Overview

HPE GreenLake for Block Storage

HPE GreenLake for Block Storage provides a cloud-operational experience and cloud consumption model for on-prem storage infrastructure. It boosts operational agility and financial flexibility and frees up resources and capital – enabling organizations to simplify storage management and move faster.

At A Glance

HPE GreenLake for Block Storage is the industry's first block storage-as-a-service offering that offers self-service and a 100% data availability guarantee built-in for mission critical environments. Businesses can transform faster with a cloud operational experience and self-service agility everywhere. It empowers customers to transform from IT operator to service provider, focusing on accelerating outcomes, not managing infrastructure. With this service, customers can:

- Go faster with self-service agility. Line of business and database (DB) admins can self-provision storage instantly to accelerate application deployment.
- Consume as a service with predictable monthly payments based on consumption.
- Get started quickly with self-service quoting and ordering by choosing from pre-configured templates and modifying attribute as desired .
- Run any application without compromise while enjoying 100% availability guarantee for mission-critical apps and get an industry-leading 6x9s for all other workloads, versus the typical 4x9s.

What's New

- Smart templates for ordering with flexibility to commit at varying levels of maximum installed capacity.
- Ability to retain media as an attribute while subscribing to HPE GreenLake for Block Storage.
- General purpose tier – suited for mix of primary and secondary workloads
- Transform from LUN-centric to AI-driven, app centric storage provisioning. No storage expertise required, and no more guesswork.
- Unified cloud management enables you to globally manage and monitor your entire fleet of block storage from a single Cloud -based cloud console that's accessible from any location, on any device.
- Say goodbye to endless firefighting thanks to industry-leading AI Ops for infrastructure that drives autonomous operations and helps ensure your apps are always on and always fast.
- Help ensure quality of service for your mission-critical apps by setting priorities on a specific volume or application group that ensure performance expectations are always met.
- Support for HPE GreenLake for Block Storage built on HPE Alletra Storage MP solutions designed to serve workloads ranging from SMB to Fortune 100 Enterprise workloads.

Standard Features

Key Features and Benefits

HPE GreenLake for Block Storage is a cloud data service—offered on the HPE GreenLake edge-to-cloud platform—that simplifies on-prem storage management with the speed and agility of a cloud operational experience. It provides cloud-like self-service ordering, provisioning, and management that abstracts and automates underlying storage infrastructure complexity, shifting operations to be app, and not infrastructure-centric. And it delivers on-premises storage consumed as a service, meeting any workload SLA with the right resilience (including a 100% availability guarantee for mission-critical apps), performance, and cost.

The core feature set includes:

- Instant, self-service quoting and ordering
- All block lifecycle management (volume provisioning, protection policies, volume update, delete, and grow)
- Intent based provisioning of application data with recommendation of headroom availability, which indicates the relative ability of a storage system to support a proposed workload without experiencing performance degradation. Furthermore, with a remote protection policy for the volumes, recommendations are based on headroom availability in the source and partner systems.
- Inventory dash boarding (capacity details/trends, performance details/trends, alerts, protection levels)
- Replication and Management of restore points (replication configuration and restore point management: restore, sync, promote/demote, export/un-export, delete)
- Customize columns in table view for volume inventory
- Create volumes without exporting to a host group
- Customize LUN ID while creating volumes
- View host paths information in host detail page
- Reporting (performance reporting, capacity reporting, alert reporting, audit logging, task status)
- Create and manage volume clones
- Virtual lock support for Mission Critical Tier
- Enhanced reporting capabilities for Mission Critical Tier
  - Two new charts have been added to trend I/O Size and Queue Length
  - Pre-defined templates are available for top volume paths by read latency, top volume sets by read IOPS, top host ports by write throughput.
  - Customize views by resource type for volumes, volume sets, host ports and hosts with Top-6 or Select-10 with sorting by metric.
  - View and compare performance metrics across remote copy links using the custom reports
  - Reports can be downloaded as CSV or PDF
- Enhanced reporting capabilities for Business Critical and General Purpose Tier:
  - Three charts available to show IOPS, throughput and latency trends for Volume(s) and Pool(s).
  - Two predefined templates have been added: Top volume by read latency and write latency that can be customized by resource type for volumes with Top-6 sorting by metric or Select-10 and for Pools with Select-10.
  - Reports can be downloaded as CSV or PDF
- Extended reporting that helps analyse and troubleshoot performance issues of a storage system and its volumes:
  - Headroom utilization with analysis breakdown by Top-5 volume contribution available for Mission Critical Tier.

