Nowoczesne systemy storage Huawei – bezpieczeństwo, elastyczność i niezawodność

Konrad Tutak, Data Center Solution Sales Leader

Huawei: Leading provider of ICT infrastructure and smart devices

207,000 employees

54% employees work in R&D

170+ countries and regions

No. 5 in global R&D investment

150,000+ active patents held globally

Vision & mission

Bring digital to every person, home and organization for a fully connected, intelligent world

HUAWEI

Sustainable and Strategic R&D Investment Results in Business Development

Industry Trends

Digitalization

Intelligence

Decarbonization

20.8%

In 2024, our total R&D spending reached **$24.5 billion**, representing 20.8% of our total revenue.

$160+ bn

Invested in R&D
over the last decade

54.1%

On December 31, 2024, 113,000 employees worked in R&D.

150,000+

Huawei has become one of the world's largest patent holders, currently holding 150,000+ active granted patents.

The total R&D investment of the other three vendors accounts for **70% of Huawei's** R&D investment.

No.5

70%

ALPHABET   META   Microsoft   Apple   Huawei   Cisco   Nokia   Ericsson

No.32   No.47   No.49
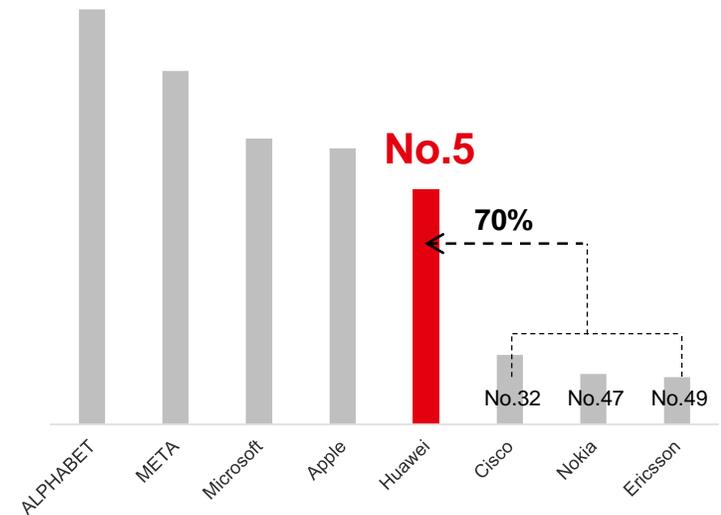
Source: The 2023 EU industrial R&D investment scoreboard

HUAWEI

Huawei, **the Game Changer** in Smartphone and NEV Industry

HUAWEI Mate XT

World's 1st Triple-foldable Smart Phone

3.6mm with **5600mAh** inside

HUAWEI Mate 70 series

Performance
40% ↑

Harmony AI

HarmonyOS NEXT

HUAWEI Pura 70 Ultra

HUAWEI Pura70 Ultra

DXOMARK Smartphone Kamera Ranking # 1

163 DXOMARK CAMERA

Foto	169 (Beste)
Zoom	164 (Beste)
Bokeh	85 (Beste)
Video	148
Vorschau	82

The Fastest Growing New EV Brand in China

S800, Extreme Luxury NEV Car

Launched in Nov. 2024

HUAWEI

Huawei smartphones and Google services

HUAWEI Mate XT

World's 1st Triple-foldable Smart Phone

3.6mm with
5600mAh inside

HUAWEI Mate 70 series

Performance
40% ↑

Harmony AI

HarmonyOS NEXT

HUAWEI Pura 70 Ultra

HUAWEI Pura70 Ultra

DXOMARK Smartphone Kamera Ranking # 1

Foto	169 (Beste)
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Bokeh	85 (Beste)
Video	148
Vorschau	82

163 DXOMARK CAMERA

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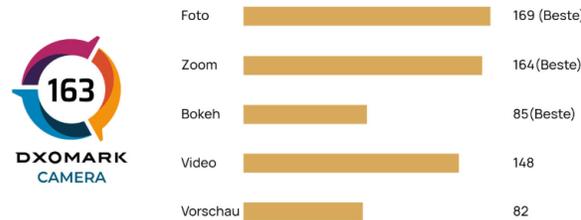
microG Project

A free-as-in-freedom re-implementation of Google's proprietary Android user space apps and libraries.

microG GmsCore is a free software reimplementation of Google's Play Services. It allows applications calling proprietary Google APIs to run on AOSP-based ROMs like LineageOS, acting as a free replacement for the non-free Google Play Services.

HUAWEI

In Europe, For Europe: Huawei Brings More Values to European ICT

Legend:
- 🔴 5G Factory
- 🔵 Research Institutes
- 🔶 Cybersecurity Center
- 🟥 Supply Center
- 🟠 Customer Training Center
- △ Joint Innovation Center
- ▲ Global Service Center

Map locations: Stockholm, Tampere, Helsinki, Gothenburg, Cambridge, Edinburgh, Dublin & Cork, Bristol, Netherlands, Berlin, Louvain-la-Neuve, Kyiv, Belgium, Leuven, Hungary, Munich, Grenoble, Romania, Milan, Istanbul, Nice, Madrid, Rome

1 week Circle

2 weeks Circle

top EMPLOYER EUROPE 2024 — CERTIFIED EXCELLENCE IN EMPLOYEE CONDITIONS

13,000+ employees

3,400+ researchers **27** R&D Centers in **13** countries

230+ tech. partnership agreements with 150+ universities and institutes

140+ universities collaboration across Europe

10,000+ patents at the European Patents Office (EPO)

Zero security incident

Poland
Software Development for Consumer Business

Hungary & Netherlands
Supply Center

Strasbourg
1st wireless equipment manufacturing factory outside of China (€200M, 80K ㎡)

Hungary
Invertor plant in Koppelberg, Hungary, 30k ㎡.

HUAWEI

Global Storage Market Share 2024

	DellEMC	Huawei	Netapp	PureStorage	IBM	HPE	Hitachi
	23.6%	19.0%	13.0%	7.6%	7.7%	8.0%	5.8%
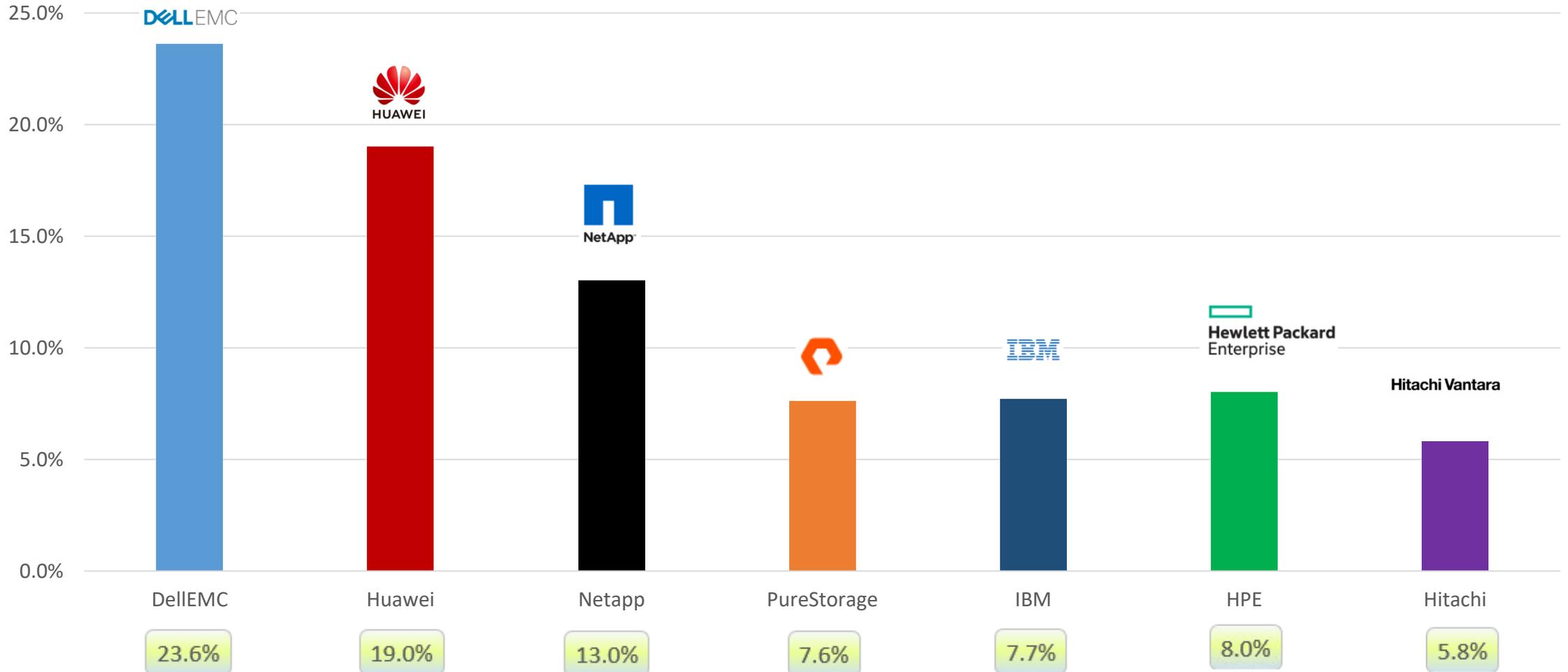
Global All-flash Storage Market Share 2024

DellEMC	Huawei	Netapp	PureStorage	IBM	HPE	Hitachi
20.5%	19.0%	16.9%	13.4%	11.8%	6.4%	3.0%
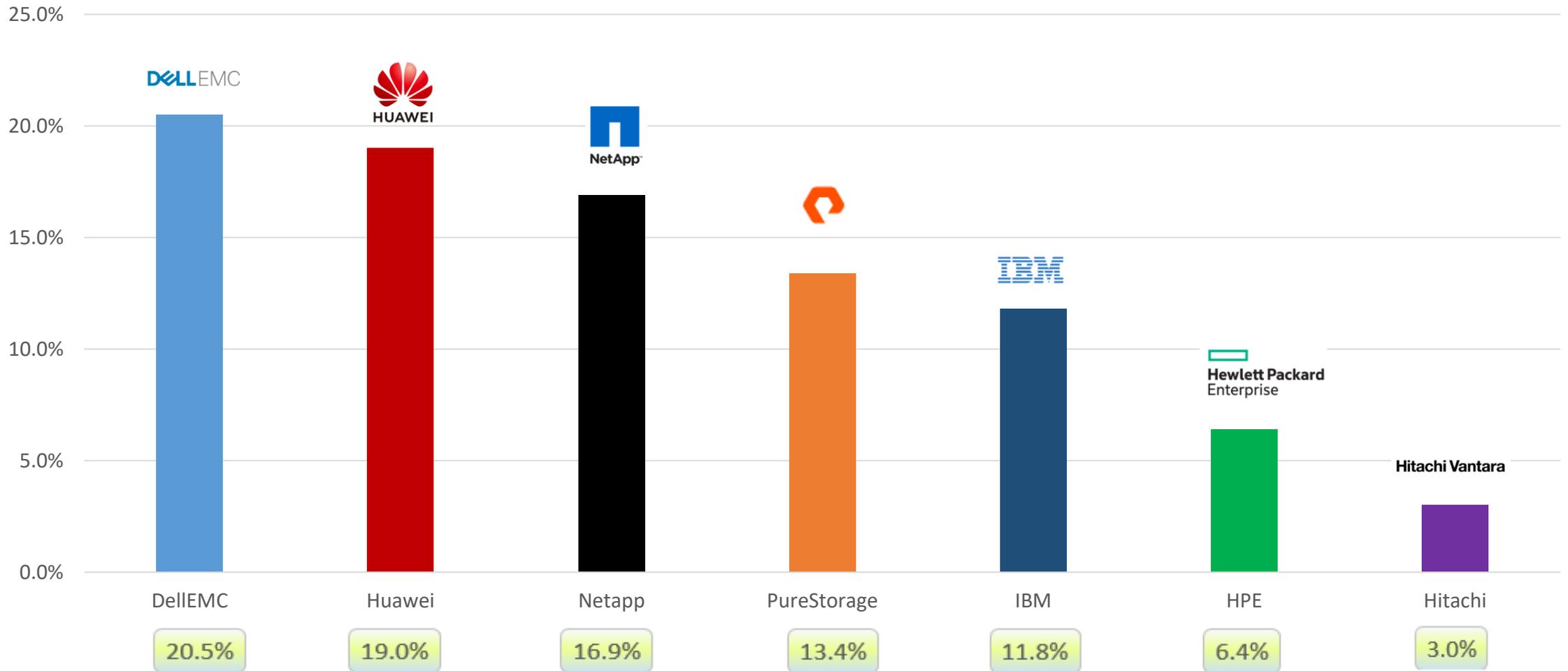
Huawei Named a Customers' Choice in Gartner® Peer Insights™ Voice of the Customer for Primary Storage Four Times

Gartner Peer Insights "Voice of the Customer"
Primary Storage Platforms

Each quadrant is sorted alphabetically.

