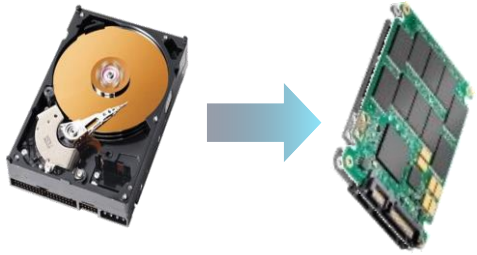
Huawei Kunpeng Computing SDS Solution

Contents

Technology Trends: Flash Storage, Cloudification, and Data Value Mining

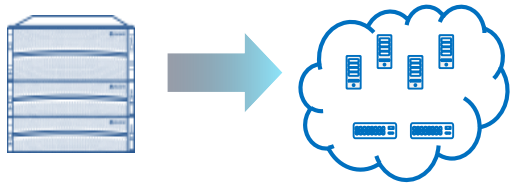
Data access performance



HDD SSD

- 100x performance
- Lower TCO

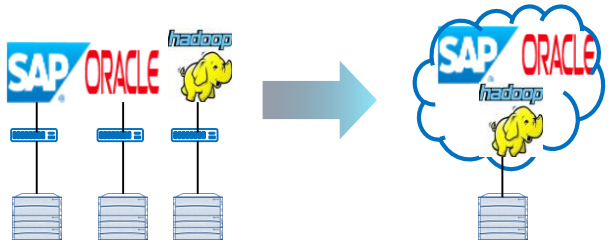
Storage resource sharing



Centralized architecture Distributed cloud architecture

- Two nodes -> Thousands of nodes
- Service rollout: months to days

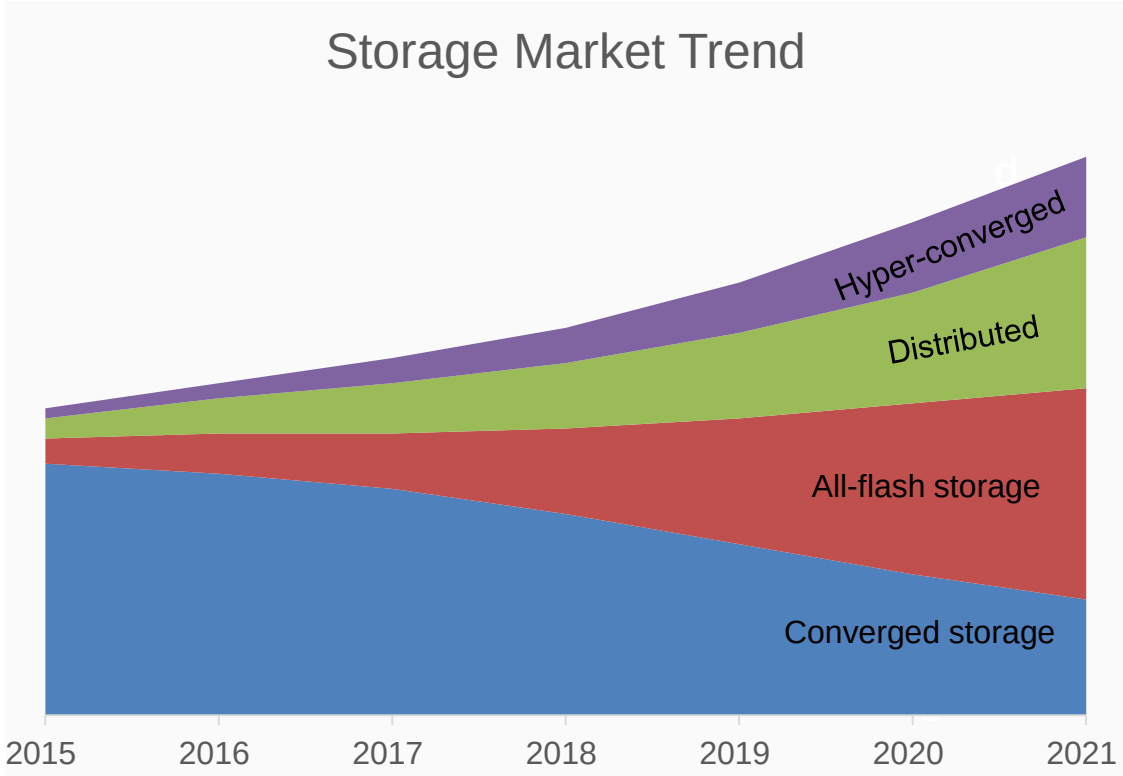
Data value mining



Data island Data lake

- Multiplied performance
- Improved data analysis efficiency

Market Trends

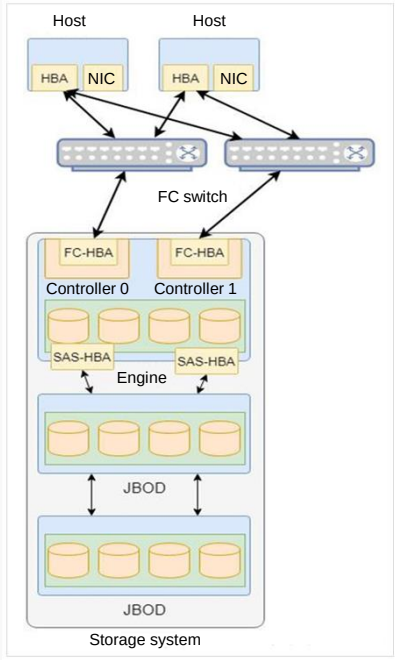


Source: IDC&HUAWEI MI

Distributed cloud storage is experiencing a rapid market growth due to the facts:

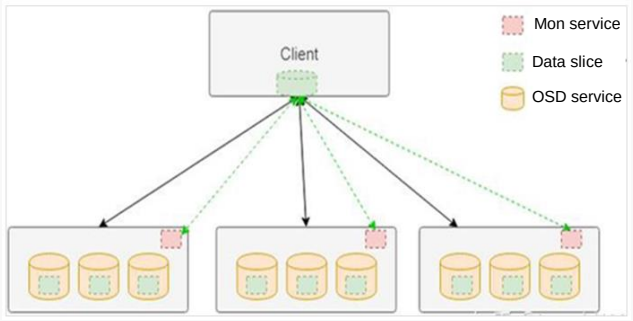
