Engineered for the highest availability

HPE NonStop family of systems

HPE GreenLake

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HPE NonStop family of systems

In a world that never stops, many enterprises absolutely can't afford to be unavailable — for any reason. That's where the unique value of HPE NonStop comes in, with fully integrated, fault-tolerant systems delivering the highest availability, massive scalability, and operational efficiency. And, now offering the flexibility and choice of an unparalleled family of systems. HPE NonStop for industries that never stop.
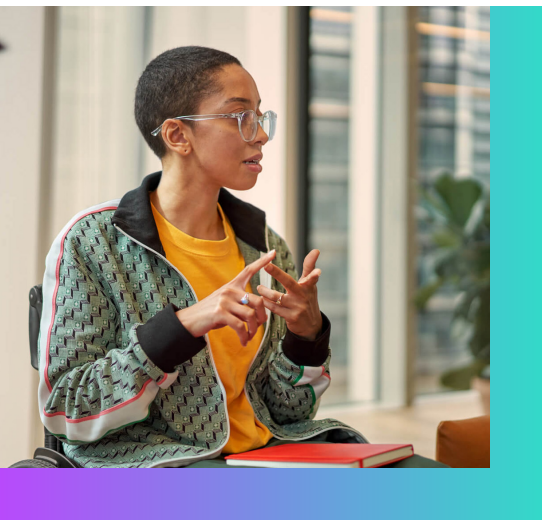
Engineered for the highest availability level

In this mission-critical environment, business processing, online transaction processing (OLTP), and enterprise databases are the most-critical workloads to ongoing success — and are driving the need for workload-optimized, proven technology that can deliver continuous business and lower risk.

When availability matters, it's time for a new compute approach.

HPE NonStop is designed specifically for the very highest availability level. According to the IDC Availability Level 4 definition,[1] that means business processes continue as before.

"AL4 defines true fault tolerance, enabling continuous data processing, even in the event of the failure of one hardware or software component. The end user experiences no perceived interruption based on the use of fault-tolerant servers. In this level, the combination of multiple hardware and software components allow a near-instantaneous failover to alternate resources so that business processing continues as before without interruption."[2]

> " HPE NonStop has never failed us. Our entire payment factory runs on it. Everything about NonStop, from the hardware tooling to the OS and database, is built to make sure no transaction can be lost. That is very important for protecting the good name of our bank and keeping the confidence of our customers."
>
> – **Fred Böcker**, Product Owner for HPE NonStop, Rabobank

AL4
- Fault-tolerant server
- Switch to alternate resources is not perceptible to end users
- 100 percent component and functional resiliency

AL3
- Clustered server
- Short outage is needed for failover to take place
- User workload fails over to alternate resources

AL2
- Workload balancing
- Balancing may not be perceptible to end users because of retry
- User request is redirected to alternate resources

AL1
- Not shipped as highly available
- Need to switch to redundant resources before processing resumes
- No special protection for availability

Applications

Modern application development tools

Middleware

Database and transaction management

System management and control

Security

HPE NonStop operating system

Hardware
The HPE NonStop fully integrated stack

AL4 defines fully fault-tolerant servers

> Developments of the past few years have been a perfect storm for the continuing importance of AL4 platforms. The platforms have changed, and the environment around them has changed, allowing high-value data on fault-tolerant systems to be fully leveraged for digital transformation."

– **Peter Rutten**, IDC Infrastructure Systems, Platforms and Technologies group

AL4 systems mean no interruption of work, no transactions lost, and no degradation in performance. For more than four decades, the HPE NonStop architecture remains the ideal choice when there's a need for the highest level of availability and reliability — in compute environments that require continuous business.

Fully virtualized integrated stack

The HPE NonStop technology delivers true business resiliency with a highly integrated stack of hardware, software, database, and application services — providing the foundation that HPE NonStop mission-critical customers continue to rely on.

Continuous availability — Delivering instant, continuous access to secure, accurate data

Extremely low TCO — Reducing operating costs, and gaining on loss of downtime

Real-time database — Handling high-volume transaction processing and data warehouse environments

Data integrity — Ensuring transaction integrity and reliable handling of data

Massive scalability — Enabling near-linear scaling without degradation

Standard and modern — Leveraging the economies of standards-based, modular computing, and modern software development environments

End-to-end security — Providing sophisticated protection of resources and data

HPE NonStop systems are architected with built-in clustering, workload balancing, and online management to deliver continuous application availability and meet the most stringent uptime SLAs. HPE NonStop systems scale up to 16 HPE NonStop CPUs (currently for the HPE NonStop X NS7) within a single system (node), each running its own copy of the HPE NonStop OS, and scale out to 4,080 HPE NonStop CPUs on 255 networked HPE NonStop nodes. These capabilities enable an environment that pools and optimizes all resources at the application level. Processing capacity, storage, and network resources are shared transparently to the end user.

The proven reliability, and virtually unlimited scalability of HPE NonStop is enabled by the HPE NonStop operating system, which combines the scalability of shared-nothing, massively parallel processing with industry-leading application availability, uncompromising data integrity, and support for key industry standard application programming interfaces (APIs) and services. It is this tightly integrated hardware and software architecture, combining hardware fault tolerance and software process-pair fault tolerance that delivers the very highest availability level.

