



- Efficient Processing for Diverse Data
- Everlasting Operations for Workloads
- Economical Storage for Mass Data

Huawei OceanStor Pacific is a next-generation scale-out storage series designed for hybrid workloads to support the business needs of today and tomorrow. Our goal is to build a cutting-edge converged data storage platform that can address the unpredictable data storage demands and challenges of emerging applications with reliable and simple storage infrastructure. The series can also simplify the management of complex enterprise data, enhance data resilience, and facilitate sufficient storage, free mobility, and full utilization of diverse mass data across enterprise data centers. This helps drive the intelligent evolution of all enterprise services.

Huawei OceanStor Pacific scale-out storage provides a full series of products in flexible form factors to fit into a wide range of service scenarios, such as high-performance computing (HPC), high performance data analytics (HPDA), AI applications, intelligent videos, virtualization/cloud resource pools, databases, big data analytics, and mass data archiving.



Performance Models

OceanStor Pacific 9920

Balanced Models

OceanStor Pacific 9550 | 9546 | 9540 | 9520

Video Models

OceanStor Pacific 9350 | 9346 | 9340

Product Overview

◀ Performance model

OceanStor Pacific 9920 is an all-flash (NVMe SSD) scale-out storage product, with each 2 U chassis housing 1 storage node. It delivers excellent performance and boasts flexible component configurations to meet the access requirements of various structured¹ and unstructured workloads. In addition, it supports 61.44 TB NVMe SSDs, and each node provides a maximum raw capacity of 1536 TB and up to 800,000 IOPS data access at a stable latency of 1 ms.

◀ Balanced model

- OceanStor Pacific 9550 is a hybrid storage product that features ultra-high density and large capacity to deliver optimal cost-effective storage. Each 5 U chassis houses 2 storage nodes and uses large-capacity HDDs as main storage. Each chassis provides a raw capacity ranging from 720 TB to 2880 TB, reducing required cabinet space by 62.5% compared to general-purpose storage servers. It is ideal for mass unstructured data storage.

Note: 1. Structured data storage includes scale-out block storage.

- OceanStor Pacific 9546 is Huawei's brand-new high-density balanced scale-out storage product. Each 4 U chassis accommodates 1 or 2 storage nodes and uses large-capacity HDDs as main storage. Each chassis provides up to 1440 TB raw capacity and 6 GB/s bandwidth. It is applicable to mass unstructured data storage.
- OceanStor Pacific 9540 is a large-capacity hybrid scale-out storage product. Each 4 U chassis accommodates 1 storage node. It enables high capacity density and flexible component configurations to fulfill the access requirements of a wide range of structured workloads.
- OceanStor Pacific 9520 is a hybrid scale-out storage product with each 2 U chassis housing 1 storage node. It provides flexible component configurations to meet the access requirements of various structured and unstructured workloads.

◀ Video model

- OceanStor Pacific 9350 is a hybrid storage product that features ultra-high density and large capacity to deliver optimal cost-effective storage. Each 5 U chassis houses 2 storage nodes and uses large-capacity HDDs as main storage. Each chassis provides a raw capacity ranging from 720 TB to 2880 TB, reducing required cabinet space by 62.5% compared to general-purpose storage servers. It is suitable for scenarios that only store massive amounts of video stream data from cameras.
- OceanStor Pacific 9346 is Huawei's new-generation 4 U high-density scale-out storage product. Each 4 U chassis accommodates 60 x 3.5-inch large-capacity HDDs, which are used as main storage. It provides a raw capacity of 1440 TB, and reduces required cabinet space by 40% and power consumption by 16% compared to general-purpose 4 U storage servers. OceanStor Pacific 9346 offers you a brand-new storage option that finely balances capacity, performance, and costs. It is applicable to high-performance video and image stream data from cameras.
- OceanStor Pacific 9340 is a hybrid scale-out storage product with each 4 U chassis housing 1 storage node. It enables high capacity density and flexible component configurations to store both video and image stream data from cameras.

