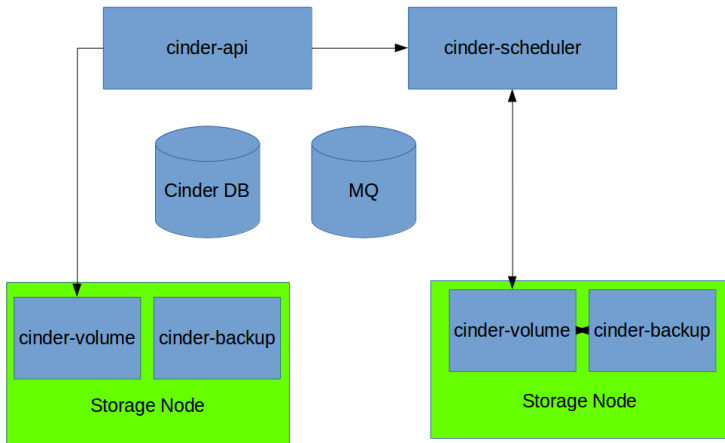
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 - ▶ Quite reliable
- ▶ *QoS support*
 - ▶ Moderate number of supporting drivers

Architecture (pre-Mitaka)



Architecture

40	643f9169 1/10/13	Huang	11
41	c53d8e34 5/3/12	Jenkins	1
42	c53d8e34 5/3/12	Jenkins	1
43	61f39169 1/10/13	Huang	11
44	d17cc23c 2/14/13	Huang	12
45	d17cc23c 2/14/13	Huang	12
46	643f9169 1/10/13	Huang	11
47	c53d8e34 5/3/12	Jenkins	1
48	a771e45a 6/3/13	Vilgelm	16
49	a771e45a 6/3/13	Vilgelm	16
50	a771e45a 6/3/13	Vilgelm	16
51	3f8d7857a 1/6/14	Traeger	28
52	3f8d7857a 1/6/14	Traeger	28
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54	c53d8e34 5/3/12	Jenkins	1
55	c53d8e34 5/3/12	Jenkins	1
56	c53d8e34 5/3/12	Jenkins	1
57	51418bdd 11/27/12	Griffith	8
58	c53d8e34 5/3/12	Jenkins	1
59	12e4d923 12/3/15	Pham	57
60	8636a9fe 7/19/12	Bryant	3
61	bcdf9f363 3/10/14	Perocco	32
62	bcdf9f363 3/10/14	Perocco	32
63	6c708d12 2/18/13	Basnight	13
64	6c708d12 2/18/13	Basnight	13
65	c53d8e34 5/3/12	Jenkins	1
66	a771e45a 6/3/13	Vilgelm	16

The screenshot shows a code editor with the following Python code:

```
from cinder.volume import rpc

scheduler_driver_opt = cfg.StrOpt(
    'scheduler_driver_opt',
    help='The driver to use for the scheduler.',
    default='nova.scheduler.driver.NoopSchedulerDriver',
    metavar='DRIVER',
)

CONF = cfg.CONF
CONF.register_opt(scheduler_driver_opt)

QUOTAS = quota.QUOTAS

LOG = logging.getLogger(__name__)

class SchedulerManager(manager.Manager):
    """Chooses a host to create the volume on"""

    RPC_API_VERSION = '1.11'

    def __init__(self, target = messaging.Target(version=RPC_API_VERSION, service_name='nova.scheduler'),
                 scheduler_driver=None, service_name=None,
                 *args, **kwargs):
        if not scheduler_driver:
            scheduler_driver = CONF.scheduler_driver

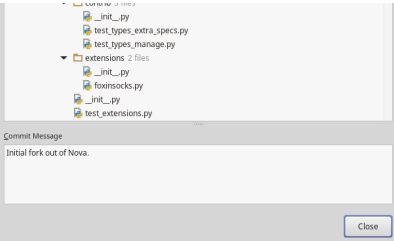
    def __init__(self, scheduler_driver=None, service_name=None,
                 *args, **kwargs):
```

The file explorer on the right shows the following files:

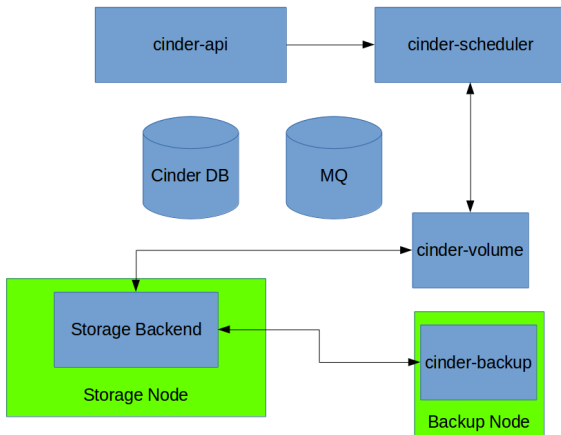
- __init__.py
- test_types_extra_spec.py
- test_types_manage.py
- extensions 2 files
 - __init__.py
 - foxinsocks.py
- __init__.py
- test_extensions.py

The commit message field shows:

Commit Message
Initial fork out of Nova.



Architecture (non-LVM-backends)

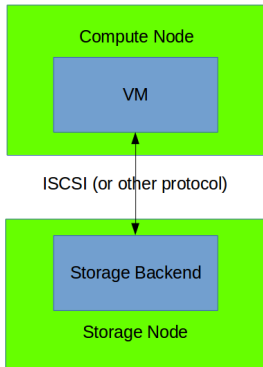


Attach to VM or detach from VM

Complicated chain of internal REST API calls from Nova to Cinder.

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- ▶ Cinder usage outside of OpenStack
 - ▶ `python-brick-cinderclient-ext` project
 - ▶ You'll still need DB (MySQL), MQ (RabbitMQ) and Keystone

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- ▶ cinder-volume service clustering *AKA c-vol A/A HA support*
 - ▶ Right now it is still risky to run multiple c-vols controlling a single storage backend

Thank you!

<https://github.com/dulek/openstack-meetup-wroclaw-cinder>

remind me to switch to next slide for Q&A

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