Architectural choice without compromise

For decades, enterprises have trusted HPE NonStop systems to power mission-critical 24x7 solutions, recognizing the distinct advantages of unmatched continuous availability and scalability. And now, HPE is offering the flexibility and choice of an unparalleled portfolio of HPE NonStop fault-tolerant systems for high-value business workloads and customer-facing applications — each with the same HPE NonStop fundamentals.

Extending the HPE NonStop brand

The HPE NonStop product family of factory-integrated, fully tested, and verified hardware and software systems can be deployed on the Intel® Xeon® processors of the current HPE NonStop platform, also commonly referred to as the HPE NonStop converged systems. HPE has extended the mission-critical HPE NonStop solution to include a virtualized solution that can be deployed in a private cloud environment. This HPE Virtualized NonStop (vNS) is managed through VMware® based solutions and can be deployed on many industry standard x86-based servers. This software-based solution increases your choice of HPE NonStop systems from the fully integrated and tested HPE NonStop converged systems to VMware based virtualized IT platform as a service depending on what best suits your specific needs.

The addition of HPE Virtualized NonStop provides current HPE NonStop customers with the flexibility to confidently make continued investments in their current HPE NonStop infrastructure, with an option to move to a software defined, private cloud environment whenever they are ready. Whatever your HPE NonStop deployment choices are, you will benefit from the HPE NonStop fundamentals of availability, scalability, security, and data integrity for your mission-critical workloads.

HPE NonStop systems at-a-glance

Ultra-robust systems that deliver 24x7 continuous availability, unrivalled data integrity, and the capacity to handle the most-demanding processing-intensive workloads.

HPE NonStop NS4 and HPE NonStop NS8 are the latest systems evolving the HPE NonStop architecture from blade-systems to a rack-mounted CPU architecture, with a new system interconnect.

HPE NonStop systems powered by Intel Xeon processors

HPE NonStop NS4 system

Entry-class system for smaller enterprise businesses and emerging markets as well as distributed computing and test/development environments

HPE NonStop NS8 system

Virtually unlimited scalability with high-level performance based on the x86 architecture with InfiniBand as the system interconnect

Table 1. HPE NonStop NS8 and NS4 systems

HPE NonStop CPUs per system	Minimum: 2 Maximum: 4	Minimum: 2 Maximum: 16
Software licensing	Core licensing: 1 or 2-core software license	Core licensing: 2, 4, or 6-core software license
RAM	Per CPU: • Minimum 32 GB • Maximum 64 GB Per system: • Maximum 256 GB	Per CPU: • Minimum 64 GB • Maximum 256 GB Per system: • Maximum 4.0 TB for a 16 CPU HPE NonStop system
Memory type	HPE DDR4 memory	HPE DDR4 memory
HPE NonStop OS	L-series (L20.10 or later)	L-series (L20.10 or later)
System interconnect	InfiniBand	InfiniBand
Clustering	Expand-over-IP	HPE NonStop X Cluster Solution Expand-over-IP
I/O controllers (maximum number of CLIMs)	8	56
Network controller	Designed for 5 x 1GbE ports per network controller. A network controller can be an HPE NonStop entry-class IP or Telco CLIM. The NS4 is designed for up to four IP or Telco CLIMs.	Designed for 4 x 10GbE and 1 x 1GbE ports per network controller. A network controller can be an HPE NonStop IP or Telco CLIM. The HPE NonStop NS8 X4 system is designed for up to 56 CLIMs (a combination of Storage, IP, and Telco CLIMs). A minimum of two IP or Telco CLIMs are required.
Drive type	SAS SFF (2.5 in.) Solid State Drive (SSD), SAS SFF (2.5 in.) Hard Disk Drive (HDD). Enterprise storage system (ESS) with HPE XP8 Storage Array.	SAS SFF (2.5 in.) Solid State Drive (SSD), SAS SFF (2.5 in.) Hard Disk Drive (HDD). Enterprise storage system (ESS) with HPE XP8 Storage Array.
Drive description	Designed for up to 25 SAS SFF drives per enclosure and up to 100 drives per system. The drive enclosures connect to storage controllers referred to as HPE NonStop entry-class Storage CLIMs. The NS4 is designed for up to four Storage CLIMs.	Designed for up to 25 SAS SFF drives per enclosure and up to 2,700 drives per system. The drive enclosures connect to storage controllers referred to as HPE NonStop Storage CLIMs. The HPE NonStop NS8 X4 system is designed for up to 56 CLIMs (a combination of Storage, IP, and Telco CLIMs). A minimum of two Storage CLIMs is required.

