

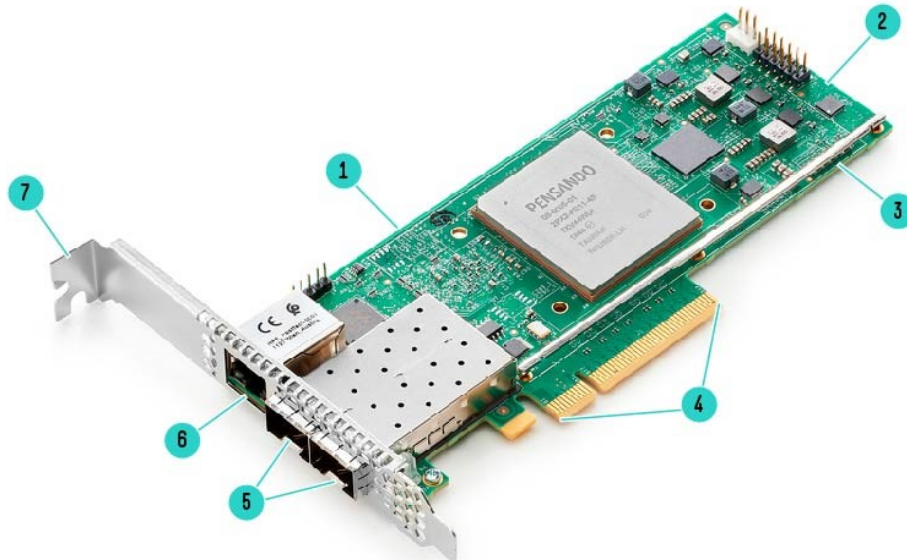
### Overview

#### Pensando Distributed Services Platform

The Pensando Distributed Services Platform (DSP) for HPE Servers delivers a powerful suite of software-defined network and security services like firewall, micro-segmentation, and telemetry—boosting network performance by moving these services to their ideal location, the server edge, where the transition between network and server occurs. This approach eliminates the need for discrete appliances, simplifies infrastructure design/operations, strengthens security posture, and improves total cost of ownership (TCO) while providing unmatched telemetry, I/O visibility and troubleshooting insights.

The massive expansion in the number and diversity of applications, as well as an explosion in the amount of data being generated and transported through enterprise data centers, has pushed the architectural limits of modern IT infrastructure. Traditional “scale-up” approaches – where networking services are embedded into top-of-rack switches, or networking and security appliances – are no longer able to keep up, suffering from either performance, agility or scale limitations as policy tables bloat and the number of active flows reaches into the millions. The limitations and expense of this centralized resource model have led data center architects to limit the core network infrastructure functions to simply transporting IP traffic with as little latency and jitter as possible.

Just as compute and storage systems are adopting a “scale out” approach, so too the networking and security elements of the data center must adopt a Scale-out Services Architecture and these functions need to find a new home in this model. The ideal place to instantiate these services is the server edge (the border between the server and the network) where services such as firewall, encryption, tunneling and VPN termination can be delivered in a scalable manner. In fact, since each server edge is tightly coupled to a single server, it needs to be aware only of the policies related to that server and its users. This approach naturally scales – as more services capabilities are made available when new servers are added.



**Notes:** The heatsink on the DSC-25 card shown in the photo above has been removed to display all components on the card.

- |    |                                      |    |                   |
|----|--------------------------------------|----|-------------------|
| 1. | Pensando DSC-25 Card (P26966-B21)    | 5. | 2 x 10/25G SFP28  |
| 2. | Power 20W typical                    | 6. | 1G Mgmt Port      |
| 3. | VMware, RedHat, SUSE, Windows Server | 7. | Standup PCIe Card |
| 4. | X8 PCIe Gen3                         |    |                   |

Overview

XXXXXX-**X21** is SKU designation formed by a common six digit part number and a -**X21** suffix that identifies a SKU that is available across multiple server family lines. Refer to the table below to find the SKU suffix that applies to the specific server product line this option can be ordered with.

