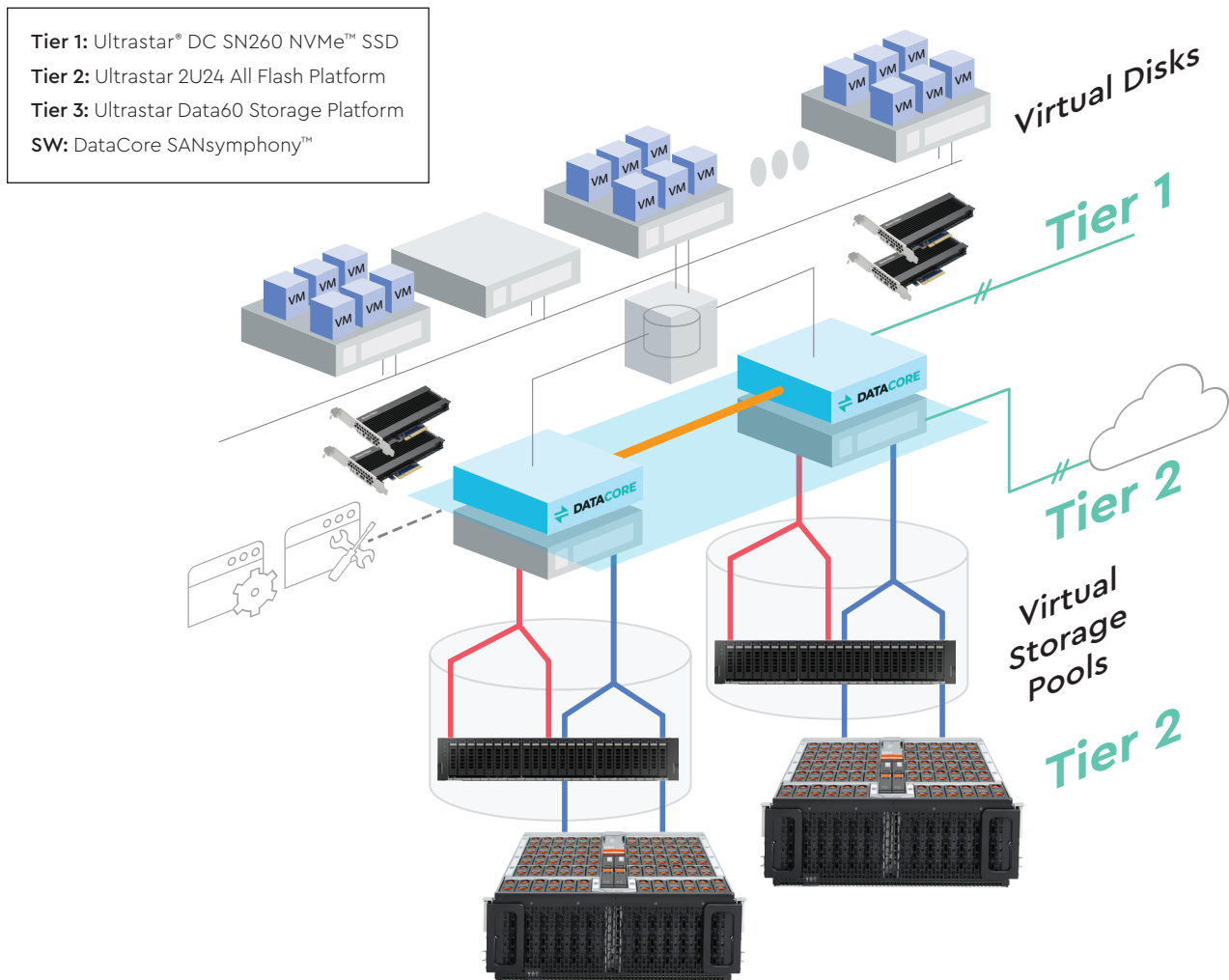


Multi-Tiered Storage Solution



Tier 1: Ultrastar® DC SN260 NVMe™ SSD
Tier 2: Ultrastar 2U24 All Flash Platform
Tier 3: Ultrastar Data60 Storage Platform
SW: DataCore SANsymphony™

To create a multi-tiered storage solution, it takes two mirrored server nodes with SATA and NVMe SSDs, 2x JBOFs with SAS SSDs and 2x JBODs with SAS HDDs. This reference architecture uses 2x generic x86 servers connected to 2x Ultrastar 2U24 all flash platform and 2x Ultrastar Data60 storage platform. The Datacore SANsymphony software runs on top of the server nodes.

For purposes of server sizing, the PCIe bus is used to install backend and frontend controllers. Two Broadcom® HBA 9480-8i8e Tri-Mode Storage Adapters are used to connect the Ultrastar 2U24 Flash platform and the Ultrastar Data60 storage platform to the servers. A QLogic HBA controller is used to interconnect the servers and connect the servers to the SAN.