All HPE GreenLake services are subject to the terms and conditions of the HPE GreenLake Service Descriptions. You can find the most current version **https://www.hpe.com/psnow/doc/a50005247ENW**

When ordering for delivery to multiple locations, a separate purchase order is required for each location

Service and Support

Service and Support

Support is included as part of the subscription for HPE GreenLake for Block Storage. Included with the support is 24x7 telephone and email support for the arrays and hardware components for the chosen subscription term. Based on the configuration (Value, Balanced or Performance) selected, either a Lite or Entry level HPE GreenLake Select solutions experience will apply. More information on the HPE GreenLake Select Solutions can be found **here.**

Refer to the HPE GreenLake for Block Data Sheet **https://www.hpe.com/psnow/doc/a50006454enw** for the service deliverables and the shared responsibility model as part of the subscription.

Additional recommended HPE Services to help accelerate your business outcomes:

- HPE Edge-to-Cloud Transformation Maturity (workshop)
- HPE Service Credits
- HPE Storage Networking
- HPE Accelerated Migration
- HPE Asset Upcycling
- HPE Data Migration Services
- HPE Data Sanitization Service
- HPE Security Risk and Compliance

Configuration Information

Step 1 – Open OCA and Select New Configuration

- Hover over New Configuration and select HPE GreenLake from drop-down options
- Ensure that Integrated Quoting (IQ) is selected under Quotation mode
- Click on Select from Smart Templates in bottom left

Step 2 – Choose your Smart Template Category

- Under Data Storage category select either sub-category Block Storage or Block Storage MP
  - Select Block Storage sub-category for General Purpose (HPE Alletra 5000), Business Critical (HPE Alletra 6000), or Mission Critical (HPE Alletra 9000) Storage solutions
  - Select Block Storage MP sub-category for Storage solutions built on HPE Alletra MP Storage

Step 3 – Use Filters to select Smart Template with desired configuration

- **Use Filters to find Smart Template that reflects desired specifications**
  Notes: Select the Smart Template closest to desired configuration and modify config via menu as needed

- **HPE Alletra Smart Template config names & descriptions explain what template contains in configuration**

- **Filters for HPE Greenlake for Block Storage built on HPE Alletra Storage MP**
  - HPE Greenlake for Block Storage built on HPE Alletra Storage MP Smart Templates can support performance workloads ranging from SMB to high-end Enterprise performance requirements
  - Drive Config - All configs are 24 drives with 1, 2, 3, 4, or 6 shelves (Example: 6 shelves of 24 drives = 24x24x24x24x24x24)
    - If you are building a config with <24 drives (12, 16, 18, or 20) - select Smart Template that is closest to desired config and modify # of drives
      - Example: If desire 12-drive config, select 24-drives and use menu to remove 12 drives
  - Drive Size - Options are 1.92TB, 3.84TB, 7.68TB, or 15.36TB NVMe SSDs
  - Min Commit TB (Billable capacity) - Options range from 0-50 TB to 1000-2999 TB in varying increments
  - Nodes - 2-Node or 4-Node options
  - Tier (Core Count) - 8-Core, 16-Core, or 32-Core options
  - Workload (Clusterability) - Clustered or Non-Clustered options

- **Filters for HPE Greenlake for Block Storage built on HPE Alletra Storage (Alletra 5000, 6000, 9000)**
  - Min Commit TB Filter – use to filter Smart Templates for desired Usable Capacity
    Notes: User must select reserve commit of 60%/70%/80%/90% for chosen smart template.
  - Workload Filter– Choose Availability level
    - Mission Critical - suited for mission-critical applications that require:
      - 100% availability guaranteed
      - Bandwidth optimized performance > 10GB/sec
      - Advanced, synchronous, and multi-site resiliency
      - Large-scale environments
    - Business Critical - suited for business-critical applications that require:
      - 99.9999% availability
      - Wide range for performance expectations from 2GB<X>10GB/sec
      - Advanced site replication desired, with some tolerance for failover time
      - Medium-sized or virtual environments

