

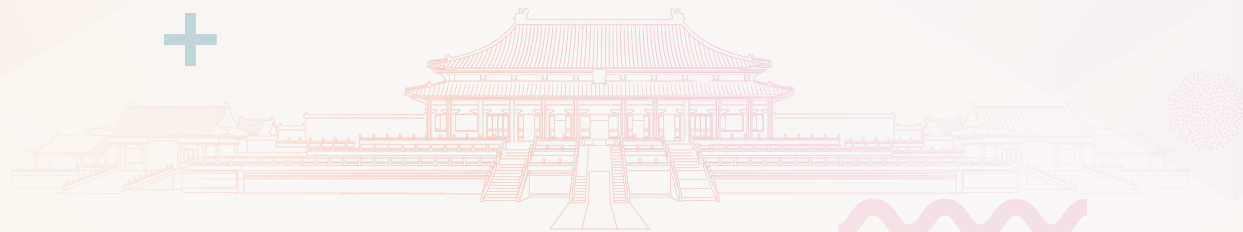


CEPHALOCON APAC 2018

THE FUTURE OF STORAGE

22-23 March 2018 | BEIJING

Stor4NFV: Exploration of Cloud-native Storage in OPNFV





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NFV Cloud

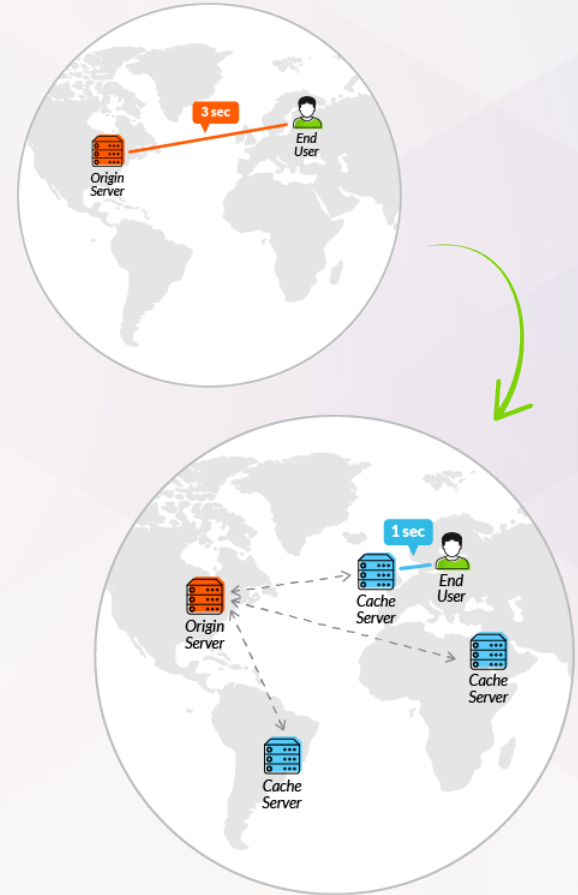
A Network Functions Virtualization (NFV) cloud is a datacenter and network built to host, deploy, and service virtual network functions (VNFs) using a cloud network.