The server(s) contain each 2x Ultrastar DC SN260 7.68TB AIC NVMe SSDs as a Tier-1 in the Auto-Tiering storage pool and 2x Ultrastar SA210 480GB SATA SSDs for the Windows Server 2016 operating system.

The Ultrastar 2U24 All Flash Platform can be equipped with Ultrastar SS200 SAS SSDs (3.84/7.68TB) or Ultrastar DC SA620 SATA SSDs

(960GB/1.9TB). Minimum configuration is 12 SSDs, with maximum total capacity of 184TB of flash storage (fully populated). This reference architecture uses 24x Ultrastar SS200 7.68TB SAS SSD.

The Ultrastar Data60 can be equipped with Ultrastar DC HC510, DC HC520 or DC HC530 SAS HDDs, providing a data repository of up to 840TB in a 4U storage rack. Minimum configuration is 24 HDDs, providing an upgrade roadmap of up to 60 drives. If an additional performance tier is required, it is possible to install SAS/SATA SSDs in up to 24 of the drive slots. This reference architecture uses 60x Ultrastar DC HC510 6TB SAS HDDs.

The DataCore SANsymphony software requires both DataCore SANsymphony EN-Node licenses (free to request and download) and Nx Datacore TB Capacity license. The amount of TB Capacity licenses is dependent on the total managed storage capacity in the configuration. In this reference architecture, we used a total of 1118TB raw capacity (360TB HDD in the Ultrastar Data60, 184TB SSD in the 2U24 All Flash Platform, and an additional 15TB Ultrastar DC SN260 NVMe SSD in each server, and mirrored across 2 sets).

Server Configuration

Item	Description	P/N	Qty
Server	Generic x86 server		2
CPU	Intel® Xeon® Gold 5120 Processor	Intel Xeon Gold 5120 Processor	4
Memory	16GB PC4-21300 2666MHz DDR4 ECC Registered DIMM Micron MTA36ASF472PZ-2G6D1	MEM-DR416L-CL06-ER26	32
System Disk	Western Digital Ultrastar SA210 480GB SATA SSD	OTS1650	4
Hot-swap 3.5" to 2.5" SATA/SAS Drive Trays	Tool-less black hot-swap 3.5-to-2.5 converter HDD drive tray (Red tab)	MCP-220-00118-0B	4
RAID controller for SATA SSD	Broadcom 9341-4i	05-26105-00	2
RAID controller for JBOD/JBOD connection	Broadcom HBA 9480-8i8e Tri-Mode Storage Adapter	05-50031-00	4
NVMe Cache	Western Digital Ultrastar DC SN260 7.68TB AIC NVMe SSD (2x per node)	OTS1353	4
HBA for host connection	QLogic 16Gb dual port Fibre Channel HBA	QLE2692-SR-CK	4

Storage Configuration

Item	Description	P/N	Qty
Tier-1 JBOD	Ultrastar 2U24 All Flash Platform SE2U24-24 184.32TB nTAA SAS RI-1DW/D ISE	1ES0111	2
Tier-2 JBOD	Ultrastar Data60 Storage Platform (with 360TB SAS HDD)	1ES1160 (512E HDD) or 1ES1158 (4KN HDD)	2
SAS cable	Ultrastar Data60 Cable IO HD mini-SAS to HD mini-SAS 2m 2Pack	Included in the Ultrastar 2U24 and Data60 platforms	8

Software

Item	Description	P/N	Qty
Operating System	Windows Server 2016 Standard	OEM SKUs from server vendor	2
DataCore SW	SANsymphony EN-Node license	Free to request and download	2
No RAID overhead	Datacore TB Capacity license (1-year maintenance)	DEN-EWR-S12-500	1118
	Datacore TB Capacity license (3-year maintenance)	DEN-EWR-S36-500	1118
RAID-1 for data protection within the individual nodes	Datacore TB Capacity license (1-year maintenance)	DEN-EWR-S12-250	559
	Datacore TB Capacity license (3-year maintenance)	DEN-EWR-S36-250	559

Note: Any other RAID usage that would result in other managed net capacity will change the SKU accordingly;

Note: Any already existing EN capacity anywhere else will also change the SKU, depending on the total managed capacity;

P/N scheme for Nx Datacore TB Capacity license DEN-EWR-Sxx-yyy is as follows:

N	Total new managed capacity of the customer represented by the servers and the storage capacity added
xx	Maintenance term, i.e. 12 = 1 year / 36 = 3 year.
yyy	Total managed capacity band, after the new capacity is purchased
	001 = 1 to 9 TB
	010 = 10 to 24 TB
	025 = 25 to 49 TB
	050 = 50 to 99 TB
	100 = 100 to 249 TB
	250 = 250 to 499 TB
	500 = 500 to 999 TB
	01M = 1000 and above

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One megabyte (MB) is equal to one million bytes, 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 formatting and partitioning of the drive, software, and other factors.