Configuration Information

- General Purpose - suited for applications that require
  - 99.9999% availability
  - Wide range of performance expectations from 0.3GB<X>2GB/sec
  - Mix of primary workloads and secondary backup and disaster recovery
  - Small or Medium-sized environments

– Tier Filter – Choose your performance service level objective

- Performance Optimized Tier - A block storage service for I/O intensive, very-low latency workloads, and bandwidth-intensive applications at a given availability level. Most common for SAP HANA, Oracle, Microsoft SQL Server, and IBM DB2 based applications
- Balanced Optimized Tier - A block storage service designed to balance scalable capacity requirements with I/O sensitive, very-low latency workloads at a given availability level.
- Value Optimized Tier - A block storage service optimized for cost for I/O sensitive, very-low latency workloads at a given availability level.

Performance Requirement	HPE Greenlake for Block built on HPE Alletra MP	Mission Critical (HPE Alletra 9000)	Business Critical (HPE Alletra 6000)	General Purpose (HPE Alletra 5000)
Performance Tier	Up to 1.1M IOPS (read)	Up to 1M IOPS (read)	Up to 400K IOPS (read)	Up to 120K IOPS (read)
	Up to 382K IOPS (mixed)	Up to 300K IOPS (mixed)	Up to 200K IOPS (mixed)	Up to 120K IOPS (mixed)
	Up to 30GB/s & 9GB/s (read & write)	Up to 30GB/s & 6GB/s (read & write)	Up to 9GB/s & 3GB/s (read & write)	Up to 5.0GB/s & 2.0GB/s (read & write)
Balanced Tier	Up to 640K IOPS (read)	Up to 600K IOPS (read)	Up to 200K IOPS (read)	Up to 65K IOPS (read)
	Up to 210K IOPS (mixed)	Up to 200K IOPS (mixed)	Up to 100K IOPS (mixed)	Up to 60K IOPS (mixed)
	Up to 20GB/s & 5GB/s (read & write)	Up to 25GB/s & 5GB/s (read & write)	Up to 2GB/s & 2GB/s (read & write)	Up to 1.9GB/s & 1.0GB/s (read & write)
Value Tier	Up to 355K IOPS (read)	Up to 300K IOPS (read)	Up to 150K IOPS (read)	Up to 20K IOPS (read)
	Up to 118K IOPS (mixed)	Up to 100K IOPS (mixed)	Up to 75K IOPS (mixed)	Up to 15K IOPS (mixed)
	Up to 11GB/s & 2GB/s (read & write)	Up to 12GB/s & 2GB/s (read & write)	Up to 4GB/s & 1GB/s (read & write)	Up to 1.0GB/s & 0.3GB/s (read & write)
The performance service level objective includes standard data operations (i.e. UI, Intelligent Autonomous Storage, garbage collection). Event-based data operations (replication, snapshots, hw upgrade, etc.) are excluded.				
The underlying device Infrastructure deployed is designed to deliver the stated total IOPS under 1ms latency for the specified workload: Read IOPS: 100%, 8k.				
Mixed IOPS: 50% read, 50% write, 8k.				
Throughput: 256k sequential				

Availability Tier	NVMe SSD	SAS HDD/SSD
Mission Critical	Yes	
Business Critical	Yes	
General Purpose		Yes

Step 4 – Modify Smart Template Configuration to satisfy Customer requirements

- To modify HPE Alletra Storage MP Smart Templates - user must click on Components tab + click on HPE GreenLake for Block Storage MP #1 Group in second row to view OCA menu
  – Contract Term, Service Experience Level, Networking Interface + All HW config options can be modified
  Notes: All HPE Alletra Storage MP Smart Templates are configured as 3-Year Term with Standard Service Level and Fiber-Channel Network Interface
- To modify HPE Alletra Storage Smart Templates - user must click on Components tab + click on HPE Alletra x000 #1 Group in second row to view Solution Wizard in OCA
  – Contract Term, Service Experience Level, Networking Interface + all HW config options can be modified
  Notes: All HPE Alletra Storage MP Smart Templates configured as 3-Year Service Term
- By using OCA menu to modify Smart Templates – wide ranges of usable capacity points can be supported. See table below.