The OceanStor Pacific series uses storage system software to integrate local storage resources from hardware nodes into a fully scale-out storage pool. It also provides upper-layer applications with file, HDFS, object, and block storage services on demand. Furthermore, its diverse and adaptable features provide efficient processing for diverse data, everlasting operations for workloads, and economical storage for mass data.

- File storage service: Compatible with native NFS and SMB protocols, as well as parallel interfaces like POSIX and MPI-IO. Provides native seamless multi-protocol interworking and high-speed cache acceleration, ideal for high-performance computing (HPC), High-Performance Data Analytics (HPDA), and other performance-intensive storage scenarios.
- HDFS storage service: Provides a decoupled storage-compute big data solution that uses native HDFS semantics and does not require plug-ins to be installed on compute nodes. Intelligent storage tiering and takeover of multiple HDFS clusters reduce the total cost of ownership (TCO) while offering a consistent user experience.
- Object storage service: Compatible with Amazon S3. Provides multi-site multi-active disaster recovery solutions that allow users to choose the Erasure Coding (EC) or replica mode on demand. Boasts excellent performance in processing small objects, ideal for scenarios such as mass data archiving and content resource pools.
- Block storage service: Enables SCSI or iSCSI access and delivers high availability (HA) solutions such as scale-out active-active and cabinet-level redundancy. Works with a variety of data encryption algorithms, ideal for scenarios such as virtualization/cloud resource pools and databases.

You can purchase and deploy any one of the products and storage services on demand or deploy multiple types of storage services in a storage pool based on your needs. The same copy of data can be accessed through file, HDFS, and object storage protocols without migration, allowing for efficient data access and reducing storage space consumption.

The OceanStor Pacific scale-out storage has been widely adopted in a variety of scenarios, including HPC, big data analytics, intelligent video, virtualization/cloud, and content storage and archiving. We provide superior performance for domains such as oil & gas exploration, life sciences, financial institutions, carriers, smart city projects, and Internet companies.

Features

◀ Efficient processing for diverse data

The OceanStor Pacific scale-out storage uses innovative performance acceleration technologies, such as directory DHT partitioning, intelligent disk granularity management, large I/O passthrough, small I/O aggregation, and multi-tier intelligent caching, to meet the access requirements of both bandwidth- and OPS-intensive workloads with just one storage system. The next-generation parallel file system can be accessed through standard protocols such as NFS and SMB as well as POSIX and MPI-IO interfaces provided by Distributed Parallel Client (DPC). DPC can simultaneously connect to multiple storage nodes to implement I/O load balancing. Additionally, it supports Transmission Control Protocol (TCP) and Remote Direct Memory Access (RDMA), achieving higher single-stream and single-client performance. Working with DPC, OceanStor Pacific supports a large-scale compute cluster with up to 5000 nodes.

The OceanStor Pacific scale-out storage uses the computing power provided by high-performance processors to offload some storage functions to the processor layer, thereby accelerating software functions with hardware. It offers 20% more storage computing power than competing products with the same configuration. It can be adapted to all customer needs for I/O, bandwidth, latency, and capacity. OceanStor Pacific supercharges the technology of today for the business of tomorrow.

◀ Everlasting operations for workloads

The OceanStor Pacific scale-out storage ensures E2E reliability at the I/O, system, and data center levels to offer 99.9999% availability, helping you create solutions tailored to your data protection needs. Specifically, it enables E2E data integrity checks and self-healing and uses inline verification and periodical background verification to handle silent data corruptions, such as bit changes and incorrect positions of read/write data. This helps ensure high data availability. The powerful elastic EC provides data redundancy protection so that a single storage system can tolerate the simultaneous failure of up to 4 nodes. OceanStor Pacific also supports dynamic EC, where a node failure will trigger automatic adjustments to EC ratios without compromising system reliability. Technologies such as multi-module concurrent service takeover enable services on a failed node to be switched over

within 10 seconds. OceanStor Pacific monitors device status in real-time to provide comprehensive sub-health detection and self-healing for disks, nodes, and networks. It also builds a disaster recovery system using replication or scale-out active-active functions for high data center availability. OceanStor Pacific uses EC- and replica-based multi-site multi-active disaster recovery solutions to build an economical, everlasting, and efficient object storage foundation.