OPNFV

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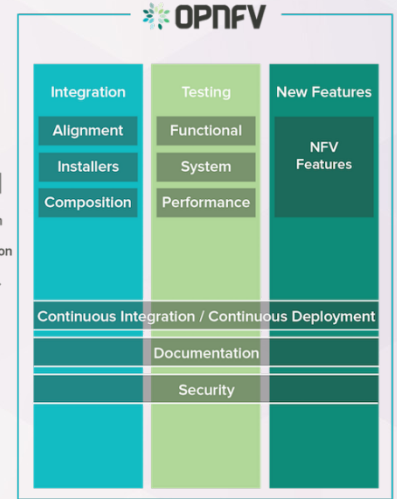
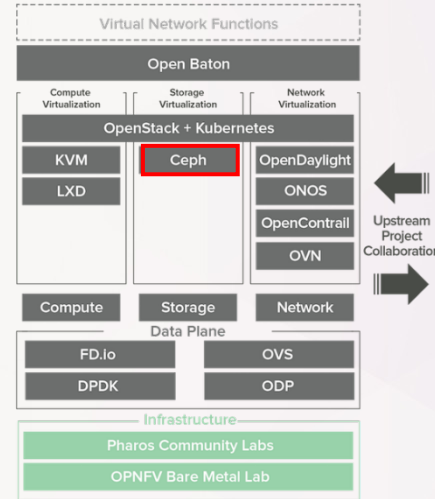
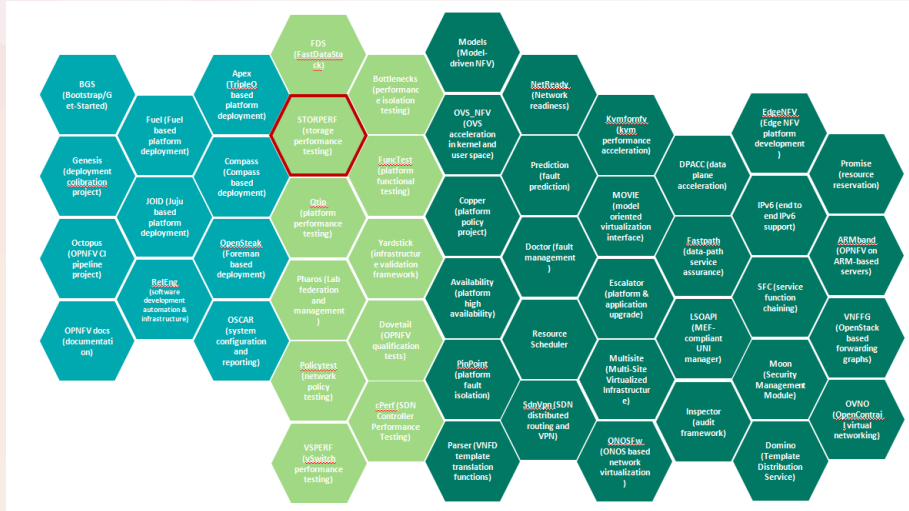
- ❖ accelerate NFV transformation
- ❖ a reference NFV platform
- ❖ an integrated open source platform
- ❖ a large range of use cases
- hi-definition video streaming for use with virtual CDN





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OPNFV Storage Project Landscape



- There is only one official OPNFV project that is solely focusing on storage – storperF, which is providing the benchmarking for storage performance. There is no storage functionality focused project.
- Ceph has been part of the official release architecture since Arno, however it is only used by the installers and there is no project covering how to use it in a functional view



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Stor4NFV

Stor4NFV provides a storage solution based on [Ceph](#) and [OpenSDS](#), and focuses on the optimization for storage intensive use cases of [NFV](#), like I/O performance improvements.



Stor4NFV: Status

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- ❑ **Became one official OPNFV project in Sept 2017**
- ❑ **Goals of the first release**
 - Integrate Ceph with OpenSDS
 - Build installers of Stor4NFV, specifically, Compass4NFV



Stor4NFV: Target

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I/O performance improvements will be one initial target, but we also need to consider scaling and stability factors as well. Ultimately storage will need to progress to be a key part of the entire OPNFV architecture.

- Client RDB cache to accelerate Ceph I/O read and write
- High throughput and low latency solution based on all flash storage media
- Customized optimization approaches for different sorts of data, such as small data and large data
- ...



Stor4NFV Architecture

Standalone

with OpenStack

with K8S



openstack.