Configuration Information

Smart Templates – Usable Capacity	Mission Critical – HPE Alletra MP	Mission Critical – HPE Alletra 9000	Business Critical – HPE Alletra 6000	General Purpose – HPE Alletra 5000
Performance Optimized Tier	31Tb to 2PB	59 to 252 TB	60 to 245 TB	305 to 638 TB
	Up to 2PB possible	Up to 2.3PB possible	Up to 984 TB possible	Up to 1260TB possible
Balanced Optimized Tier	31Tb to 2PB	125 to 512 TB	60 to 245 TB	91 to 152 TB
	Up to 2PB possible	Up to 2.3PB possible	Up to 575 TB possible	Up to 504TB possible
Value Optimized Tier	31Tb to 2PB	125 to 256 TB	29 to 122 TB	30 to 60 TB
	Up to 2PB possible	Up to 2.3PB possible	Up to 184 TB possible	Up to 210 TB possible

Notes:
- Usable storage can be used for all object types including snapshots, clones and replicated volumes.
- Usable capacity Max for HPE Alletra MP solution will continue to scale higher in future releases.

Step 5: In Services tab - select Media retention setting to keep sensitive data protected

- Defective Media Retention (DMR)
- Comprehensive Defective Material Retention (CDMR)

To learn more about these please refer to HPE Defective Media solutions brief:
https://www.hpe.com/psnow/doc/4aa1-8067enw

Shared Responsibility Model (SRM)

HPE GreenLake for Block Storage subscription includes the necessary hardware, software, and services to deliver the service level specified. The service levels offered are based on a foundational shared responsibility model (SRM) depicted below:

Customer	HPE
Responsible for the connectivity to GreenLake Cloud Platform (GLCP), the administration, and the management of the data/ objects	Responsible for the functionality of the infrastructure providing the service
Site Readiness including datacenter facilities and internet connectivity	Installation & activation of device
Maintain connectivity to GreenLake Cloud Platform	Customer Orientation
Volume Creation and administration	Access to software, firmware, and documentation updates
Data resilience and remote replication	Onsite hardware support
Data backup	Proactive support and operational guidance*
Applying recommended software updates & security patches	Test volume Creation
Data Monitoring	Operational Insights and Dashboard*
Initiating the order of additional capacity beyond total available capacity	Proactive capacity planning*
	Proactive incident alerting*
	Communicate security incident & remediation

Notes: *Proactive communication is delivered using HPE Infosight (included as part of subscription)

Pre-requisite for HPE GreenLake for Block Storage

As part of the shared responsibility model, the customer is expected to make appropriate decisions including but not limited to:

- Rack Infrastructure requirements
  - Space
  - Rails
- Power Infrastructure requirements
  - PDU
  - Cables

Configuration Information

Supported Operating Systems by Service Level

Mission Critical Service Level

- Citrix® Hypervisor
- HPE HP-UX®
- IBM® AIX®
- IBM Virtualization
- Microsoft® Windows® Server and Microsoft® Hyper-V™
- Oracle® Linux®
- Oracle® Solaris
- Red Hat® Enterprise Linux®
- SUSE® Linux Enterprise Server (SLES)
- VMware ESX and ESXi | VSI OpenVMS

Business Critical & General Purpose Service Level

- Microsoft® Windows® Server, including Microsoft® Hyper-V™
- VMware vSphere™
- HPE HP-UX®
- Ubuntu SUSE® Linux Enterprise
- SUSE® Linux Virtualization
- Red Hat® Enterprise Linux®
- Red Hat® Enterprise Virtualization CentOS
- Oracle® Linux® (UEK and RHEL compatible kernels)
- Oracle® Solaris
- Citrix® Hypervisor
- IBM® AIX®