<b>-B21</b>	<b>-H21</b>	<b>-K21</b>
<b>COMPUTE Server Line</b>	<b>SPECIALIZED COMPUTE Server Line</b>	<b>STORAGE Line</b>
HPE Cloudline CL2100/CL2200/CL2800/CL3100/CL4100/CL5200/CL5800 Servers HPE Composable Cloud for ProLiant DL HPE ProLiant BL460c/BL660c Servers HPE ProLiant DL20/DL160/DL180 Servers HPE ProLiant DL325/DL360/DL380/DL385/DL560/DL580 Servers HPE ProLiant DX360/DX380 Servers HPE ProLiant MicroServer HPE ProLiant for Microsoft Azure Stack HPE ProLiant ML30/ML110/ML350 Servers HPE Synergy 480/660 Systems HPE ProLiant DX170r/DX190r, DX2000 Servers HPE ProLiant DX560 Gen10 server HPE ProLiant DX4200 Gen10 server	HPE Apollo 35/40/70 Systems HPE Apollo 2000/6000 Servers HPE XL170r/XL190r/XL270d (Apollo 6500) Gen10 Server for BlueData Software HPE Converged System 300/500/700/750 HPE Edgeline Systems and Servers HPE Integrity BL860c i6/BL870c i6/BL890c i6 Server Blades HPE Integrity MC990 X Server HPE Integrity rx2800 i6 Server HPE Integrity Superdome HPE SGI 8600 System HPE Solutions for SAP HANA (TDI)	HPE Apollo 4200 Gen9/Gen10 Servers HPE Apollo 4200 Gen10 LFF Server for BlueData Software HPE Apollo 4510 Gen10 System HPE D2220sb/D2500sb Storage Blade HPE D3000/D6020/D8000 Disk Enclosures HPE Scalable Object Storage with Scality RING HPE SimpliVity 2600 HPE SimpliVity 325/380 Gen10 HPE Storage File Controllers HPE StoreEasy 1460/1560/1650/1660/1860  Disclaimer: This may not be a complete listing of applicable servers



## Standard Features

### Policy and Services Manager (PSM)

Pensando's Policy and Services Manager (PSM) is a distributed system, leveraging an intent-based model that delivers network and security policy to Pensando Distributed Service Cards (DSC) for services implementation at the edge. The PSM provides a secure API, CLI and GUI driven management framework to protect services and applications. It is built as a set of micro-services and is therefore highly scalable and fault tolerant. By employing an intent-based model, users are assured of consistent policy and configuration throughout a multi-tenant domain that supports thousands of nodes.

The PSM utilizes the DSC's gRPC and RESTful APIs for the management and monitoring of all device capabilities. Pensando's Policy and Services Manager enables seamless distribution of ACL and firewall security policies, network configuration, encryption policies, etc. to active DSCs. In addition, it provides full lifecycle management of the platform and all associated security and network services with pervasive visibility.

### Features

- Microservices-based, scalable distributed management controller
- Visibility of network problems at the edge of network
- Central management of network and security policy configuration
- Integration with VMware vCenter®
- Intent-based policy deployment model
- Recovery from node, process failures, and network partitions
- Independent from production data and traffic

### Benefits

- Simplified configuration and policy management for large scale deployments
- Security for Workloads
- "Always-on" telemetry for deep visibility into network behavior
- Troubleshooting capability to drastically shorten problem isolation time
- High Scale, High Performance Microservices-based, scalable distributed management controller

### PSM: Centralized Distributed Network and Policy Management

Managing security at Cloud-scale requires a new way of thinking about both management and security. Pensando has drawn from the wealth of today's DevOps practices in architecting the PSM as the backbone for network and security policy management for DSCs, creating an ideal and thoughtful balance. Administrators and Operators interact with a centralized scale-out service for simplicity and high availability, yet the system itself is fully distributed to avoid both bottlenecks and availability issues.