In addition, the OceanStor Pacific scale-out storage provides comprehensive data protection solutions to ensure service data resilience and reliability and operation traceability. For example, OceanStor Pacific encrypts data via internal and external key managers, offers multi-field audit logs for multi-level management of operation records, and implements multi-tenancy for resource isolation and mutual interference prevention. It also supports secure boot and digital signature to ensure that data is always secure.

◀ Economical storage for mass data

The OceanStor Pacific scale-out storage organizes storage media, including HDDs and SSDs, into large-scale resource pools and provides industry-standard interfaces for upper-layer applications and clients. This eliminates typical data center bottlenecks and overcomes obstacles to system performance, such as unbalanced utilization of hardware resources by siloed storage systems. The storage can start small and scale out to up to 4096 nodes in a cluster. This allows for linear performance growth as capacity expands, maximizing the initial investment.

The OceanStor Pacific scale-out storage protects data through elastic EC, a powerful data redundancy mechanism. EC provides nearly triple the disk space utilization of traditional multi-copy protection, offering a variety of EC ratios for flexible on-demand deployment. An EC ratio of 22+2 and a disk space utilization rate of up to 91.6% help reduce your hardware investment. OceanStor Pacific uses primary storage tiering policies to support automatic data migration between high-performance and large-capacity pools, enabling efficient storage and management of hot and cold data.

The OceanStor Pacific scale-out storage also provides scenario-specific solutions to help you maximize your IT investments. For example, the decoupled storage-compute big data solution significantly improves data analysis efficiency and automatically takes over services from third-party HDFS. The scenario-specific data compression solution optimizes storage space and provides secondary data reduction for genome sequencing, satellite remote sensing, and digital pathology scenarios. This maximizes the return on investment (ROI) and reduces the TCO.

◀ Simplified lifecycle management

The OceanStor Pacific scale-out storage provides unified, converged management and intelligent O&M across multiple products and storage services. Intelligent resource prediction identifies the service risks of storage resources in advance. This helps you make better-informed decisions on capacity expansion, procurement, and service adjustment. In addition, intelligent fault diagnosis provides comprehensive sub-health detection and processing across the system for precise fault locating and troubleshooting.

Application Scenarios

◀ HPC

The OceanStor Pacific scale-out storage provides high-performance file storage services for HPC platforms. OceanStor Pacific supports DPC, which is compatible with POSIX and MPI-IO, for better adaptation to HPC services. Automatic storage tiering optimizes the storage architecture, and scenario-specific data compression improves storage space utilization to increase both efficiency and cost-effectiveness.

Typical industry scenarios: Oil and gas exploration, genome sequencing, electron cryomicroscopy, weather forecasting, and autonomous driving

◀ Big data analytics

The OceanStor Pacific scale-out storage provides a decoupled storage-compute big data solution. This enables on-demand configuration and flexible expansion of storage and compute resources and reduces TCO. OceanStor Pacific is fully compatible with native HDFS semantics, ensuring a consistent user experience. It supports the coexistence of coupled and decoupled storage-compute architectures for seamless infrastructure evolution.

Typical industry scenarios: Big data for offline finance analytics, Internet log retention, operational carrier analytics, governments, and smart city projects

◀ Backup and archiving of mass data

The OceanStor Pacific scale-out storage provides enterprise-grade object storage resource pools featuring high performance and reliability, supporting high-throughput workloads, frequent access to hot data, long-term storage, and online access. OceanStor Pacific is ideal for real-time online services, such as Internet data, online audiovisual data, and enterprise web disks. Moreover, its HyperGeoMetro- (multi-site multi-active) and HyperReplication-based (remote replication) disaster recovery solutions ensure service continuity and data reliability.