HPE Virtualized NonStop

HPE Virtualized NonStop delivers HPE NonStop Software (O/S, database, clustering, security) managed in a VMware environment using HPE or third-party x86 servers. It reflects the continuing innovation and "always adapting" HPE NonStop solution portfolio to keep customers at forefront of technology to fulfill business objectives as needs change. HPE vNS allows customers to host HPE NonStop solutions within their enterprise's software-defined data center (SDDC), virtualized and managed through VMware vRealize® Orchestrator™. HPE Virtualized NonStop systems can be deployed on infrastructure as a service (IaaS) built using industry standard servers, storage, and networking products from your choice of vendors. The full suite of HPE NonStop X software products runs on vNS. Applications built for the HPE NonStop X (TNS/X) architecture need no modifications or recompilation to run on HPE Virtualized NonStop, and hence offers great compatibility and easy, flexible movement between architectures, depending on where you want to place your HPE NonStop workload.

Table 2. Technical specifications — IaaS[3]

Specification	
Supported virtualization and cloud technologies	VMware vSphere® 6.5 and 6.7
Compute nodes	Intel® x86-64 (Intel Xeon) processor-based servers
Connectivity fabric for HPE NonStop VMs	RoCE
Supported hypervisors	VMware ESXi™ 6.5 and 6.7

Table 3. Technical specifications — HPE Virtualized NonStop system configuration

Specification	HPE Virtualized NonStop (high-end)	HPE Virtualized NonStop (entry-class)
Number of cores	2, 4, and 6	1
Allowed CPUs	2 to 16 (even count only)	2 or 4
Memory per CPU	64 GB to 192 GB in 1 GB increments	32 GB to 64 GB in 1 GB increments
Number of IP/Telco vCLIMs supported	2 to 54 (total of IP/Telco and storage vCLIMs <= 56)	2 to 4
Allowed cores per IP/Telco vCLIM	8 (default), 4 (user option)	8 (default), 4 (user option)
Number of storage vCLIMs supported	2 to 54 (total of IP/Telco and storage vCLIMs <= 56)	2 to 4
Allowed cores per storage vCLIM	8 (default), 4 (user option)	8 (default), 4 (user option)
Support for RoCE clustering	Yes	No
Licensing methodology	vCore	vCore

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[3] For a complete and up-to-date description of the IaaS requirements and how to deploy and manage on VMware, refer to the document "Hardware architecture guide for HPE Virtualized NonStop on VMware" available here.

HPE NonStop systems: Engineered for fault tolerance

The entire family of HPE NonStop systems being sold today run the HPE NonStop OS L-Series are 100% fault-tolerant while delivering high level of availability, massive scalability, data integrity, and a low total cost of ownership (TCO). The NS4 X4 and NS8 X4 systems are architected with rack-mounted CPUs coupled together with an industry-standard InfiniBand as the system interconnect for extreme scalability, fabric flexibility, high throughput, and low latency.

Massive scale-out capacity to grow and flex with your business needs with the HPE NonStop NS8

The HPE NonStop NS8 system can scale out to match growing business demands, with the capacity to handle processing-intensive workloads. Starting with as few as two HPE NonStop CPUs, a single HPE NonStop NS8 node can grow up to 16 HPE NonStop CPUs.

The HPE NonStop NS8 system offers 2-, 4-, or 6-core software licensing options. When licensed at the 6-core option, the HPE NonStop NS8 provides almost three times the performance capacity of the HPE Integrity NonStop BladeSystem NB56000c licensed at its maximum 4-core option.[4]

With HPE NonStop Dynamic Capacity licensing, you can temporarily increase your compute capacity by an additional 2-cores per HPE NonStop CPU. When you no longer need the additional capacity, you simply return the system licensing to its original state. These changes can be done completely online.

A single HPE NonStop NS8 node can support up to 4 TB of main memory (RAM). With HPE NonStop Expand-over-IP, the HPE NonStop NS8 can be networked with up to 255 nodes. This represents an impressive scale-out factor up to 4080 CPUs and more than 24,000 cores — supported by up to 1 PB of memory. More details on HPE NonStop X Cluster solution later in the document.

Flexible capacity in an entry-class system with capacity to grow with your business needs

The HPE NonStop NS4 system can scale to match growing business demands, with the capacity to handle processing-intensive workloads. Available in a two HPE NonStop CPU hardware bundle, the HPE NonStop NS4 system can be expanded up to four HPE NonStop CPUs, each with 64 GB of memory (RAM).

The HPE NonStop NS4 offers 1- or 2-core software licensing options, providing customers with additional choices when planning for future growth. A customer can start with a 1-core software license and easily move to a 2-core with a onetime bump in performance capacity on a running system.

A single HPE NonStop NS4 system (node) can support up to 256 GB of main memory (RAM). With HPE NonStop Expand-over-IP, the HPE NonStop NS4 can be networked with up to 255 nodes. This represents an impressive scale-out factor of more than 1,000 CPUs and more than 2,000 cores — supported by ~64 TB of memory.

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[4] 6-core licensed HPE NonStop NS8 X4 system compared to an HPE Integrity NonStop i BladeSystem NB56000c licensed at 4-cores, HPE Internal testing, August 2020

HPE GreenLake with HPE NonStop

Before we go into the details of why, what and how of HPE NonStop together with HPE GreenLake, let us examine what HPE GreenLake actually is and how it is helping customers across the world.

