

A photograph of a data center aisle with server racks. The scene is dimly lit with blue and purple ambient lighting. Several glowing rectangular frames in various colors (cyan, magenta, blue) are overlaid on the image, highlighting different areas of the server racks and the aisle.

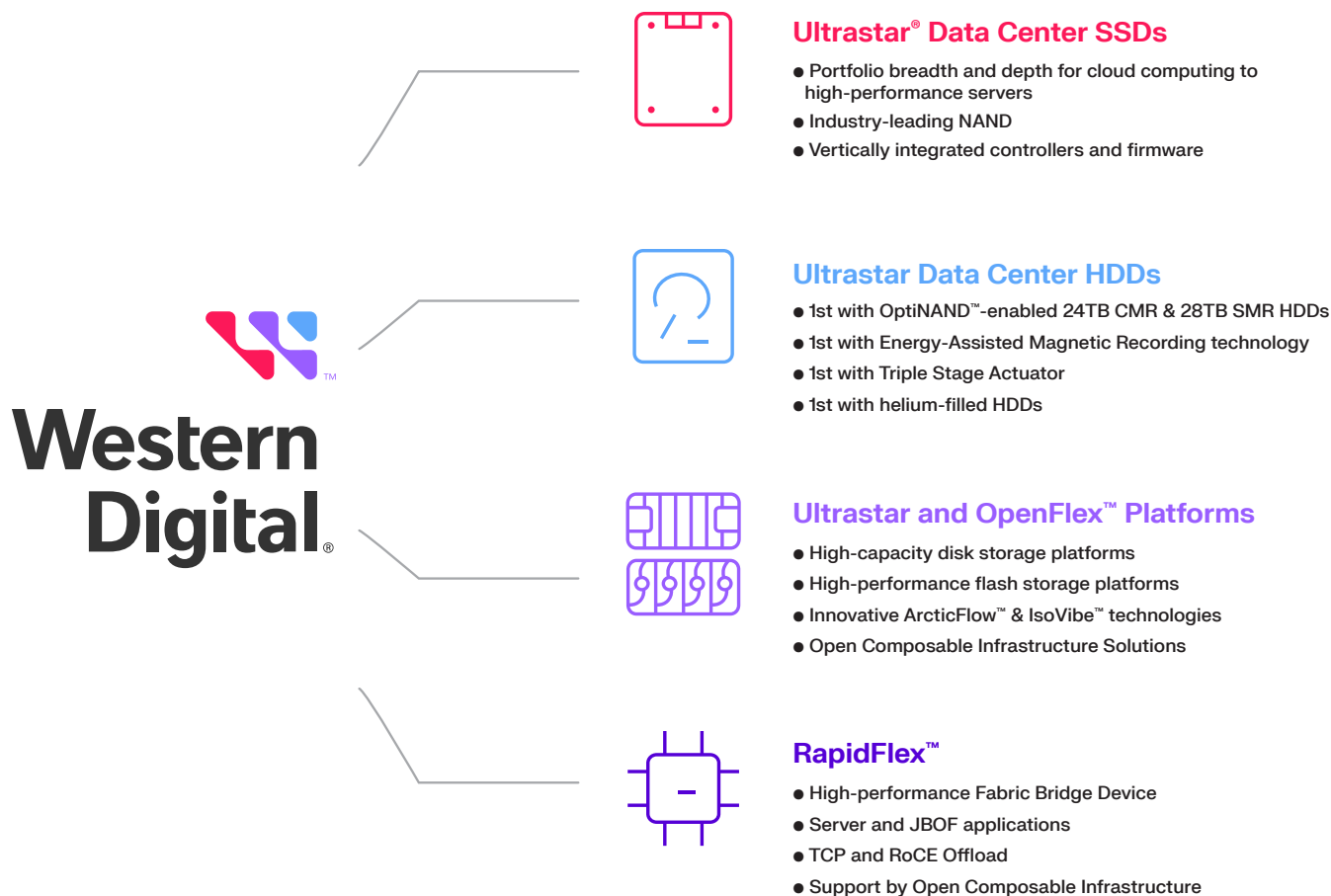
Data Center Storage Solutions

Powering the Data Revolution



For more than 50 years, Western Digital® has been enabling data at scale. Our data center SSDs, HDDs, fabric bridges, and platforms enable our customers to gain and leverage insights that they can extract from the zettabytes of data being generated by smart factories, connected endpoints, autonomous vehicles, IoT devices and more. Our robust portfolio and our outstanding customer service help companies and individuals transform their businesses with data.