While policies are configured and managed centrally, they are distributed to each DSC, enabling individual DSCs to serve as an autonomous intelligent Edge, simplifying management by eliminating the need for centralized appliances and their complex infrastructure connectivity requirements for delivering infrastructure services. While the PSM uses a similar structure to Kubernetes for its own objects, customer workloads and services can correspond to containers, VMs and bare-metal workloads alike, including the ability to configure and manage security, network, and telemetry services.

### PSM: Highly Available and Fault Tolerant

To facilitate both operational simplicity and high availability, each PSM cluster node can be deployed either as a virtual appliance or as a set of native microservices on an existing Kubernetes cluster. The PSM may be deployed as a 3, 5 or 7 node quorum-based cluster, ensuring high availability and operational correctness in the event of any server or network failures. It is architected to be fault tolerant, allowing recovery from any process failures, node failures, or network partitions. Furthermore, since the PSM exclusively manages the control plane, there is no impact to the data path at Pensando DSCs if the PSM is ever offline or unreachable.



## Standard Features

### PSM: Policy Deployment

Policy configuration at scale represents a declaration of intent, regardless of propagation delays, planned maintenance windows, or unplanned network/server outages. Security configuration and changes must always be delivered as intended. The Pensando PSM deploys policy configurations and updates with an intent-based model that is widely used in modern network and storage infrastructure management platforms. All managed DSC devices are guaranteed to run coherent versions of network and security policies that have been deployed at scale.

### PSM: Comprehensive Audit and Compliance

Immutable secure audit records are the backbone of regulatory compliance in any industry. The Policy and Services Manager maintains detailed and comprehensive audit logs of every change. Its firewall service maintains firewall logs that include all essential attributes needed to meet the highest compliance standards. All logs can be easily exported from the PSM in CSV format, or continuously streamed through syslog to Splunk™, Kafka, ELK, or any big data analytics platform customers utilize

### PSM: Lifecycle Management

Every aspect of data center services and security undergoes continuous change. Managing the lifecycle of security rules and policies, workloads, applications requires a management model that adequately reflects the relationships, workflows and dynamics of data center operations. The Pensando PSM offers comprehensive lifecycle management, not only for security policies and workloads, but also for the underlying infrastructure itself. A native management model reflects the full lifecycle of all objects, allowing control of every object's lifecycle phase (Create, Replace, Update, Delete) through either the REST API or GUI.

Since the PSM has been designed with an intent-based model at its foundation, updates will always propagate. Even in situations where services or nodes may be unreachable or offline, the PSM guarantees that all updates intended for a given DSC will be received and instantiated as intended, whether towards a specific security rule being updated, or an upgrade of the DSC firmware itself.

## Distributed Services Platform Software Licensing Tiers and Capabilities

	Enterprise License	Enterprise Pro License
<b>Policy and Services Manager</b> Centralized Distributed Network and Policy Management	Included	Included
<b>Platform Security</b> Hardware-Root-of-Trust	Included	Included
<b>Always-on Telemetry and Deep Observability</b>	Included	Included
<b>Micro-Segmentation</b> For Virtualized (Window Hyper-V, Linux KVM) and Containerized (Kubernetes) Workloads		Included
<b>Distributed Stateful Firewall</b> For Bare-Metal, Virtualized (Window Hyper-V, Linux KVM) and Containerized (Kubernetes) Workloads		Included
<b>3rd Party Controller Integration</b>	Included	Included
<b>Notes:</b> Please refer to the <a href="#">Pensando Platform Enterprise Edition Release Notes</a> for specific software functionality support details.		

### Always-on Telemetry and Deep Observability

The Pensando Distributed Services Platform (DSP) brings sophisticated wire-speed telemetry to HPE ProLiant, Edgeline, and Apollo servers, providing real time observability and insights for network and storage, without affecting application performance or imposing any compromise on security or encryption. All observability functions are centrally managed through the PSM, which radically simplifies workload identification and correlation, and accelerates troubleshooting. The platform can easily correlate packet flows, ingest application level metrics, and do complex inferencing to expose actionable insights. Always-on telemetry at the server edge enables proactive end-to-end troubleshooting and problem reporting, minimizing downtime and significantly reducing MTTR.



