

All-Flash Data Center for Ubiquitous Data Services

The background features a dark blue field with intricate, wavy patterns of lighter blue and green. These patterns resemble fluid motion or data flow, with some areas appearing more vibrant and others more muted. The overall effect is a sense of dynamic energy and technological sophistication.

Ubiquitous data services require faster, innovative, and more reliable data storage

Social media



Online transactions



Teleconsultations



Automation production



Ubiquitous Data Services

Anyone

Anything

Anytime

Continuous Acceleration

The quest for performant data services never ends

Continuous Innovation

Diversified applications need innovative storage

Continuous Protection

24/7 data service response is required

Continuous acceleration: Ultimate user experience requires faster storage acceleration for various service systems

Database service acceleration required



1,700 TPS → 24,000 TPS

Core banking system: Credit card transaction pressure increased by 13x on Black Friday



1.1 billion → 23 billion

Taxation system: The number of e-invoices generated in a Latin American country increased by 20x in 5 years

Virtualization service acceleration required



100 apps → 700 apps

Manufacturing virtualization: The virtualization applications of an auto company increased by 7x in 5 years



1000 → 8000

Enterprise OA: VDI demands of company S increased by 8x in 3 years

File sharing service acceleration required



8.1 billion → 108 billion

Carrier CDRs: 4G-to-5G billing pressure in a country increased by 12x



40s → 1s

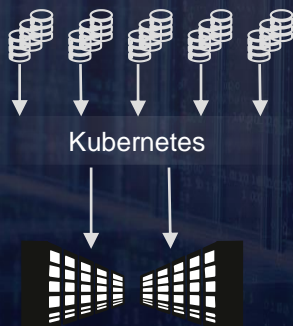
Healthcare PACS: High-concurrency response requirements for MRIs (3000–5000 images)

Continuous innovation: Innovative data services require efficient storage resource deployment and high utilization

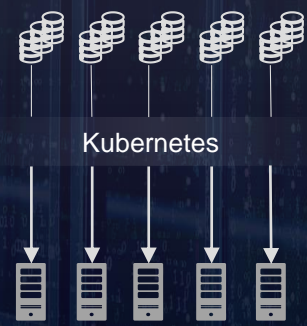
Inefficient resource deployment and difficult data sharing

96% of enterprises are using or evaluating containers

Inefficient container storage resource deployment



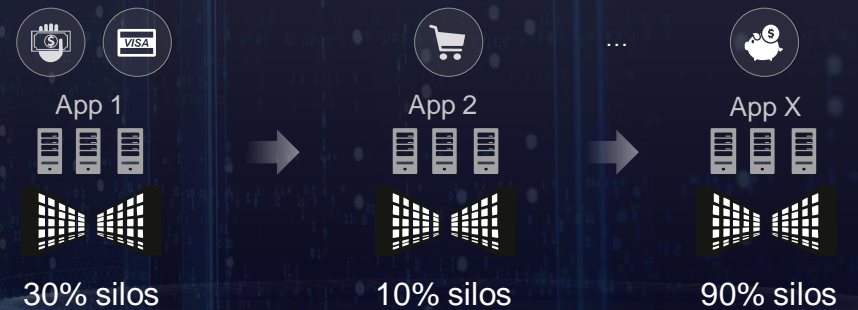
Difficult multi-application data sharing



Low resource utilization and difficult management

89% of enterprises still face IT silos

Overall storage resource utilization: < 40%



Continuous protection: Always-on data services place higher requirements on comprehensive data protection

Wider scope and higher level of DR required

4X

99.99999%

SAN / NAS / Big data / Containers

Active-Active / 3DC / xDC DR solutions

Protection of more applications required

Protection level upgrades required

Faster backup data growth and difficult recovery

35% vs **10%**

1000 TB vs **20 TB/H**

Annual backup data growth

Annual budget growth

Average recovered data

Average recovery bandwidth

More efficient data backup required

Higher recovery speed required

More ransomware attacks and bigger loss

150%

\$1.85M




CAGR of ransomware attacks

Average recovery cost

Ransomware attack prevention required

Oriented to the all-flash data center: Huawei storage provides acceleration, innovation, and protection for ubiquitous data services

