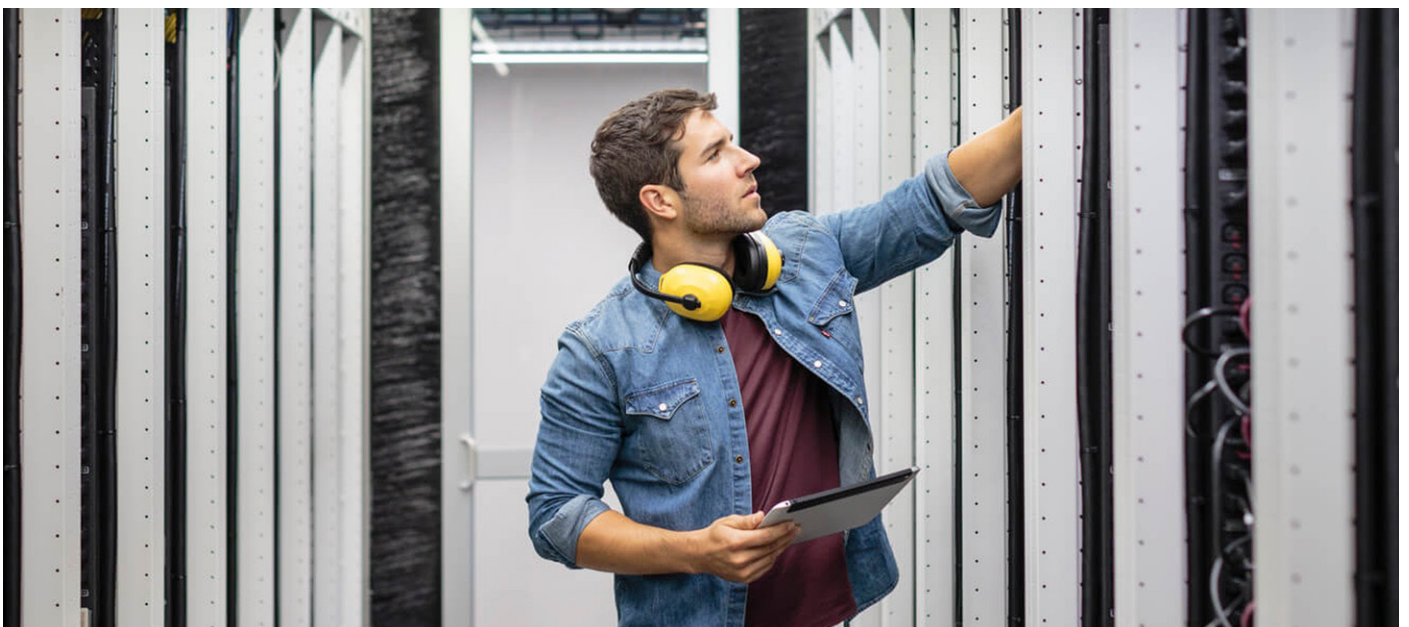


HPE ProLiant DL325 Gen10 Plus solutions for Microsoft Azure Stack HCI

Contents

Introduction.....	2
Azure Stack HCI solution management	2
HPE ProLiant DL325 Gen10 Plus for Azure Stack HCI solution—guidelines	3
All-Flash SAS SSD capacity example configuration.....	4
Hybrid NVMe Cache/SAS HDD capacity example configuration.....	5
Supported network adapter and storage controller options.....	6
Services and support	7
Free up resources with Operational Services from HPE Pointnext Services.....	7
Appendix	9



Introduction

This technical white paper provides solution guidelines and example configurations for Azure Stack Hyperconverged Infrastructure (HCI) solution on HPE ProLiant DL325 Gen10 Plus servers. These cluster solutions can be deployed using Windows Server 2019 or Azure Stack HCI 20H2 OS. HPE has certified the following solutions that optimize Storage Spaces Direct based virtualized storage for efficiency and performance.

- All-Flash SAS SSD Capacity
- Hybrid NVMe Cache/SAS HDD Capacity

Azure Stack HCI solution management

HPE offers unique Microsoft Windows Admin Center (WAC) extensions and a snap-in for Microsoft Azure Stack HCI solution management. For additional information, see hpe.com/us/en/alliance/microsoft/ws-admin-center.html.