Notes: For the latest information on supported operating systems refer to Single Point of Connectivity Knowledge (SPOCK) for HPE Storage products: **https://h20272.www2.hpe.com/spock/**

Technical Specifications

Physical Dimensions						
Mission Critical (HPE Alletra MP)	**Reservation Level**	**Height (Rack Units)**	**Host Ports Active/Total**	**Width (cm)**	**Depth (cm)**	**Weight (kg)**
Performance	31TB -2PB	8U to 27U	10B-T: 32/32 10GbE: 32/32 25GBE: 32/32 32Gb FC: 32/32	varies based on config choices - see table below	varies based on config choices - see table below	varies based on config choices - see table below
Balanced		2U to 27U				
Value		2U to 25U				
Mission Critical (HPE Alletra 9000)	**Reservation Level**	**Height (Rack Units)**	**Host Ports Active/Total**	**Width (cm)**	**Depth (cm)**	**Weight (kg)**
Performance	33TB-88TB	4U	10B-T: 32/32 10GbE: 32/32 25GBE: 32/32 32Gb FC: 32/32	48.3	83.9	77.3 to 82.9
	132TB-198TB	8U				151.1
Balanced	66TB-198TB	4U	10B-T: 32/32 10GbE: 32/32 25GBE: 32/32 32Gb FC: 32/32			77.3 to 82.9
	264TB-385TB	8U				151.1
Value	66TB – 88TB	4U	10B-T: 16/16 10GbE: 16/16 25GBE: 16/16 32Gb FC: 16/16			55.1
	132TB – 198TB	6U				82.9
Business Critical (HPE Alletra 6000)	**Reservation Level**	**Height (Rack Units)**	**Host Ports Active/Total[1]**	**Width (cm)**	**Depth (cm)**	**Weight (kg)**
Performance	33TB – 198TB	4U	10B-T: 12/24 10GbE: 10/20 25GbE: 6/12 32Gb FC: 8/16	43.9	80	54.5
Balanced	33TB- 198TB	4U	10B-T: 12/24 10GbE: 10/20 25GbE: 6/12 32Gb FC: 3/12			54.5
Value	16TB -88TB	4U	10B-T: 8/16 10GbE: 6/12 25GbE: 4/8 32Gb FC: 4/8			54.5
General Purpose (HPE Alletra 5000)	**Reservation Level**	**Height (Rack Units)**	**Host Ports Active/Total[1,2]**	**Width (cm)**	**Depth (cm)**	**Weight (kg)**
Performance	165TB – 355TB	8U	10B-T: 12/24 10GbE: 12/24 25GbE: 6/12 32Gb FC: 6/12	43.9	89	117
	532TB	12U	10B-T: 12/24 10GbE: 12/24 25GbE: 6/12 32Gb FC: 6/12			169
Balanced	49TB – 132TB	4U	10B-T: 8/16 10GbE: 4/8 25GbE: 4/8 32Gb FC: 4/8			65
Value	16TB – 49TB	4U	10B-T: 8/16 10GbE: 4/8 25GbE: 4/8 32Gb FC: 4/8			65

Technical Specifications

Notes:

- The Fibre Channel ports for Business Critical and General Purpose are Active/Active (non-optimized)
- All General Purpose configurations have additional 2/4 10B-T embedded ports not included in the port counts listed above
- The physical specifications (Height, Weight, Port count) of the Alletra MP configurations vary based on configuration options selected. Please use table (below) to calculate physical specifications of desired configuration.