## Standard Features

### Micro-Segmentation for Virtualized (Windows Hyper-V, Linux KVM) and Containerized (Kubernetes) Workloads

Isolate application tiers and virtualized (Windows Hyper-V, Linux KVM) and containerized (Kubernetes) workloads from each other on HPE servers and achieve “zero-trust security” enforced within each machine by the Pensando Distributed Services Card (DSC).

### Distributed Stateful Firewall for Bare-Metal, Virtualized (Windows Hyper-V, Linux KVM) and Containerized (Kubernetes) Workloads

Enabling policy enforcement and permitted-list communications between servers within the data center (E-W security), the Pensando DSC implements an enterprise-class, centrally managed stateful firewall at each server edge, with no host agents required and no performance impact. Advanced firewall functionality includes: Application Layer Gateway (ALG), and packet-based DDos attack protection (Flood, TCP SYN, fragmentation, Ping-of-Death, and more).

### 3rd Party Controller Integration

The Pensando PSM integrates with compute orchestration systems such as VMware vCenter and Kubernetes to simplify service provisioning. Example scenarios include identifying the compute instances (workloads) and implementing visibility or networking policy implemented and enforced by the DSC cards at each server node. As container workloads are added, removed or changed, the Pensando Distributed Services Platform matches the administered policies to the workloads, ensuring that authorized network, security, telemetry and troubleshooting policies are applied. The PSM also handles the addition/deletion of new hosts and their association with corresponding workloads, workload migration events, and lifecycle management of DSC cards.

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## HPE Greenlake Management Services

HPE Greenlake Management Services is a suite of services that helps customers manage, operate, and optimize their IT environments. Services can be tailored to meet the unique requirements of a customer’s environment—from operating their entire data center to managing specific environments within it, such as SAP HANA®, or operating certain layers of the infrastructure, like storage. Our Greenlake Management Services use a standardized approach that enables us to provide advice for optimizing a customer’s environment to improve quality, scalability, availability and reduce cost.

### Remote Monitor, Operate, Administer and Optimize Services

- Monitor: 24x7 Remote Monitoring, we monitor the environment and acknowledge alerts
- Operate: Single point of contact for problem identification and resolution. React to alerts, action (HPE scope) or pass to customer, perform scheduled maintenance as agreed upon
- Administer: Investigate alerts, execute activities to resolve, recommend and execute changes required (upon customer approval), perform patch updates. Infrastructure and network administration, access control, security updates, back-up and performance and capacity management.
- Optimize: We offer a higher, master level set of skills, these next generation skills enable HPE to provide advice in key technology areas supported with an eye to continuous improvement and optimization of the environment.

HPE Greenlake Management Services Help customers to manage and operate their IT environment through the unique combination of HPE people, process, and platform, all delivered based on ITIL best Practices.

### Platform

- An advanced suite of integrated management tools used to manage and optimize the environment
- Reduce investment in tools, staff, and training with HPE IP and platform
- Minimize risk with AI-driven business insights
- Support business-aligned decisions from core to cloud to edge

### People

- Experience premium support with dedicated relationship manager
- Gain faster business results with full-stack certified expertise
- Reduce risk with continuous support across 8 global support centers, 5000 experts



## Standard Features

### Process

- Deliver compliant outcomes with ITSM and HPE IP
  - Achieve greater IT continuity
  - Drive business efficiency with continuous improvement
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### HPE GreenLake

HPE GreenLake is HPE's market-leading IT as-a-service offering that brings the cloud experience to apps and data everywhere – data centers, multi-clouds, and edges – with one unified operating model. HPE GreenLake delivers public cloud services and infrastructure for workloads on premises, fully managed in a pay per use model. It combines the benefit from a public cloud-like experience with the customers' need to maintain full control of the IT solutions on premises.

HPE GreenLake customers can start with the capacity needed initially and grow with business demand, leveraging active capacity management, variable monthly payments based on metered usage, and services that simplify IT.

HPE GreenLake supports a wide, and growing, range of workloads as a service, including both HPE and partner technologies.