Kubernetes

Stor4NFV

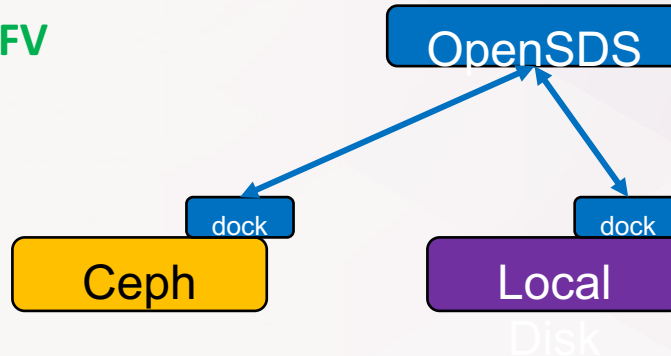
OpenSDS

dock

Ceph

dock

Local
Disk



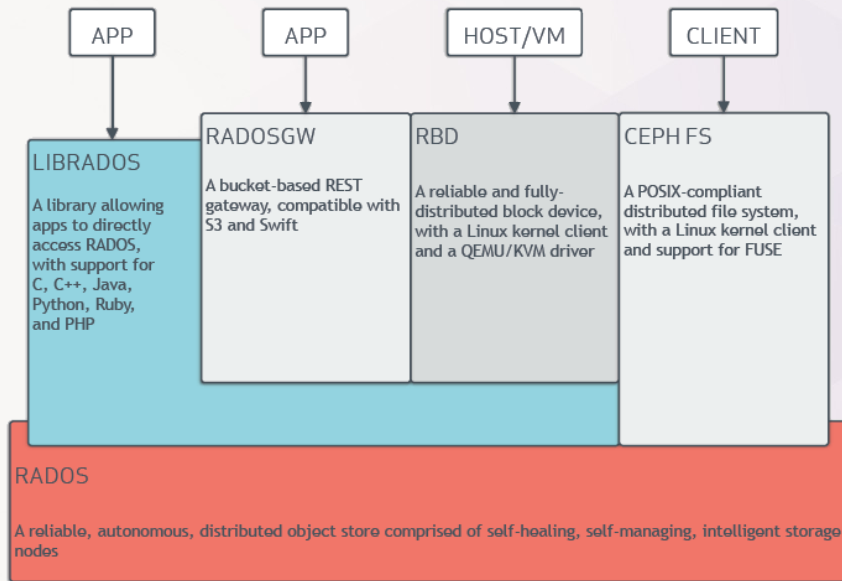


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Ceph

Ceph is by default recommended in the reference design since A release.

For Stor4NFV project, Ceph is the backend driver of OpenSDS.

