sodacon 2020
DATA CONNECTED

CINDER
Data Management Challenges

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Agenda

1. OpenStack and Cinder
2. What Cinder Does
3. How Cinder Does It
4. What Cinder Can Do for You
5. How You Can Get Involved

OpenStack

OpenStack is an **open source** project for building a private or public infrastructure-as-a-service cloud running on standard hardware

- requires virtualization software
- requires a base operating system
- more info: **openstack . org**

OpenStack

OpenStack architecture: a number of projects that provide different cloud services via REST APIs

- Compute Service - Nova
- Networking Service - Neutron
- Image Service - Glance
- Block Storage Service - Cinder
- Identity Service - Keystone
- Object Store - Swift
- … and many more!

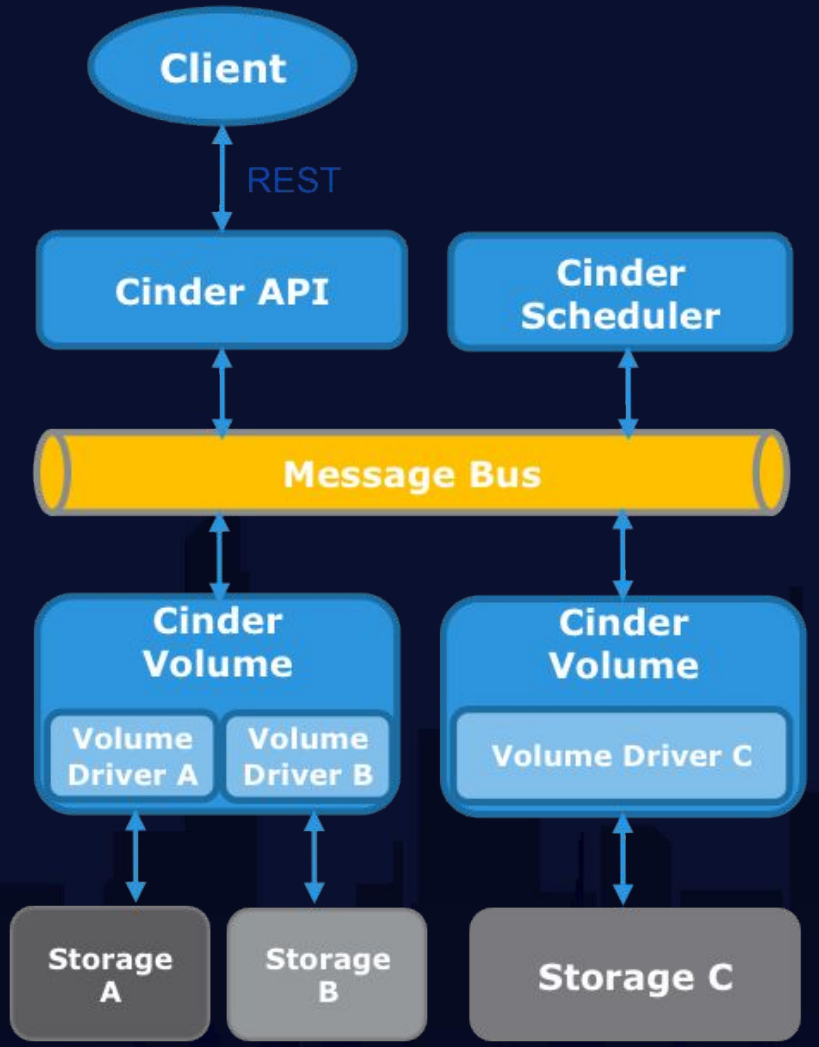
search: **openstack api reference**

Cinder

Cinder is the OpenStack Block Storage service

- Implements services and libraries to provide on demand, self-service access to Block Storage resources
- Provides Software Defined Block Storage via abstraction and automation on top of various traditional backend block storage devices

Cinder Architecture



Cinder Project Deliverables

- cinder
- python-cinderclient
- os-brick
- python-brick-cinderclient-ext
- cinderlib
- cinder-tempest-plugin
- cinder-specs

code: **opendev . org / openstack / {name}**

Why are we looking at the horse's back end?