Examples include:

- Compute - Meet general purpose to high-performance computing needs
- Storage - Fast access to data with massive scalability and high availability
- Private Cloud - Gain agility with cloud services in customer data center and at the edge
- Database - Scalability for the most robust database environments
- Virtualization - Deliver capacity for virtualized workloads, with technology built and sized for customer needs

Backup - Worry free backup, data protection, disaster recovery, and Dev/Test

Powered by HPE GreenLake Central, a new intuitive self-service portal and operations console, customers can rapidly deploy services, gain cost and compliance insights, and simplify management across their entire hybrid estate. With HPE GreenLake Central, customers can free business units and developers from the traditional wait times for services as they use the self-service portal to find and use the services that they need.

Leveraging Pensando Distributed Services Platform, HPE has enriched the HPE GreenLake offer with a suite of software-defined, distributed network and security services.

The integration of the Pensando Distributed Services Platform into the HPE GreenLake infrastructure assures customers that every dollar paid for the HPE GreenLake computing power is spent to support the enterprise business processes instead of management applications like firewalling, micro-segmentation, load balancing, and other network and security functions, which are executed on the Pensando Distributed Services Cards' own silicon, instead of servers' CPU. One more positive side effect is a significant cost reduction, since the costly appliances usually adopted by customers for firewalling, load balancing and the like are not needed anymore, since their functions are pre-integrated in the HPE GreenLake with Pensando infrastructure. All this is available in customer premises or in a colocation facility and managed according to an as a service model.

Moreover, by adopting the HPE GreenLake with Pensando, customers will get all the power of the HPE's and Partners' technology equipped with an edge computing accelerator that allows to handle critical network functions at the compute edge, and the scale-out approach of HPE GreenLake compute and storage systems is extended to the networking and security elements of the data center.

HPE GreenLake with Pensando is available to customer through a public-cloud-like experience and priced according to a pay per use model.

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## Standard Features

### Supported Servers

- ProLiant DL325 Gen10
- ProLiant DL360 Gen10
- ProLiant DL380 Gen10
- ProLiant DL385 Gen10
- ProLiant DL560 Gen10
- ProLiant DL580 Gen10
- ProLiant DL325 Gen10 Plus
- ProLiant DL385 Gen10 Plus
- Apollo 4200 Gen10
- Apollo 4510 Gen10
- Edgeline EL8000

### GreenLake Offering

- ProLiant DL360 Gen10
- ProLiant DL380 Gen10

### Supported HCI Platforms

- VMware vSAN ReadyNode (vSAN 6.5 / 6.7 / 7.0)

Supported Operating Systems				
	Supported By HPE and Pensando	Signed Driver	Certified Driver	Inbox Driver
<b>Red Hat Enterprise Server</b>				
RHEL 7.7	Yes	Yes	No	No
RHEL 7.8	Yes	Yes	No	No
RHEL 7.9	Yes	Yes	No	No
RHEL 8.0	Yes	Yes	No	No
RHEL 8.1	Yes	Yes	No	No
RHEL 8.2	Yes	Yes	Yes	No
RHEL 8.3	Yes	Yes	Yes	Yes
<b>SUSE Enterprise Linux Server</b>				
SLES12 SP4	Yes	Yes	No	No
SLES12 SP5	Yes	Yes	No	No
SLES15 SP0	Yes	Yes	No	No
SLES15 SP1	Yes	Yes	No	No
SLES15 SP2	Yes	Yes	No	Yes
<b>VMware vSphere ESXi</b>				
ESXI 6.5	Yes	Yes	Yes	No
ESXI 6.7	Yes	Yes	Yes	No
ESXI 7.0	Yes	Yes	Yes	No
<b>Microsoft Windows Server</b>				
2016	Yes	Yes	Yes	No
2019	Yes	Yes	Yes	No



## Standard Features

### Warranty

This product is covered by a global limited warranty and supported by HPE Pointnext Services and a worldwide network of Hewlett Packard Enterprise Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HPE Pointnext Operational Services or customized service agreements. Hard drives have either a one year or three-year warranty; refer to the specific hard drive QuickSpecs for details.

