



The OpenSDS Project

Open Source Data Storage Platform for Digital Transformation

STEVEN TAN

OpenSDS TSC Chair

VP & CTO Cloud Solution for Storage, Huawei



IT Evolution

Development

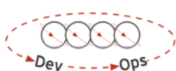
Waterfall



Agile



DevOps



Application

Monolithic



Tiered



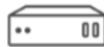
N-Tier

Microservices

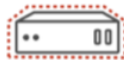


Deployment

Physical Machines



Virtual Machines



Containers



Infrastructure

Legacy



Private/Public Cloud



Hybrid/Multi-Cloud



Storage

Scale Up



Scale Out

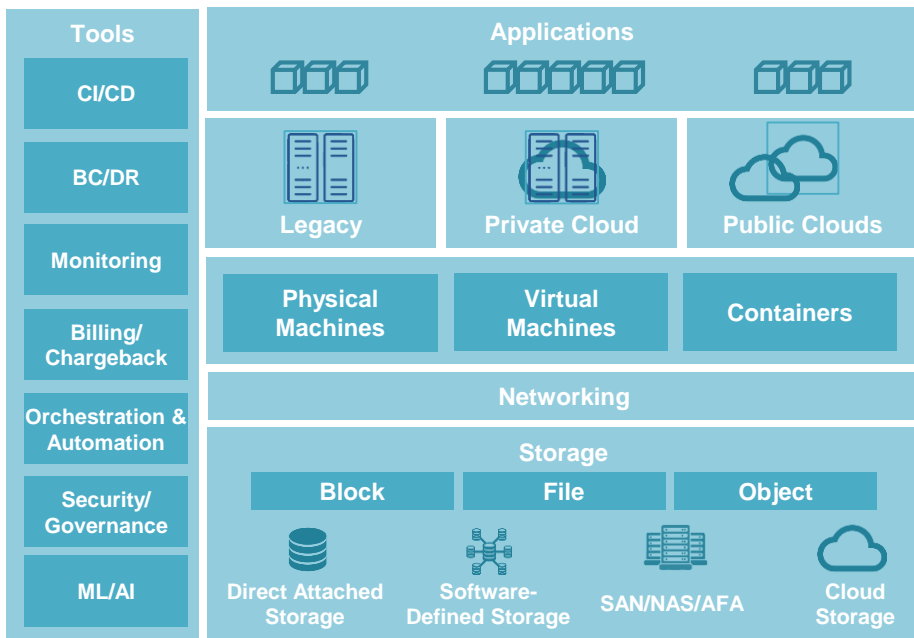


Storage-as-a-Service



Source: Redhat

The Modern Data Center



New Storage Challenges

- **Provisioning** storage for different application, deployment, and infrastructure models
- **Management** of data and storage across heterogeneous storage, private, hybrid and multi-clouds
- **Integration** with solution tools

The Solution Requirements

Open Source

An open community of vendors, end-users, and developers working together

Open Standard

Standard RESTful API's, data and security standards


Benchmarks

To standardize measurements for performance

Certification

To ensure components work and interoperate

The Solution

 Open SDS Platform	Control/ Management Plane	Standard REST API, Single Pane Management, Policy-Based, Storage and Data Services, Orchestration and Automation
	Data Plane	Data Reliability, High Availability, Data Protection, Data Mobility, Data Reduction, I/O Performance
	Storage Platforms	DAS, SAN, NAS, AFA, Commodity, Cloud

Decoupled control plane from data plane and storage platforms



An open source community working to address **data storage integration** challenges, particularly in **scale-out cloud native environments** with **heterogeneous storage platforms**.