HPE extensions for Microsoft Windows Admin Center

For Azure Stack HCI solutions built with HPE ProLiant DL325 Gen10 Plus servers on Windows Server 2019 or Azure Stack HCI OS, HPE has created two WAC extensions to enable HPE-specific management features. The HPE server extension provides a “single pane of glass” view of server components, health status, remedy options, and BIOS setting details. It also provides links to server HPE iLO for additional in-depth server management. The HPE extension for Microsoft Azure Stack HCI highlights cluster health and configuration details. It also surfaces firmware and driver revisions across cluster nodes to help prevent node inconsistency, a leading factor of issues with hyperconverged clusters.

HPE snap-in for deployment and update of Microsoft Azure Stack HCI configurations

For Azure Stack HCI solutions built with HPE ProLiant DL325 Gen10 Plus servers on Azure Stack HCI OS, HPE provides a snap-in for Windows Admin Center to support firmware/software deployment and update. The latest Service Pack for ProLiant (SPP) can be deployed during the WAC Cluster Creation process before a cluster is created, or during the WAC Cluster Updates after a cluster is already up and running.



HPE ProLiant DL325 Gen10 Plus for Azure Stack HCI solution—guidelines

- All the Azure Stack HCI solution examples documented in this technical white paper can be configured using a SFF or LFF chassis
- Any core count processors can be used in building an Azure Stack HCI solution
- The minimum processor frequency that can be used is identified in each of the Azure Stack HCI solution examples
- Use of alternative Windows OS boot devices and capacities other than what is specified in the example Azure Stack HCI solution configurations in this document is supported
 - Microsoft Software Defined Datacenter Additional Qualifier (SDDC AQ) is not required for boot drives
 - For additional information, see [Microsoft Storage Spaces Direct Base requirements for Windows Boot](#)
- Always install and update HPE extension for Microsoft Azure Stack HCI solution firmware and drivers using [Service Pack for ProLiant \(SPP\) Version 2021.10.1](#) or later
 - All Azure Stack HCI solution validations performed by HPE always use the most recent Service Pack for ProLiant (SPP) version
 - Alternative component firmware should only be used to resolve critical issues as indicated by HPE Support Communication Customer Bulletin
- For more information on Microsoft's platform hardware requirements for an Azure Stack HCI solution, refer to [Microsoft's Storage Spaces Direct hardware requirements](#)
- All drives available for HPE ProLiant will always have Windows Server Certification so any drives in the HPE catalog for the platform can be used with these HPE extension for Microsoft Azure Stack HCI solutions
 - See [HPE ProLiant DL325 Gen10 Plus QuickSpecs](#) for a complete list of available drive options
 - Each Azure Stack HCI solution in this document can only be configured using the solution identified bus types for cache and capacity devices
 - When choosing drives for HPE extension for Microsoft Azure Stack HCI solutions, make sure you follow the [Microsoft Recommended Drive Hardware Requirements](#)
- Azure Stack HCI solutions can be implemented using Windows Server 2019 or Azure Stack HCI OS. For information on configuration and deployment of HPE extension for Microsoft Azure Stack HCI solutions on HPE ProLiant using Microsoft Windows Server 2019, see [Implementing Windows Server 2019 Azure Stack HCI using HPE ProLiant servers](#). For information on configuration and deployment of HPE extension for Microsoft Azure Stack HCI solutions on HPE ProLiant using Microsoft Azure Stack HCI OS, refer to [Implementing Azure Stack HCI OS using HPE ProLiant servers](#).



All-Flash SAS SSD capacity example configuration

Solution Configuration/node
Version 1.0

HPE ProLiant DL325 Gen10 Plus All-Flash SAS SSD
SAS SSD capacity
Processor configurations 2.0 GHz or faster
Memory configurations from 64 GB to 2 TB
Minimum of 2 nodes with a cluster witness
Maximum of 16 nodes