All-Flash Data Center

 One-click insight  Worry-free migration  Intelligent management **SmartIDC | MigrationDirector | DME**
Innovative DC storage consolidation

ORACLE SAP HANA VMware OpenStack Kubernetes Docker MySQL TomCat MongoDB TensorFlow

Conventional production services

Innovative production services

Data center network

OceanStor Dorado All-Flash Storage
SAN | NAS | Container storage

OceanProtect Backup Storage
Backup | Ransomware protection

3DC DR



OceanStor Dorado SAN: Provides efficient and reliable data services for databases and virtualization



ORACLE SAP HANA

VMware OpenStack

OceanStor Dorado
All-Flash Storage

SAN: High reliability

SmartMatrix full-mesh architecture

Full-mesh | Full redundancy

Availability

99.99999%

Service interruption time

< 3s a year

SAN: High performance

FLASHLINK[®] intelligent algorithms

Flash-native | Global load balancing

SPC-1

21M IOPS

E2E latency

0.05 ms

OceanStor Dorado NAS: Improves file sharing application experience in performance, reliability, and functionality



**OceanStor Dorado
All-Flash Storage**

NAS: High performance

FLASHLINK[®]
intelligent algorithms

Global distributed file system |
Flash-native

NAS performance

30% ↑

NAS: High reliability

SmartMatrix
full-mesh architecture

Full-mesh | Full redundancy

System-level reliability

Tolerates the failure of 7
out of 8 controllers

Industry's only
NAS active-active DR

Active-Active |
Integrated

Solution-level reliability

RPO = 0, RTO = 0

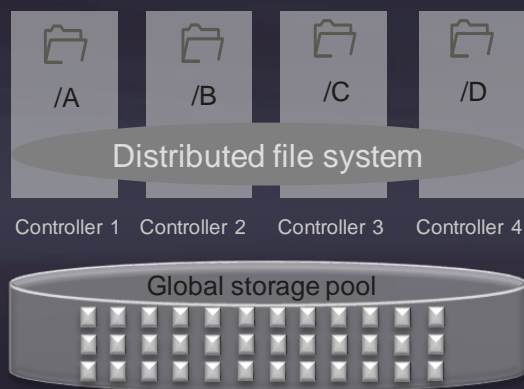
NAS: Full functionality

Extensive...

- protocols
- efficiency improvement features
- data protection features
- data trustworthiness features

OceanStor Dorado NAS: Flash-native, global shared distributed file systems deliver 30% higher NAS performance

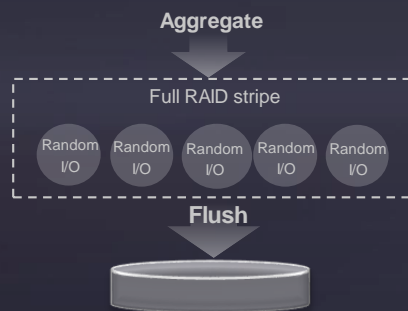
Global shared distributed file system



Uses the directory balancing algorithm to eliminate the bottleneck of a single controller.

FLASHLINK®

Full stripe write
reduces write penalty



Aggregate multiple random I/Os into a full RAID stripe to reduce write penalty.

Global GC
reduces performance fluctuation



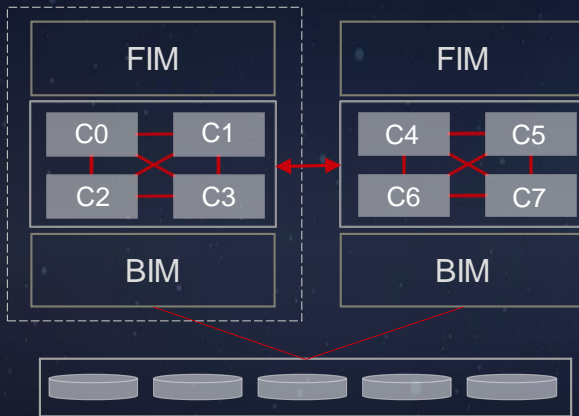
Global garbage monitoring and unified GC reduce performance fluctuation.