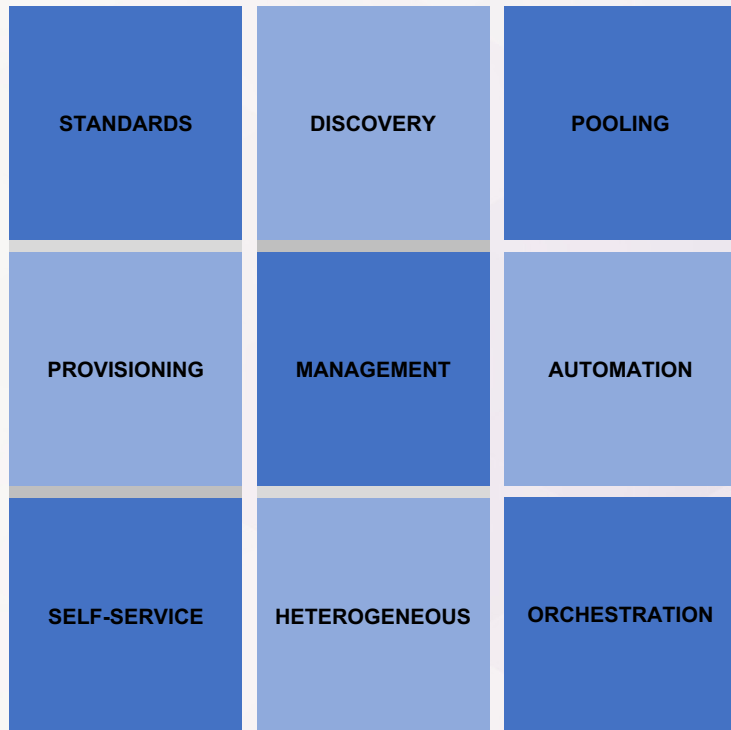




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OpenSDS

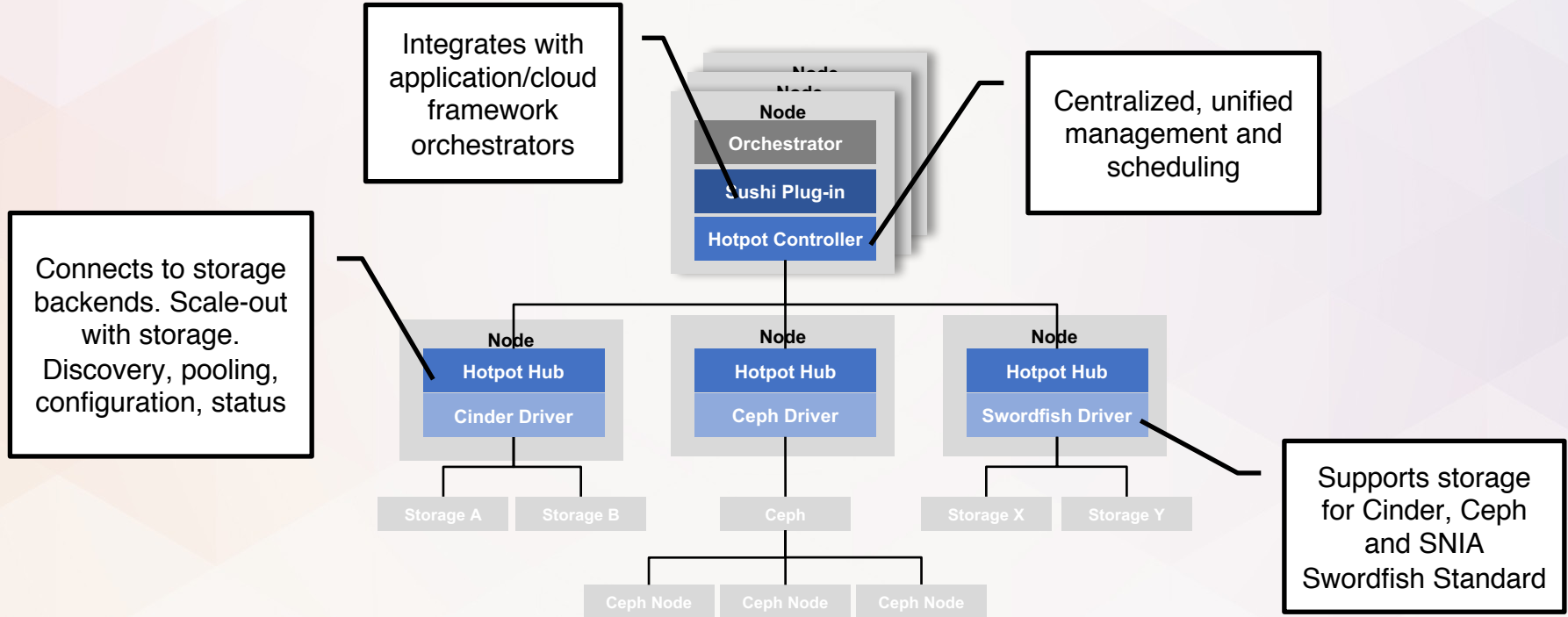
OpenSDS is software-defined storage control for traditional and cloud native environments with enterprise, commodity and cloud storage





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OpenSDS: Architecture



OpenSDS: Community



Technical Steering Committee



Steven Tan, Chairman
VP& CTO Cloud Solution, Huawei



Rakesh Jain, Vice-Chair
Research Engineer and Architect, IBM Research



Allen Samuels
R&D Engineering Fellow, Western Digital



Anjaneya "Reddy" Chagam
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Infrastructure Lead, Yahoo Japan



Kei Kusunoki
Storage Architect, NTT Communications



Yuji Yazawa
Group Lead, Toyota ITC



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OpenSDS: Key Value to Ceph

Policy-Driven Orchestrator

Storage Provisioning and
Data Management

STORAGE PROFILE

- **Profile Name**
- **Regions** {list of regions storage can be provisioned from}
- **Protocols** {list of data transfer protocols}
- **Profile Policies (configured by administrator)**
 - **Max Request Size** {max vol/share/object size}
 - **Performance** {QoS, latency, throughput, IOPs}
 - **Availability** {HA mirror|replicas|EC{m,n}, geo-distribute}
 - **Optimization** {thin|compress|dedupe}
 - **Protection** { {snapshot|backup {pool}}}
 - **Lifecycle**{event,{migrate|replicate|compress|archive|delete|erase}}
 - **Tiering** {list of tiers and conditions}
 - **Networking** {VPN ...}
 - **Security** { ACL, encryption, compliance, ...}
 - **Sharing** { none | read write | read only } {list of tenants to share}