Item	Description	Part number	Quantity
Operating system	Windows Server 2019 Datacenter (16 core) or Azure Stack HCI 20H2 HPE recommends HPE OEM licenses for Windows Server 2019	See Appendix for HPE OEM license options	1
Additional processor core licenses depend upon processor option	Windows Server 2019 Datacenter Additional License (2/4/16 core) HPE recommends HPE OEM licenses for Windows Server 2019	See Appendix for HPE OEM license options	Varies
Server	HPE ProLiant DL325 Gen10 Plus 24SFF Configure-To-Order Server	P15535-B21	1
Processors	See HPE ProLiant DL325 Gen10 Plus QuickSpecs for Processor Options	xxxxxx-B21	1
Memory	See HPE ProLiant DL325 Gen10 Plus QuickSpecs for Memory Options	xxxxxx-xxx	Varies
Network adapters	See Supported network adapter and storage controller options	xxxxxx-B21	1 or more
Storage controllers	See Supported network adapter and storage controller options	xxxxxx-B21	1 or more
OS boot	HPE 480GB SATA 6G MU M.2 2280 3yr Wty DS SSD	875490-B21	2
M.2 kit	HPE Universal SATA HHHL 3yr Wty M.2 Kit	878783-B21	1
Power supply	HPE 800W FS Plat Ht Plg LH Pwr Sply Kit	865414-B21	2
TPM	HPE Trusted Platform Module 2.0 Gen10 Plus Black Rivets Kit	P13771-B21	1
Rail kit	HPE DL325 Gen10 Plus 1075mm Easy Install Rail Kit	P18544-B21	1
HPE OneView	HPE OneView w/o iLO including 3yr 24x7 Support 1-server FIO LTU	P8B31A	1
HPE iLO Advanced	HPE iLO Advanced 1-server License with 3yr Support on iLO Licensed Features	BD505A	1

Cabling instructions can be found [here](#).

Option type	Description	Part number	Quantity
Minimum drive size validated, equal or larger drive sizes may be used			
Capacity SSD	HPE 800GB SAS 12G MU SFF SC DS SSD	See guidelines below	4 or more

Drive configuration guidelines

- Use of alternative size SAS SSD capacity drives within this solution is supported
 - The capacity must be configured with 4 or more SAS SSD drives with a size greater than or equal to 800 GB
 - See [HPE ProLiant DL325 Gen10 Plus QuickSpecs](#) for a complete list of available SAS SSD drive options



Hybrid NVMe Cache/SAS HDD capacity example configuration

Solution BOM/node HPE ProLiant DL325 Gen10 Plus Hybrid NVMe/SAS HDD
Version 1.0 NVMe cache/SAS HDD capacity
Processor configurations 2.0 GHz or faster
Memory configurations from 64 GB to 2 TB
Minimum of 2 nodes with a cluster witness
Maximum of 16 nodes

Item	Description	Part number	Quantity
Operating system	Windows Server 2019 Datacenter (16 cores) or Azure Stack HCI 20H2 HPE recommends HPE OEM licenses for Windows Server 2019	See Appendix for HPE OEM license options	1
Additional processor core licenses depend upon processor option	Windows Server 2019 Datacenter Additional License (2/4/16 core) HPE recommends HPE OEM licenses for Windows Server 2019	See Appendix for HPE OEM license options	Varies
Server	HPE ProLiant DL325 Gen10 Plus Configure-To-Order Server	P18606-B21	1
Processors	See HPE ProLiant DL325 Gen10 Plus QuickSpecs for Processor Options	xxxxxx-B21	1
Memory	See HPE ProLiant DL325 Gen10 Plus QuickSpecs for Memory Options	xxxxxx-xxx	Varies
Network adapters	See Supported network adapter and storage controller options	xxxxxx-xxx	1 or more
Storage controllers	See Supported network adapter and storage controller options	xxxxxx-xxx	1 or more
OS boot	HPE 480GB SATA 6G MU M.2 2280 3yr Wty DS SSD	875490-B21	2
M.2 kit	HPE Universal SATA HHHL 3yr Wty M.2 Kit	878783-B21	1
Drive cage kit	HPE DL325 Gen10 Plus 8SFF Smart Carrier FIO Drive Cage Kit	P15511-B21	1
Drive cage kit	HPE DL325 Gen10 Plus 8SFF to 16SFF Smart Carrier Drive Cage Upgrade Kit	P15497-B21	1
Drive cage kit	HPE DL325 Gen10 Plus 2SFF U.3 Smart Carrier Enablement Kit	P20418-B21	2
Power supply	HPE 800W FS Plat Ht Plg LH Pwr Sply Kit	865414-B21	2
TPM	HPE Trusted Platform Module 2.0 Gen10 Plus Black Rivets Kit	P13771-B21	1
Rail kit	HPE DL325 Gen10 Plus 1075mm Easy Install Rail Kit	P18544-B21	1
HPE OneView	HPE OneView w/o iLO including 3yr 24x7 Support 1-server FIO LTU	P8B31A	1
HPE iLO Advanced	HPE iLO Advanced 1-server License with 3yr Support on iLO Licensed Features	BD505A	1