#### Notes:

- Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories:
- Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part;
- Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have Hewlett Packard Enterprise replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at:  
<http://h17007.www1.hpe.com/us/en/enterprise/servers/warranty>.

Maximum: The remaining warranty of the HPE product in which it is installed (to a maximum three-year, limited warranty).

Minimum: One year limited warranty.

**Notes:** Additional information regarding worldwide limited warranty and technical support is available at:

<http://h17007.www1.hpe.com/us/en/enterprise/servers/warranty/index.aspx#.V4e3tPkrJhE>

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### Warranty and Support Services

Warranty and Support Services will extend to include HPE options configured with your server or storage device. The price of support service is not impacted by configuration details. HPE sourced options that are compatible with your product will be covered under your server support at the same level of coverage allowing you to upgrade freely. Installation for HPE options is available as needed. To keep support costs low for everyone, some high value options will require additional support. Additional support is only required on select high value workload accelerators, fiber switches, InfiniBand and UPS options 12KVA and over. Coverage of the UPS battery is not included under HPE Pointnext Operational Services; standard warranty terms and conditions apply.

24x7 software support is included in each Pensando software license. Customers can submit cases to HPE directly through the HPE Support Center portal or by calling HPE direct. Hewlett Packard Enterprise will respond to received cases with 2 hours. This coverage applies 24 hours a day, 365 days a year.

Pensando Distributed Services Platform products are supported by the HPE Pointnext Services Software Defined Networking (SDN) Center of Excellence (CoE), providing troubleshooting, advice and assistance. The SDN CoE is a virtual team located around the world, available 24x7. The SDN CoE are highly trained in the Software Defined Networking hardware, software and complex solution interoperability. If a problem requires engineering resources, the SDN CoE collaborates directly through live case exchange with Pensando as they investigate the issue.

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## Service and Support

### HPE Pointnext - Service 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. HPE Pointnext **Advisory Services** focus on your business outcomes and goals, partnering with you to design your transformation and build a roadmap tuned to your unique challenges. Our **Professional** and **Operational Services** can be leveraged to speed up time-to-production, boost performance and accelerate your business. HPE Pointnext specializes in flawless and on-time implementation, on-budget execution, 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.

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## Recommended Services

### HPE Pointnext Tech Care.

HPE Pointnext Tech Care is the new operational service experience for HPE products. 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 reimaged 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 2 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.

<https://www.hpe.com/services/techcare>

### 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

<https://www.hpe.com/services/completercare>

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## Service and Support

### Other related Services

#### HPE Server Hardware Installation

Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<https://h20195.www2.hp.com/v2/Getdocument.aspx?docname=5981-9356enw>

#### HPE Installation and Startup Service

Provides for the installation of your HPE hardware according to product specifications including options. The HPE service delivery technician will connect the product to a LAN as appropriate and enable remote support to allow for automatic case creation for hardware failures. Installation and start up services also include the installation of one supported operating system type (Windows® or Linux).

#### HPE Datacenter Care service

HPE Datacenter Care helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services “building blocks.” You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with HPE via a single point of accountability for HPE and others’ products. For more information, visit:

<http://www.hp.com/services/datacentercare>

#### DC for Hyperscale

Datacenter Care for Hyperscale is available for Service Providers and HPC customers who use a scale out approach to computing with a high-volume homogenous infrastructure and resilient architecture can take advantage of this environment support tailored to their operating model.

#### HPE Factory Express for Servers and storage

HPE Factory Express offers configuration, customization, integration and deployment services for HPE servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HPE products supported through Factory Express include a wide array of servers and storage: HPE Integrity, HPE ProLiant, HPE Apollo, HPE ProLiant Server Blades, HPE BladeSystem, HPE 9000 servers as well as the MSAXxx3PAR suite, XP, rackable tape libraries and configurable network switches.