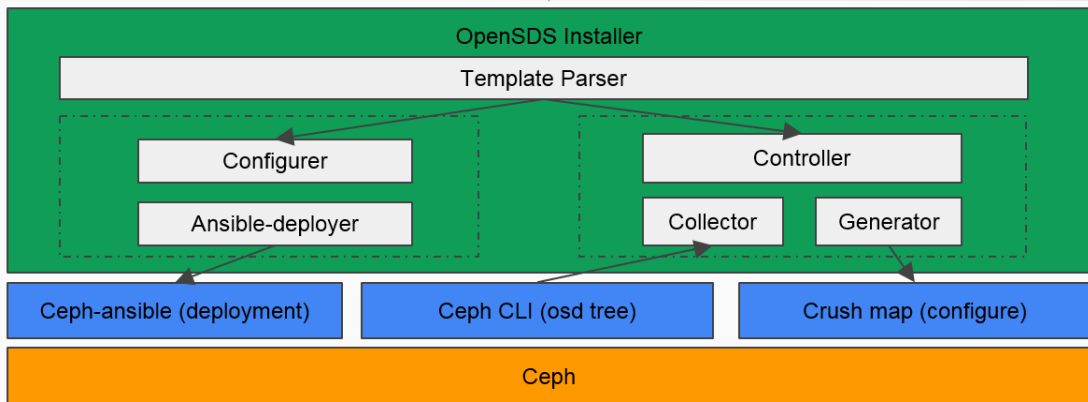
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OpenSDS: Key Value to Ceph

Dedicated Differentiator

Enable advanced features
(config, crushmap, ...)

```
template.yml
configFile: /etc/ceph/ceph.conf
pool:
  ssd:
    storageType: block
    recoveryTimeObjective: 0
    provisioningPolicy:
      - fixed
    accessProtocol: rbd
    maxIOPS: 1000
  disks:
    - hostname: test
      path: /dev/loop0
```





OpenSDS: OpenStack Scenarios

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❑ Keystone Integration

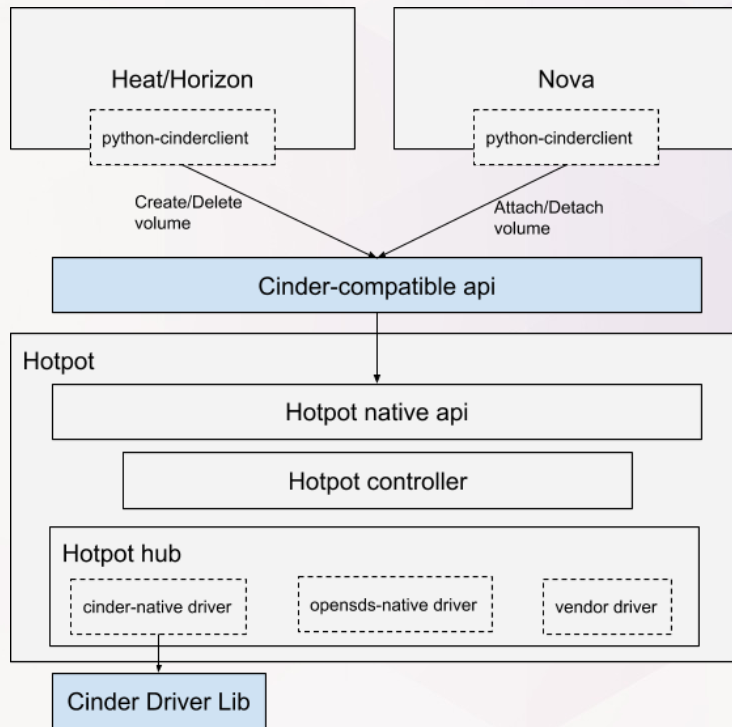
- OpenSDS should recognize tenants (projects in OpenStack) and users created in OpenStack Keystone.
- OpenSDS should provide authentication and multi-tenant authorization through Keystone's Identity APIs.