- Cloud storage is transitioning from dedicated to general-purpose devices, which brings advantages like simple management, low TCO, and large-scale linear expansion.
- Emerging applications (video, big data, and digital applications) and their data are migrating from on-premises to the cloud.

Storage Architecture Evolution: from Centralized to Distributed



Centralized storage

- Magnetic head (controller), disk array (JBOD), switch, management device, etc
- Storage engine, which receives data and places it in the storage system



Distributed storage

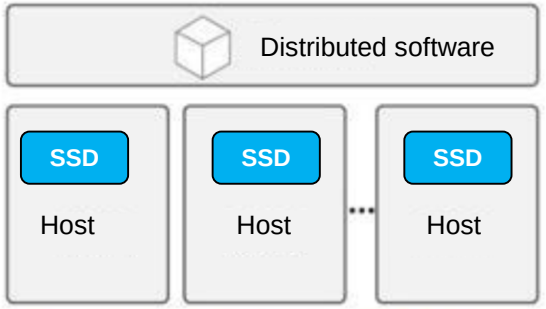
- The Mon service maintains the logical relationship of the storage hardware. The OSD service manages disk drives.
- Data locations in the storage system are determined based on the device mapping. The client communicates directly with the storage node, without passing through any central node and thus eliminating performance bottlenecks.