MARKET AVERAGE

Strong Performer

⭐ Customers' Choice

Huawei
Infinidat
NetApp

iXsystems

MARKET AVERAGE

Dell Technologies
Hewlett Packard Enterprise
Pure Storage
Synology

Hitachi Vantara

Aspiring

Established

OVERALL EXPERIENCE

USER INTEREST AND ADOPTION →

As of Dec 2024   © Gartner, Inc
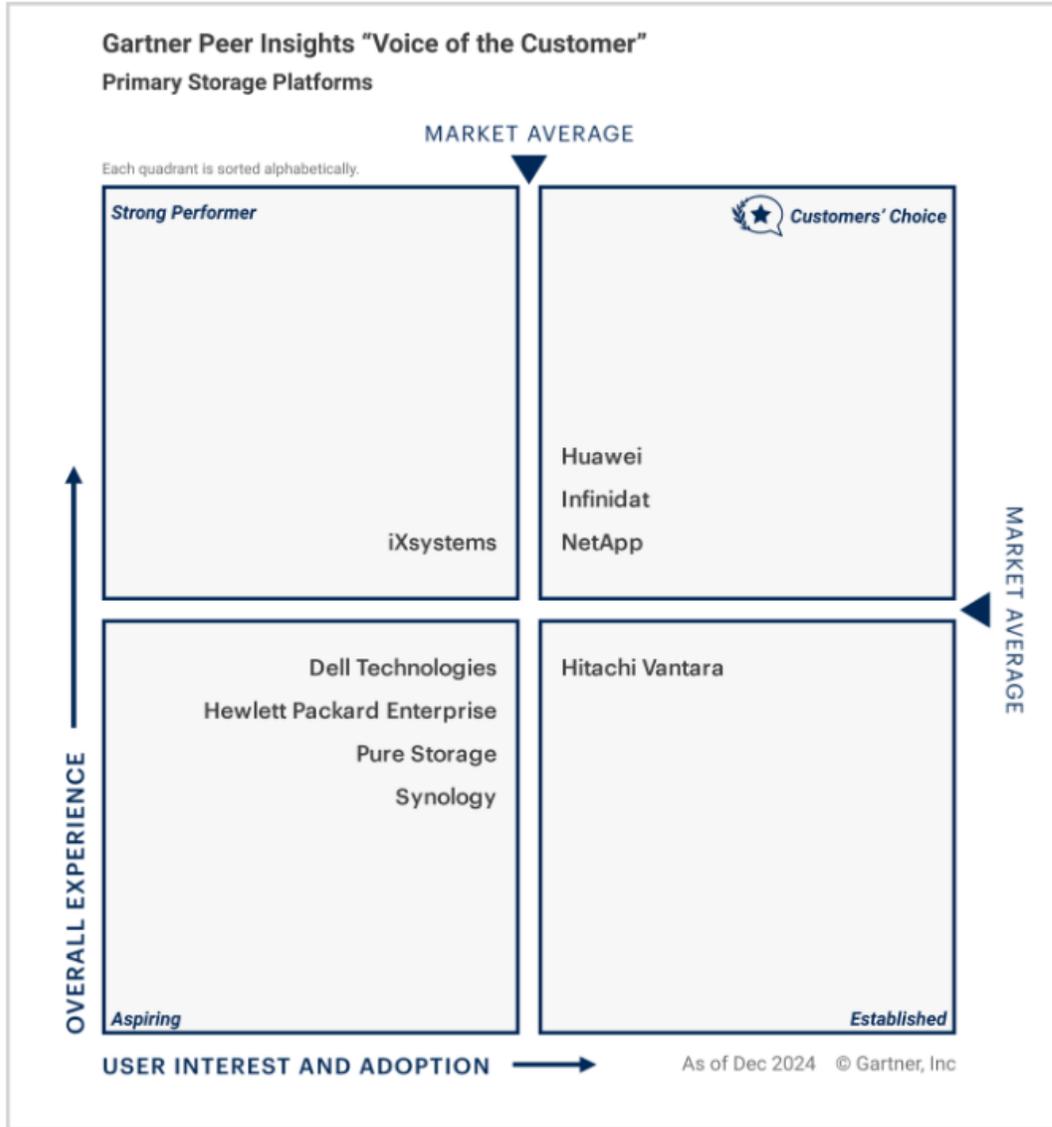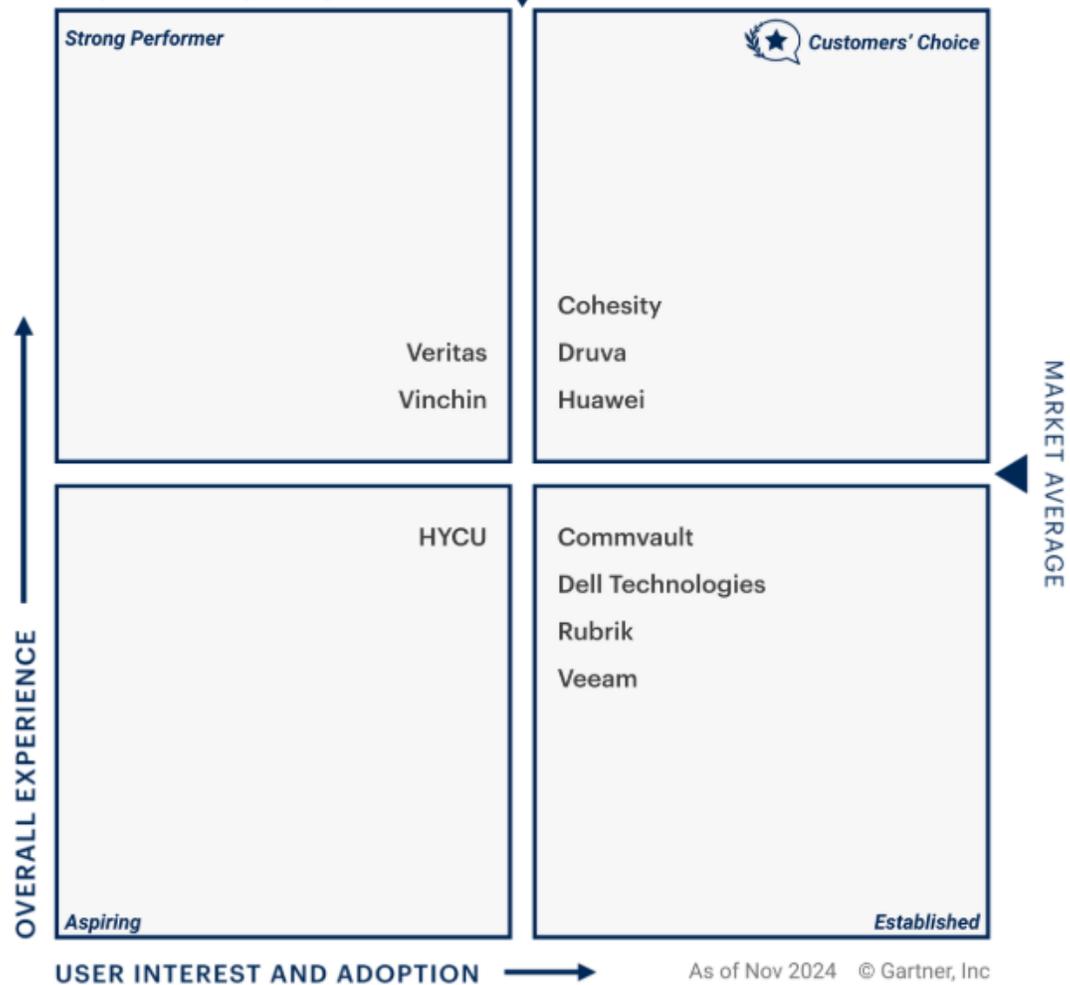
Gartner

Gartner Peer Insights "Voice of the Customer"
Primary Storage Platforms

Eligible Vendors	Overall Responses	Willingness to Recommend
Dell Technologies	21	95%
Hewlett Packard Enterprise	29	96%
Hitachi Vantara	113	100%
⭐ Huawei	227	100%
⭐ Infinidat	77	99%
iXsystems	38	100%
⭐ NetApp	126	98%
Pure Storage	64	96%
Synology	52	94%

80%   90%   100%

Sorted alphabetically

As of Dec 2024   © Gartner, Inc

Gartner

Huawei was named a Customers' Choice in 2025 Gartner Peer Insights ™ Voice of the Customer for Enterprise Backup and Recovery Software Solutions

Huawei Named a 2025 Gartner® Peer Insights™ Customers' Choice

Gartner Peer Insights Customers' Choice 2025

99% Willingness to Recommend
4.9 ★★★★★ Overall Rating

Gartner Peer Insights "Voice of the Customer"
Enterprise Backup and Recovery Software Solutions

Plugin and Veeam integration is back!
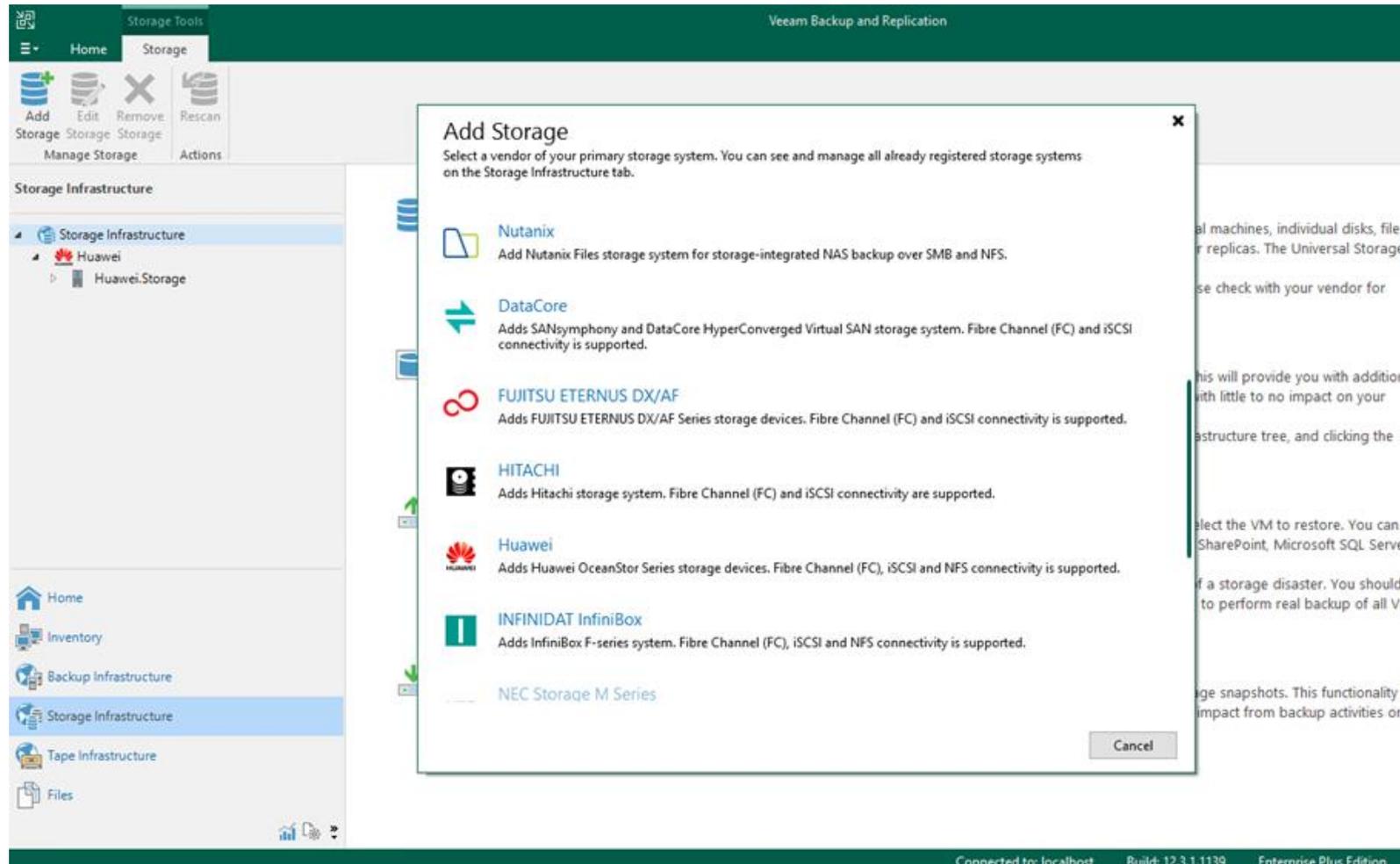
Data Storage Portfolio

‹‹‹ Data Storage ›››

All-Flash Storage

OceanStor Dorado
8000/18000

OceanStor Dorado
5000/6000

OceanStor Dorado
2000/2100/3000

Data Protection

OceanProtect
X6000/X8000/X9000

OceanProtect
X3000

OceanProtect Appliance

OceanCyber
300

OceanStor
BCManager

Capacity Flash

5310/5510

Hybrid Flash Storage

OceanStor
18510/18810
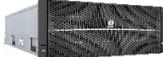
OceanStor
6810

OceanStor
5310/5510/5610

OceanStor
2200/2600

Scale-Out Storage

OceanStor Pacific 9950/9920
Performance Nodes

OceanStor Pacific 9550/9540/9520
Hybrid Nodes

OceanStor Pacific 9350/9340
Archive Nodes

OceanDisk
(Lustre/GPFS)

1500/1600

AI Storage

A800

‹‹‹ Data Management ›››

DME Data Center Intelligent Management Platform

DME

DME IQ Intelligent Cloud O&M Platform

DME IQ

## ‹‹‹ Fibre Channel (FC) Switch ›››

Fibre Channel (FC) Switch

OceanStor SNS3664/SNS3096/
SNS3696E/SNS5604/SNS5608 FC Switch

‹‹‹ Solutions ›››

Data Protection Solution
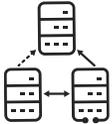
Disaster Recovery Solution

Backup Solution

Archiving Solution

Ransomware Protection Storage Solution

Ransomware Protection Storage Solution

Container Storage Solution
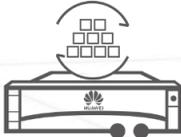
Container Storage Solution

Datacenter Virtualization Solution (DCS)