Option type	Description	Part number	Quantity
Minimum drive size validated, equal or larger drive sizes may be used			
Cache NVMe	HPE 1.6TB NVMe Perf MU SFF SC U.3 SSD	See guidelines below	2 or more
Capacity HDD	HPE 600GB SAS 12G 10K SFF SC DS HDD	See guidelines below	4 or more

Cabling instructions can be found [here](#).

Drive configuration guidelines

- Use of alternative size NVMe Cache and SAS HDD Capacity drives within this solution is supported
 - The cache must be configured with 2 or more NVMe devices with a size greater than or equal to 1.6 TB
 - The capacity must be configured with 4 or more SAS HDD drives with a size greater than or equal to 600 GB
 - See [HPE ProLiant DL325 Gen10 Plus QuickSpecs](#) for a complete list of available NVMe and SAS HDD drive options



Supported network adapter and storage controller options

- Adapters supporting both iWARP and RoCE must be configured in iWARP mode
- HPE extension for Microsoft Azure Stack HCI solution only supports the use of SAS Drives in HPE external disk enclosures
- You will achieve better Storage Spaces Direct I/O performance with drives directly connected to storage controllers versus connecting drives to the storage SAS expander
- The HPE Smart Array P816i-a SR controller has 16 PCIe lanes allowing connection of up to 16 SAS or SATA drives. It is your perfect choice for achieving maximum Storage Spaces Direct I/O performance without the use of an SAS expander
- OS boot drives must not reside on any Smart Array Controller containing Storage Spaces Direct drives
- Storage Spaces Direct drives cannot reside on any Smart Array Controller configured with RAID volumes

Option type	Description	Part number
Network OCP3	HPE Ethernet 10/25Gb 2-port SFP28 QL41232HQCU OCP3 Adapter	P10118-B21
Network adapter PCIe plug-in	HPE Ethernet 10/25Gb 2-port SFP28 QL41232HLCU Adapter	P22702-B21
Storage controller modular	HPE Smart Array P816i-a SR Gen10 (16 Internal Lanes/4GB Cache/SmartCache) 12G SAS Modular LH Controller	869083-B21
Storage controller modular	HPE Smart Array E208i-a SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular LH Controller	869079-B21
Storage controller modular	HPE Smart Array P408i-a SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular LH Controller	869081-B21
Storage controller PCIe plug-in	HPE Smart Array E208i-p SR Gen10 (8 Internal Lanes/No Cache) 12G SAS PCIe Plug-in Controller	804394-B21
Storage controller PCIe plug-in	HPE Smart Array P408i-p SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS PCIe Plug-in Controller	830824-B21
Storage controller PCIe plug-in (Only SAS Drives are supported)	HPE Smart Array E208e-p SR Gen10 (8 External Lanes/No Cache) 12G SAS PCIe Plug-in Controller	804398-B21
Storage controller PCIe plug-in (Only SAS Drives are supported)	HPE Smart Array P408e-p SR Gen10 (8 External Lanes/4GB Cache) 12G SAS PCIe Plug-in Controller	804405-B21
Storage SAS expander	HPE DL325 Gen10 Plus 16SFF SAS Expander Kit	P16946-B21



Services and support

HPE Pointnext Services—Services and support

Get the most from your HPE products. Get the expertise you need at every step of your IT journey with [HPE Pointnext Services](#). We help you lower your risks and overall costs using automation and methodologies that have been tested and refined by HPE experts through thousands of deployments globally. [Advisory Services](#) from HPE Pointnext Services, focus on your business outcomes and goals, partnering with you to design your transformation and build a road map aligned to your unique requirements. Our [Professional](#) and [Operational Services](#) can be leveraged to speed up time-to-production, boost performance, and accelerate your business. HPE Pointnext Services specializes in flawless and on-time implementation, on-budget performance, and creative configurations that get the most out of software and hardware alike.