Storage Types

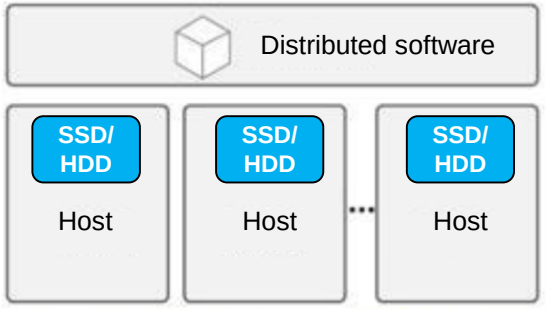
Type	Description	Typical Application
Block storage	• Map the entire raw disk space to the host. The disk space is formatted using file systems. • FC, iSCSI • High performance, low latency (xxx μs), and average scalability	Virtual machines, databases, and Enterprise Resource Planning (ERP)
Object storage	• Access files through their key values. Data is stored in a flat structure, facilitating data access. • HTTP, HTTPS • High scalability, high latency (xx ms), and average performance	Video, audio, images, web disks, and static web pages
File storage	• Access files through file paths, simplifying data access. • NFS, CIFS, POSIX • Relatively high scalability, relatively high latency (x ms), and average performance	Big data, HPC

Distributed Storage

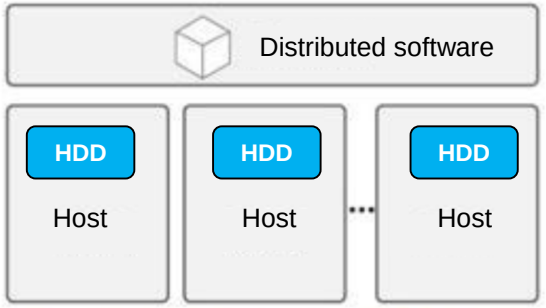
Hot data storage



Warm data storage



Cold data storage



Data Type	Application Scenario	Performance Requirement	Hardware Solution
Hot data	Online data that is frequently accessed	High storage performance	• Mainly NVMe SSD all-flash storage. • Massively concurrent I/O access to small data blocks. • Major performance bottleneck: CPUs. Multi-core architecture is more appropriate.
Warm data	Between hot data and cold data	Between hot data and cold data	• Capacity-intensive SSDs or large-capacity HDDs. • Major performance bottleneck: network resources. • Use data compression to improve storage media utilization.
Cold data	Offline data that is not frequently accessed. For example, backup and archive data.	Low storage performance but large storage capacity	