Essential Data Infrastructure for the Zettabyte Age



Trusted Storage Delivering Innovation Across All Technologies



NVMe™ SSDs

Low-latency, high-performance NVMe SSDs to accelerate your data center workloads



Helium-filled HDDs

Highest capacity HDDs for data center expansion and cost-efficient scale



Air-filled HDDs

Economical and reliable data access for traditional data center application



Platforms

Complete portfolio of storage platforms and servers for SATA, SAS, NVMe and NVMe-oF™



Fabric Bridges

Enable NVMe over fabrics (NVMe-oF) attached storage systems using fabric bridge devices and adapters





Optimize Your Data Center with Ultrastar SSDs


	Ultrastar DC SN655	Ultrastar DC SN650
Compute Intensive/HPC	✓	
All Flash Array Primary Storage	✓	
Relational Databases	✓	
Artificial Intelligence/Machine Learning	✓	✓
Converged/Hyperconverged Infrastructure	✓	✓
OLTP	✓	
OLAP	✓	
Virtualization	✓	✓
noSQL Databases	✓	✓
Content Caching	✓	✓
File/Object Storage	✓	✓
Cloud Compute/Cloud Storage	✓	✓



Ultrastar Data Center NVMe SSDs

	Performance NVMe	Mainstream NVMe
	 <p>Ultrastar DC SN655</p>	 <p>Ultrastar DC SN650</p>
Interface	PCIe Gen4 1x4, 2x2, NVMe 1.4	PCIe Gen4 1x4, NVMe 1.4
Form Factor	U.3, 15mm	U.3, 15mm
Endurance/Capacity (GB) ^{1,2}	1 DW/D: 3840, 7680, 15360	1 DW/D: 7680, 15360
NAND	3D TLC	
Seq R/W (MB/s), up to ³	6,800/3,700	6,600/2,800
Random R/W (KIOPS), up to	1,100/125	970/109
Reliability ⁴	Unrecoverable Bit Error Rate (UBER): 1 in 10 ¹⁷ MTBF (M hours): 2.5 AFR: 0.35%	Unrecoverable Bit Error Rate (UBER): 1 in 10 ¹⁷ MTBF (M hours): 2 AFR: 0.44%
Security	SE, ISE, TCG Ruby	SE, ISE



	High Capacity Helium-filled Hard Drives				
	 Ultrastar DC HC680	Ultrastar DC HC670	Ultrastar DC HC580	Ultrastar DC HC570	Ultrastar DC HC560
Interface	SATA 6Gb/s	SATA 6Gb/s, SAS 12Gb/s	SATA 6Gb/s, SAS 12Gb/s	SATA 6Gb/s, SAS 12Gb/s	SATA 6Gb/s, SAS 12Gb/s
Rotational speed (RPM)	7200				
Form Factor	3.5-inch data center HDD				
Capacity (TB)	28	26	24	22	20
Format	512e/4Kn	512e/4Kn	512e/4Kn	512e/4Kn	512e/4Kn
Sustained transfer rate (MB/s, max) ⁵	265/253	298/284	298/284	291/277	291/277
Idle_A (W), SATA/SAS ⁶	5.5	5.7/6.1	5.5	5.7/6.0	6.1/5.8
ArmorCache™	Yes				
Reliability ⁷	MTBF (M hours): 2.5 AFR: 0.35% Workloads: up to 550TB/year				
Security	Base (SE), SED, SED-FIPS				




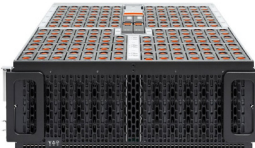
Ultrastar Data Center HDDs

	Helium-filled Hard Drives		
	 Ultrastar DC HC550	 Ultrastar DC HC530	 Ultrastar DC HC520
Interface	SATA 6Gb/s, SAS 12Gb/s		
Rotational speed (RPM)	7200		
Form Factor	3.5-inch data center HDD		
Capacity (TB)	18, 16	14	12
Format	512e		
Sustained transfer rate (MB/s, max) ⁵	269 (18TB) 262 (16TB)	267	243
Idle_A (W), SATA/SAS ⁶	5.6/5.8	5.5/5.9	5.0/6.1
ArmorCache™	Yes		
Reliability ⁷	MTBF (M hours): 2.5 AFR: 0.35% Workloads: up to 550TB/year		
Security	Base (SE), SED, SED-FIPS		






	Air-filled Hard Drives			
	 Ultrastar DC HC330	 Ultrastar DC HC320	 Ultrastar DC HC310	 Ultrastar DC HA210
Interface	SATA 6Gb/s, SAS 12Gb/s			SATA 6Gb/s
Rotational speed (RPM)	7200			
Form Factor	3.5-inch data center HDD			
Capacity (TB)	10	8	6, 4	2, 1
Format	512e	512n available on 4TB capacity		512n
Sustained transfer rate (MB/s, max)	262	255	255 233 w/512n	200 (2TB) 184 (1TB)
Idle (W), SATA/SAS	8.0/9.0	7.4/8.4	5.9/7.0	5.9/NA
Reliability	MTBF (M hours): 2 AFR: 0.44% Workloads: up to 550TB/year			
Security	Base (SE), SED, SED-FIPS			SE