❑ Glance Integration

- OpenSDS also needs to integrate with Glance and work with its image stores so that hotpot can upload volume to image stores and create volume from image.

❑ Cinder Driver Lib Integration

- There is a POC implementation of Cinder driver lib by a Red Hat engineer: <https://github.com/Akrog/cinderlib>. It is a Python library that allows volume drivers to be used outside of Cinder. We can write a golang-python sdk of southbound driver that uses this driver lib.





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OpenSDS: Kubernetes Scenarios

❑ Container-Storage-Interface (CSI)

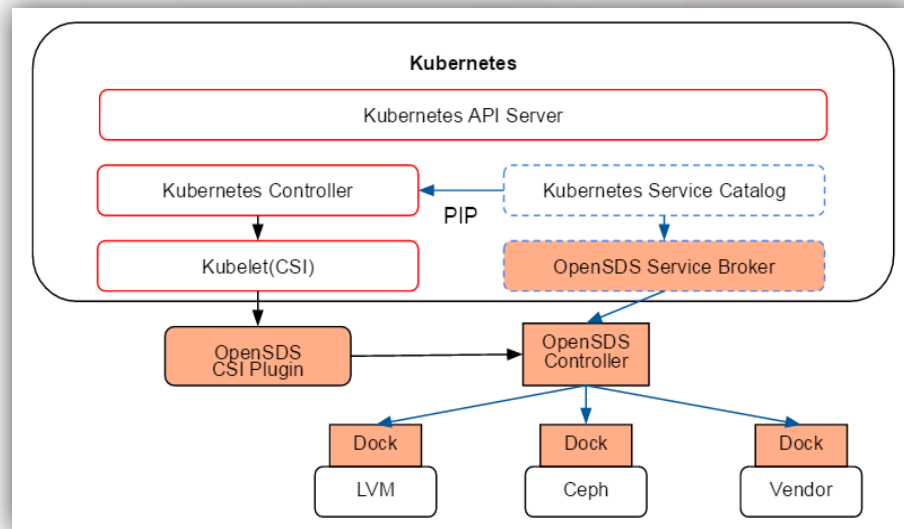
- Enable storage vendors (SP) to develop a plugin once and have it work across a number of container orchestration (CO) systems.
- OpenSDS is the first batch of storage controllers to support CSI in k8s 1.9

❑ Kubernetes Service Catalog

- Integration between Kubernetes and brokers implementing the OSB API.
- 4 resources: [Broker](#), [ServiceClass](#), [Instance](#), [Binding](#).

❑ OpenSDS Service Broker

- Responsible for advertising a catalog of service offerings and service plans to Service Catalog, and acting on requests from Service Catalog for provisioning, binding, unbinding, and deprovisioning.
- Expose OpenSDS [advanced features](#) (replication, migration, data protection and so on) to Kubernetes without changing a line of code.



<https://github.com/opensds/nbp>



Demo: OpenSDS Enabling Ceph deployed and configured automatically

- Operation system: Ubuntu 16.04
- Language: Go 1.9.2
- Testing Env:
 - OpenSDS: v0.1.5
 - Ceph: Luminous
 - OpenSDS Installer (PoC): v0.0.1
 - Ansible: v2.7.2
- Projects link:
 - Stor4NFV: <https://github.com/opnfv/stor4nfv>
 - OpenSDS: <https://github.com/opensds>
 - OpenSDS Installer (PoC): <https://github.com/leonwanghui/opensds-installer>



```
1 vultr-test [0] x +
root@test:~# █
```

A terminal window titled "1 vultr-test [0]" showing a dark desktop environment. The desktop background is black with a faint, light-colored mountain range visible at the bottom. A single yellow cursor is positioned in the center of the screen. On the left side, there are several small, faint icons representing desktop files or folders.

```
1 vultr-test [1] x +
root@test:~# █
```

A terminal window titled "1 vultr-test [1]" showing a dark desktop environment. The desktop background is black with a faint, light-colored mountain range visible at the bottom. A single green cursor is positioned in the center of the screen. On the left side, there are several small, faint icons representing desktop files or folders.