Governance

Technical Steering Committee



Steven Tan, Chairman
Huawei, VP & CTO Cloud Storage Solution



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



Allen Samuels
Western Digital, R&D Engineering Fellow



Anjaneya "Reddy" Chagam
Intel, Chief SDS Architect



Jay Bryant
Lenovo, Cloud Storage Lead

End-User Advisory Committee



Cosimo Rossetti
Vodafone, Lead Storage Architect



Yusuke Sato
Yahoo Japan, Infrastructure Lead



Kei Kusunoki
NTT Communications, Storage Architect

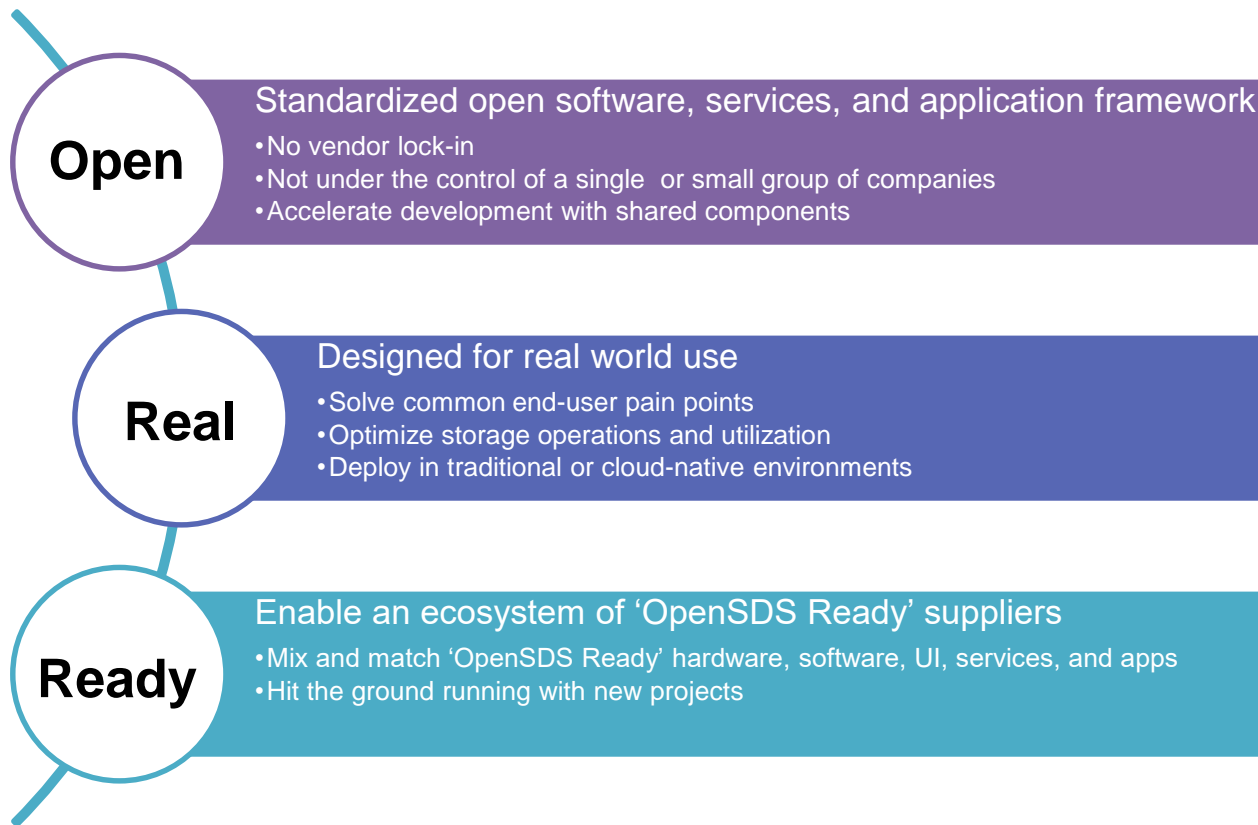


Yuji Yazawa
Toyota ITC, Group Lead



Wim Jacobs
KPN, Senior Architect

Goals



The Core Projects

SUSHI

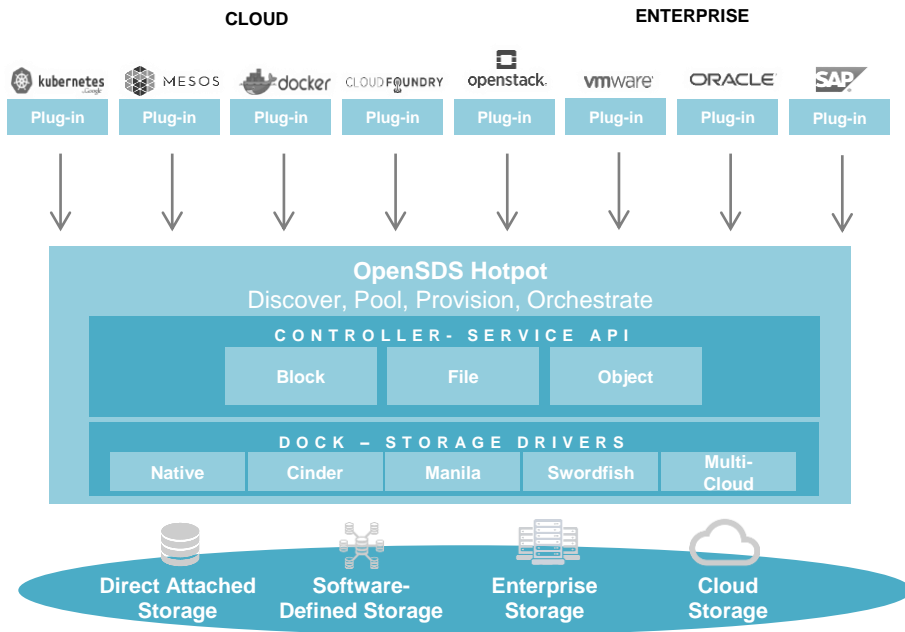
The Northbound Plug-ins Project

Common plug-ins to enable OpenSDS storage services for cloud and application frameworks