Major challenges faced by enterprise IT today

1. **Imperative modernization hindered by traditional IT:** Legacy toolsets and/or lack of skills and resources, issues with data accessibility, application portability, and full cost visibility make it difficult for IT to address the challenges inherent in the new edge-to-cloud reality.

2. **Aligning financial models to cloud era:** IT budgets are shrinking, and organizations are looking for new ways to fund innovation, do more with less through evolving consumption models, and leverage embedded managed services to reduce reliance on expensive skill sets.

3. **Implementing end-to-end security.** Organizations are struggling with implementing end-to-end security that fully accords with their hybrid and multi-cloud requirements due to a lack of expertise in applying security innovations such as zero trust architecture and DevSecOps.

4. **Optimizing capacity planning.** IT decision-makers need the ability to optimize capacity planning to avoid errors that can result in too much spending on over-estimated capacity as well as any upgrades, fixes, and penalties that stem from under estimating capacity.

So, what is HPE GreenLake and how it can help?

HPE GreenLake is our hybrid cloud offering that delivers cloud services from HPE and partners through a highly integrated and simple edge-to-cloud platform at customer's choice of location bringing a cloud experience to all apps and data. It has some or all of the below aspects, that can be uniquely customized for individual needs:

• It is a **hybrid cloud** purposely built for data and workloads which run best in a private environment, due to needs such as data sovereignty, compliance, and gravity.

• The platform provides an experience which is pay as you go,* self-service, scalable and "**managed for you**" in all the aspects – data, security, cloud, or edge – bringing innovation at cloud speed to your hybrid environment.

• HPE GreenLake **modernizes IT for data and applications** our customers need to keep private and on-premises, while meeting the needs of performance, TCO and sustainability.

• Customers can be assured they **always have the capacity** needed for workloads with a built-in buffer to enable scale to meet unexpected spikes in resource demand.

Why HPE GreenLake for the mission-critical HPE NonStop platform?

First and foremost, HPE GreenLake helps the HPE NonStop platform to be a part of the enterprise-wide cloud strategy initiatives while making it easier for a diverse set of customers to cross the bridge of modernization with the pay-as-you-go model reserving large capital expenditures. It provides a consumption model that adapts to their usage patterns, aligning expenditures with business outcomes. It fosters a closer partnership with HPE for customers' day-to-day business execution **plus** better planning for growth, new features, new products, new analytics, security and meeting compliance, while helping them solve the diminishing HPE NonStop talent problem.

Simply put, it's our **business resilient, highly integrated stack of hardware, software, database, services and application** able to deliver high levels of availability, massive scalability and data integrity to our mission critical customers.
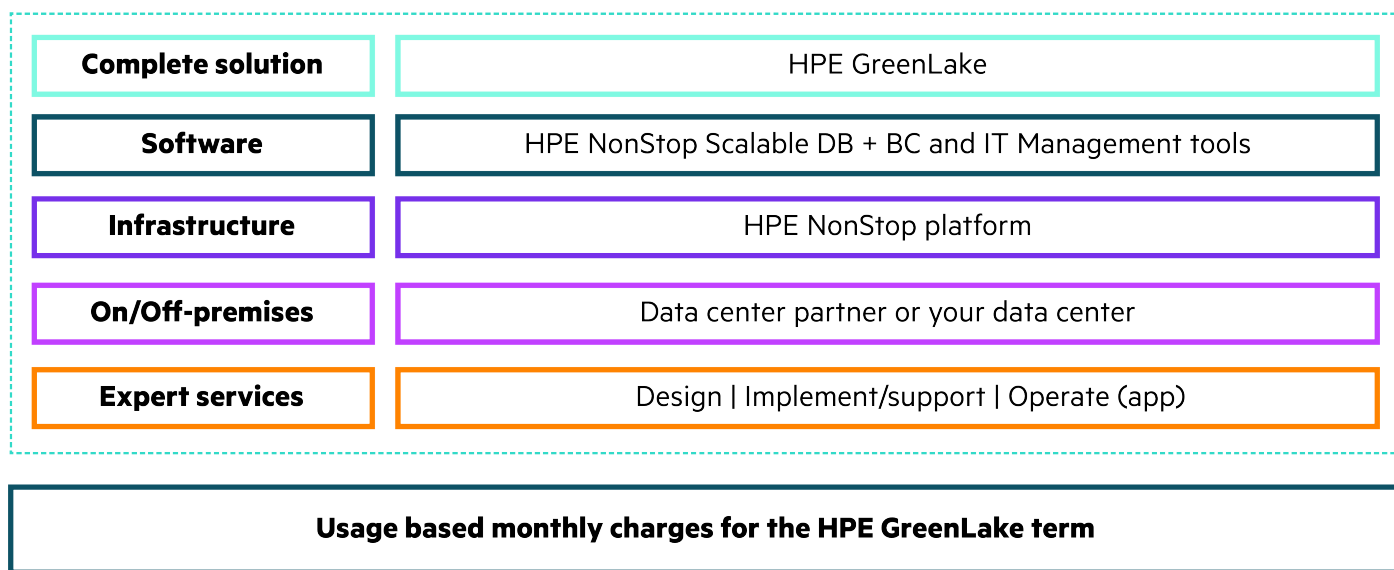
Complete solution	HPE GreenLake
Software	HPE NonStop Scalable DB + BC and IT Management tools
Infrastructure	HPE NonStop platform
On/Off-premises	Data center partner or your data center
Expert services	Design | Implement/support | Operate (app)

