



## OceanStor Dorado V6

### Ever Fast, Ever Solid, AI-Powered Storage

#### No.1 Performance with Chip-Powered Architectures

20,000,000 IOPS

0.1 ms latency

Intelligent chips

End-to-end NVMe architecture for full series

FlashLink<sup>®</sup> intelligent algorithm

#### Always-On Applications with SmartMatrix-Based 4-Layer Reliable Layouts

Huawei's patented anti-wear leveling

Symmetric active-active design

SmartMatrix fully-interconnected architecture

Tolerance of 7-out-of-8 controller failure

Zero interruption on applications

Zero awareness of faults

Zero impact during upgrades

Magnitude-9.0 earthquake resistance

Tolerance of three-SSD failure

Gateway-free active-active solution

10-second periodic snapshots

Gateway-free cloud backup

#### Efficient O&M with Edge-Cloud AI Synergy

AI chips based on machine learning framework

No data migration for 10 years

60-day performance and capacity trend prediction

14-day disk fault prediction

Immediate solutions for 93% of problems

Huawei OceanStor Dorado V6 all-flash storage sets new benchmarks in storage performance and reliability for enterprises' mission-critical service, providing excellent user experience. With Huawei-developed intelligent chips, FlashLink<sup>®</sup> intelligent algorithm, and full-series end-to-end NVMe architecture, the OceanStor Dorado V6 delivers 20 million IOPS\* of best-in-class performance, twice that of the next-best player in the industry. The next-generation hardware platform and SmartMatrix architecture with fully interconnected design ensure always-on services. The AI chips are the first in the industry to make storage systems more and more intelligent during the application operations.

Excelling in scenarios such as databases, virtualization, and big data analytics, Huawei OceanStor Dorado V6 all-flash storage is best suited in carrier, finance, government, and manufacturing, and other industries.

## Product Features

### No.1 Performance with Chip-Powered Architectures

In today's rapidly changing world, all-flash storage has become the first choice for many enterprises, whose application online time has changed from 8-hour to 24-hour always-on and application response time from quasi-real time to real-time. By leveraging intelligent chips, end-to-end NVMe architecture, FlashLink<sup>®</sup> algorithm, and powerful scalability of up to 32 controllers, the OceanStor Dorado V6 all-flash storage delivers 20,000,000 IOPS\* of best-in-class performance and 0.1 ms of latency, twice that of the next-best player.

OceanStor Dorado V6 is the perfect partner for enterprises who want to quickly step into the all-flash storage era.

- **Intelligent chips:** Huawei all-flash storage uses five built-in intelligent chips for end-to-end application acceleration, providing speeds 2x faster than the next-best player.

- ✓ The intelligent multi-protocol interface chip hosts the protocol parsing previously performed by the general-purpose CPU, expediting the front-end access performance by 20%.
  - ✓ The intelligent processor chip sets new benchmark of performance, and its computing power is 25% better than the industry average.
  - ✓ The intelligent AI chip actively analyzes and understands the I/O rules of multiple application models based on machine learning frameworks to implement intelligent prefetching of memory resource. This improves the read cache hit ratio by 50%.
  - ✓ The intelligent SSD controller chip hosts the core Flash Translation Layer (FTL) algorithm, accelerating data access within SSDs and delivering a 10% less read latency than the industry average.
  - ✓ The intelligent BMC management chip has a built-in Huawei storage fault library, which speeds up fault location and diagnosis of components, and shortens the fault recovery time from 2 hours to 10 minutes.
- **End-to-end NVMe architecture for full series:** All-flash storage has been widely adopted to upgrade existing IT systems for enterprises, but always-on service models continue to push the IT system performance boundaries to a new level. Existing SAS-based all-flash storage cannot break the bottleneck of 0.5 ms latency. The NVMe all-flash storage is a future-proof architecture. It implements direct communication between the CPU and SSDs, shortening the transmission path. In addition, the quantity of concurrencies is increased by 65,536 times, and the protocol interaction is reduced from four times to two. Huawei is a pioneer in adopting the end-to-end NVMe architecture for full series. The OceanStor Dorado V6 all-flash storage uses the industry-leading 32G FC/100GE RoCE NVMe protocols at the front end, PCIe 4.0 protocol inside, and 100GE RoCE protocol at the back end for end-to-end data acceleration. This enables latency as low as 0.1 ms and 5x faster transmission than SAS all-flash storage.
  - **Intelligent algorithms:** Most flash vendors lack end-to-end self-development capabilities to fully utilize SSD performance. Huawei OceanStor Dorado V6 all-flash storage incorporates FlashLink® intelligent algorithm to empower intelligent chips and other key components. Moreover, it adjusts the data layout between SSDs and controllers based on self-developed controllers, chips, and operating systems. In addition, the large-block sequential writes and metadata independent partitioning technologies ensure stable performance, whereas I/O priority adjustment technology ensures that read and write I/Os are always prioritized, and the service allocation technology reduces the loads of the controller enclosure by using intelligent SSD enclosures to host data reconstruction workflows. The FlashLink® intelligent algorithm fully unleashes the power of all-flash memory and helps Huawei OceanStor Dorado V6 achieve unparalleled performance to deliver smooth service experience.
  - **Linear performance and capacity expansion:** Business growth requires a predictable, scalable, and powerful storage infrastructure in the future. The scale-out architecture of Huawei OceanStor Dorado V6 supports linear expansion up to 32 controllers and 20,000,000 IOPS\* as the number of engines increases, meaning it is ready to meet the needs of enterprise growth at any time.