#### HPE Service Credits

HPE Service Credits offers flexible services and technical skills to meet your changing IT demands. With a menu of service that is tailored to suit your needs, you get additional resources and specialist skills to help you maintain peak performance of your IT. Offered as annual credits, you can plan your budgets while proactively responding to your dynamic business.

#### HPE Education Services

Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment. <http://www.hp.com/ww/learn>

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## Service and Support

### HPE Support Center

The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers. Learn more <http://www.hpe.com/support/hpesc>.

The HPE Support Center Mobile App\* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

#### Notes:

- \*HPE Support Center Mobile App is subject to local availability.
- For more information: <http://www.hpe.com/services>.
- Pensando Distributed Services Platform is covered under the HPE Pointnext Services contract applied to the HPE ProLiant Server. No separate HPE support services need to be purchased.

Warranty and Support Services will extend to include HPE options configured with your server or storage device. The price of support service is not impacted by configuration details. HPE sourced options that are compatible with your product will be covered under your server support at the same level of coverage allowing you to upgrade freely. Installation for HPE options is available as needed. To keep support costs low for everyone, some high value options will require additional support. Additional support is only required on select high value workload accelerators, fiber switches, InfiniBand and UPS batteries over 12KVA. See the specific high value options that require additional support at:

<https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA4-8876ENW.pdf>.

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### Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction

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## Configuration Information

### Distributed Services Card (DSC)

Pensando Distributed Services Platform DSC-25 Enterprise 10/25Gb 2-port SFP28 Card	P26966-B21
Pensando Distributed Services Platform for HPE iLO Sideband Management Adaptive LOM Module	P26969-B21

**Notes:** You can access iLO through the DSC-25 network ports by ordering the HPE iLO Sideband Management Adaptive LOM Module (P26969-B21) in addition to the DSC-25 card (P26966-B21), or you can only order the DSC-25 card and use the dedicated iLO port on the server to access iLO.

### Pensando Distributed Services Platform Software Licenses

#### Enterprise Software Licenses

Pensando Distributed Services Platform Enterprise 1-year Renewal Subscription 24x7 Support E-RTU	R6A06AAE
Pensando Distributed Services Platform Enterprise 3-year Subscription 24x7 Support E-RTU	R6A07AAE
Pensando Distributed Services Platform Enterprise 4-year Subscription 24x7 Support E-RTU	R6F68AAE
Pensando Distributed Services Platform Enterprise 5-year Subscription 24x7 Support E-RTU	R6A08AAE

#### Enterprise Pro Software Licenses

Pensando Distributed Services Platform Enterprise Pro 1-year Renewal Subscription 24x7 Support E-RTU	R6A09AAE
Pensando Distributed Services Platform Enterprise Pro 3-year Subscription 24x7 Support E-RTU	R6A10AAE
Pensando Distributed Services Platform Enterprise Pro 4-year Subscription 24x7 Support E-RTU	R6F69AAE
Pensando Distributed Services Platform Enterprise Pro 5-year Subscription 24x7 Support E-RTU	R6A11AAE

#### Requirements:

One 1yr/3yr/4yr/5yr Enterprise or 3yr/4yr/5yr Enterprise Pro license must be purchased for every DSC-25 card in a server.



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## Related Options

### Supported Transceivers

#### 25Gb Transceivers

HPE 25Gb SFP28 to SFP28 3m Direct Attach Copper Cable	844477-B21
HPE 25Gb SFP28 to SFP28 5m Direct Attach Copper Cable	844480-B21
HPE 25Gb SFP28 to SFP28 7m Active Optical Cable	844483-B21
HPE 25Gb SFP28 to SFP28 15m Active Optical Cable	845396-B21
HPE 25Gb SFP28 SR 100m Transceiver	845398-B21

#### 10Gb Transceivers

HPE BladeSystem c-Class 10Gb SFP+ SR Transceiver	455883-B21
HPE BladeSystem c-Class 10Gb SFP+ LR Transceiver	455886-B21

#### 10Gb Direct Attach Copper (DAC) Cables

HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable	487655-B21
HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable	537963-B21