HPE Alletra Storage MP HW Specifications

Physical Dimensions	Width in/mm	Depth in/mm	Height in/mm/U	Weight lb/kg
HPE 42U 1075mm G2 Advanced Series Rack	23.50 / 597	43.78 / 1111	78.99 / 2006	281 / 127
HPE 42U 1075mm G2 Enterprise Series Rack	23.54 / 598	44.30 / 1125	78.98 / 2007	230 / 105
HPE 42U 1200mm G2 Advanced Series Rack	23.50 / 597	50.65 / 1286	78.99 / 2006	311 / 141
HPE 42U 1200mm G2 Enterprise Series Rack	23.54 / 598	51.19 / 1300	78.98 / 2007	251 / 114
HPE Alletra Storage MP Base Enclosure (Enclosure, two Controller IOMs, two PS, one CDM, no drives, no HBAs)	19.00 / 483	33.11 / 841	3.44 / 87.5 / 2	74.0 / 33.6
HPE Alletra Storage MP Base Enclosure Packaging Pallet	23.00/584 24.00/610	38.75/984 40.00/1016	11.50/292	
HPE Alletra Storage MP NVMe SSD with carrier	3.11 / 79	6.57 / 167	0.59 / 15.0	0.63 / 0.28
HPE 32Gb 4-port FC Host Bus Adapter	3.33 / 84.6	5.20 / 132	0.59 / 15.0	0.50 / 0.23
HPE 10/25Gb 4-port Ethernet Host Bus Adapter	3.33 / 84.6	5.20 / 132	0.59 / 15.0	0.50 / 0.23

Power Requirements

Mission Critical (Alletra 9000)	Performance	Balanced	Value
Input Voltage, frequency	200 to 240 VAC (50 to 60 Hz)		
Max power requirements (VA)	2079 – 3033	1955-2088	1099-1440
Thermal (BTU/hour)	7092 - 10347	6671 - 9827	3751 – 4913
Refrigeration (tons)			
Business Critical (Alletra 6000)	**Performance**	**Balanced**	**Value**
Input Voltage, frequency	200-240V, 50-60Hz, 8.7A		
Max power requirements (VA)	2443	1998	1697
Thermal (BTU/hour)	7022	6033	5043
Refrigeration (tons)	0.59	0.50	0.42
General Purpose (Alletra 5000)	**Performance**	**Balanced**	**Value**
Input Voltage, frequency	100-120V, 50-60Hz; 200-240V, 50-60Hz		
Max power requirements (VA)	900W 1.000kVA	850W 0.944kVA	750 W 0.833kVA
Thermal (BTU/hour)	2952	2788	2460
Refrigeration (tons)			

Notes:

- HPE Alletra Storage MP Base Controller uses 200 to 240 VAC (50 to 60 Hz)
- Refer to HPE Power Advisor tool (link below) for power consumption, thermal/heat loading, circuit sizing information - **HPE Power Advisor utility**

Summary of Changes

Date	Version History	Action	Description of Change
06-May-2024	Version 13	Changed	Overview, Standard Features, Configuration Information and Technical Specifications sections were updated
22-Jan-2024	Version 12	Changed	Configuration Information section was updated Update to subscription terms
08-Jan-2024	Version 11	Changed	Overview, Standard Features, Service and Support and Configuration Information sections were updated What's New, Config, SKU and T&C link updated
06-Nov-2023	Version 10	Changed	Standard Features and Services and Support sections were updated. HPE Services Rebranding
10-Jul-2023	Version 9	Changed	Overview and Configuration Information sections were updated
20-Mar-2023	Version 8	Changed	Technical Specifications section was updated. Tech Specs updated
05-Dec-2022	Version 7	Changed	Configuration Information section was updated
21-Nov-2022	Version 6	Changed	Overview and Standard Features section were updated
07-Nov-2022	Version 5	Changed	Configuration Information and Technical Specifications sections were updated. Updates to core features
03-Oct-2022	Version 4	Changed	Standard Features section was updated. Updates to core features
06-Sep-2022	Version 3	Changed	Standard Features section was updated. Updates to core feature set
01-Aug-2022	Version 2	Changed	Minor corrections
27-Jun-2022	Version 1	New	New QuickSpecs

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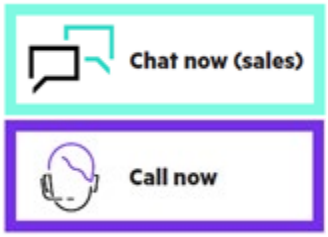

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