## Always-On Applications with SmartMatrix-Based 4-Layer Reliable Layouts

For the sustainable development, finance, manufacturing, carriers, and other industries are vigorously promoting service system upgrades toward intelligent application platforms, which may redefine IT architecture due to more diverse services and data types. For Chief Technology Officers (CTOs) who need robust IT systems that can consolidate multiple types of services and ensure stable service running, Huawei OceanStor Dorado V6 all-flash storage is the perfect choice. It ensures end-to-end reliability at levels ranging from component, product, solution to cloud layers, supporting the data consolidation scenarios with 99.9999% of service availability.

- **SSDs with benchmark-setting reliability:** Reliability has been a top concern for developing SSDs, but Huawei SSDs are on the right track. Leveraging global wear-leveling technology, Huawei SSDs can balance their loads and extend the service life. In addition, Huawei's patented anti-wear leveling technology prevents simultaneous multi-SSD failures and improves the reliability of the entire system.
- **Storage products with benchmark-setting reliability:** The product design is a systematic project that should be considered from reliability, availability, and serviceability before its market launch.
  - ✓ **Reliability:** Huawei OceanStor Dorado V6 all-flash storage provides the industry's most stable SmartMatrix architecture based on the fully interconnected design and intelligent multi-protocol interface chip. The unique SmartMatrix with the fully interconnected design at both front- and back-ends tolerates 7 controller failures without service disruption, setting a new benchmark of storage reliability. In the event that a controller becomes faulty, services are switched to functioning ones within one second in an uninterrupted link and application-unaware manner thanks to full connection between front-end interface modules and four controllers. In the system upgrade scenario, component-based upgrades can be completed online in one second without service awareness and data waits thanks to the component-based software design and multi-protocol interface chip.
  - ✓ **Availability:** In high-availability scenarios, Huawei OceanStor Dorado V6 all-flash storage adopts symmetric active-active controller design. LUNs have access to application servers through any controller rather than having ownership. Multiple controllers share loads running the load balancing algorithm. If a controller fails, other controllers can smoothly take over services without any interruption or performance loss. In reconstruction scenarios, Huawei OceanStor Dorado V6 controllers use the RAID-TP technology to tolerate simultaneous failures of three SSDs (RAID 6 tolerates simultaneous failures of only two disks). SSD enclosures are the industry's first to use built-in computing chips to offload reconstruction services from controllers. With OceanStor Dorado V6, recovering 1 TB of data takes just 15 minutes. This effectively minimizes the risks of data reconstruction delay and data loss caused by SSD capacity increases.
  - ✓ **Serviceability:** Huawei OceanStor Dorado V6 all-flash storage adopts a fully redundant architecture and hot-swap design to prevent Single Points of Failure (SPOFs). The storage applies the 3D fixed structure, the combination of vibration isolation and absorption, and the damping screws with non-rigid material, all of which ensure always-on services in the event of severe vibration. In addition, Huawei OceanStor Dorado is the industry's first to pass the magnitude-9.0 earthquake resistance test by the China Telecommunication Technology Labs (CTTL).

- **Gateway-free active-active solution with benchmark-setting reliability:** Flash storage is designed for enterprise applications that require zero data loss or zero application interruption. Therefore, an active-active solution becomes the idea choice. The OceanStor Dorado V6 applies a gateway-free active-active solution to reduce node failure, simplify deployment, and improve system reliability. In addition, the active-active solution implements active-active mirroring for load balancing and cross-site takeover without service interruption, ensuring that core applications are not affected by system breakdown. The solution can also be smoothly upgraded to the Disaster Recovery (DR) solution in geo-redundant mode, providing high-level data protection.
- **Gateway-free cloud backup with benchmark-setting reliability:** Traditional backup solutions are slow, expensive, and the backup data cannot be directly used. The OceanStor Dorado V6 all-flash storage provides a Converged Data Management (CDM) solution. It improves the backup frequency by 30-fold based on the industry-leading 10-second backup interval technology, and allows backup copies to be directly used for development and testing. The DR and backup are integrated in the storage array, slashing TCO of DR construction by 50%. Working with HUAWEI CLOUD and Huawei jointly-operated clouds, the solution achieves gateway-free DR and DR in minutes on the cloud.