HOTPOT

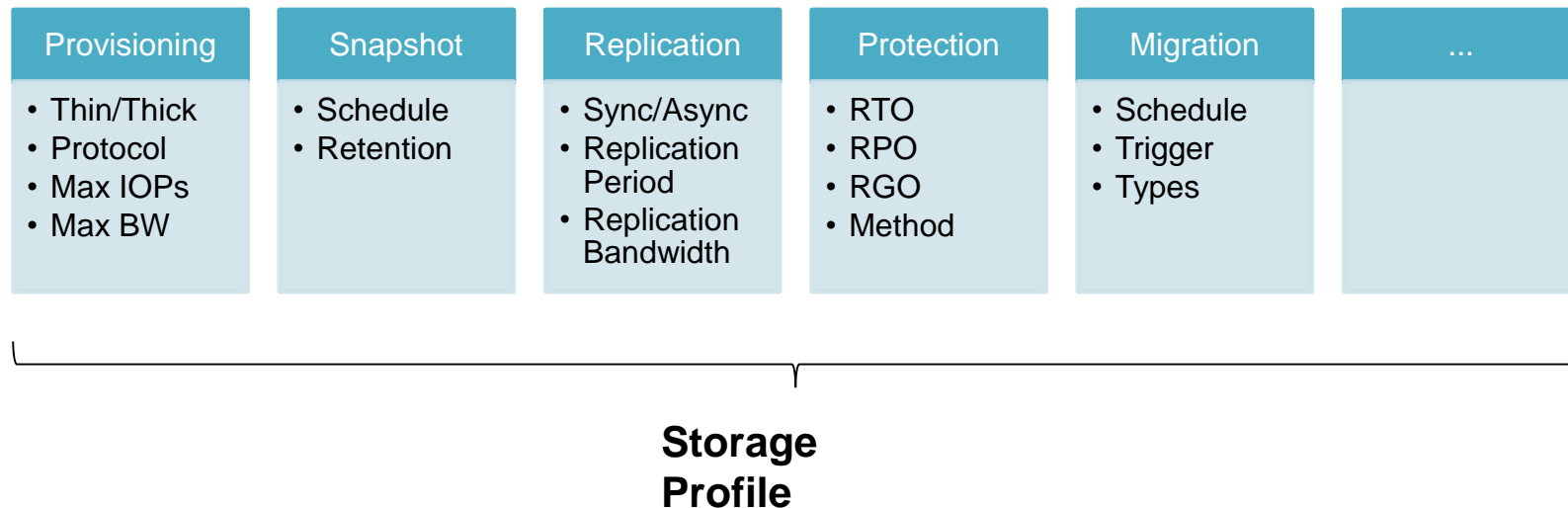
The Storage Controller Project

Single control for block, file, and object services across storage on premise and in clouds