Usage based monthly charges for the HPE GreenLake term

Figure 1. HPE GreenLake and HPE NonStop solution recipe

* May be subject to minimums or reserve capacity may apply

Details of HPE NonStop integration and availability with HPE GreenLake

The HPE NonStop platform has been part of the HPE GreenLake selling model since the latter's inception. It has been first introduced as a fixed capacity model, providing customers with right to use the full capacity of the HPE NonStop system in exchange of a flat monthly fee. This model usually also includes the HPE NonStop hardware, software, support, professional services and HPE managed services costs to impart the complete benefits of an as-a-service model. Customers need to pay a fixed monthly fee throughout the HPE GreenLake contract term which usually aligns with the HPE NonStop licensing terms of 3-, 4-, 5-years. This helps the customers with a predictable, monthly cost-estimation, rather than huge capital outlays buying the actual hardware and associated software.

Introducing the flexible, consumption-based billing model for HPE NonStop

HPE has recently introduced a consumption-based model for HPE NonStop systems with HPE. With this new model, you will get a more granular, core-consumption based billing approach. HPE GreenLake together with HPE NonStop have developed a metering mechanism that captures changes in the number of activated CPU cores in the system, enabling a cloud economics model, where you pay for actual core usage, rather than having to pay for the installed capacity.

The in-built metering mechanism tracks active cores per hour and helps to create a variable, monthly HPE GreenLake billing based on actual cores used per hour (Monthly sum of active cores). Customers can use the familiar HPE GreenLake edge-to-cloud platform for usage tracking and billing. With proper sizing, there are opportunities to leverage this new flexible core capability during peak seasons, and end of month processes. In summary the consumption-based model provides an end user a more consistent customer experience during hours of the day with higher processing demands to support the business. The new, flexible, consumption-based model and the old full-capacity model for the HPE NonStop platform are together referred to as HPE GreenLake Flex Solutions built for high availability compute.

HPE NonStop Software

The advantage of the HPE NonStop Software stack

HPE NonStop systems have been designed from day one with an integrated software stack that supports fault tolerance. These are delivered to customers as fully tested and verified hardware and software solutions for out-of-the-box efficiency. The HPE NonStop software stack includes the HPE NonStop OS and the OSS file system, security, system management, middleware, Java and Java-frameworks, a modern development environment, and one of the most scalable fault-tolerant databases in the world.

The HPE NonStop X is offered with the L-series version of the HPE NonStop operating system. The HPE NonStop X software stack has been optimized to take advantage of the x86 architecture and use InfiniBand technology to improve software performance throughout the system. Security and time synchronization software are included with the HPE NonStop OS.

HPE NonStop SQL/MX and SQL/MP database products are both available on HPE NonStop X with all the latest features for massive scalability. Middleware products are available, as are Java and Java-related frameworks. The HPE NonStop Development Environment for Eclipse (NSDEE) and compilers are enhanced with x86 architecture in mind. If you are new to HPE NonStop you may find the HPE NonStop Eclipse development environment friendly and familiar to your application development efforts on other platforms. HPE NonStop is also taking great strides in the area of application modernization with DevOps. Innovating on the platform is now as flexible and easy as any modern IT platform in your data center since modern DevOps tools such as Git, Ansible, and Jenkins can be used to develop applications on HPE NonStop.

Modern application development environment

Integrated Development Environments (IDEs) make it easier for most developers to create and maintain application programs. With that in mind, HPE NonStop has invested in bringing these modern environments to the HPE NonStop application community. Now programmers can develop and test their business-critical applications for HPE NonStop from anywhere. HPE NonStop Development Environment (NSDevEnv) is a self-sufficient package for remote development of fault-tolerance aware, always-on applications using a true public cloud model. It is a self-sufficient bundle of three products which help edit, compile and build applications without having to own/procure the products. The HPE NSDevEnv is offered in the virtual machine (VM) based software-as-a-service model and is designed to leverage the public cloud's reach and flexibility. Application programmers and solution developers can readily access all the tools in one place, at their convenience, whenever they want to and from wherever they are, in a pay-as-you-go cloud economics model.

Modern frameworks

There are well over one hundred frameworks available to software developers, most of which are based on a specific language such as Java, C++, or JavaScript. Several of the most widely used open source and free Java frameworks make up the SASH stack, an acronym to describe a set of open-source middleware that encourages application objects to be Plain Old Java Objects (POJO) — domain objects that only implement application specific logic.