Kunpeng Storage Servers

TaiShan 2280 V2

TaiShan 5280 V2

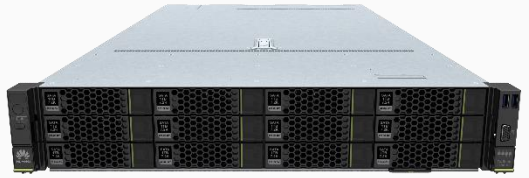
TaiShan 5290 V2

TaiShan 2280 V2 Server

User Requirements

Cold storage

12 x HDDs



Balanced

12 x HDDs +

4 x NVMe SSDs

High performance

12 x NVMe SSDs +

12 x HDDs

TaiShan 5280 V2 Server: Powered by Kunpeng Processors

User Requirements

Cold storage

36 x HDDs

Balanced

36 x HDDs +

4 x NVMe SSDs

TaiShan 5290 V2 Server: Powered by the Kunpeng Processor

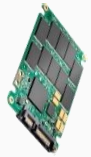
User Requirements

Cold storage

72 x HDDs

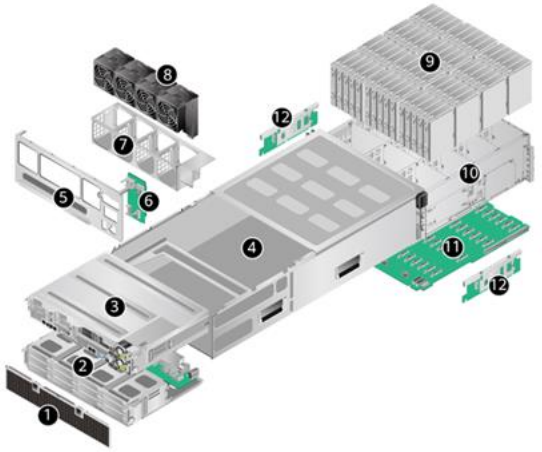
Balanced

72 x HDDs +

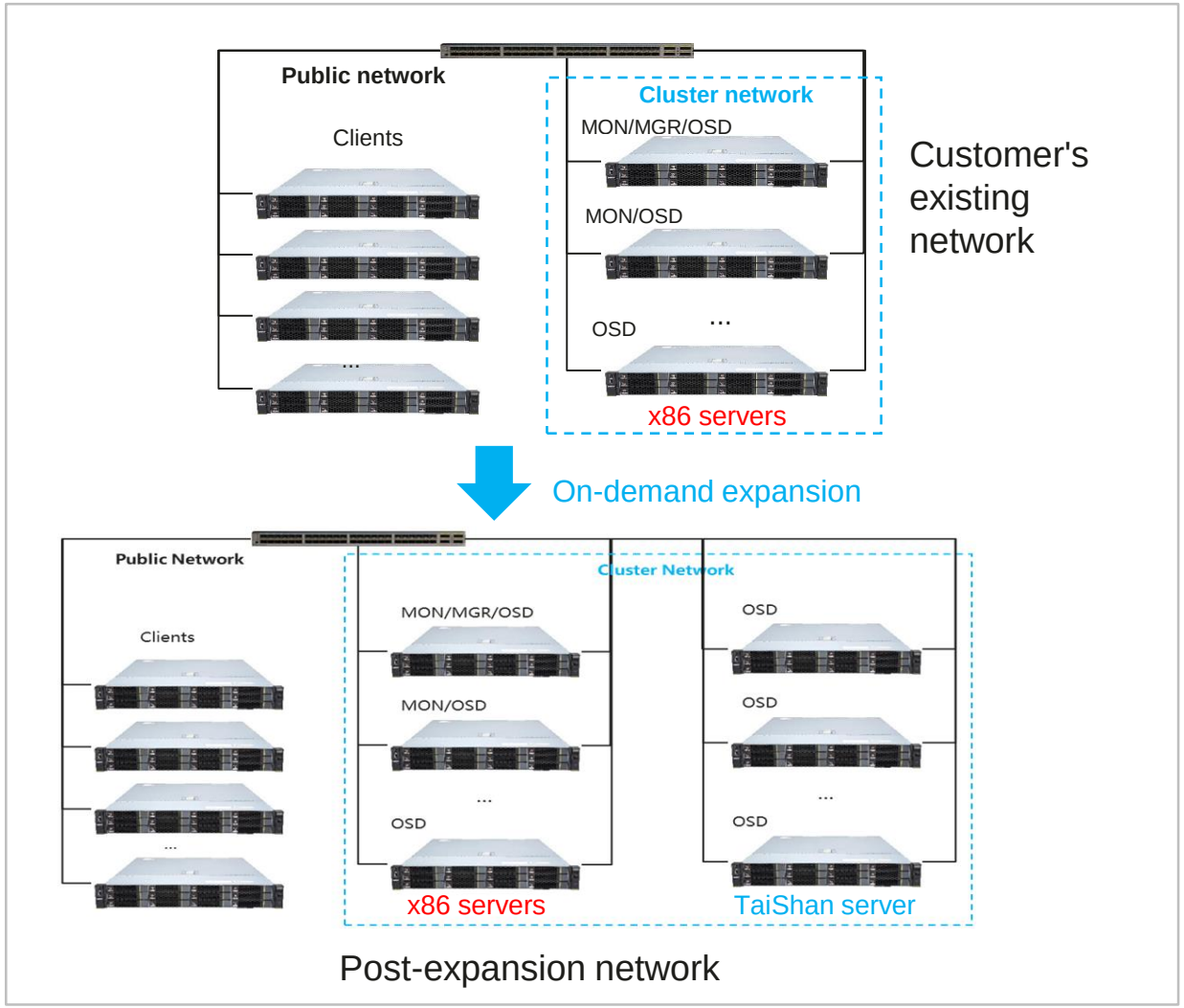


4 x NVMe SSDs

Hardware components of TaiShan 5290:



Kunpeng and x86 Hybrid Deployments



Restrictions

- Software: open-source Ceph 12.2.X, 13.2.X, and 14.2.X
- Storage scenarios: block storage, object storage, and file storage

Constraints: In a hybrid deployment, the two must have the same Ceph and OS versions.