DCS

OceanStor Dorado

All Flash Storage

Ever Fast | Ever Solid | Ever Secure

OceanStor Dorado
18000

OceanStor Dorado
8000

OceanStor Dorado
6000/ 5000/ 3000/ 2000

HUAWEI

Dorado V6 Uses the Symmetric Active-Active Architecture for True Load Balancing

Host

Controller A

Controller B

Forwarding

ALUA (asymmetric) A-A architecture

Host

Controller A

Controller B

LUN

Symmetric A-A architecture

Dorado Series
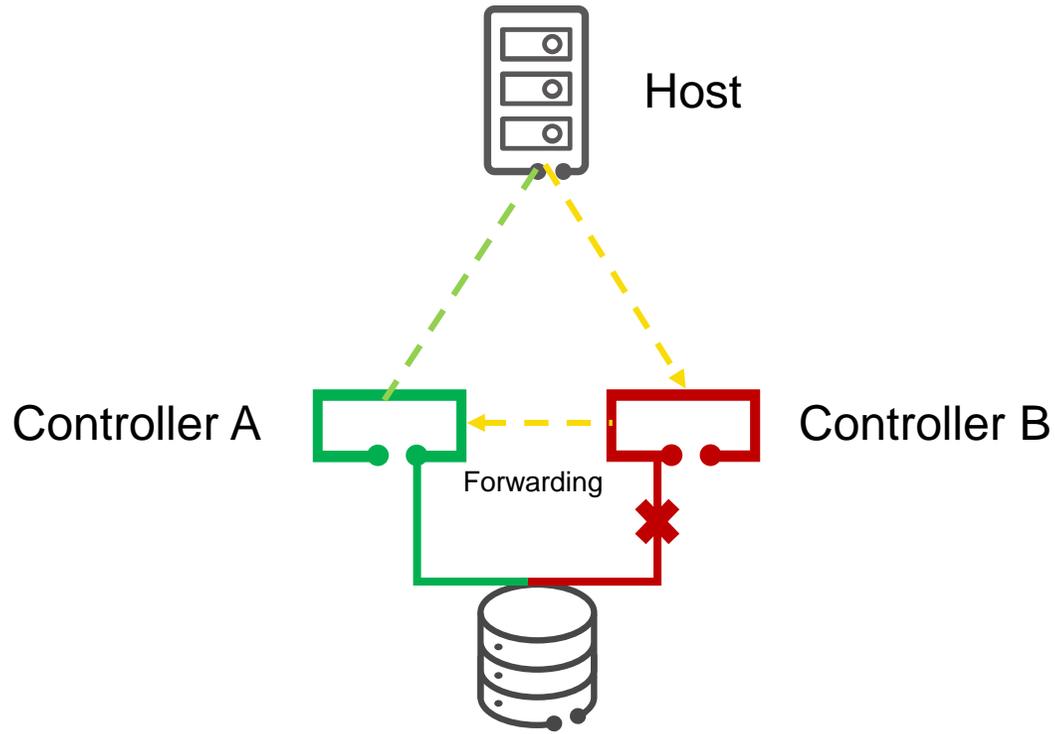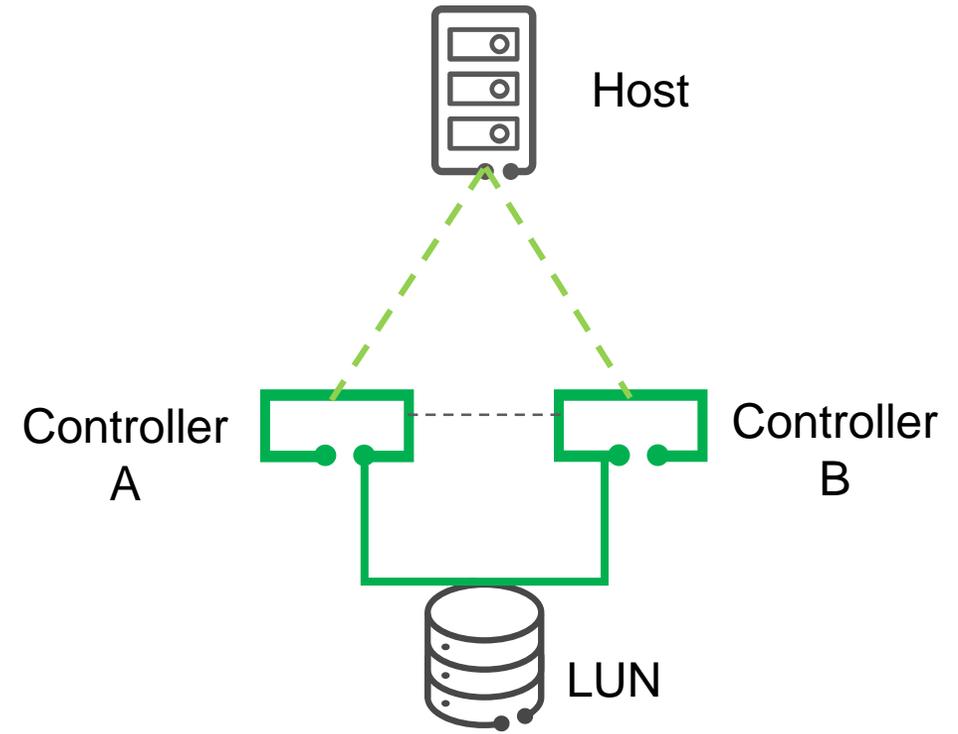
Innovative E2E Acceleration for leading performance

Innovative E2E acceleration for leading performance

E2E hardware innovation

Chipsets and NVMe SSDs developed by Huawei

SAN & NAS
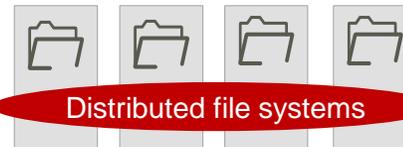
Distributed file systems

E2E software innovation

Distributed file system and FlashLink intelligent algorithms

A Leading All-Flash Enterprise NAS Storage with the Innovative Scale-Out File System

Globally shared scale-out file system

Ctr1	Ctr2	Ctr3	Ctr4
/A	/B	/C	/D

OceanFS

Global storage pool
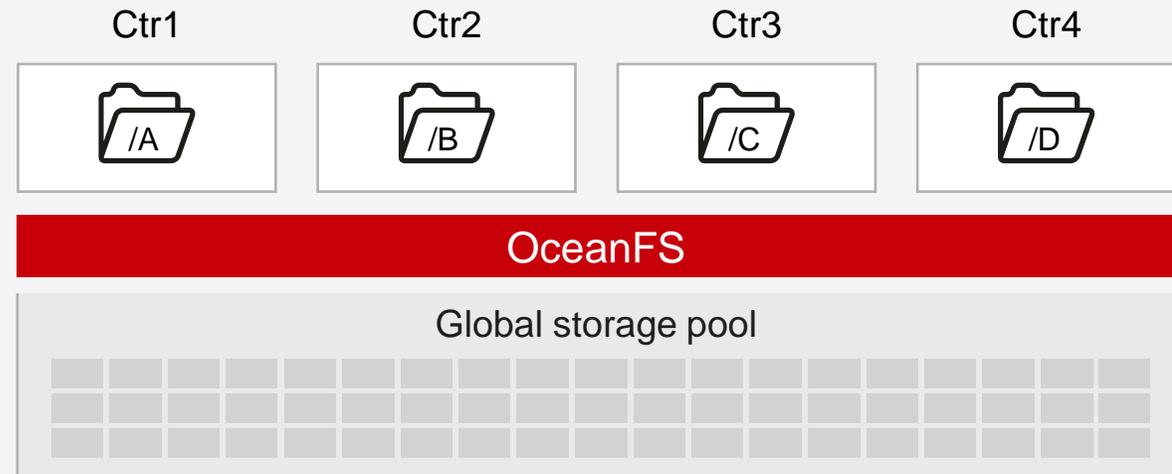
- The directory balancing algorithm eliminates the bottleneck of a single controller or CPU.

- Directories created on the client are evenly distributed on all CPUs or controllers to maximize the performance of all storage controllers and CPUs.

Highest NVMe density in the industry with most reliable drives

SSD wear leveling and Huawei-patented anti-wear leveling

LDPC + SmartFSP 3.0 for error correction granularity 10x superior to competitors

Intra-disk DIF preventing silent data corruption

Data inspection algorithm preventing data distortion

Built-in dynamic RAID improving utilization

RAID at the SSD and system levels for solid reliability

System Reliability with RAID-TP

Simultaneous 3-disk failure without service interruption

30 minutes
RAID-TP

5 hours
Traditional RAID

Reconstruction of 1 TB data

SSD failure toleration

Traditional RAID: up to 2 SSDs
Huawei RAID-TP: simultaneous 3-SSD failure

Data reconstruction

Traditional RAID: 5 hours
RAID-TP: 1 TB of data within 30 minutes

HUAWEI

Active-Active Solution for SAN and NAS

ERP
CRM   BI
File Sharing

OceanStor Dorado

1010101010101010101010101010101010101010

FC / IP

OceanStor Dorado

DC A

DC B

HyperReplication

HyperReplication

OceanStor Dorado

OceanStor
storage system

DR center
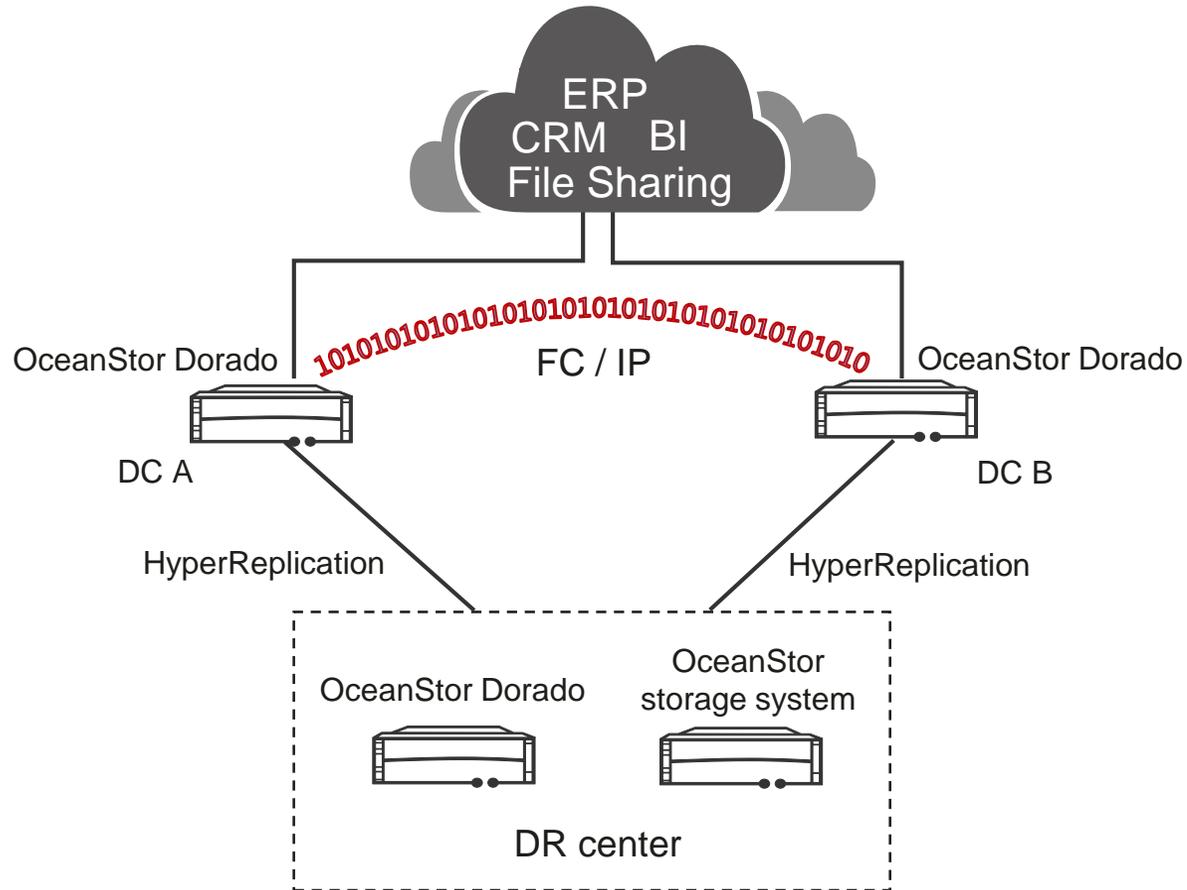
Lightning-fast and rock-solid

- Gateway-free: SAN and NAS convergence

- SAN active-active: Load balancing between sites, RPO = 0, RTO ≈ 0

- LUN / File-system Level of clustering

Easy-to-scale

- Scalability to 3DC (SAN) improves reliability.

- Serial, parallel, and star networking (SAN) meets the most demanding requirements for enterprise reliability.

HUAWEI

Geo-Redundant Active-Active Solution for SAN and NAS

Metro Cluster

99.99999%

Active-active

Production center 1   **Production center 2**
City A

Geo-redundant 3DC DR

99.99999%

Active-active

Production center 1   **Production center 2**
City A

DR center 2
City B

Geo-redundant 4DC DR

99.99999%

Active-active

Production center 1   **Production center 2**
City A

Remote replication

99.99999%

Active-active

Production center 4   **Production center 3**
(New)   **City B**   **(Original DR center)**

Data Security Technologies

Air Gap

Secure snapshot

Ransomware detection

Hyper

Replication link encryption

WORM file system

Anti-virus for NAS

Storage encryption

File & IP filtering
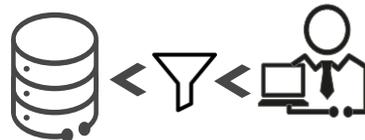
Multi-factor Authentication & ACL
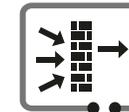
Detection and Analysis for NAS Storage: Ransomware Attack Detection Process

Encrypted data
- Partially or fully encrypting data
- Fast encryption
- Generating special name extensions

File entropy changes

File type changes

File metadata changes

File change rate

File name extension change rate

Trend analysis of new files

Quantity trend	Type trend
Name trend	Size trend
Entropy trend	

Trend analysis of modified files

Quantity trend	Type trend
Name trend	Size trend
Entropy trend	

Trend analysis of deleted files

| Quantity trend | Type trend |

Local entropy ML model

(Xgboost, LightGBM)
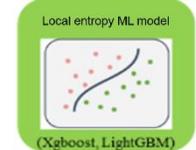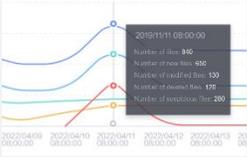
Detecting suspicious copies

Using the Honeypot Technology to Effectively Cope with Slow Attacks

1. User file system scanning	2. Honeypot file type design	3. Honeypot file content generation	4. Honeypot file placement design	5. Attach detection based on honeypot files
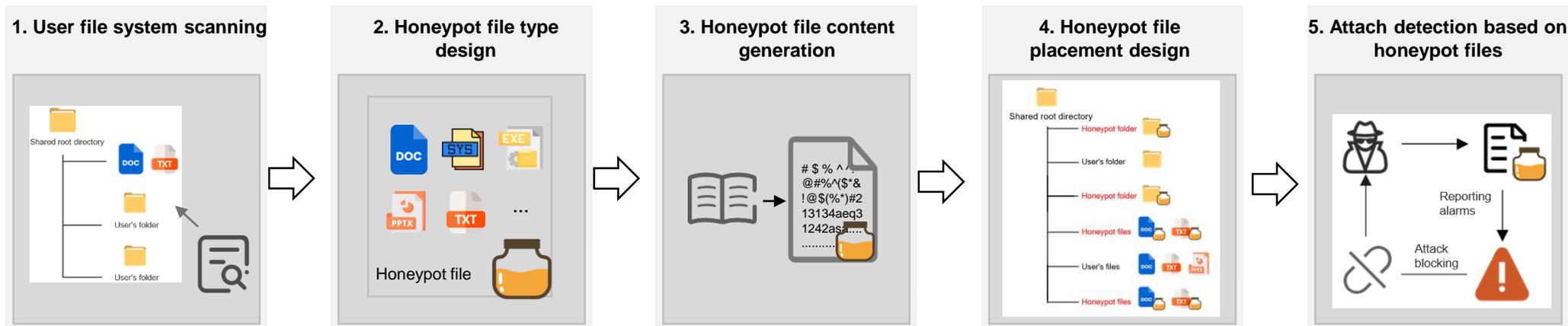
Key technologies

1. **Adaptive honeypot generation:** Honeypots are adaptively generated based on profiling and fitting of user files.
2. **Automatic honeypot deployment:** Honeypots are automatically deployed based on the priority analysis of virus attacks.
3. **Lightweight detection:** A lightweight honeypot-based detection algorithm based on abnormal I/Os and prior information of honeypot content is used.