• Apache MyFaces (presentation services)

• Axis2 (web services)

• Spring (business services)

• Hibernate (persistence services)

As a result, these open-source frameworks have been widely adopted by Java developers, and in many cases have become the de facto technology for developing enterprise Java applications largely replacing EJB technology. HPE has tested and certified these frameworks for deployment on HPE NonStop. Sample programs, recommended configuration parameter values, and detailed user guides have been published. The Eclipse IDE has optional plug-ins to aid in Java development.

Framework-based applications are container agnostic. Applications can run on a lightweight web container like Tomcat or on a full-fledged Java EE application server like JBoss Application Server. This allows the choice of deployment server that is best suited for the server platform.

Modern application development tools

The HPE NonStop build tools and compilers have been integrated into both the Microsoft Visual Studio with the Enterprise Toolkit (ETK) HPE NonStop Edition and into Eclipse with HPE NonStop Development Environment for Eclipse (NSDEE). These tools, including Certified Java SE Platform (JDK and JVM) and Apache Tomcat, help improve the productivity of new HPE NonStop developers. Many optional components and additional tools are available as plug-ins for each IDE.

> Reputation is everything. We are proud of the way our NonStop systems have performed over the past year. From my experience, NonStop is really, really stable. It's always up, and we've never had database corruption. I don't recall any major system issues that had caused downtime."
>
> – **Pascal Remy**, Director, Euroclear

Middleware

From a business perspective, the service-oriented architecture (SOA) model can help IT be more responsive to changing business needs, thereby improving business agility. HPE NonStop can play an important role in an SOA architecture as a first-class platform for the provision of SOA services.

Using the HPE NonStop system in this role brings the values of application and scalability, availability, data integrity, and ease of manageability to SOA services — without special programming.

The HPE NonStop system SOA product technologies provide the necessary capabilities for service access, invocation, and implementation.

HPE NonStop iTP WebServer

HPE NonStop iTP WebServer software provides the HTTP and HTTPS protocol service for all the other SOA components. Built on the HPE NonStop Transaction Services/MP (HPE NonStop TS/MP) infrastructure, iTP WebServer software provides a fault-tolerant and scalable container for web service implementation, hosting both HPE NonStop SOAP and HPE NonStop Servlets for JSP components.

HPE NonStop SOAP

HPE NonStop SOAP software supports the standard SOAP 1.2 protocol. The combination of iTP WebServer and HPE NonStop SOAP software provides the standard SOAP over HTTP protocol for invoking SOA services on the HPE NonStop system. HPE NonStop SOAP is built on HPE NonStop TS/MP infrastructure and is fault tolerant and scalable.

HPE NonStop Application Server for Java

The HPE NonStop Application Server for Java (NSASJ) includes the Enterprise JavaBeans (EJB) Container and the web container modules of the JBoss AS. The built-in capabilities of Enterprise JavaBeans enable developers to concentrate solely on their business logic, rather than worry about platform dependence and related functionalities such as transaction integrity, data persistence, and availability. NSASJ is designed as an HPE NonStop Transaction Services/ Massively Parallel (TS/MP) serverclass. Because it is a serverclass, NSASJ is continuously available and offers near-linear scalability on the HPE NonStop system.

HPE NonStop Servlets for JavaServer Pages (JSP)

HPE NonStop Servlets for JSP software is a fortified version of the Apache Tomcat web container that exhibits HPE NonStop availability and scalability while supporting the standard Java Platform Enterprise Edition (JEE) Servlets and JSP programming models. HPE NonStop Servlets for JSP software runs as a scalable serverclass using the iTP WebServer and HPE NonStop TS/MP infrastructure. This integrated environment transparently inherits the scalability, reliability, and fault tolerance of the HPE NonStop system.

Open-source Apache Axis2/Java software can be used in conjunction with the scalable HPE NonStop Servlets for JSP container to implement either Java service adapters or Java SOA business processes. In addition, the JToolkit for HPE NonStop Servers software enables easy access to Pathway servers and Enscribe flat file data from Java-based SOA services.

HPE Pathway with HPE NonStop TS/MP

HPE Pathway with HPE NonStop TS/MP software provides application server functionality that allows businesses to develop and deploy business-critical OLTP applications on HPE NonStop systems. Using Pathway enables developers to concentrate on implementing their business logic without having to be concerned about common application services, such as load balancing, communications I/O, memory management, fault tolerance, and threading and scheduling. All these common services are provided by the Pathway application server software.
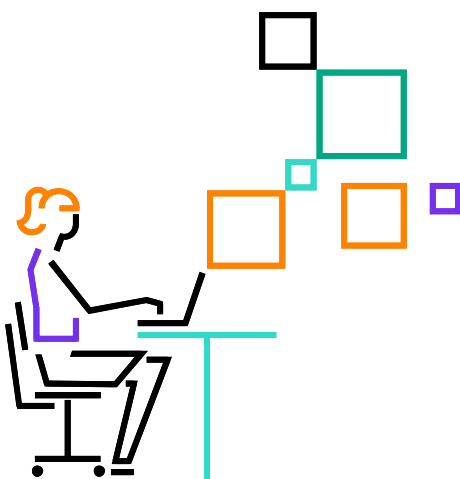
Modern backup options

With the HPE NonStop BackBox solution, customers can build out a complete backup environment to support all of their HPE NonStop systems or integrate HPE NonStop into an existing environment with other servers. HPE NonStop BackBox software is part of ETI-NET's family of virtual tape-based products for HPE NonStop systems. Unlike other virtual tape products for HPE NonStop, the HPE NonStop BackBox management software, catalogs, and metadata are resident on the HPE NonStop system, enabling protection via Transaction Management Facility (TMF).