Deployment Suggestions

- To make it easy to locate and rectify server hardware faults, deploy small storage resource pools, because a larger storage resource pool generally brings a larger fault domain.
- Divide a large storage cluster into multiple storage pools, each of which contains fewer than 100 servers.
- Use independent storage pools for capacity expansion to reduce hardware fault risks and simplify storage management.

Kunpeng SDS Partners

Open Source Ecosystem

ceph

Commercial Software

HUAWEI

杉岩数据 SANDSTONE

XSKY

EasyStack

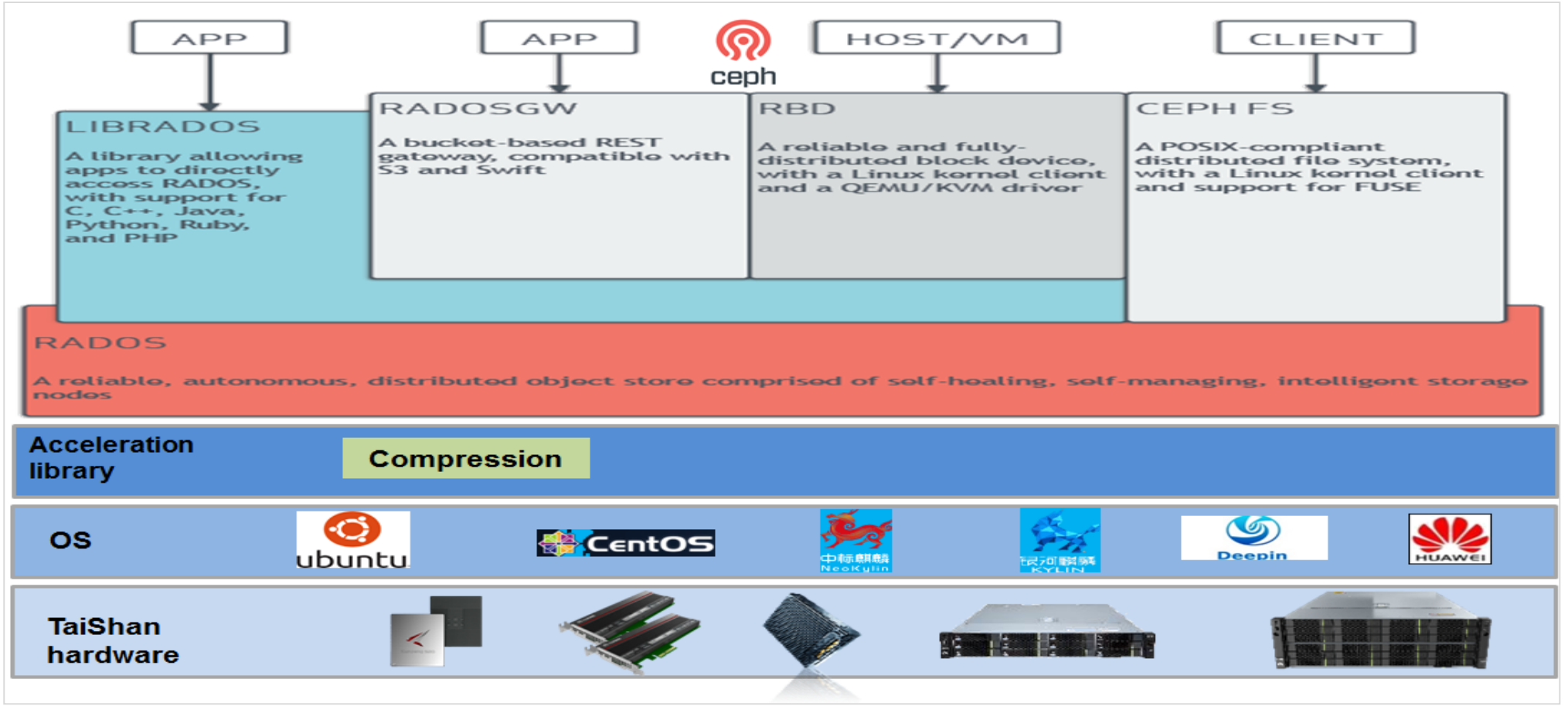
ArcherOS安超

DATATOM

国科 GOKE

天融信 TOPSEC

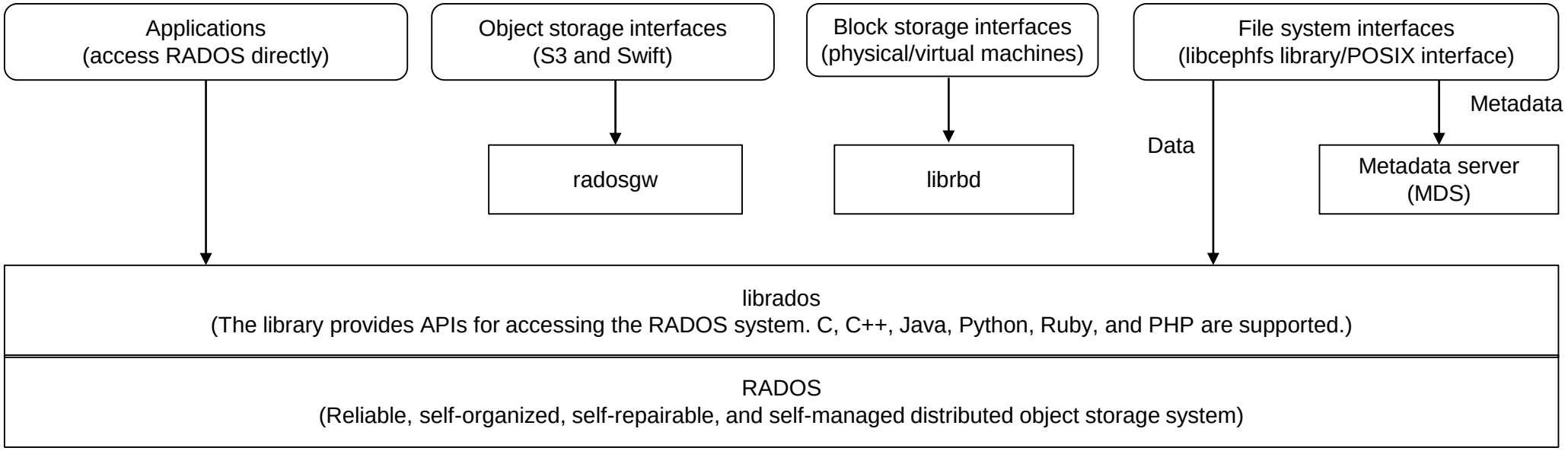
SDS Solution



Kunpeng SDS technology stack

Ceph Architecture and Storage Scenarios

- Object storage: provides native APIs and is compatible with Swift and S3.
- Block storage: thin provisioning, snapshot, and clone.
- File storage: POSIX interface and snapshot.



Summary: Why Choose Kunpeng SDS Solution?

- **High performance**

  All-flash storage has performance advantages in certain scenarios.
- **Smooth expansion**

  Deploy Kunpeng and x86 servers together for a smooth, hitless cluster expansion.
- **Hardware data compression**

  Use Kunpeng hardware compression to improve storage utilization and performance as well as reduce CPU overhead.
- **Prosperous ecosystem**

  Support mainstream open-source software and China home-made commercial software, without a need for application porting.

HUAWEI

Huawei Cloud Academy

Thank You.

Grow With Intelligence