Consume IT on your terms

[HPE GreenLake](#) brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

Managed services to run your IT operations

[HPE GreenLake Management Services](#) provides services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

Free up resources with Operational Services from HPE Pointnext Services

HPE delivers services for IT by using proven best practices as well as automation and methodologies that have been tested and refined by HPE experts and [artificial intelligence](#) through thousands of deployments globally. Choose from the recommended services for customers purchasing from Hewlett Packard Enterprise or an authorized reseller. Services are quoted using Hewlett Packard Enterprise order configuration tools.

HPE Pointnext Tech Care

HPE Pointnext Tech Care is the new operational service experience for HPE products. HPE Pointnext Tech Care goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Pointnext Tech Care has been reimagined from the ground up to support a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. [HPE Pointnext Tech Care](#) is available in three response levels. Basic, which provides 9x5 business hour availability and a 1-hour response time. Essential which provides a 15-minute response time 24x7 for most enterprise level customers, and Critical which includes a 6-hour repair commitment where available and outage management response for severity 1 incidents.

HPE Pointnext Complete Care

HPE Pointnext Complete Care is a modular, edge-to-cloud IT environment service that provides a holistic approach to optimizing your entire IT environment and achieving agreed upon IT outcomes and business goals through a personalized and customer-centric experience. All delivered by an assigned team of HPE Pointnext Services experts. [HPE Pointnext Complete Care](#) provides:

- A complete coverage approach—edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience



HPE as Microsoft's Cloud Solution Provider

Microsoft's Cloud Solution Provider (CSP) program allows the customer to move away from transactional purchases of software and infrastructure and embrace cloud-driven business enablement with pay-as-you-go solutions.

- CSP means no up-front commitment and there are no constraints of perpetual licenses. It provides enterprises with improved flexibility as they pay a predictable monthly bill based on their usage of Microsoft cloud services.
- Enterprises can contract solely with HPE as their CSP for the Azure subscription and services. The price and payment relationship with the CSP simplifies the billing as it avoids the hassle of keeping track of multiple billing cycles for different subscriptions with Microsoft.
- Customers can save cost and increase the efficiency of their IT spend by switching from transactional and perpetual purchases of software and infrastructure and embracing cloud-driven business enablement with pay-as-you-go pay per minute solutions.
- It is a CSP program requirement that CSP partners must include support when reselling the subscription. Customers will contact their CSP for level 1 and level 2 support and the CSP is required to help resolve the problem for the customer. The CSP can elevate calls to Microsoft if needed but the CSP remains responsible for all customer communications.

For additional information on the Microsoft Cloud Solution Provider program, visit: partner.microsoft.com/en-US/cloud-solution-provider

HPE can also provide remote support for Microsoft Cloud Services (Azure and Office 365) via Microsoft's proven access model for partners such as Microsoft Azure Lighthouse and Granular Delegated Admin Privileges (GDAP) to existing cloud customers when HPE is not the customer's CSP.

For additional information on the Microsoft Managed Services features for remote access, visit:

docs.microsoft.com/en-us/azure/lighthouse/

docs.microsoft.com/en-us/partner-center/gdap-introduction



Appendix

Hewlett Packard Enterprise recommends cost-efficient HPE OEM licenses for Microsoft Windows Server 2019 Datacenter for a complete Azure Stack HCI solution from hardware to operating system out of one hand. Alternatively, customer supplied Windows Server 2019 Datacenter licenses such as Volume License or Retail can also be used.

The HPE OEM calculator for Microsoft Windows Server Core Licensing tool can assist you in calculating the number of required licenses: hpe.com/servers/windows-license-calculator.

HPE offers OEM Windows Server licenses in two distinct options and a wide range of languages:

- **Reseller Option Kit (ROK)**—Available through authorized HPE resellers at the time of purchase of an [HPE server system](#).
- **Direct from HPE factory**—Available for sale along with the purchase of your HPE server from the factory, you can select HPE OEM Windows Server 2019 Datacenter as a **not preinstalled** (Npi) option (also referred to as **drop in the box** license).

In both options, the OS media is included with the server.

For an updated list of available part numbers, see the [Windows Server 2019 QuickSpecs](#).

Learn more at

hpe.com/solutions/azurestackhci

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