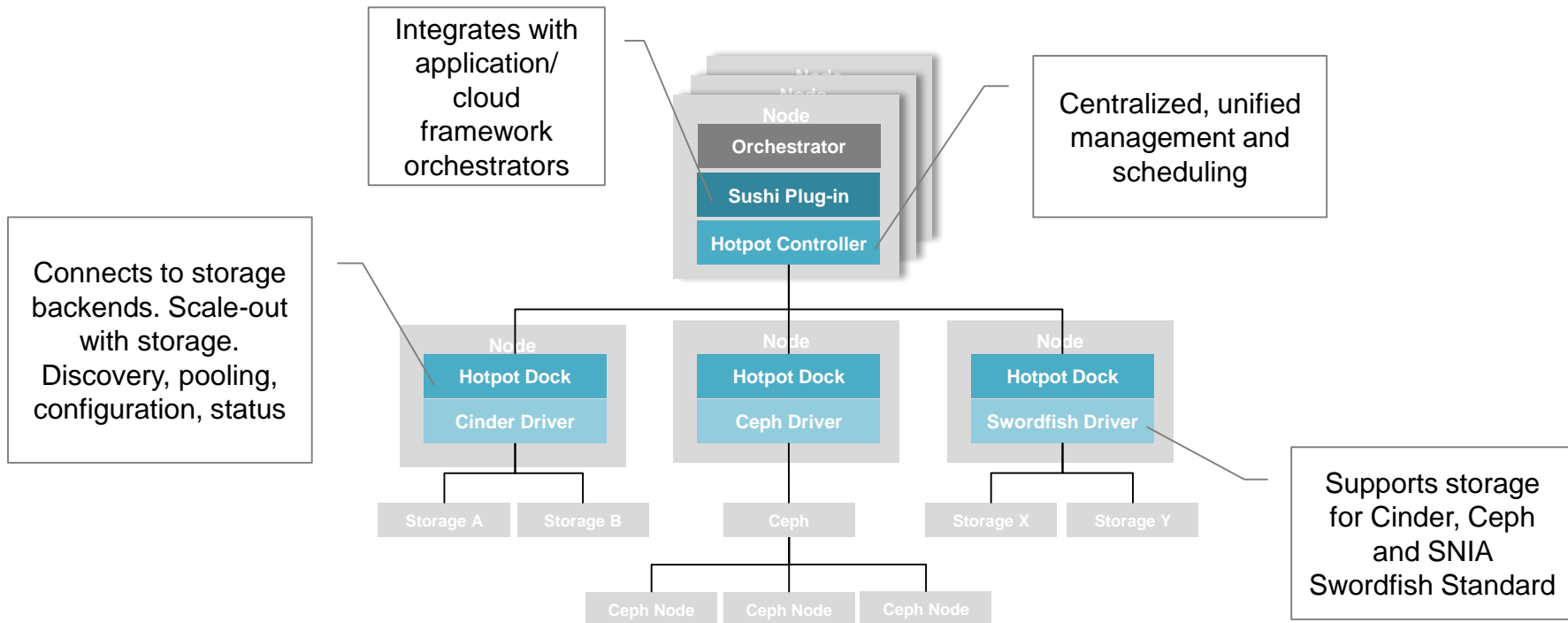


Data Storage Profiles and Policies

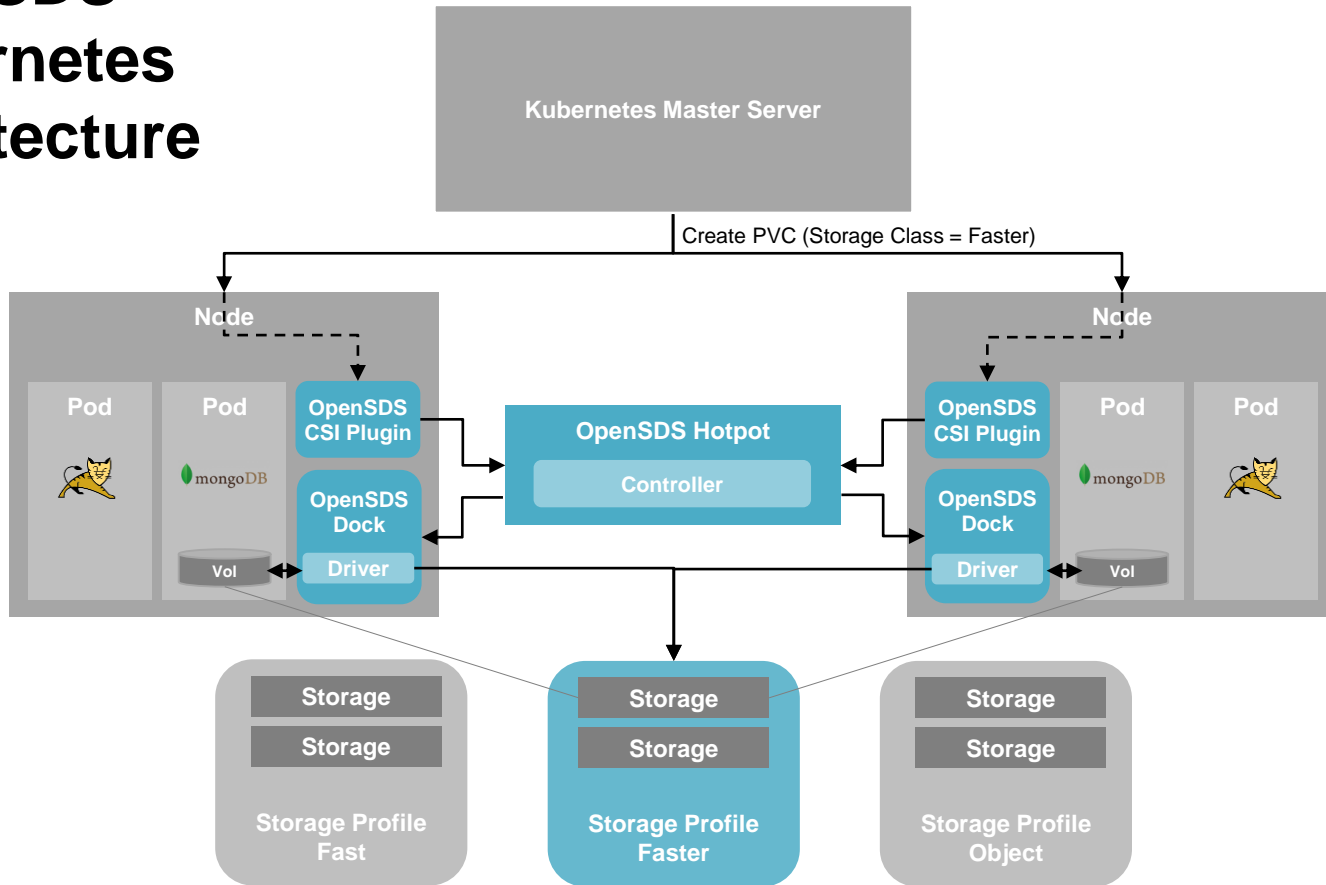
Policy-Driven Storage Provisioning and Data Management