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## Technical Specifications

<b>PENSANDO DSC-25 CARD (P26966-B21)</b>	
ASIC	Pensando Capri
Form Factor	Standup card
Card Profile	Half-height, half-length (brackets for full-height and half-height PCIe slots are provided)
Dimensions	69 mm x 176mm
Weight	178 grams
PCIe Interface	8-lane PCIe Gen3
Data Rate	10/25Gb
Network Ports	2 x SFP28
Management Port	1 x RJ45 100M/1G Ethernet
Indicators	Port activity and link
Power	20W typical
Cooling	Passive
Distance	7 meters for DAC (Copper cable); 15 meters AOC (Active optic transceiver); 100 meters SFP SR transceiver
IEEE Standards Compliance	<ul style="list-style-type: none"> <li>– IEEE 802.3by, Ethernet Consortium 25 Gigabit Ethernet, supporting all FEC modes</li> <li>– IEEE 802.3ae 10 Gigabit Ethernet</li> <li>– IEEE 802.3ad, 802.1AX Link Aggregation</li> <li>– IEEE 802.1Q, 802.1P VLAN tags and priority "</li> </ul>
Jumbo Frames	Up to 9216 Bytes
Pre-boot Execution Environment (PXE) in UEFI Mode	Yes
Pre-boot Execution Environment (PXE) in Legacy BIOS Mode	No
Wake-on-LAN (WOL)	No
Internet Protocol (IP)	IPv4, IPv6
Large Send Offload (LSO)	Yes
Checksum Offload	Yes
Interrupt Coalescence	Yes
Auto Negotiation / Sensing	Yes
Teaming Network Fault Tolerance (NFT)/Transmit Load Balancing (TLB)/Switch-assisted Load Balancing (SLB) Switch Independence Teaming/IEEE 802.1AX Link Aggregation Protocol	Yes
Promiscuous Mode	Yes
Internet protocol security (IPsec) offload	No
iSCSI Acceleration	No
iSCSI Boot	No
Tunnel Offload (NVGRE & VXLAN)	No
Remote direct memory access (RDMA)	No
Receive side scaling (RSS)	Yes
I/O Acceleration Technology (I/OAT)	No
VMware NetQueue	No



## Technical Specifications

<b>Pensando DSC-25 Card (P26966-B21)</b>	
Microsoft Virtual Machine Queue (VMQ)	No
Virtual Machine Device Queues (VMDq)	Yes
Message Signaled Interrupts (MSI-X)	Yes
Congestion Notification (802.1Qau)	No
Energy Efficient Ethernet (IEEE 802.3az)	No
Precision Time Protocol (IEEE 1588)	No
Timing and Synchronization (IEEE 802.1AS)	No
Partitioning (IEEE 802.1Qbg/Flex-10)	No
Oneview Enable NPAR	No
Network interface card partitioning (NPAR)/Switch Independence NPAR	No
Single Root I/O Virtualization (SR-IOV)	No
VMDirectPath	Yes
iWARP	No
DPDK	Yes
Physical functions per port	1
Root of Trust	Yes
Authenticated Updates	Yes
Secure Boot	No
Audit Log	Yes
Configuration Utilities	Yes
Device-level Firewall	Yes
HPE Sea of Sensors 3D	No
iSCSI/FCoE	No
LED indicators	Yes
NEBS	No
Optimized for Virtualization	Yes
Sanitization	No
TCP/UDP/IP	Yes



## Summary of Changes

Date	Version History	Action	Description of Change
04-Oct-2021	Version 8	Changed	Pointnext Services Updated
02-Aug-2021	Version 7	Changed	Service and Support Section was updated
18-Jan-2021	Version 6	Changed	Configuration Information Section was updated
07-Dec-2020	Version 5	Changed	Updated Supporting Operating Systems and Transceivers
05-Oct-2020	Version 4	Changed	Configuration Information and Standard Features Sections were updated
03-Aug-2020	Version 3	Changed	Configuration Information Section was updated
06-Jul-2020	Version 2	Changed	Standard Features Section was updated
06-Apr-2020	Version 1	New	New QuickSpecs.





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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less

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