30% higher performance



OceanStor Dorado NAS: Industry's only NAS storage that tolerates 7/8 controller failures and supports active-active DR

SmartMatrix full-mesh architecture



One FIM/BIM* shared by 4 controllers

Fully interconnected controllers

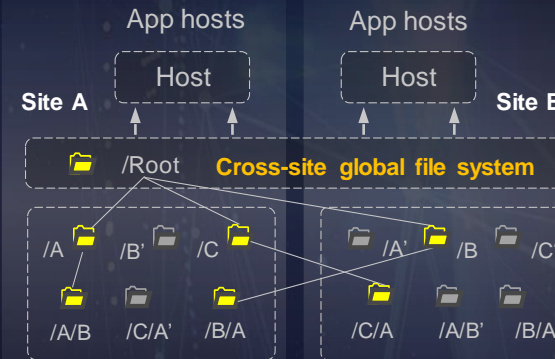
2 controller enclosures connected to 1 smart SSD enclosure

Tolerates the failure of 7 out of 8 controllers

Tolerates controller failures or supports NDU in single-client-link scenarios

* Front/back-end interconnect I/O module

Industry's only active-active DR for SAN & NAS



Cross-site global file system:

Using directory balancing algorithms and data copies for parallel access to cross-site file systems and active-active disaster recovery

Industry's only active-active DR for NAS

OceanStor Dorado NAS: Efficient, reliable, and trustworthy NAS services with various protocols and functions

Protocols



SMB v2/v3

NFS v3/v4.0/v4.1

FTP/HTTP

NDMP

Efficiency improvement features



SmartQuota

SmartQoS

SmartDedupe

SmartCache

Internal DNS

SmartCompression

Data protection features



HyperSnap

HyperVault

CloudBackup

HyperClone

HyperReplication

Active-Active HyperMetro

Data trustworthiness features



AuditLog

AntiVirus

SmartMulti-Tenant

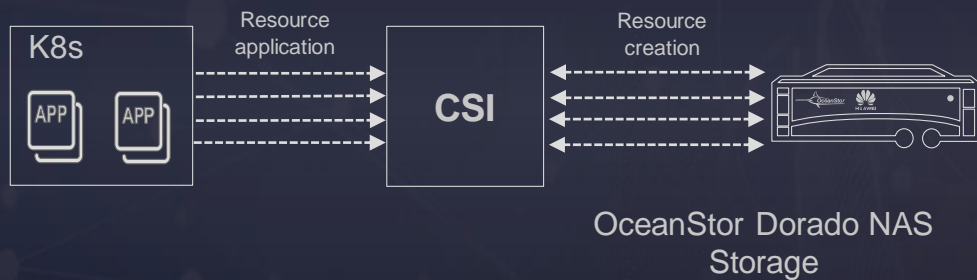
HyperLock

SmartEncryption

Container Storage Solution: Optimized resource scheduling, sharing, and expansion with OceanStor Dorado NAS

Efficient resource scheduling

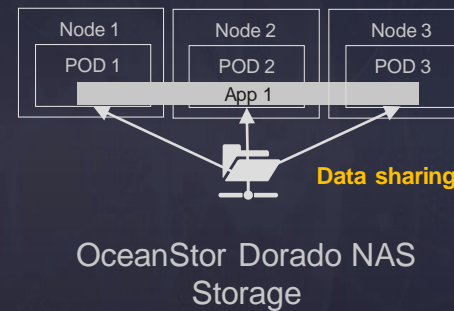
Storage resource provisioning for mass containerized applications