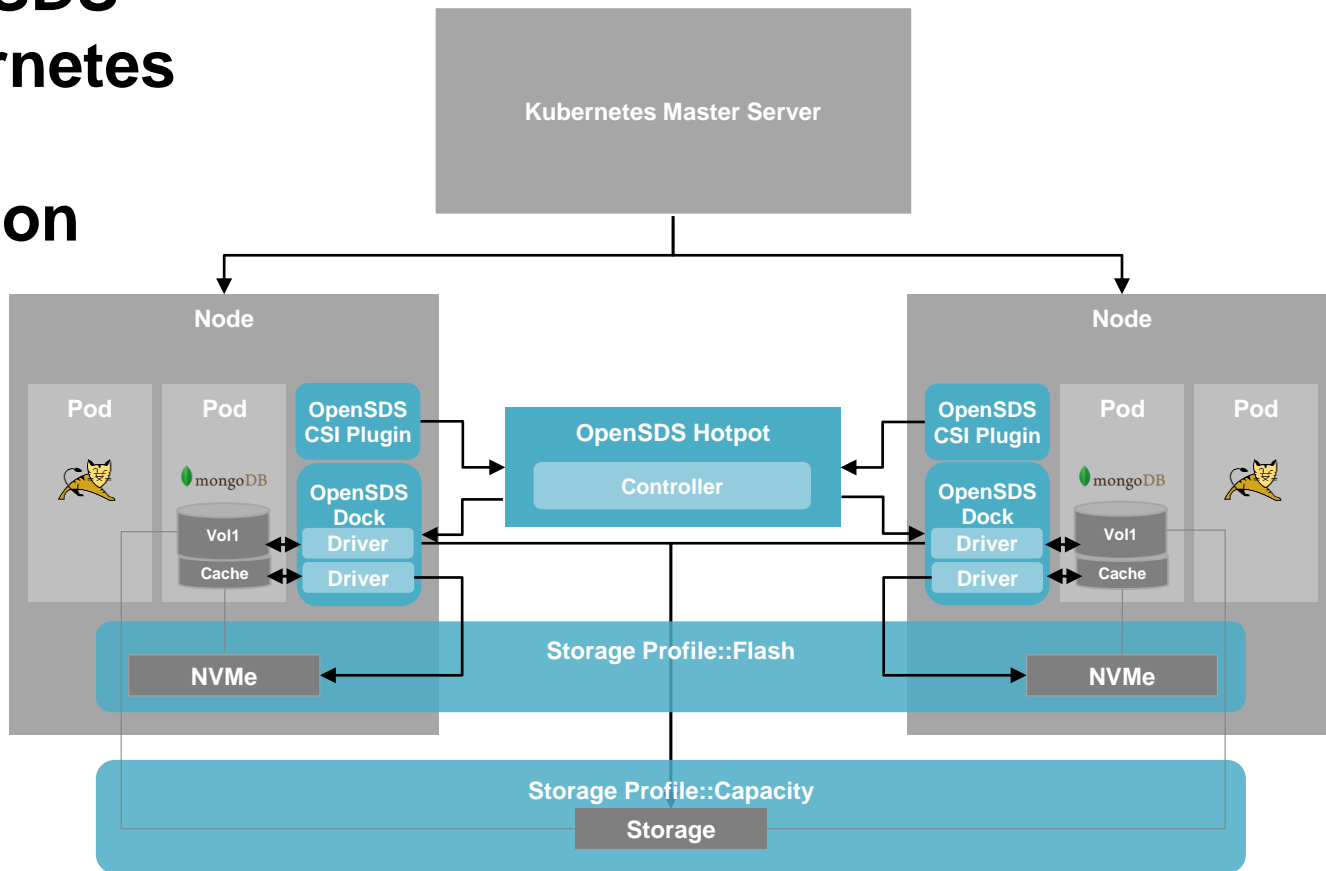
Distributed Scale-Out Architecture



The OpenSDS Kubernetes Architecture



The OpenSDS Kubernetes Flash Solution



The Dashboard

admin

Region_Chengdu

Home

Update 5 minutes ago

Volume

3 volumes

Profile

2 profiles have been created

Resource

2 storages, 2 availability zone

Identity

Managing tenants and users

Create Profile

Create profile to suit your specific use requirements.