Customer benefits

- **Proactive defense:** Ransomware attacks are detected before they strike user's normal data.
- **Low consumption**: Honeypot files occupy a total space of < 1% of the storage capacity, implementing lightweight detection.
- **Low false positive rate:** Ransomware detection with a low false positive rate of less than 1% is achieved.

Lab test result: During tests in real-world settings with over 300 collected ransomware viruses, the detection rate was 100% with no false positives (over 80 ransomware viruses attacked the shared directory).

HUAWEI

Ransomware Detection and Analysis for SAN Storage

NEW

1   I/O behavior feature detection

Time 1	Time 2	…	Time n

Read I/O count; Count of write I/Os after reading;	Write I/O ratio; …

ML-based classification

+++

Time sequence indicator detection (abnormal performance indicators)

Abnormal ⚠️

2   Multi-feature fusion detection

B	C	D	E	…	∞

$F(x)_B$ $F(x)_C$ $F(x)_D$ $F(x)_E$ $F(x)_n$

1 KB
2 KB
4 KB

Fusion

Pre-trained model -based detection

M-CNN

convolution + ReLU   max pooling   fully connected + ReLU   softmax

Abnormal ⚠️

3   Multi-feature detection

T0   T1   T2   Features extracted

Incremental data
Incremental data

Snapshot comparison   Snapshot comparison

Feature heat map
Content features

Pre-trained model-based detection

Abnormal change of the data compressible ratio with time
Timing features

Key Technical Challenges

- **SAN lacks semantics:** SAN storage cannot sense application semantics. It is difficult to distinguish normal I/Os from ransomware attacks.

Key Technical Solution

In-event detection:
- I/O behavior detection
- Content feature detection

Post-event detection:
- System multi-dimensional feature detection

Detection Effect

- In database (such as MySQL/SQL) /VM scenarios, the E2E detection rate is over **96%**.

Customer Benefits

- Ransomware attack detection within seconds (< 1 min)
- E2E recovery time reduced by 20 times

OceanStor Dorado Portfolio

Entry-Level			Midrange	
Enterprise Features, High cost-effectiveness			*Full Functionality, Leading technology*	
• **Dorado 2000**	• **Dorado 2100**	• **Dorado 3000 V6**	• **Dorado 5000 V6**	• **Dorado 6000 V6**
✓ Only SAS SSD	✓ Only SAS SSD	✓ NVMe	✓ NVMe	✓ NVMe
✓ 25 disk slots in 2U	✓ 25 disk slots in 2U	✓ 25 disk slots in 2U	✓ 36 disk slots in 2U	✓ 36 disk slots in 2U
✓ Only SAN	✓ Only NAS	✓ SAN & NAS	✓ SAN & NAS	✓ SAN & NAS

Symmetric active-active architecture in every model

HUAWEI

OceanStor Dorado Portfolio

High-End
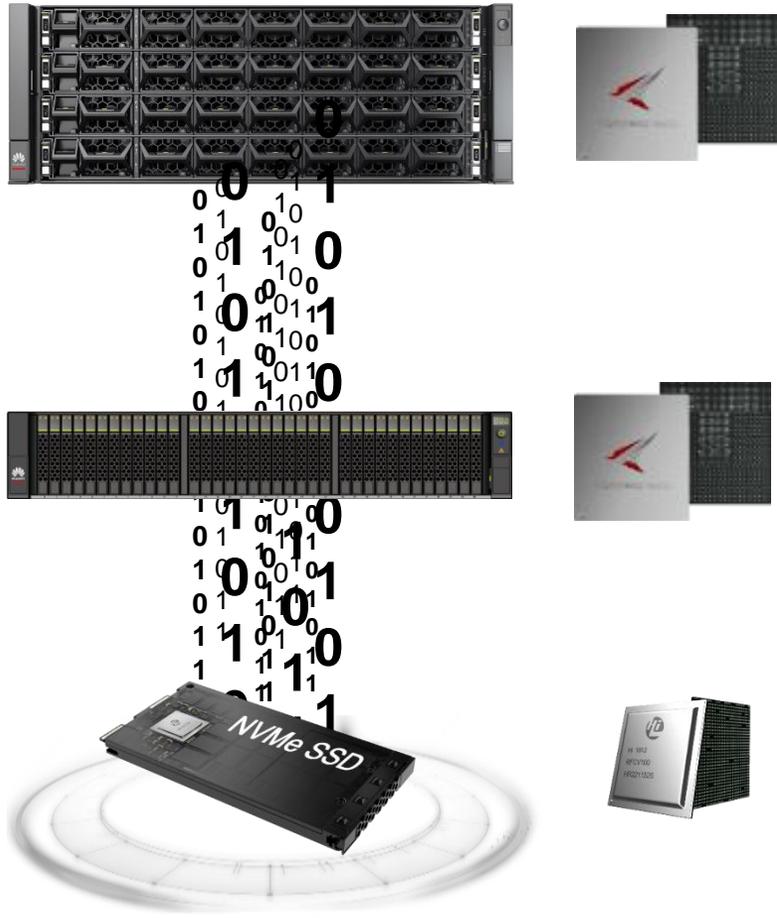
4U Controller Enclouser
4 Controllers

SmartMatrix (Full-Mesh)

From 512 up to 768 cores

Up to 4TB cache

Up to 8PB usable capacity on NVMe

SmartNVMe Disk Enclosures with
RDMA100G links

SmartMatrix - Full-Mesh

Server

FC switch

WWN: 2100xxxxabcd

- Each front-end port provides one FC connection to the host.
- The host identifies only one FC connection with a unique WWN.

- 4 internal links connect to the controllers in an enclosure.
- Each controller has its own FC connection to the host.

Backplane

Ctrl.0 Ctrl.1 Ctrl.2 Ctrl.3

Controller failure is transparent to hosts
- No impact on hosts: FC links and services continue without any alarm or event.
- Rapid takeover: The front-end chipset redirects I/Os to other controllers.

Server

FC switch

WWN: 2100xxxxabcd

Backplane

X

Ctrl.0 Ctrl.1 Ctrl.2 Ctrl.3

HUAWEI

Unified Storage of Native Blocks, Files, and Objects, Enabling Mission-Critical Applications and AI Training/Inference on One Device
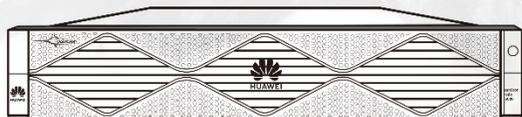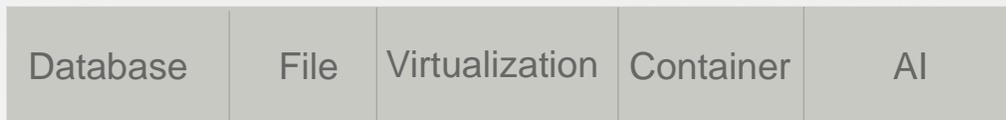
	Block	File	Object (June 2025)
Active-active	√	√	√*
Synchronous/ asynchronous replication	√	√	√*
Clone	√	√	√*
RAID 2.0+	√	√	√
Deduplication and compression	√	√	√
QoS	√	√	√
Global cache	√	√	√
Global garbage collection	√	√	√

* 2026 support

HUAWEI

OceanStor Capacity Flash
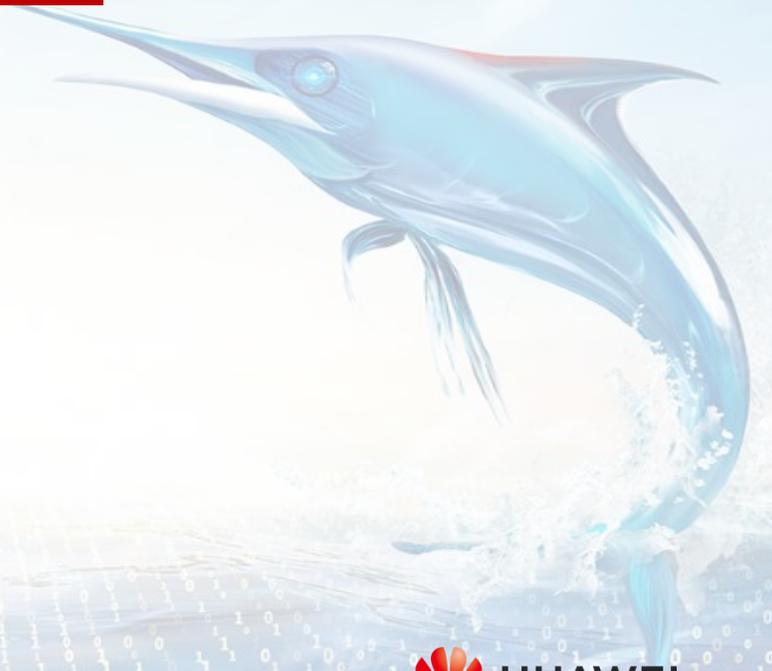
Capacity oriented All-flash

- **5310**
  - ✓ Symmetric active-active
  - ✓ NVMe
  - ✓ SAN & NAS
  - ✓ 128G/256G cache
  - ✓ Up to 2PiB of effective capacity

- **5510**
  - ✓ Symmetric active-active
  - ✓ NVMe
  - ✓ SAN & NAS
  - ✓ 256G/512G/1TB/1.5TB/2TB cache
  - ✓ Up to 16PiB of effective capacity

SLC

Capacity-oriented SSD NVMe
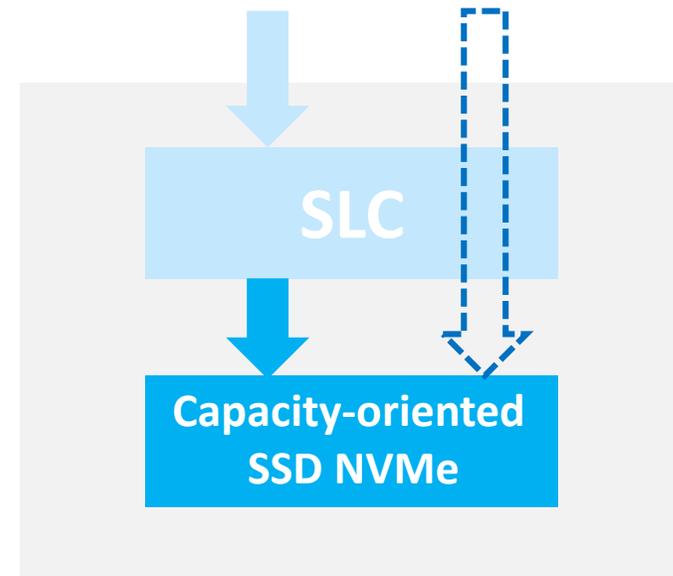
Capacity oriented All-flash

OceanStor Hybrid Flash

OceanStor Capacity Flash

OceanStor Dorado

4-10 ms

2-3 ms

0.5-1 ms

HUAWEI
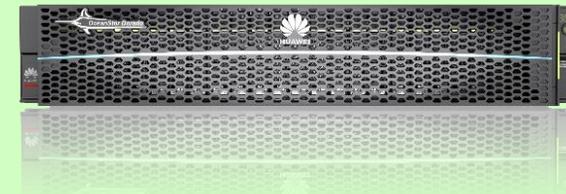
OceanProtect

Data Protection

All-Scenario Data Protection for the Intelligent World

OceanProtect X8000   OceanProtect X9000   OceanProtect X6000/X3000

HUAWEI

OceanProtect: An Enterprise-Class Backup Storage

Backup Media Server

...

Backup Server

IP(recommended)/FC

OceanProtect Backup Storage
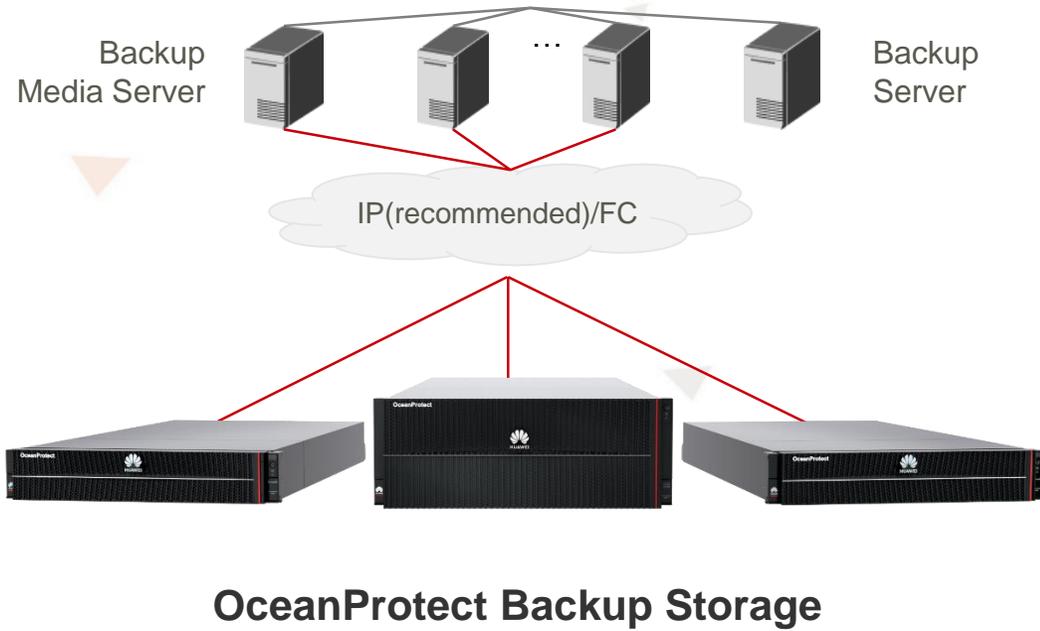
Rapid Backup Rapid Recovery