Ultrastar Data Center Platforms

	Hybrid Storage Platforms	
		
	Ultrastar Data60	Ultrastar Data102
Storage Type	HDD	
Interface	SATA/SAS	
# Drives (up to)	60	102
Capacity (up to)	1.56PB	2.65PB
Dimension	4U	
Features	IsoVibe ArcticFlow	

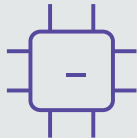
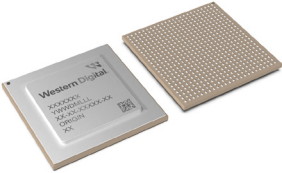



OpenFlex Data Center Platforms



	NVMe-oF Storage Platforms	
	  OpenFlex Data24	 OpenFlex Data24 3200
Storage Type	SSD	SSD
Interface	NVMe (NVMe-oF) 2, 4, or 6 RapidFlex NICs	NVMe (NVMe-oF) 6 RapidFlex NICs
Connection Type	RoCE	RoCE or TCP
# Drives (up to)	24	24
Capacity (up to)	368TB	368TB
Dimension	2U	2U



RapidFlex Data Center Fabric Bridge

	NVMe-oF Controllers	
	 <p data-bbox="701 721 915 748">RapidFlex A2000</p>	 <p data-bbox="1409 721 1623 748">RapidFlex C2000</p>
Device Type	<p data-bbox="695 797 926 818">ASIC Fabric Bridge Device</p> <p data-bbox="1346 797 1688 818">Half-height / half-length NVMe Adapter</p>	
Network Interface	<p data-bbox="1171 867 1331 911">vDual Ports 100 / 50 / 25 GbE</p>	
PCIe Interface	<p data-bbox="1157 954 1346 976">PCIe Gen 4 x 16 lanes</p>	
NVMe Capability	<p data-bbox="1066 1019 1436 1063">NVMe 1.4 Compatible NVMe-oF 1.1 Compatible TCP and RoCEv2</p>	
Dimension	<p data-bbox="758 1105 863 1127">25mm BGA</p>	<p data-bbox="1423 1105 1612 1127">129.41mm x 68.95mm</p>
Features	<p data-bbox="1010 1175 1499 1219">Bridges NVMe to NVMe-oF running on Ethernet Fabrics Enables Composable Disaggregated Infrastructure (CDI)</p>	



	Edge Servers	
		
	Ultrastar Edge	Ultrastar Edge-MR Ruggedized Edge Server
Device Type	Transportable Edge Server	Ruggedized Edge Server
Maximum Storage	8 Ultrastar DC SN640 NVMe SSDs 7.68TB per SSD, 1 DW/D, ISE (Instant Secure Erase)	
Network Interface	Dual 10GBase-T RJ-45 Mellanox® ConnectX®-5 100GbE QSFP28	
Physical Security	FIPS 140-2 Level 2	
Management	IPMI 2.0 system management Dedicated DB9 Serial management port	
Dimension	2U	Edge Server: 2U Ruggedized Case: 292mm x 609.6mm x 952.5mm / 11.5in x 24in x 37.5in

¹ One gigabyte (GB) is equal to 1,000MB (one billion bytes) and one terabyte (TB) is equal to 1,000GB (one trillion bytes) when referring to solid-state capacity. Accessible capacity will vary from the stated capacity due to operating environment.² Endurance rating based on DW/D using 4KiB random write workload over 5 years.

² Endurance rating based on DW/D using 4KiB 100% random write and JESD 219 workloads over 5 years.

³ Based on internal testing. Performance will vary by capacity point, changes in useable capacity, or security option. Consult product manual for further details. All performance measurements are in full sustained mode and are peak values. Subject to change.

⁴ MTBF and AFR specifications are based on a sample population and are estimated by statistical measurements and acceleration algorithms under typical operating conditions for this drive model. MTBF and AFR ratings do not predict an individual drive's reliability and do not constitute a warranty.

⁵ Idle specification is based on use of Idle_A

⁶ Based on internal testing; performance may vary depending on host environment, drive capacity, logical block address (LBA), and other factors. 1MiB = 1,048,576 bytes (2²⁰), 1MB = 1,000,000 bytes (10⁶)

⁷ Final MTBF and AFR specifications will be based on a sample population and are estimated by statistical measurements and acceleration algorithms under typical operating conditions, typical workload and 40°C device-reported temperature. Derating of MTBF and AFR will occur above these parameters, up to 550TB/year and 60°C (device reported temperature). MTBF and AFR ratings do not predict an individual drive's reliability and do not constitute a warranty.



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