* Name

high_performance

* Access Protocol

iSCSI

* Provisioning Type

☐ Auto
☒ Thin
☐ Thick

QoS Policy

☒ Enable

MaxIOPS

8000

IOPS/TB

MBWS

100

MBWS/TB

Replication Policy

☐ Enable

Snapshot Policy

☐ Enable

Customization

+ Add

Available Storage Pool

Matching

OK

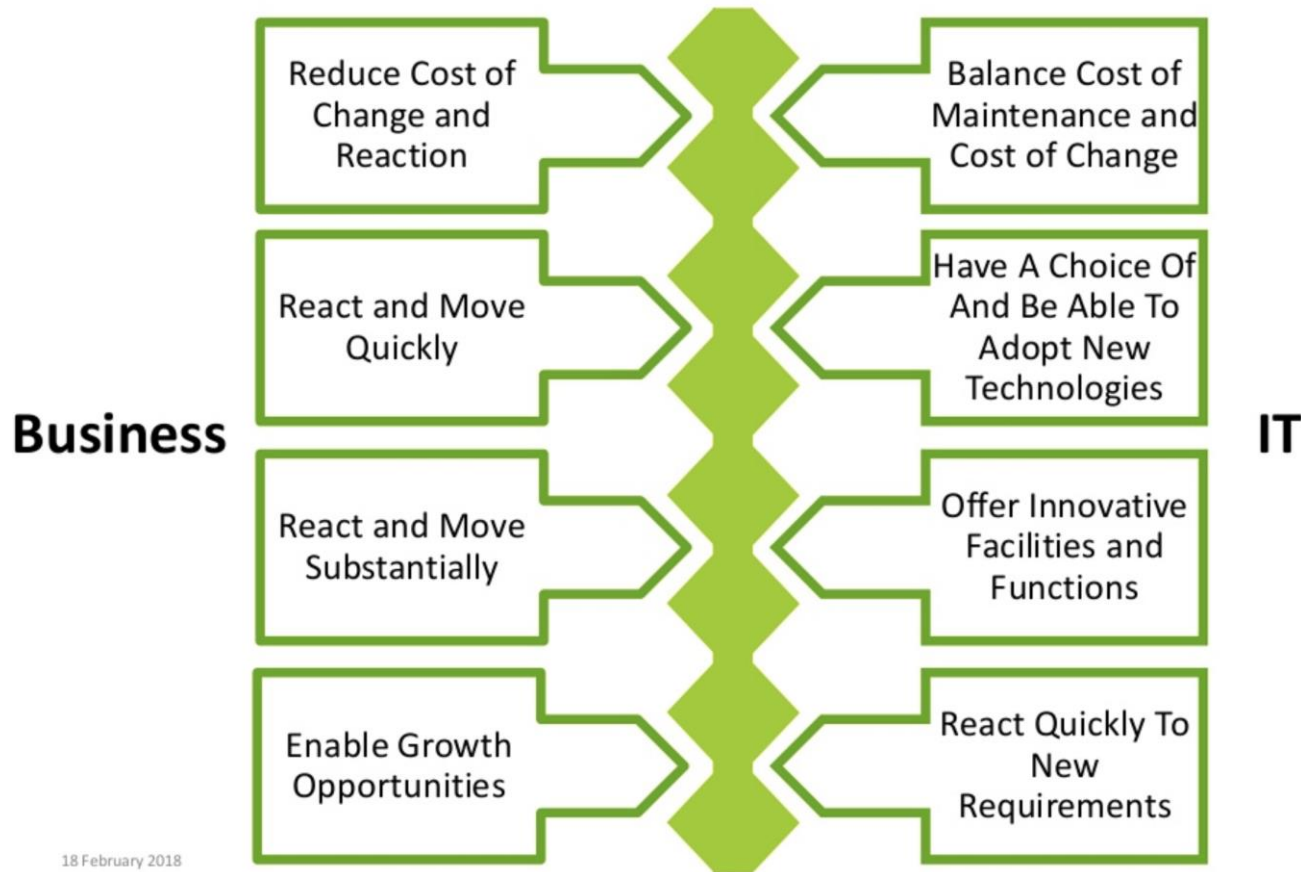
Cancel



The Road Ahead – Open Data Fabric

Getting from Open SDS to Open Data Fabric

Business And IT Drivers For Data Fabric




18 February 2018

More Business Drivers

- What's Happening? -> Monitoring
- What Happened? -> Reports
- Why It Happened? -> Analytics
- What Will Happen Next? -> Forecast/Insights/Predictive Analytics
- What To Do When Something Happens? -> Orchestration & Automation
- I Don't Have To Care What Happens -> Intelligence

Key Design Principles Of A Data Fabric

- 
- Administration, Management and Control** – Keep control of and be able to manage and administer data irrespective of where it is located
 - Security** – Common security standards across entire fabric, automate governance and compliance and manage risk
 - Automation** – Management and housekeeping activities automated
 - Integration** – All components interoperate together across all layers
 - Stability, Reliability and Consistency** – Common tools and facilities used to delivery stable and reliable fabric across all layers
 - Openness, Flexibility and Choice** – Ability to choose and change data storage, data access, data location
 - Performance, Retrieval, Access and Usage** – Applications and users can get access to data when it is needed, as soon as it is needed and in a format in which it is usable



Open Data Fabric

Powering Digital Transformation

An agile **vendor-agnostic** data fabric with **automated policy-based storage and data services** supporting **data lifecycle and other data activities**, enabling **seamless data mobility** across **heterogeneous storage platforms and clouds**, to store, protect and deliver data to the right place at the right time.

Open Data Fabric

Powering Digital Transformation



Multi-Cloud Data Control

- private and public clouds
- placement, access, replication
- global namespace and search



Orchestration & Automation

- data lifecycle, protection, replication, migration, security, governance, optimization
- CI/CD



Data & Storage Intelligence

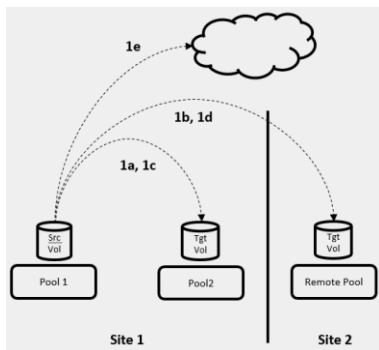
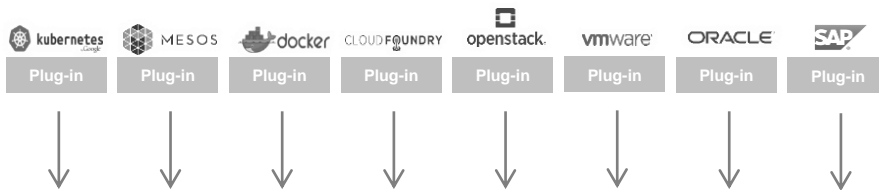
- monitor, reports, analytics, forecast
- ML/AI

Orchestration & Automation

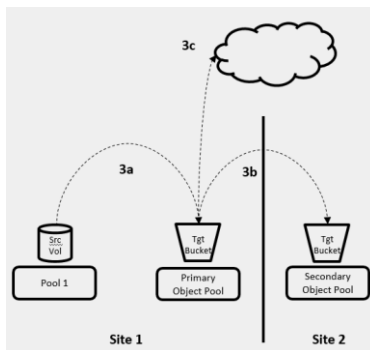
Built-in advanced **automated storage and data services** that respond to any compute frameworks in a common way across traditional data centers, private and public clouds

CLOUD

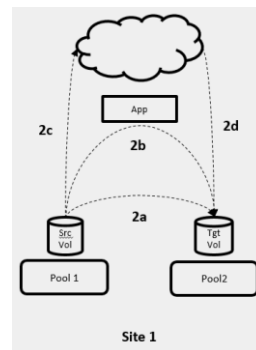
ENTERPRISE



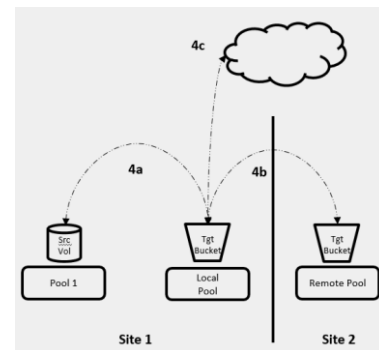
Data Replication



Data Protection



Data Migration



Data Lifecycle

Data Storage Intelligence

A standardize way to monitor the environment and its components, analyze the collected data using machine learning and AI, and **automatically tune the storage infrastructure** to optimize for performance, efficiency, and cost