End-to-end backup acceleration

All-Flash

Efficient Reduction

Up to 72:1
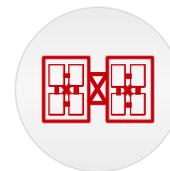
High Reliability

Active-Active

Controller ⟳ Controller

RAID-TP

No vendor lock-in

Veeam · VERITAS · IBM · COMMVAULT · MICRO FOCUS · arcserve · NAKIVO Backup & Replication · ATEMPO · Acronis · Zerto

CIFS, NFS

Microsoft SQL Server · ORACLE RMAN

CIFS, NFS

OceanProtect · HUAWEI

OceanProtect · HUAWEI
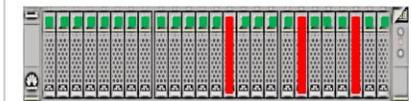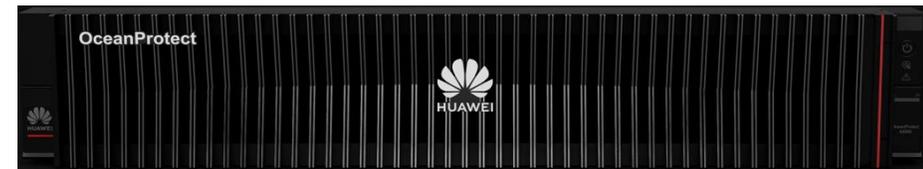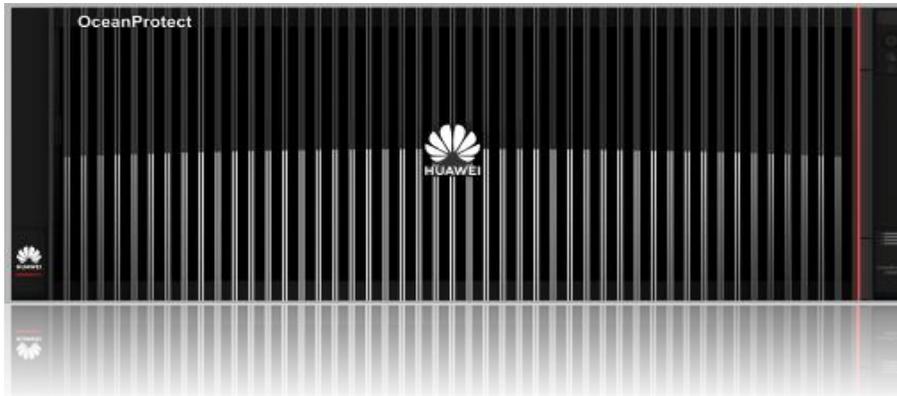
4-Step Advanced Dedupe and Compression for Optimal Data Reduction

Periodic backup	Structured data header	Insert data	Data dedupe	Different application data	
	Changed data	Data features and multi-layer variable-length chunking	Fingerprint calculation, search, and comparison	Dedicated compression algorithm for backup	Write data to disks after compression

① **Backup data preprocessing** ② **Multi-layer inline variable-length dedupe** ③ **Feature-based compression** ④ **Byte-level compaction**

Up to **72:1***
data reduction ratio

Global deduplication

Cross-controller global fingerprint deduplication at the storage pool level, enabling data deduplication among multiple file systems

Efficient concurrency

Multi-controller parallel processing in active-active mode, fully utilizing the advantages of the multi-controller architecture and improving deduplication efficiency

*Test case: 200 VMs in a virtualization scenario, daily full backup for 28 days, 4% modifications per day, 0.125% new data per day.

Source Deduplication Technology Based on the DataTurbo Client to Reduce Backup Time

Backup server

Backup media server

Backup media server

Backup media server

① ③

DataTurbo

DataTurbo

DataTurbo

②

IP/FC

IP/FC

IP/FC

OceanProtect Backup Storage

File system Backup images

④

① **Segment data and calculate fingerprints**

② **Check duplicate fingerprints and return the results**

③ **Compress non-duplicate data then package and send them**

④ **Write data**
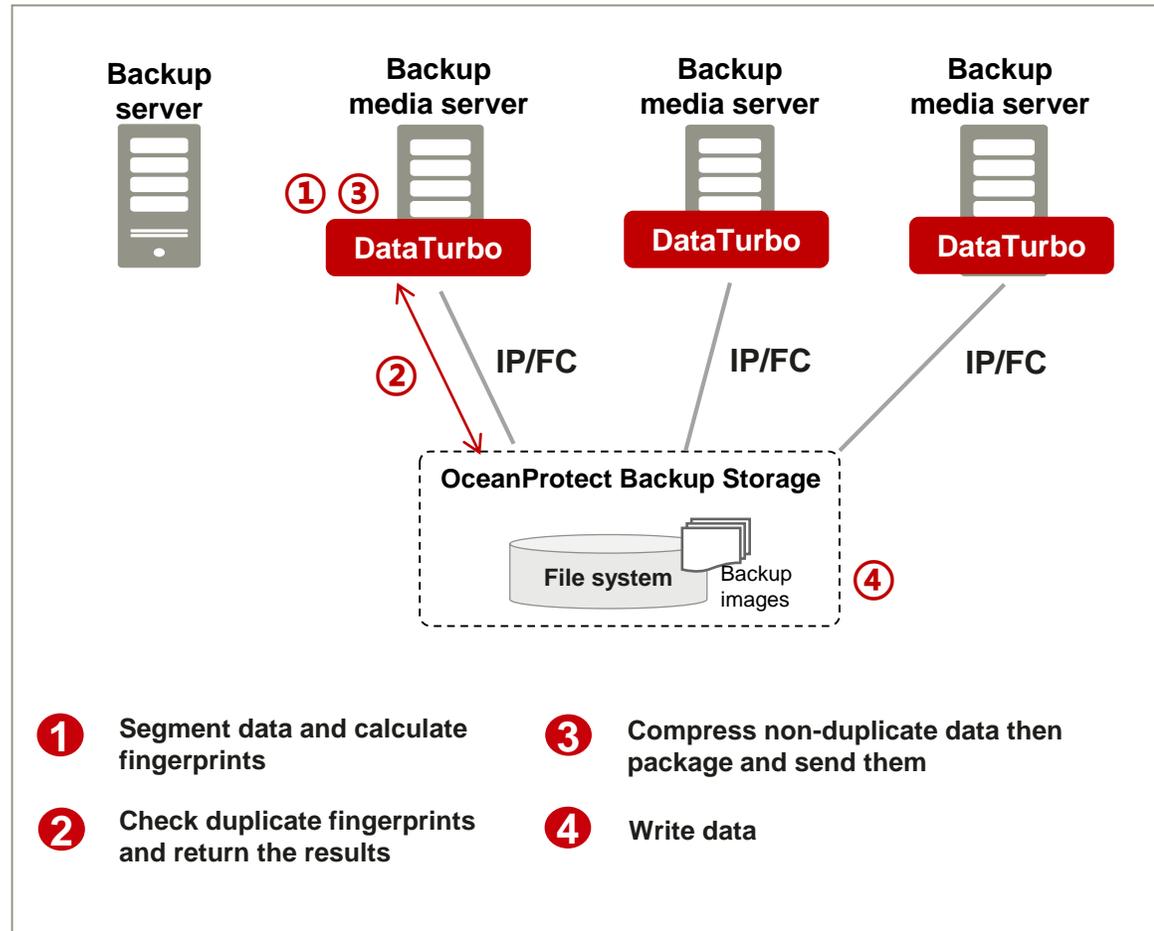
Lower TCO

- DataTurbo client is deployed on the backup media server.
- Source deduplication reduces the amount of data to be transmitted and saves network bandwidth.
- Source deduplication and transmission of non-duplicate data improve logical backup bandwidth.

Shorter backup time

1 PB

Backup data

Industry-leading backup storage boost (90+ TB/hour) — **10 hours**

3 hours

DataTurbo (310 TB /hour)

OS compatibility: CentOS 7.x, SUSE 12 SP4/SP5, Ubuntu 20.4, Oracle Linux 7.6/7.9, Red Hat 8.x, Windows Server 2022, and more OSs are supported. Network requirements: RTT ≤ 100 ms, packet loss rate < 0.1%. Network type: IPv6 is not supported.

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Storage Deduplicated Replication for Saving Replication Network Bandwidth

Data Center 1

Backup server **Backup media server**

OceanProtect Backup Storage

File system — Backup images

Data Center 2

Backup server **Backup media server**

OceanProtect Backup Storage

File System — Backup images

① ③ ②
④

Storage replication

① **Read fingerprints of data and send them to the target device**

③ **Package and send non-duplicate data (compression available)**

② **The target device checks duplicate data and returns the result.**

④ **Write data**

Lower TCO

- With deduplication for replication, non-duplicate data is transmitted, saving bandwidth.
- With replication data compression, the amount of data to be transmitted and TCO are reduced.
- Interoperability and replication between different product models is supported.
- Data can be backed up and replicated at the same time

Network requirements:
- RTT ≤ 100 ms
- Packet loss rate < 0.1%

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E2E Encryption Prevents Sensitive Data Leakage
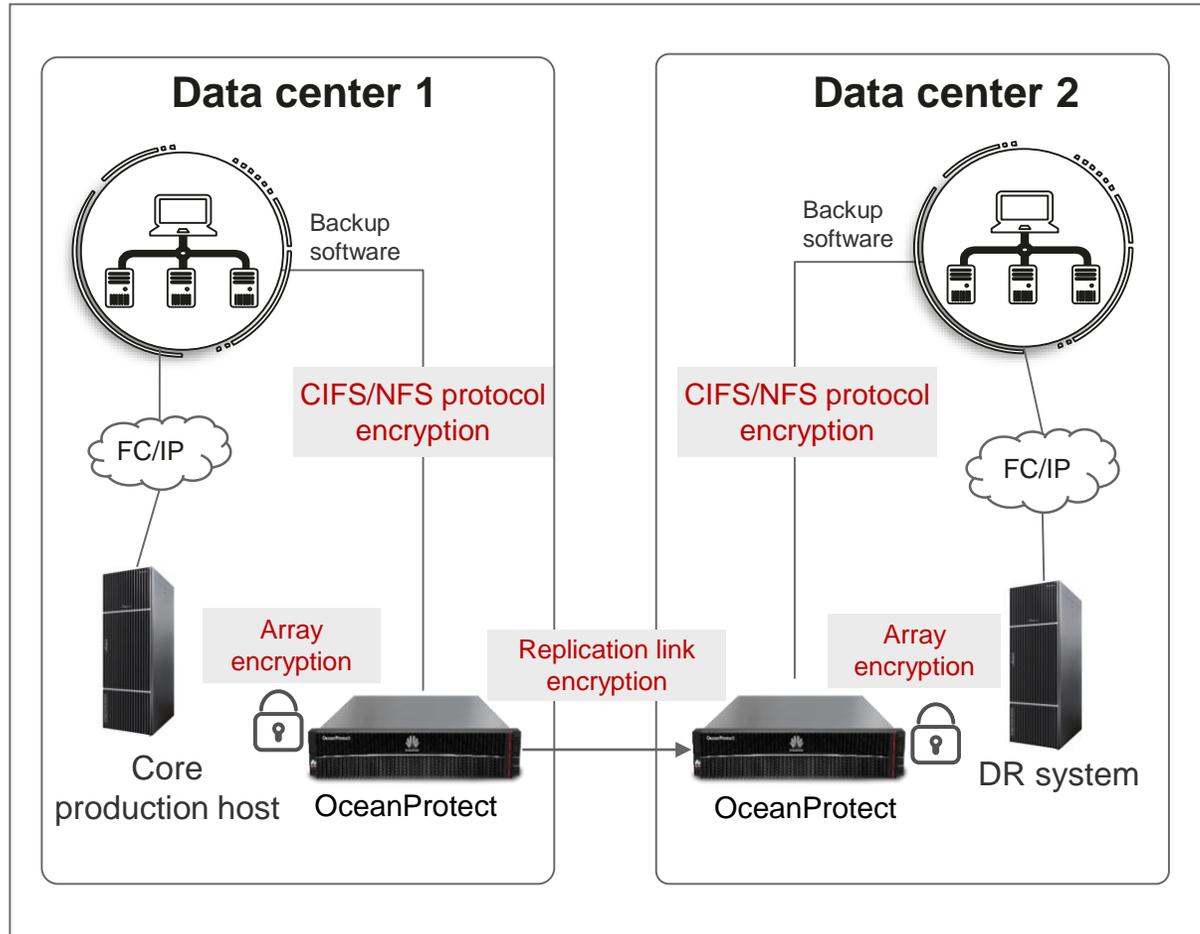
1 **Protocol encryption**

2 **Replication link encryption**

3 **Array encryption**

Leading Air Gap Replication Enables Physical Secure Data Isolation

Backup environment

Isolation environment

OceanProtect

T2
T1
Data copies   T0

Air Gap
replication

OceanProtect

T2
T1
Data copies   T0

OceanStor BCManager

1
**Isolation and
protection**

2
Replication

3
**Snapshot
recovery**

- OceanStor BCManager manages storage in the
  isolation zone.
- The replication link is disconnected.
- The physical security of copies in the isolation
  zone is ensured.

- Periodic and automatic replication
- The network interface is shut
  down after replication.
- A secure snapshot is created in
  the isolation zone after replication.

- Achieve snapshot rollback in the isolation zone.
- Reverse remote replication for restoring data to the
  backup environment.
- The network interface is shut down after replication.