Typical industry scenarios: Production, storage, backup, and archiving of document imaging in banks, audio and video recordings, medical imaging, e-documents of governments and enterprises, smart city projects, and the Internet of Vehicles (IoV)

◀ Intelligent video and image

The OceanStor Pacific intelligent video storage series (OceanStor Pacific 9350, OceanStor Pacific 9346, and OceanStor Pacific 9340) can interconnect with major streaming media software platforms to provide cost-effective and reliable enterprise-grade file storage. With high-density hardware and performant software, the series helps you accelerate your business's intelligent transformation while meeting the diverse requirements for storing massive amounts of video and image stream data.

Typical industry scenarios: Intelligent traffic police and campus security

◀ Virtualization/Cloud resource pool

The OceanStor Pacific scale-out storage provides storage resource pools to host mass data for on-demand resource provisioning and elastic capacity expansion in virtualization and cloud environments. OceanStor Pacific dramatically improves storage resource deployment, expansion, and O&M efficiency. OceanStor Pacific supports software encryption algorithms such as XTS-AES-128 and XTS-AES-256 to provide comprehensive data encryption and protection solutions and ensure data resilience and reliability.

Typical industry scenarios: Channel access clouds for Internet finance, development and testing clouds, carrier cloud services for BOM domains and B2B cloud resource pools, smart governments, and smart city clouds

Specifications

General scenarios: Key specifications of scale-out file, object, and HDFS storage products

Model	OceanStor Pacific 9920	OceanStor Pacific 9550	OceanStor Pacific 9546	OceanStor Pacific 9520
System Architecture	Fully symmetric scale-out architecture			
Max. Raw Capacity per Chassis	1536 TB	2880 TB	1440 TB	336 TB
Height per Chassis	2 U	5 U	4 U	2 U
Number of Nodes per Chassis	1	2	1 or 2	1
Max. Number of Main Storage Disks per Node	25	60	30 or 60	14
Number of Processors per Node	2 x Kunpeng 920 processors	1 x Kunpeng 920 processor	1 or 2 x Kunpeng 920 processors	1 or 2 x Kunpeng 920 processor
Max. Memory per Node	512 GB	256 GB	256 GB	256 GB
Max. Cache per Node	N/A	4 x Half-palm NVMe SSDs	4 x Palm-sized NVMe SSDs	4 x NVMe SSDs
Number of System Disks per Node	2 x 480 GB SATA SSDs	2 x 480 GB SATA SSDs	2 x 480 GB SATA SSDs	2 x 480 GB SATA SSDs
Data Disk Types	Palm-sized NVMe SSDs	3.5-inch HDDs	3.5-inch HDDs	3.5-inch HDDs
Front-End Service Networks ¹	• 10GE, 25GE or 100GE TCP/IP • 10GE, 25GE or 100GE RoCE • 100Gb/s, 200Gb/s InfiniBand	• 10GE, 25GE TCP/IP • 25GE, 100GE RoCE • 100Gb/s InfiniBand	• 10GE, 25GE or 100GE TCP/IP • 25GE, 100GE RoCE • 100Gb/s, 200Gb/s InfiniBand	• 10GE, 25GE TCP/IP • 10GE, 25GE RoCE
Storage Interconnection Networks	• 10GE, 25GE or 100GE TCP/IP • 10GE, 25GE or 100GE RoCE • 100Gb/s, 200Gb/s InfiniBand	• 25GE, 100GE TCP/IP • 25GE, 100GE RoCE • 100Gb/s InfiniBand	• 10GE, 25GE or 100GE TCP/IP • 10GE, 25GE or 100GE RoCE • 100Gb/s, 200Gb/s InfiniBand	• 10GE, 25GE TCP/IP • 10GE, 25GE RoCE
Data Redundancy Protection Mechanism	EC: N + M (M is 2, 3, or 4), applicable to SSDs or HDDs used as main storage			
Storage Access Protocols	NFS, SMB, POSIX, MPI-IO, HDFS, Amazon S3, and FTP			
Key Features	Elastic EC, SmartQuota (quotas), SmartTier (storage tiering), SmartQoS (service quality), SmartEqualizer (load balancing), SmartMulti-Tenant (multi-tenancy), SmartEncryption (data encryption), SmartAuditlog (audit logs), HyperLock (WORM), HyperSnap (snapshots), HyperReplication(A) (asynchronous replication), SmartIndexing (metadata indexing), Recycle Bin, SmartInterworking (multi-protocol interworking), DIF (end-to-end data integrity verification), Object Versioning (versioning) ² , SmartTakeover (intelligent takeover) ³ , SmartCompression (scenario-specific compression), HyperGeoMetro (multiple active sites) ⁴ , HyperGeoEC (cross-site EC) ⁴ , SmartCache (intelligent SSD caching), and SmartSync (replication to the cloud)			
Data Self-Healing	Automatic concurrent data reconstruction at 2 TB per hour			
Chassis Dimensions (H x W x D)	86.1 mm x 447 mm x 830 mm	219.5 mm x 447 mm x 1030 mm	178 mm x 447 mm x 835 mm	86.1 mm x 447 mm x 830 mm
Max. Weight per Chassis (with Disks)	≤ 38 kg	≤ 164 kg	• 1-chassis, 1-node model: ≤ 98 kg • 1-chassis, 2-node model: ≤ 102 kg	≤ 48 kg
Operating Temperature	5°C to 35°C	5°C to 35°C	5°C to 35°C	5°C to 35°C
Operating Humidity	8% to 90% RH (non-condensing)	5% to 90% RH (non-condensing)	5% to 90% RH (non-condensing)	8% to 90% RH (non-condensing)