30% higher deployment efficiency than the industry-leading product

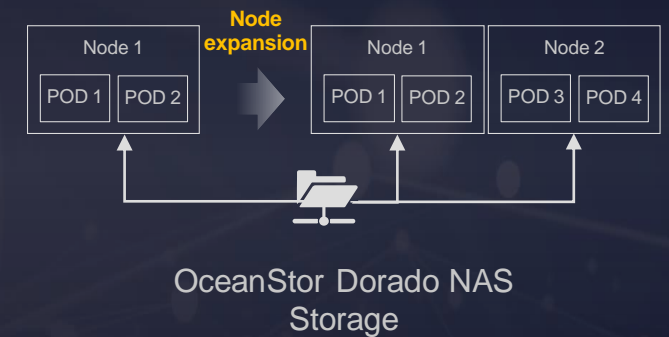
Efficient resource sharing and expansion

Multi-node parallel read/write



Cross-node data sharing

Application-storage decoupling



Node expansion without data coping and storage expansion on demand

From D2D2T to F2F2X, OceanProtect innovates all-flash backup for data protection

D2D2T



Disk



Disk



Tape

Backup performance

3–5x higher bandwidth

Backup costs

Only 10% increase in backup budget

Recovery performance

Data recovery time: ≤ 30 min

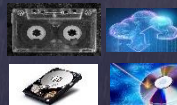
F2F2X



Flash



Flash



Anything (tapes, disks, etc.)



OceanProtect Backup Storage



Rapid backup

155 TB/hour

Rapid recovery

172 TB/hour

Efficient reduction

72:1 data reduction

OceanProtect Backup Storage: Flash-native storage offers rapid backup, rapid recovery, and efficient reduction



OceanProtect Backup Storage

Rapid backup

Rapid recovery

Efficient reduction

Flash-oriented backup storage architecture

Innovative multi-stream engine and distributed parallel acceleration

FIMs offload network protocols.



Backup nodes work in parallel.

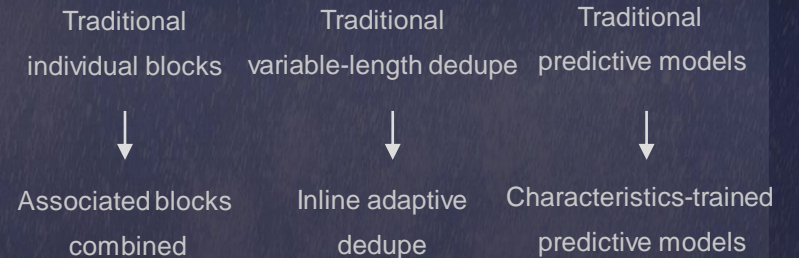
70% shorter backup window |
20s to recover 1 TB of data