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Two Technologies Prevent Data from Being Tampered with or Deleted

Backup system

Backup

OceanProtect

(1) WORM file system

(2) Secure snapshot

Application backup copy data

Backup resource pool
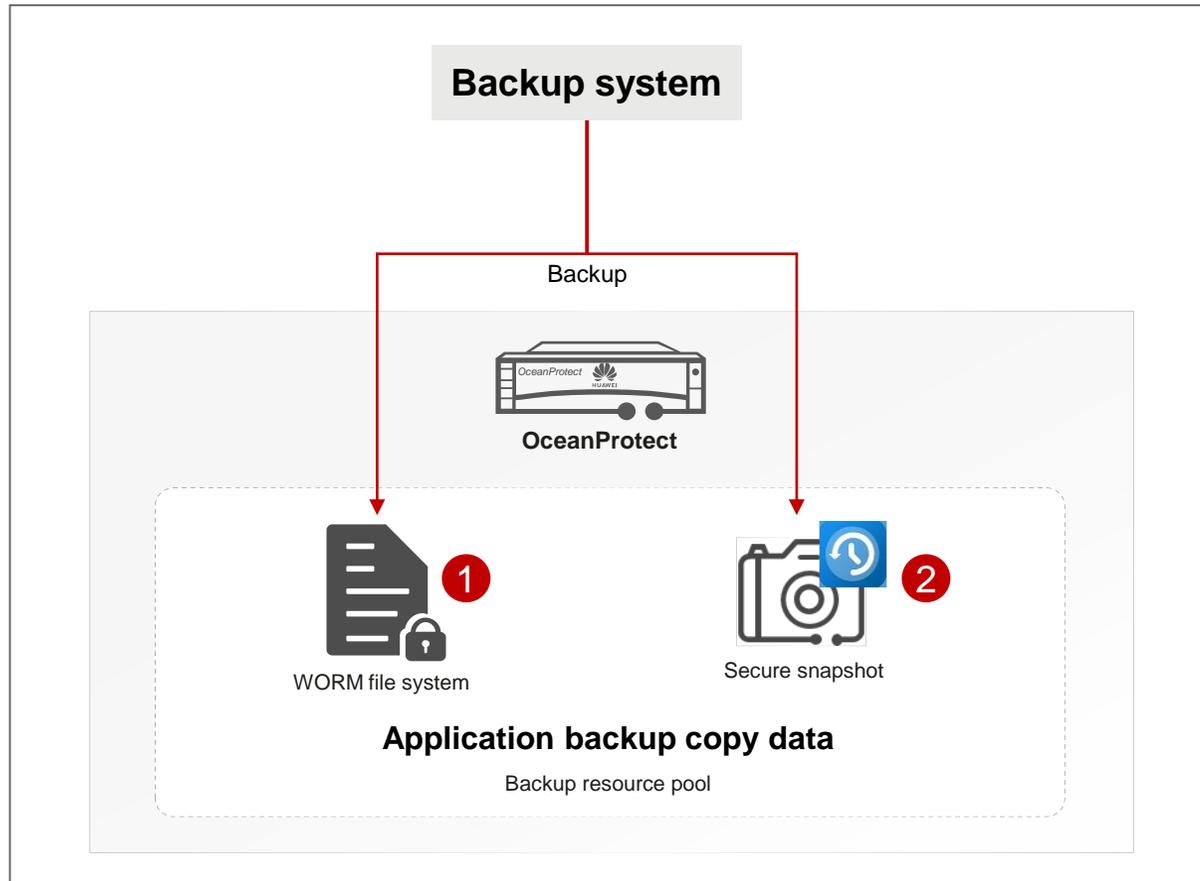
Secure snapshots of backup copies

- During the protection period, snapshots cannot be deleted.
- The scheduled policy is supported with 15s of minimum snapshot interval.
- Secure snapshot protects deduplicated and compressed data.

WORM

- Supports WORM that meets regulatory compliance.
- During the protection period, files cannot be modified or deleted.
- The automatic lock mode is supported. A file automatically enters the write protection state after being modified for a period of time (default waiting time).
- The automatic deletion mode is supported. The system automatically deletes files whose protection period has expired.

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File blocking to Prevent Unwanted Data from Being Written

Backup system

File blocking
IP filtering

Backup

OceanProtect

FileSystem

Backup resource pool
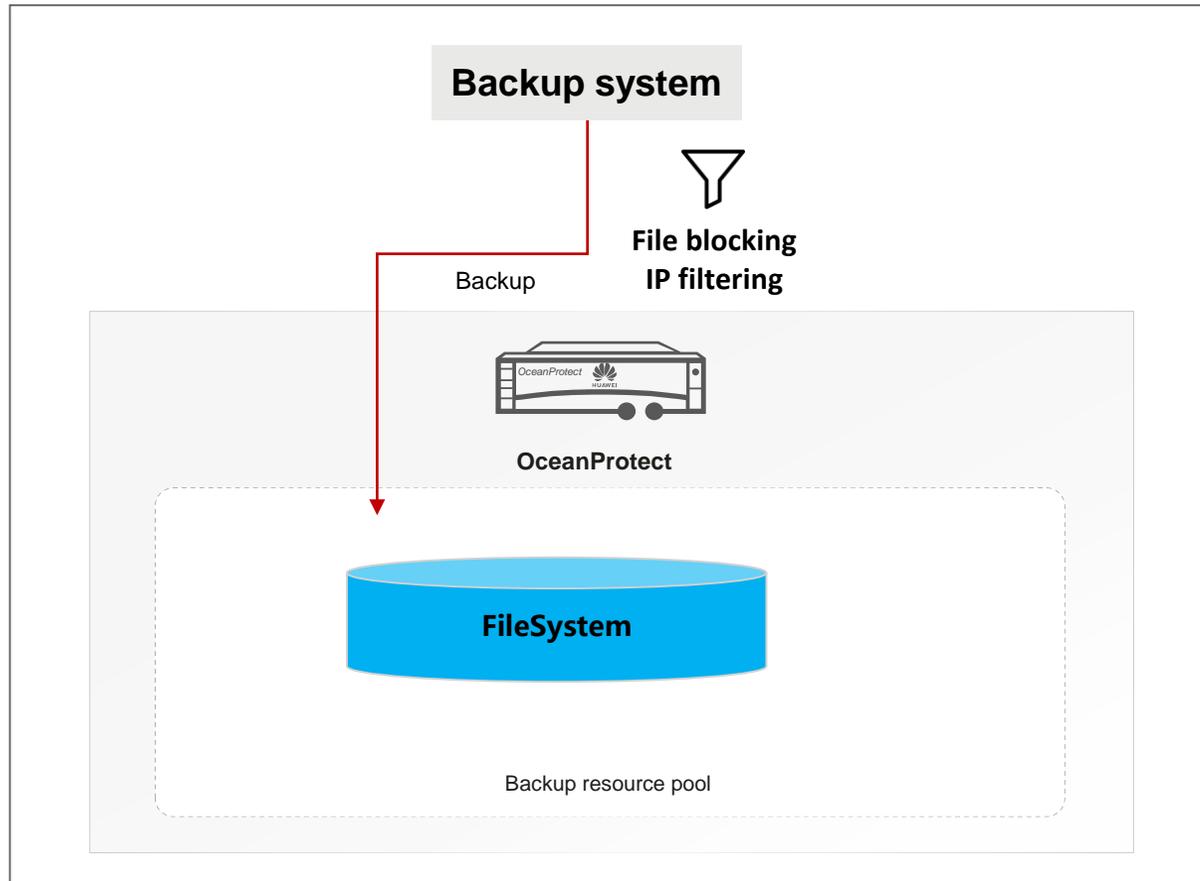
IP filtering

- Adding IP address or IP address segment that can be used to access a CIFS/NFS share

File name extension rule

- Allowed only: Users have permissions to access files with the specified extensions
- Denied only: Users don't have permissions to access files with specified extensions
- Operation permissions

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Four Models for Different Customer Requirements (All-Flash)

Category	Entry-Level	Mid-range	Entry-Level of High-End	High-End Flagship
Product model	OceanProtect X3000	OceanProtect X6000	OceanProtect X8000	OceanProtect X9000
Height per node	2 U	2 U	2 U	4 U
Number of controllers per node	2	2	2	4
Maximum number of nodes	1	1	2	2
System usable capacity	16 TB to 300 TB	16 TB to 800 TB***	One node: 16 TB to 1 PB Two nodes: 32 TB to 2 PB	One node: 16 TB to 1.8 PB Two nodes: 32 TB to 3.6 PB
System logical capacity*	Up to 4.3 PB	Up to 21.6 PB	Up to 144 PB	Up to 259.2 PB
System physical backup bandwidth	Up to 6 TB/hour	Up to 19 TB/hour	Up to 55 TB/hour	Up to 155 TB/hour
System logical backup bandwidth**	Up to 10 TB/hour	Up to 45 TB/hour	Up to 117 TB/hour	Up to 310 TB/hour
System restoration bandwidth	Up to 5.9 TB/hour	Up to 22 TB/hour	Up to 57 TB/hour	Up to 172 TB/hour
Data disk type	3.84 TB/7.68 TB SAS SSD	3.84 TB/7.68 TB SAS SSD **7.68 TB/15.36 TB/30.72 TB QLC NVMe SSD**	3.84 TB/7.68 TB SAS SSD **7.68 TB/15.36 TB/30.72 TB QLC NVMe SSD**	7.68 TB SAS SSD 15.36 TB/30.72 TB NVMe SSD
Front-end port	10/25/40/100GE, 8/16/32 Gbit/s Fibre Channel			

Note*: Logical capacity is calculated based on the 72:1 data reduction ratio. The actual logical capacity depends on the system usable capacity and actual data reduction ratio.
Note**: The logical backup bandwidth depends on the source deduplication function. For details about the compatibility of source deduplication, visit the compatibility website.
Note***: Due to product differences between the old and new versions, the maximum usable capacity remains 300 TB after an upgrade from a version earlier than 1.5.0. If higher specifications are required, contact Huawei sales personnel for evaluation.

Four Models for Different Customer Requirements (HDD)

	Entry-Level	Mid-range	Entry-Level of High-End	High-End Flagship
Product model	OceanProtect X3000	OceanProtect X6000	OceanProtect X8000	OceanProtect X9000
Height per node	2 U	2 U	2 U	4 U
Number of controllers per node	2	2	2	4
Maximum number of nodes	1	1	2	2
System usable capacity	16 TB to 300 TB	16 TB to 800 TB	One node: 16 TB to 1 PB Two nodes: 32 TB to 2 PB	One node: 16 TB to 1.8 PB Two nodes: 16 TB to 3.6 PB
System logical capacity*	Up to 4.3 PB	Up to 21.6 PB	Up to 144 PB	Up to 259.2 PB
System physical backup bandwidth	Up to 6 TB/hour	Up to 19 TB/hour	Up to 55 TB/hour	Up to 155 TB/hour
System logical backup bandwidth**	Up to 10 TB/hour	Up to 45 TB/hour	Up to 117 TB/hour	Up to 310 TB/hour
System restoration bandwidth	Up to 1 TB/hour	Up to 8 TB/hour	Up to 24 TB/hour	Up to 48 TB/hour
Data disk type	4 TB /8 TB/14 TB/18 TB/20 TB NL-SAS HDD			
Front-end port	10/25/40/100GE, 8/16/32 Gbit/s Fibre Channel			

Note*: Logical capacity is calculated based on the 72:1 data reduction ratio. The actual logical capacity depends on the system usable capacity and actual data reduction ratio.
Note**: The logical backup bandwidth depends on the source deduplication function. For details about the compatibility of source deduplication, visit the compatibility website.

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OceanProtect test results

OceanProtect X

Huawei Confidential

Lab enviromnent

2 x ESXi
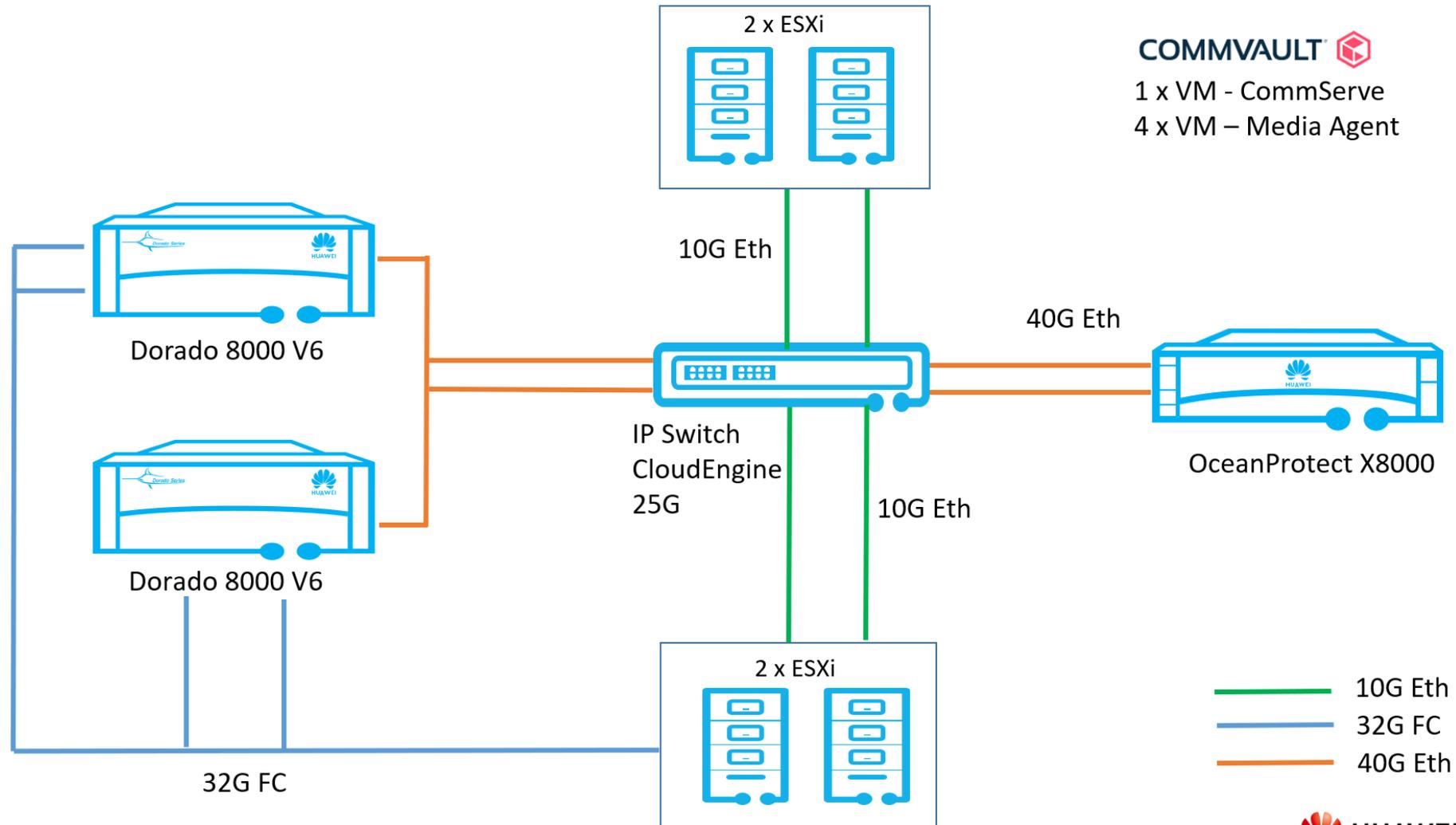
COMMVAULT ®
1 x VM - CommServe
4 x VM – Media Agent