◀ Intelligent video and image scenario: Key specifications of scale-out file and object storage products

Model	OceanStor Pacific 9340	OceanStor Pacific 9346	OceanStor Pacific 9350
System Architecture	Fully symmetric scale-out architecture		
Max. Raw Capacity per Chassis	864 TB	1440 TB	2880 TB
Height per Chassis	4 U	4 U	5 U
Number of Nodes per Chassis	1	1	2
Max. Number of Main Storage Disks per Node	36	60	60
Number of Processors per Node	2 x Kunpeng 920 processors	1 or 2 x Kunpeng 920 processors	1 x Kunpeng 920 processor
Max. Memory per Node	256 GB	256 GB	256 GB
Max. Cache per Node	4 x NVMe SSDs	4 x Palm-sized NVMe SSDs	4 x Half-palm NVMe SSDs
Number of System Disks per Node	2 x 600 GB SAS HDDs or 2 x 480 GB SATA SSDs	2 x 480 GB SSDs	2 x 480 GB SSDs
Data Disk Types	3.5-inch HDDs	3.5-inch HDDs	3.5-inch HDDs
Front-End Service Networks	• 10GE or 25GE TCP/IP	• 10GE or 25GE TCP/IP	• 10GE or 25GE TCP/IP
Storage Interconnection Networks	• 10GE or 25GE TCP/IP • 10GE or 25GE RoCE	• 10GE or 25GE TCP/IP • 10GE or 25GE RoCE	• 25GE TCP/IP • 25GE RoCE
Data Redundancy Protection Mechanism	EC: N + M (M is 2, 3, or 4)		
Storage Access Protocols	NFS, SMB, and Amazon S3		
Key Features	SmartQuota (quotas), SmartQoS (service quality), SmartEqualizer (load balancing), SmartMulti-Tenant (multi-tenancy), SmartAuditlog (audit logs), SmartIndexing (metadata indexing), SmartInterworking (multi-protocol interworking), SmartEncryption (data encryption), and DIF (end-to-end data integrity verification)		
Data Self-Healing	Automatic concurrent data reconstruction at 2 TB per hour		
Chassis Dimensions (H x W x D)	175 mm x 447 mm x 790 mm	178 mm x 447 mm x 835 mm	219.5 mm x 447 mm x 1030 mm
Max. Weight per Chassis (with Disks)	≤ 65 kg	1-chassis, 1-node model: ≤ 98 kg	≤ 164 kg
Operating Temperature	5°C to 35°C	5°C to 35°C	5°C to 35°C
Operating Humidity	8% to 90% RH (non-condensing)	5% to 90% RH (non-condensing)	5% to 90% RH (non-condensing)