Monitor



- Metrics
- Metering
- Alerts
- Logs

Analyze



- Root Cause Analysis
- Failure Prediction
- Performance Trends
- Capacity Planning

Optimize

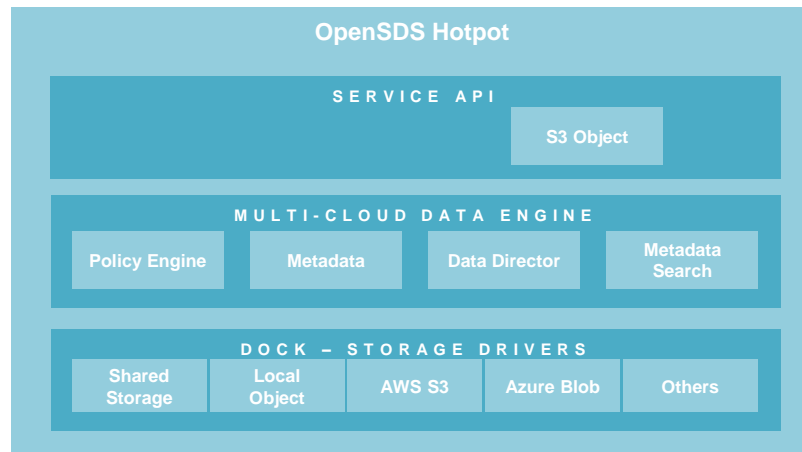
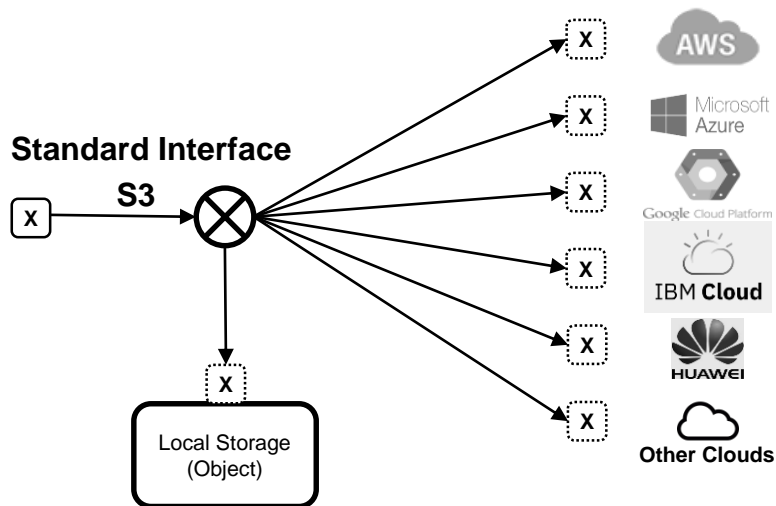


- Capacity Optimization
- Performance Tuning
- Cost Management
- Energy Efficiency
- Load Balancing

Standardize API's For Monitoring, Analysis And Optimization

Multi-Cloud Data Control

Policy-based data mobility across private and public clouds, for availability, tiering, bursting, backup, archive and DR



- Vol image, snapshot, file, object
- Policy-based placement
- Put object to multiple clouds at the same time
- Get object on demand
- Global search