Database and transaction management

HPE NonStop SQL is the mainstream database product for the HPE NonStop systems. HPE NonStop SQL has been fundamentally architected as a clustered database system. It is designed to leverage the HPE NonStop tightly integrated, shared-nothing, massively parallel platform architecture and deploys the fault-tolerant model for immediate and transparent takeover for unparalleled reliability, availability, and scalability. It supports management of massive, multi-terabyte databases as a single database image and delivers high performance in a cluster environment. HPE NonStop SQL provides:

Outstanding scalability — As the size of data volume, number of concurrent users or sessions, and query workloads and complexity for your database grow, you can add more computing power to the HPE NonStop cluster and increase throughput linearly at greater than 98 percent.[5]

Continuous availability — The HPE NonStop platform and HPE NonStop SQL provide out-of-the-box database and application availability. There is no complex configuration required to achieve true 24x7 availability. Routine database administration (DBA) tasks can be done online without requiring the database and application to be brought down.

Application portability — HPE NonStop SQL supports industry standards (ANSI SQL, JDBC, ODBC) as well as numerous extensions to support porting of database applications from other platforms. The SQL/MX DB for HPE NonStop X also supports database compatibility, which makes it easier to port applications with popular databases to the HPE NonStop X platform.

Automatic load balancing — HPE NonStop SQL offers query and data virtualization capabilities, enabling an environment that pools and optimizes all resources at the application level. With built-in clustering, automatic workload balancing, and online management, organizations using HPE NonStop SQL can seamlessly accommodate rapid growth without adding labor costs, compromising on service levels, or causing user disruption.

Lower database administration costs — HPE NonStop SQL database is distributed among multiple nodes of a cluster and is presented to the DBA and users as a single, clustered database image. The DBA's tasks are not daunting or time consuming and don't require highly specialized skills, thus managing a clustered database is no different from managing a non-clustered environment.

[5] Internal lab tests conducted by HPE NonStop Advanced Technology Center

The tight integration between the HPE NonStop SQL database management system and the HPE NonStop operating system enables absolute control over a concurrent mixed-workload environment, making the HPE NonStop SQL database unique in effectively handling all types of workloads starting concurrently across a potentially very large cluster. HPE NonStop OS plays a critical role in allocating processor, disk, and I/O resources in an environment where competing priorities have to be dynamically monitored and processes deemed to be of the highest priority need to be given precedence. Additionally, many key HPE NonStop SQL database operations take place at the operating system level, which in turn leads to increased efficiencies that have a positive impact on very large database (VLDB) and real-time database performance.

The ANSI SQL-compliant HPE NonStop SQL database can be accessed using Open Database Connectivity (ODBC) 3.0 and Java Database Connectivity (JDBC) Type 4 interfaces from Microsoft Windows and Linux® platforms, and an on-platform JDBC Type 2 driver and Open System Services (OSS) ODBC/MX driver. There are more recent enhancements as well. The drivers and ODBC server provide a highly reliable, 24x7 available and scalable connectivity solution that is standards-compliant and engineered for high performance and throughput, and well-integrated with HPE NonStop database servers.

Transaction management

To ensure database integrity, the HPE NonStop operating system integrates closely with HPE NonStop Transaction Management Facility (HPE NonStop TMF) software, which provides distributed two-phase commit protection for global database changes across all affected HPE NonStop systems.

HPE NonStop TMF software is designed to help protect a database from intentional or accidental damage. With HPE NonStop TMF software, a failure in an application, system, or network component does not result in a corrupted database because of a partially completed database update. Before an update changes the database, an image of every affected record or row is captured in memory and written to an audit log. If any part of an update fails or is programmatically aborted, HPE NonStop TMF software automatically backs out the change in its entirety, returning the database to its state just prior to the start of that change.

Disaster tolerance

HPE NonStop Remote Database Facility (HPE NonStop RDF) software extends the HPE NonStop system's legendary fault tolerance to disaster tolerance. By geographically dispersing HPE NonStop systems, HPE NonStop RDF software allows critical applications to survive a total site failure without specialized programming.

Using the transaction log generated by HPE NonStop TMF software, database changes are instantaneously replicated to one or more target systems, no matter how many transactions per second your application generates. If a primary database becomes inaccessible for any reason, processing can continue using the backup database with minimal service disruption or data loss.