Key specifications of scale-out block storage products

Model	OceanStor Pacific 9520	OceanStor Pacific 9540	OceanStor Pacific 9920
System Architecture	Fully symmetric scale-out architecture		
Max. Raw Capacity per Chassis	336 TB	864 TB	1536 TB
Height per Chassis	2 U	4 U	2 U
Number of Nodes per Chassis	1	1	1
Max. Number of Main Storage Disks per Node	16	36	25
Number of Processors per Node	1 or 2 x Kunpeng 920 processor	2 x Kunpeng 920 processors	2 x Kunpeng 920 processors
Max. Memory per Node	256 GB	512 GB, 768 GB, or 1 TB	512 GB
Max. Cache per Node	4 x NVMe SSDs	4 x NVMe SSDs or SAS SSDs	N/A
Number of System Disks per Node	2 x 600 GB SAS HDDs or 2 x 480 GB SATA SSDs	2 x 600 GB SAS HDDs or 2 x 480 GB SATA SSDs	2 x 480 GB SATA SSDs
Data Disk Types	3.5-inch HDDs	3.5-inch HDDs	Palm-sized NVMe SSDs
Front-End Service Networks	• 10GE, 25GE TCP/IP • 25GE RoCE	• 25GE TCP/IP • 25GE RoCE	• 10GE, 25GE TCP/IP • 25GE, 100GE RoCE • 100Gb/s InfiniBand
Storage Interconnection Networks	• 10GE, 25GE TCP/IP • 25GE RoCE	• 25GE TCP/IP • 25GE RoCE	• 10GE, 25GE TCP/IP • 25GE, 100GE RoCE • 100Gb/s InfiniBand
Data Redundancy Protection Mechanism	EC: N + M (M is 2, 3, or 4), applicable to SSDs or HDDs used as main storage Multi-copy: 3-copy mode		
Storage Access Protocols	iSCSI, SCSI, and OpenStack Cinder		
System Security Policies	Disk, node, and cabinet levels		
Key Features	SmartThin (thin provisioning), SmartDedupe & SmartCompression (data reduction), SmartQoS (service quality), SmartAuditlog (audit logs), SmartEncryption (data encryption), HyperSnap (snapshots), HyperClone (linked clone), HyperMetro (scale-out active-active), HyperReplication(A) (asynchronous replication), HyperReplication(S) (synchronous replication), MultiPool (multiple resource pools), DIF (end-to-end data integrity verification), and SmartMove (online volume migration)		
Data Self-Healing	Automatic concurrent data reconstruction at 4 TB per hour		
Deployment Scheme	Decoupled and coupled deployment of compute and storage resources		
Compatible Platforms	Huawei FusionSphere, VMware vSphere, Microsoft Windows Hyper-V, OpenStack, and containers ⁵		
Chassis Dimensions (H x W x D)	86.1 mm x 447 mm x 830 mm	175 mm x 447 mm x 790 mm	86.1 mm x 447 mm x 830 mm
Max. Weight per Chassis (with Disks)	≤ 48 kg	≤ 65 kg	≤ 38 kg
Operating Temperature	5°C to 35°C	5°C to 35°C	5°C to 35°C
Operating Humidity	8% to 90% RH (non-condensing)	5% to 90% RH (non-condensing)	5% to 90% RH (non-condensing)

Note:

1. NFS, SMB, HDFS, S3, and DPC support TCP, RoCE, and InfiniBand networks. Block storage allows the front-end service network and storage interconnection network to be of the same network type.
2. Object Versioning is applicable to object storage.
3. SmartTakeover is applicable to HDFS storage.
4. HyperGeoMetro and HyperGeoEC are applicable to object storage.
5. iSCSI can be used to connect containers.

For More Information

To learn more about Huawei storage, please contact your local Huawei office or visit the Huawei Enterprise website: <http://e.huawei.com/en/>.



Huawei Enterprise Business App



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