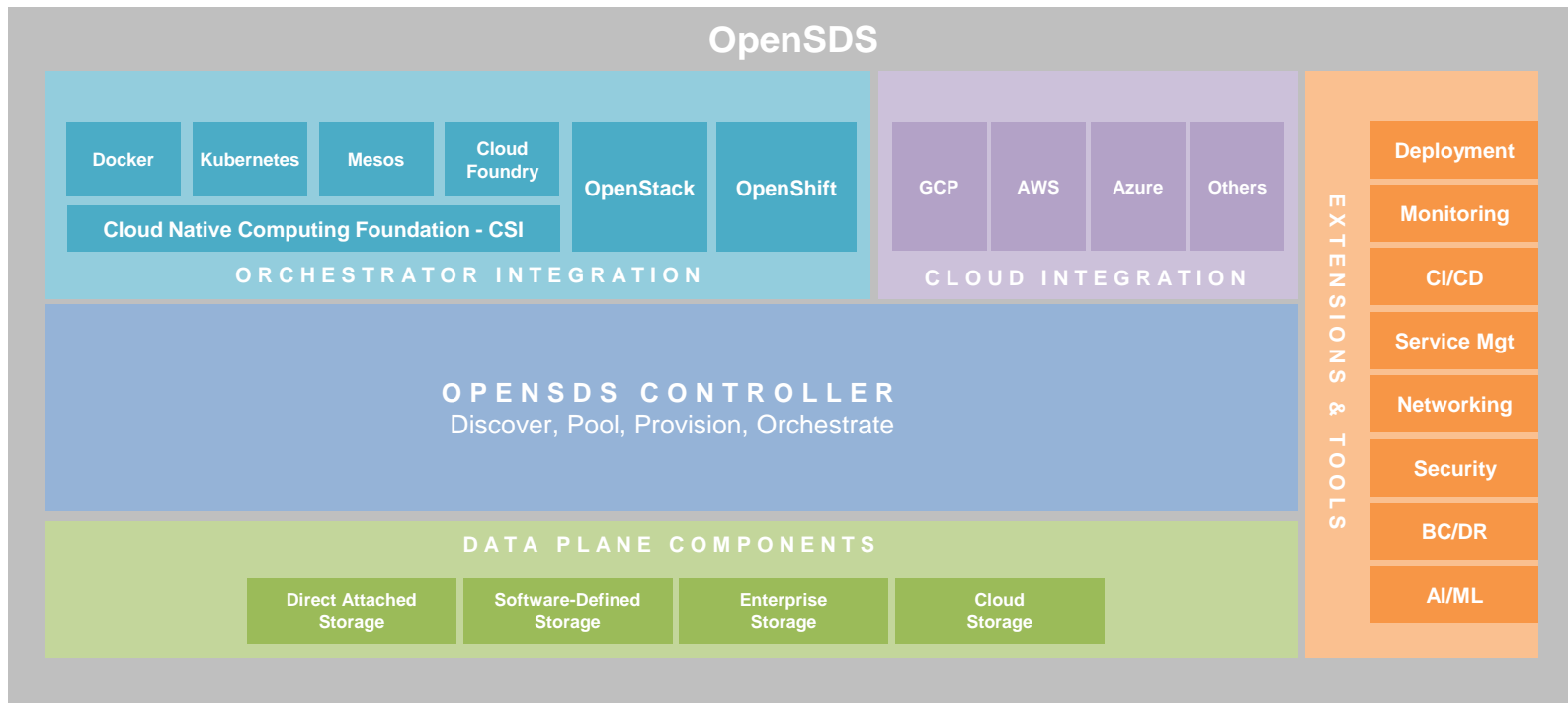
Value Proposition

- ODF **unifies management** of storage and data services across multiple clusters and sites
- ODF **integrates data management** with application frameworks OpenStack, Kubernetes, VMware etc.
- ODF **enables interoperability** between end-users and their partners, as well as OpenSDS member solutions
- ODF **avoids vendor lock-in** offering multi-vendor solutions



Roadmap

Project Framework



OpenSDS Roadmap v0.17

2017H2 ZEALAND

- Kubernetes FlexVolume
- Vol CRUD
- Standalone Cinder Integration
- CSI Support
- Ceph, LVM

2018H1 ARUBA

- OpenStack
- Replication Array-Based, Host-Based
- Dashboard
- Storage Profiles
- Enumeration
- Block Storage
 - Cinder Drivers
 - Ceph
 - LVM
 - Huawei: Dorado

2018H2 BALI

- S3 Object
- Multi-Cloud Data Control
- Multi-OpenStack
- Monitoring
- Storage Groups Snapshots, Replication
- Southbound Swordfish*
- NVMeoF Preview

2019H1 CAPRI*

- File Share
- Analytics
- Lifecycle
- Migration
- Data Protection
- NVMeoF

2019H2++

- ...





Conclusion

Key Takeaways

1. Leverage OpenSDS community to discuss and address IT storage and data challenges
2. Accelerate transformation using OpenSDS
3. Participate in the technical meetings and events
4. Plan, Design, Build the Open Data Fabric together

OpenSDS 2018 Events



OpenStack Summit, Vancouver
May 21-24

Open Source Summit, Vancouver
Aug 29-31

OpenSDS mini summit
CloudNativeCon, Copenhagen
May 1-4

OpenSDS showcase
Open Source Summit, Beijing
Jun 25-27

OpenSDS showcase
CloudNativeCon, Seattle
Dec 11-13

OpenSDS mini summit
Open Source Summit, Edinburgh
Oct 22-24

OpenSDS showcase
OpenStack Summit, Berlin
Nov 13-15

OpenSDS showcase
Cloud Native Days, Tokyo
Aug 2-3

OpenSDS showcase
Open Source Summit, Tokyo
Jun 20-22

OpenSDS showcase
Interop Japan, Tokyo
Jun 13-15

OpenSDS showcase
SNIA SDC, Santa Clara
Sep 24-27

OpenSDS talks
Flash Memory Summit, Santa Clara
Aug 6-9

OpenSDS show-case
OpenStack Days, Sao Paulo
Jul 28

OpenSDS mini summit
CloudNativeCon, Shanghai
Nov 14-15

OpenSDS Mini Summit @ CloudNativeCon Copenhagen



Join OpenSDS

End User Benefits

1. Nominate a representative to the End-User Advisory Committee (bi-weekly online EUAC meetings)
2. Seek help and support from OpenSDS TSC, EUAC and developer community
3. Propose projects, specify requirements, and vote on roadmap priorities
4. Participate in OpenSDS sponsored events; speak and exhibit
5. Get vendors to work together

Join OpenSDS

Vendor Benefits

1. Nominate a representative to the Technical Advisory Committee (join TSC and technical meetings)
2. Engage End-Users and understand their needs first hand
3. Propose projects, specify requirements, and guide the roadmap
4. Participate in OpenSDS sponsored events; speak and exhibit
5. Collaborate and explore potential partnerships with other vendors in an open manner

THANK YOU

 <https://www.opensds.io>

 <https://github.com/opensds>

 info@opensds.io

 [@opensds_io](https://twitter.com/opensds_io)

 opensds.slack.com

**FIND OUT
MORE**

OpenSDS @ SNIA SDC
Santa Clara, Sep 24-27

**BE A
MEMBER**

Accepting New Members
Vendors And End Users Welcome