- Your block storage has to actually be stored somewhere … so *storage backends* are essential to Cinder
- Cinder supports different backends through *drivers*
  - Drivers mediate between the Block Storage API, which provides a consistent interface to users, and particular backends
  - Strictly speaking, drivers mediate between the storage backends and Cinder services, providing a consistent interface for the Cinder software

Cinder Backend Drivers

- There are over 79 drivers in the cinder code repository
- ‘Supported’ drivers have functioning third-party CI systems that run on every proposed patch to cinder
- A third-party CI provides additional information when patches are reviewed
  - early detection of changes to cinder code that may impact a driver
  - early detection of changes to driver code that may cause a regression in cinder behavior

What tests are the 3rd Party CIs running?

- Tests are run against an OpenStack environment connected to the vendor's backend
  - The OpenStack integration test suite ("tempest")
  - Additional cinder-focused API and scenario tests contained in the cinder-tempest-plugin
    - We can add extra integration tests for drivers to focus on particular areas of functionality for particular configurations
    - example: **review . opendev . org / 737380**

Using Cinder

- Cinder is fully integrated into OpenStack, so it's easy to use with OpenStack
- Cinder can also be used in "stand-alone" mode if you want to use it independently of OpenStack
- Cinder can also be used to provide persistent volumes for containers

The Container Storage Interface

- Specifies an interface to enable a storage vendor to develop a single plugin that will work across all container systems supporting the standard
- Storage vendors do not have to touch the core code of the container orchestration system
- You can use Cinder with the CSI in three ways

1. The cinder-csi-plugin

- If you're running kubernetes on top of OpenStack, and your OpenStack deployment contains Cinder (as about 98% of deployments do), the cinder-csi-plugin can serve persistent volumes from whatever backends are configured for Cinder
  - kubernetes code
  - **github . com / kubernetes / cloud-provider-openstack**

2. The cinder-csi-plugin

- If you're *not* running kubernetes on top of OpenStack, you can still use the cinder-csi-plugin and have Cinder manage your persistent volumes by running Cinder in "standalone" mode
  - advantage: gives you a wide choice of storage backends, namely, whatever Cinder supports
  - disadvantage: very heavyweight

cinderlib

- An OpenStack deliverable of the Cinder project
- It's a python library that allows Cinder storage drivers to be used outside of Cinder
- removes the DBMS, message broker, Block Storage API, scheduler, and volume manager layers from cinder
- code: **opendev . org / openstack / cinderlib**

3. Ember CSI

- Provides a CSI standard interface to cinderlib
- cinderlib takes advantage of the consistent interface that was defined for drivers to mediate between the storage backends and Cinder
- This allows you to use cinder drivers outside of Cinder
  - enables the re-use of well-tested software for many diverse hardware backends
- code: **ember - csi . io**

Getting Involved in the Cinder Project

- It's an open source project, it's part of OpenStack, which is under the Open Infrastructure Foundation umbrella, and we follow the Four Opens:
  - open source
  - open design
  - open development
  - open community

Getting Involved in the Cinder Project

- OpenStack works on a six-month development cycle with releases in the May and November time frames
  - The release usually coincides with an Open Infrastructure Summit, where there are Forum sessions to give feedback to OpenStack projects
  - If you have some ideas for how Cinder can work better for your use case, it's an opportunity to influence Cinder development

Getting Involved in the Cinder Project

- Cinder project planning is done at the OpenStack Project Teams Gathering, which is a week-long design meeting shortly after each release
  - Feedback from the Summit/Forum is discussed here, but it's mostly software developers who want to implement specific features for Cinder
  - If you have some ideas for how Cinder can work better for your use case, and you are a software developer (or have developers who work for you), you can influence Cinder development

More about Cinder

- Project documentation
  - **https:// cinder . openstack . org**
- Cinder YouTube channel
  - **http:// tiny.cc / cinder - youtube**
- General information (including meeting times, where the code repositories are, contact information)
  - **http:// tiny . cc / cinder - info**

Thank You

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https://sodafoundation.io/events/sodacon2020