Backup-oriented data reduction algorithm

Characteristics-based compression

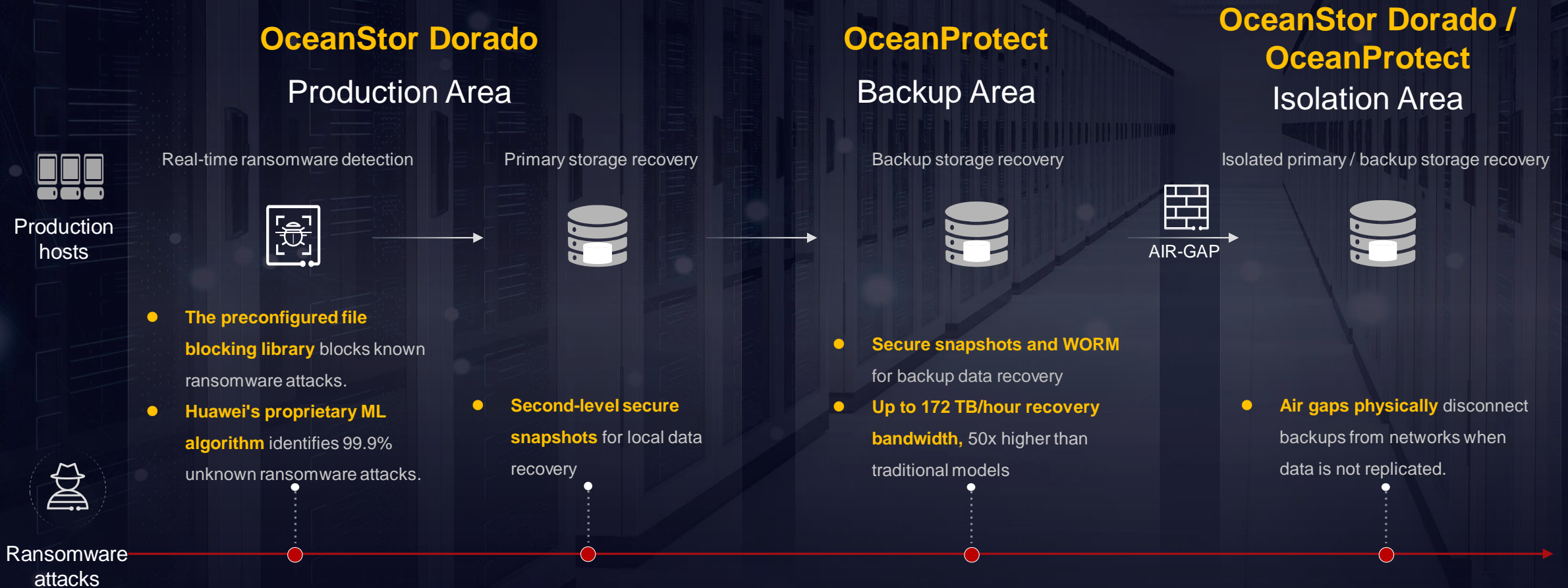
Multi-layer fragmentation

Word frequency prediction



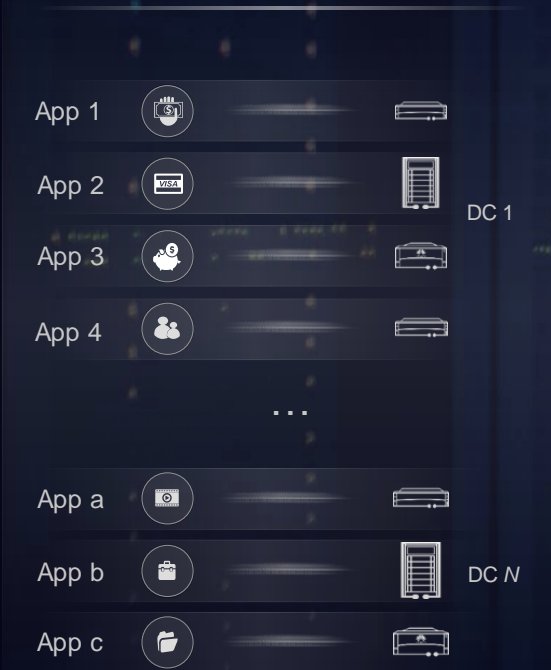
20% more user data stored in the same space

Ransomware Protection Storage Solution: OceanStor Dorado + OceanProtect comprehensive solutions defense against ransomware attacks



SmartIDC + MigrationDirector + DME: Multi-DC storage consolidation improves resource utilization by 30% and O&M efficiency by 5 times

Traditional decentralized management



Efficient and agile multi-DC consolidation



IT infrastructure assessment and planning

SMART IDC
SmartIDC

AI planning engine
One-click insights | Precise planning

6 types Of risks identified in advance
30% CAPEX reduced

Data migration



MigrationDirector

Worry-free migration
All-scenario | Automated | Always-on

0 interruption* Heterogeneous storage migration
10x Less migration time

DC resource management and O&M



Data Management Engine

SLA-based resource pool
Cross-DC converged resource management
Predictive O&M
Closed-loop automation for 16+ types of O&M scenarios

30% Higher resource utilization
5x Higher O&M efficiency

*For SAN scenarios

All-Flash Data Center for Ubiquitous Data Services



**OceanStor Dorado
All-Flash Storage**

SAN | NAS | Container storage



**OceanProtect
Backup Storage**

Backup | Ransomware protection



One-click
insights



Worry-free
migration



Intelligent
management

**SmartIDC |
MigrationDirector | DME**

Innovative data center
consolidation