10G Eth

40G Eth

Dorado 8000 V6

IP Switch
CloudEngine
25G

10G Eth

OceanProtect X8000

Dorado 8000 V6

2 x ESXi

10G Eth
32G FC
40G Eth

32G FC

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OceanProtect & Commvault – results in 10G network

» **Backup & restore of VMs**

28 x VM Windows Server	**7.7 TB**	**Backup: 50min**
		Restore: 39min
		Restore performance: ~4GB/s

» **Backup & restore of Oracle DB**

Database **Oracle**	**900 GB**	**Backup: 11min**
		Restore: 10min
		Restore performance: ~800MB/s

» **Backup & restore of SQL DB**

Database **SQL**	**600 GB**	**Backup: 7min**
		Restore: 10min
		Restore performance: ~800MB/s

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OceanProtect restore speed – VM 400GB, 10G network

OceanProtect X

10 x SSD SAS

Restore time ~7 min

Array - Total Bandwidth
2023-10-20 14:29:30 DST
● System   1.088 GB /s

14:28 DST
2023-10-20

14:33 DST
2023-10-20
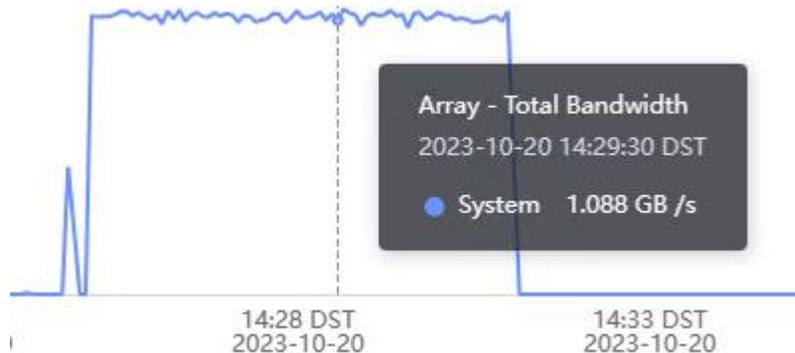
Restoring VM   ✕

| Name: | **CentOS_Test2B** | Status: | **Success** |
| Restore type: | Full VM Restore | Start time: | 10/20/2023 5:24:16 AM |
| Initiated by: | WIN-SHAK71I56P7\Administrator | End time: | 10/20/2023 5:32:05 AM |

Statistics | Reason | Parameters | **Log**

Message	Duration
✅ Processing CentOS_Test2B	0:07:44
✅ Required backup infrastructure resources have been assigned	
✅ Locking required backup files	0:00:07
✅ 8 files to restore (490 GB)	
✅ Restoring [Dorado-207-FC] CentOS_Test2B/CentOS_Test2B.vmx	
✅ Restoring file CentOS_Test2B.nvram (264.5 KB)	
✅ Preparing for virtual disks restore	0:00:14
✅ Using proxy VMware Backup Proxy for restoring disk Hard disk 1	
✅ Using proxy VMware Backup Proxy for restoring disk Hard disk 2	
✅ Restoring Hard disk 2 (90 GB) : 3.8 GB restored at 943 MB/s [hotadd]	0:00:05
✅ Restoring Hard disk 1 (400 GB) : 400 GB restored at 1 GB/s [hotadd]	0:06:04
✅ Restore completed successfully	

Close

HU
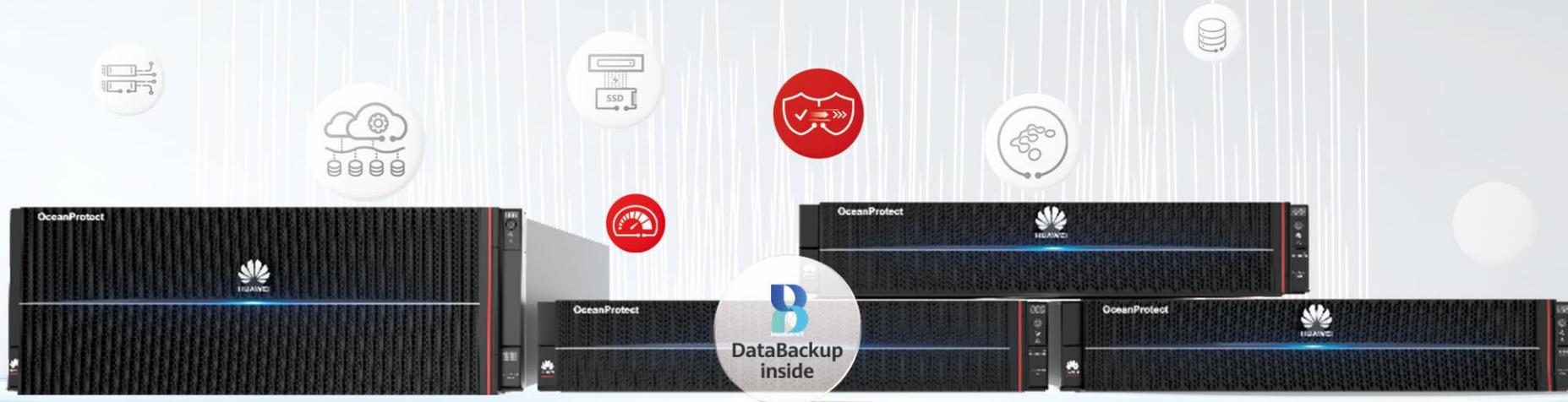
OceanProtect Data Protection Product Series

All-in-one backup appliance

Built-in backup software
OceanProtect DataBackup

OceanProtect X3000 Appliance
- Usable capacity: 16 TB to 300 TB

Built-in backup software
OceanProtect DataBackup

OceanProtect X6000/X8000/X9000 Appliance
Usable capacity: 16 TB to 3.6 PB

Backup software + Backup server + Backup storage

3 in 1

Dedicated backup storage

OceanProtect X3000 Backup Storage
- Usable capacity: 16 TB to 300 TB

OceanProtect X6000/X8000/X9000 Backup Storage
Usable capacity: 16 TB to 3.6 PB

OceanProtect E1000 (backup server) and Backup Storage

COMMVAULT   IBM TSM   VERITAS

Backup media server ··· Backup server

Huawei-developed backup software

OceanProtect E1000

Third-party backup storage pool

OceanProtect backup storage pool

OceanProtect Backup Storage
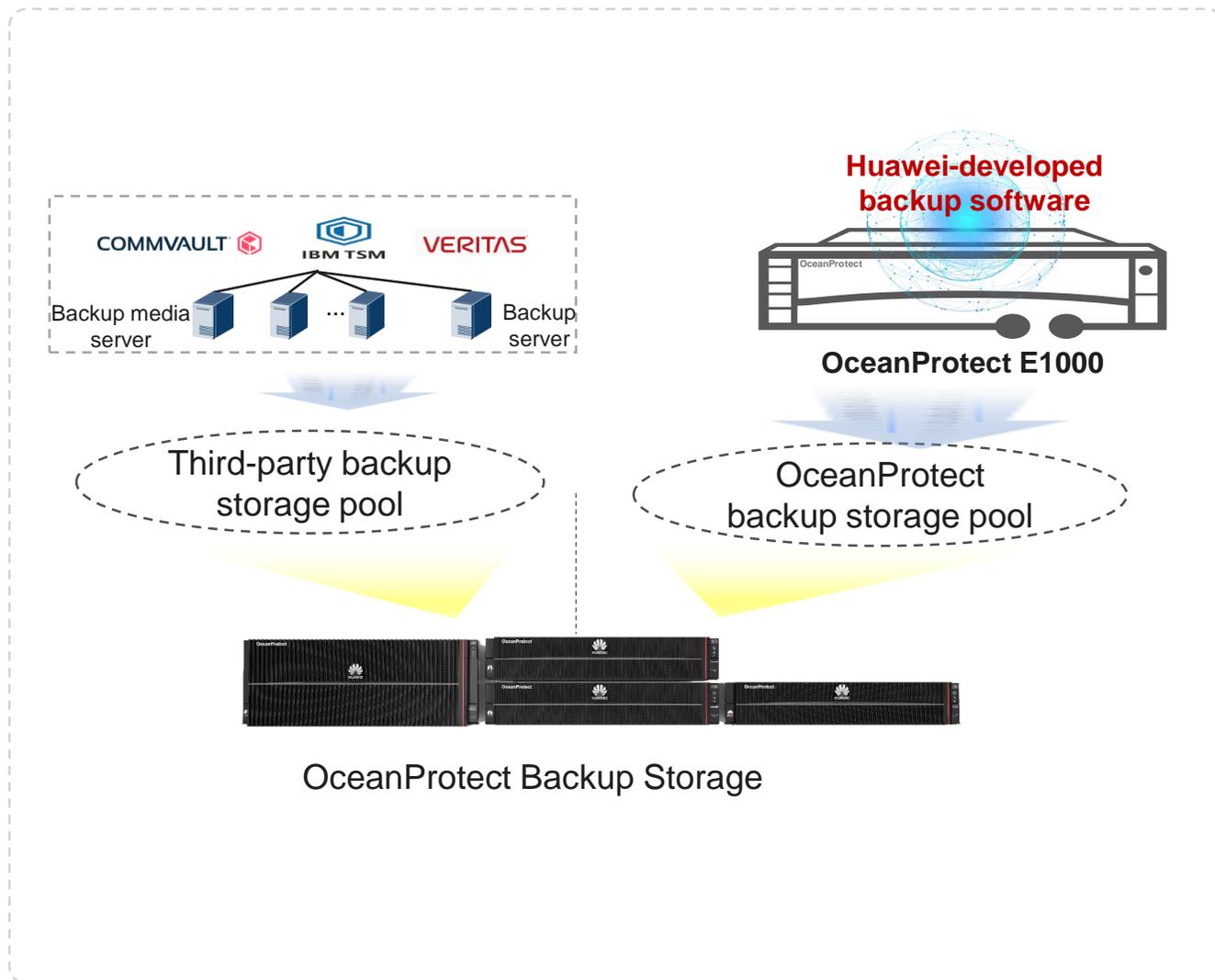
Solution overview

1. The backup software is deployed on external OceanProtect E1000 and connects to the dedicated backup storage pool at the backend. OceanProtect E1000 is scalable to 32 nodes.

2. Software and hardware—flexibly selected to fit demand—form a multi-node cluster resource pool, where backup tasks can be concurrently executed on multiple nodes for load balancing.

3. Backup, recovery, and replication are scheduled and managed by backup software on a unified platform.

Key benefits

1. **Smooth upgrade:** The legacy backup storage devices are reused, reducing system investment and reconstruction cost, with automatic upgrade for compatibility with the OceanProtect backup software.

2. **Feature compatibility:** Post upgrade, the OceanProtect appliance retains its archiving, replication, and ransomware protection features in full, preventing conflicts with the media functions.

3. **Easy operation:** Once a storage pool is created, the file system resources are automatically allocated and the network performs automated load balancing.

4. **Secure isolation:** The third-party backup software is isolated from the OceanProtect software's backup data and the network.

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OceanProtect Appliance: Ransomware Detection in Backup Copy

Detection Overview

Search for copies or resources
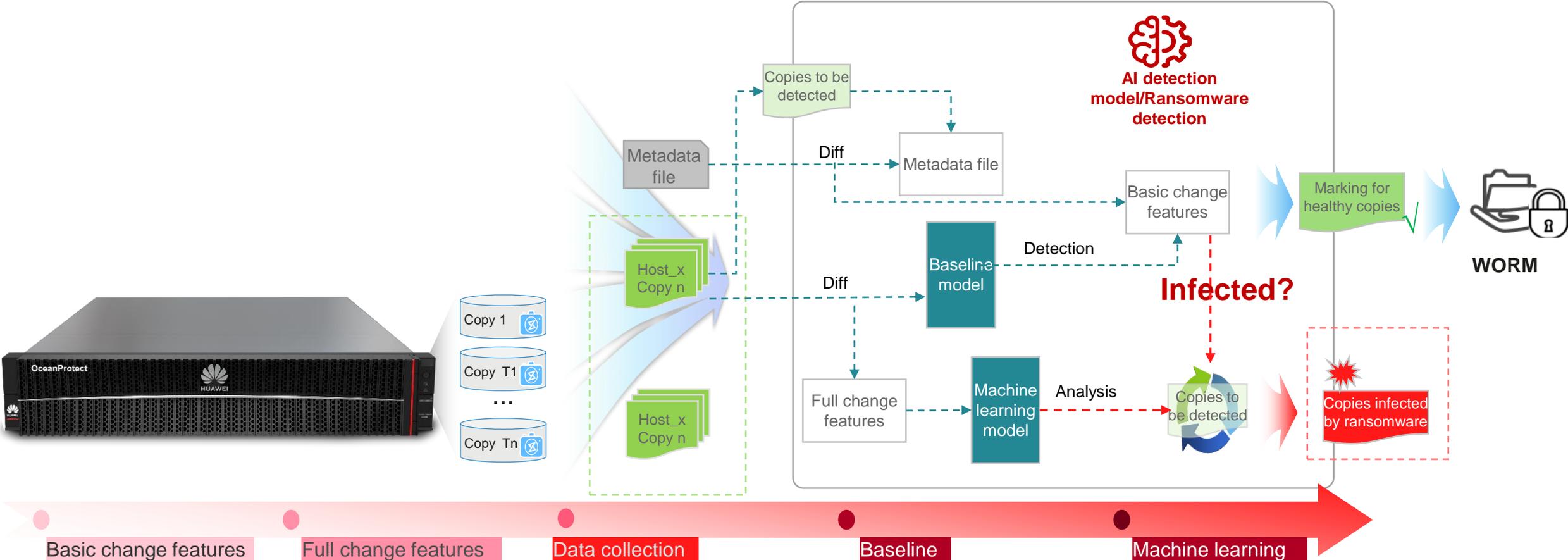
Detection Overview

3 ■ Infected

3 ■ Uninfected

0 ■ Detect Failed

0 ■ Detecting

0 ■ To be detected ⑦

Home

Protection ⌄

Explore ⌄

Data Security ⌃

Ransomware Protection

Detection Overview

Ransomware Protection a...