## Efficient O&M with Edge-Cloud AI Synergy

IT systems are designed to keep improving enterprises' efficiency, and this mission is more critical than ever in this intelligent era. Based on AI chips and AI algorithms, the OceanStor Dorado V6 all-flash storage implements intelligent O&M throughout the entire lifecycle. The innovative business model avoids service interruption caused by data migration, providing smooth user experience.

- **Edge-cloud synergy:** General-purpose cloud AI, customized edge AI, and built-in Ascend 310 chips are used for incremental training and deep learning of service characteristics, enhancing personalized customer experience. eService intelligent O&M management platform collects and analyzes 190,000+ device patterns on the live network in real time, extracts common capabilities, and enhances basic O&M.
- **AI throughout service lifecycle:** Intelligent management from resource planning to provisioning, and system tuning and risk prediction to fault location enables 60-day prediction of performance and capacity trends, 14-day prediction of disk faults, and offers immediate solutions for 93% of problems located.
- **Flash Ever program:** The intelligent elastic architecture implements component-based upgrades without the need for data migration within 10 years. Users can enjoy latest-generation software and hardware capabilities, while also making the most of their existing investments.

## Technical specifications

Model	OceanStor Dorado 3000 V6	OceanStor Dorado 5000 V6	OceanStor Dorado 6000 V6	OceanStor Dorado 8000 V6	OceanStor Dorado 18000 V6
<b>Hardware Specifications</b>					
Maximum Number of Controllers	16*				32*
Maximum Cache (Dual Controllers, Expanding with the Number of Controllers)	192 GB – 1,536 GB	256 GB – 4 TB	1 TB – 8 TB	512 GB – 16 TB	512 GB – 32 TB
Supported Storage Protocols	FC and iSCSI				
Front-End Port Types	8/16/32 Gbit/s FC/FC-NVMe, 10/25/40/100 Gbit/s Ethernet				
Back-End Port Types	SAS 3.0	NVMe Over Fabric and SAS 3.0			
Maximum Number of Hot-Swappable I/O Modules per Controller	6	12	12	28	28
Maximum Number of Front-End Ports per Controller Enclosure	40	48	56	104	104
Maximum Number of SSDs	1,200	1,600	2,400	3,200	6,400
Supported SSDs	960 GB/1.92 TB/3.84 TB/7.68 TB/15.36 TB/30.72 TB SAS SSDs				
	N/A	1.92 TB/3.84 TB/7.68 TB/15.36 TB palm NVMe SSDs			
<b>Software Specifications</b>					
Supported RAID Levels	RAID 5, RAID 6, RAID 10*, and RAID-TP (tolerates simultaneous failure of 3 SSDs)				
Value-Added Features	SmartDedupe (intelligent inline deduplication) SmartVirtualization (intelligent heterogeneous virtualization) SmartMatrix (intelligent fully-interconnected architecture) HyperMetro (active-active between storage arrays) HyperReplication (remote replication)	SmartCompression (intelligent inline compression) SmartMigration (intelligent LUN migration) HyperSnap (snapshot) HyperMetro-Inner (active-active within storage arrays) CloudBackup (cloud backup)*	SmartThin (intelligent thin provisioning) SmartQoS (intelligent service quality control) HyperCDP (continuous data protection) HyperClone (clone)		
Storage Management Software	DeviceManager (device management)	UltraPath (multi-path management)		eService (remote maintenance and management)	

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<b>Physical Specifications</b>					
Power Supply	AC: 200V~240V AC±10%      DC: 192V to 288V				AC: 346V~415V AC±10%
Dimensions (H x W x D)	Controller enclosure: 86.1 mm x 447 mm x 520 mm	Controller enclosure: 86.1 mm x 447 mm x 820 mm Palm controller enclosure: 86.1 mm x 447 mm x 920 mm NVMe SSD enclosure: 86.1 mm x 447 mm x 620 mm		Controller enclosure: 175 mm x 447 mm x 865 mm NVMe SSD enclosure: 86.1 mm x 447 mm x 620 mm	Bay: 2,000 mm x 600 mm x 1,200 mm
	SAS SSD enclosure: 86.1 mm x 447 mm x 440 mm Intelligent SSD enclosure: 86.1 mm x 447 mm x 520 mm				
Weight	Controller enclosure: ≤ 35 kg SSD enclosure: ≤ 30 kg	Controller enclosure: ≤ 50 kg Palm controller enclosure: ≤ 55 kg SSD enclosure: ≤ 30 kg		Controller enclosure: ≤ 96 kg SSD enclosure: ≤ 30 kg	System bay: ≤ 680 kg Disk bay: ≤ 540 kg
Operating Temperature	5°C to 40°C (altitude: < 1,800 m), 5°C to 35°C (altitude: 1,800 m to 3,000 m)				
Operating Humidity (Relative Humidity)	5% RH to 95% RH				

[ \* For Projects requiring any specification marked with an asterisk(\*),please contact Huawei sales. ]

#### For More Information

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



Huawei Enterprise APP



Huawei IT



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