Air Gap

Air Gap

Data Anonymization

Oracle

Anonymization Policies

Jobs

Alarms and Events

Reports

Performance

System ⌄

Resource Na... 🔍	Location 🔍	Resource Type ⚗	Associated Pol... 🔍	Copies ⇅	Infected ⇅	Uninfected ⇅	Detect Failed
zzh	8.40.98.211/ha-...	VMware VM	chaos	4	❗ 3	1	
putong_liujian...	8.40.97.103/tes...	VMware VM	test	2	--	2	

Total: 2

🔍 Enter a resource name.

Select Resource Type ⌄

Select Copy Status ⌄

Detection Report

✕

Infected

"2025-05-17 14:56:29" Copy Data Infected

Details

Time of Last Detection: 2025-05-17 14:57:16
Detection Duration: 5 minute(s), 49 second(s)
Suspicious File Detection Duration: 11 second(s)

1. No known ransomware infection was detected through static detection.
2. The following changes are detected by comparing with the previous normal copy:
New files: 126
Modified files: 260
Deleted files: 89
3. Suspected infection is detected by comparing with the previous normal copy. The suspected infection features are as follows:
New file ratio: 0.183
New high-entropy file ratio: 0.325
4. Through detection using the machine learning algorithm, the copy is infected by ransomware.
For details about the principles of more detection algorithms, see the *Ransomware Protection User Guide*.

Suspicious File List ⑦

File Path	🔍
/C/Users/Administrator/AppData/Roaming/Microsoft/Windows/Recent/Autom...	
/C/Users/Administrator/Desktop/Chaos-0b (1).zip.n6z3	
/C/Users/Administrator/Desktop/Chaos-0b (1)/Chaos-0b.exe.bi3n	
/C/Users/Administrator/Desktop/LDAPServer/LDAPServer.rar.9pbs	

Close

Data Reliability: Copy Archiving for Long-Term Retention, Enabling Efficient Data Flow Cloud on and off the Cloud

Cloud storage

OceanProtect

ProtectManager

DataMover Engine

Data protection layer

Storage layer   File system

Hardware layer

Copy T0

Copy T1

…

Copy Tn   **Archiving**

Tapes
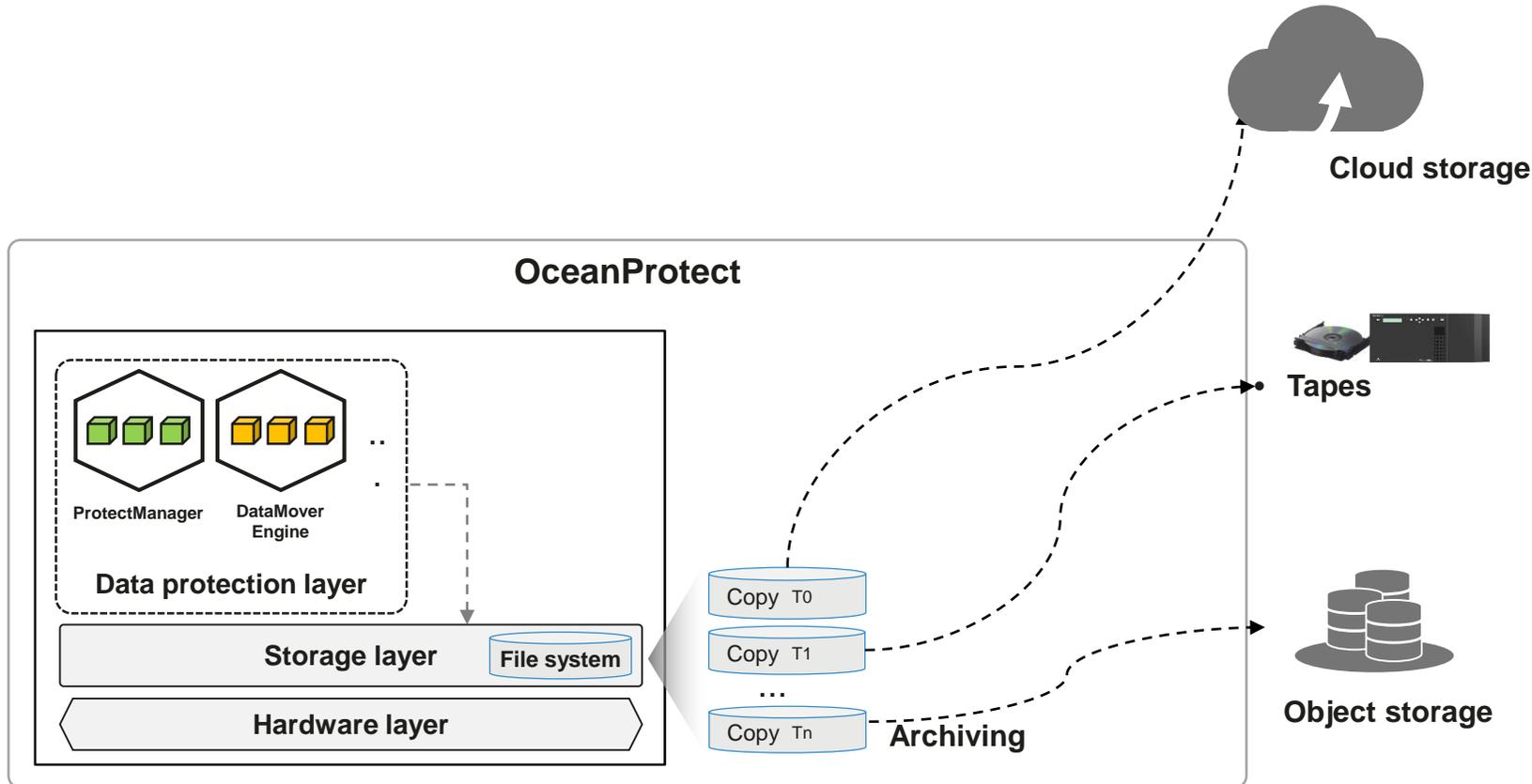
Object storage

Long-term retention

Backup copies are archived to cloud and object storage.

Tiering for archiving

Copies are dumped to different archive storage systems based on their retention periods. 1:4 (maximum) archiving is supported.

Concurrent processing by multiple controllers

Multiple controllers concurrently process a single job and multiple nodes concurrently transmit data, fully utilizing resources of multiple controllers.

Copy-level DR

If a disaster occurs on the local backup device, archived data can be scanned to a new device for normal use.

Huawei Isolation Zone

Production zone

App servers

Backup Server

OceanCyber (Anti-ransomware)

SAN

10/25 GE switch

Scan data copies

Flag abnormal copies and notify users

File blocking IP filtering

OceanStor Dorado

OceanProtect

Secure Snapshots

FileSystem

Air Gap

10/25 GE switch

Isolation zone

BCManager AirGap

Test Server

Backup Server

10/25 GE switch

GE switch

OceanProtect

FileSystem

Secure Snapshots
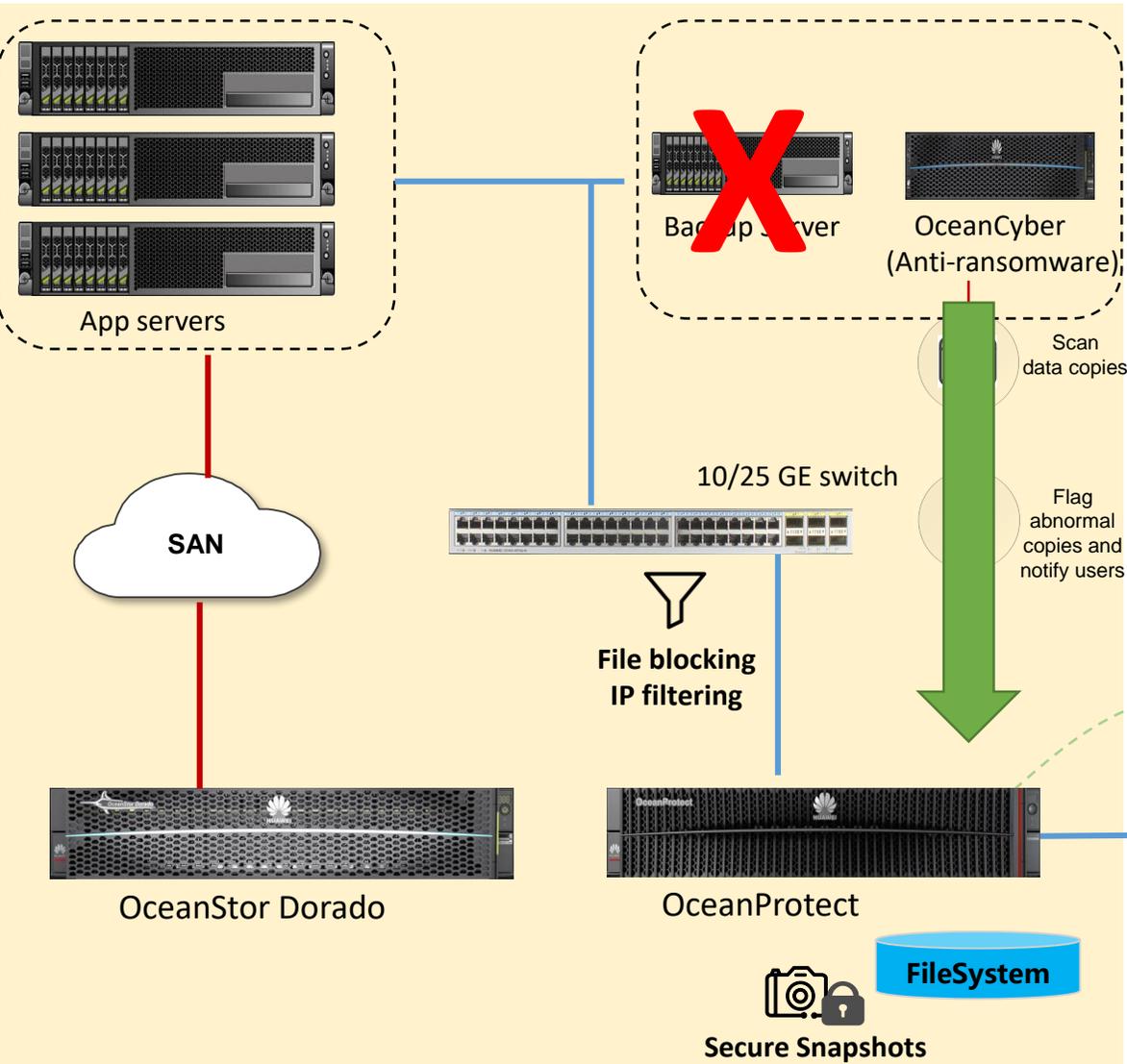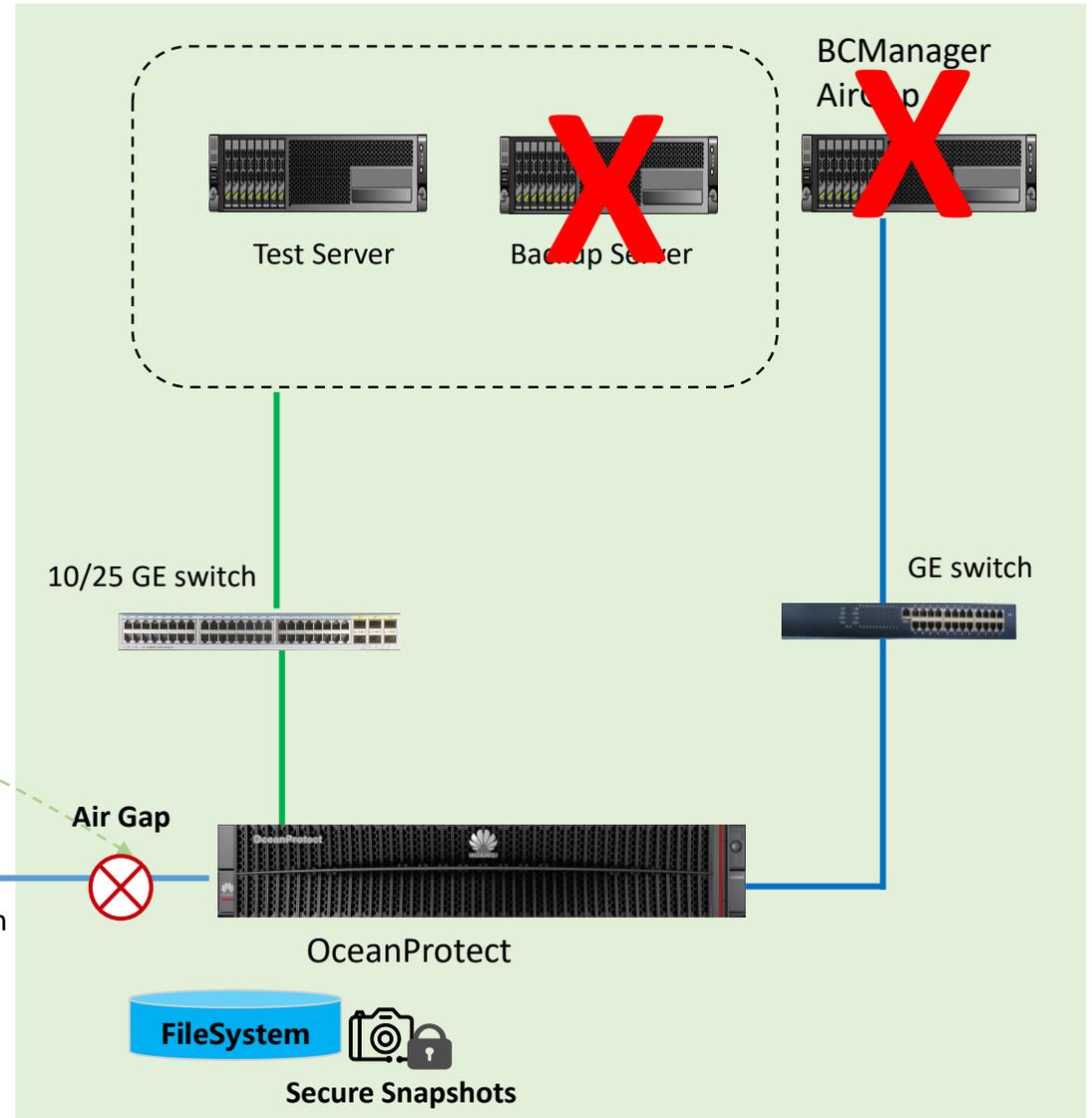
Thank you.

把数字世界带入每个人、每个家庭、每个组织，构建万物互联的智能世界。

Bring digital to every person, home and organization for a fully connected, intelligent world.

HUAWEI