HPE NonStop Database Analyzer

HPE NonStop Database Analyzer (NSDA) is a new product on our HPE NonStop portfolio. NSDA offers a new way to analyze, correlate, and visualize your SQL/MX data workload, in real time. With NSDA users can immediately identify what resources are engaged in servicing the database workload and make a more efficient use of them. Business oriented metrics allow for a wider range of users to gain visibility and control of the information that matters to them without requiring specific database knowledge. Dramatic reduction of the time spent on data gathering, correlation, and analysis helps improving agility and speed of implementation. Application deployment time is reduced; application outage situations are either quickly identified or prevented. The overall gain in visibility and control challenges the idea that analytics can only be done on a separate copy of the database. HPE NSDA is a leap forward to effortlessly optimize your database workload while seamlessly serving both transactional and analytical requirements.
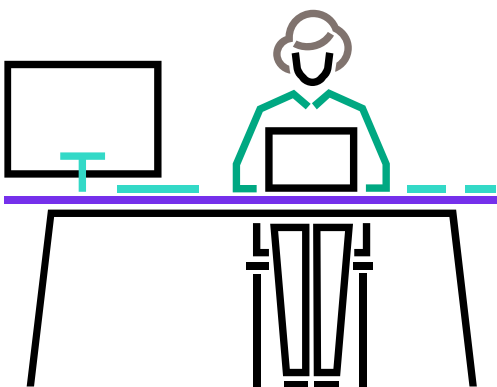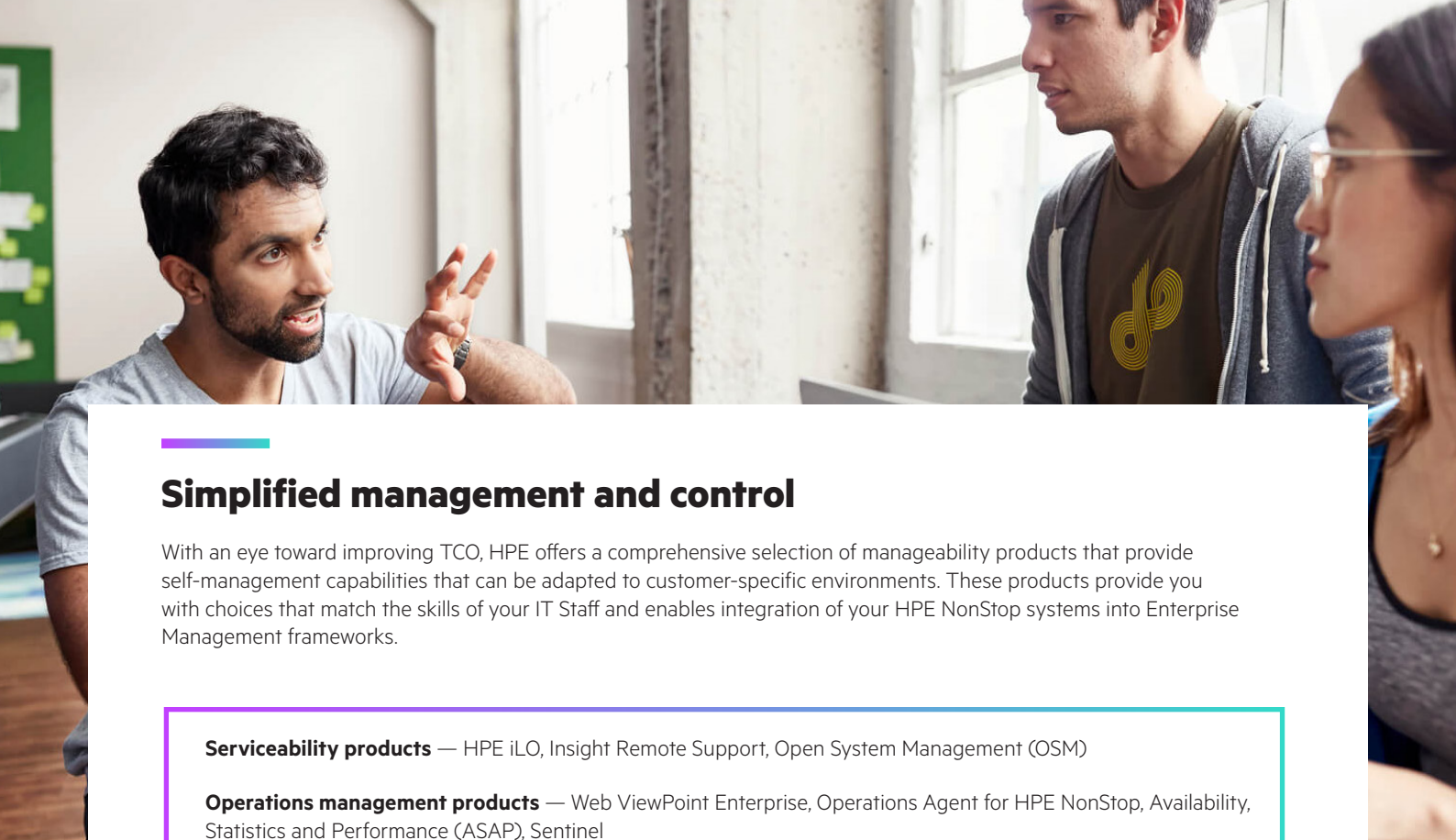
Simplified management and control

With an eye toward improving TCO, HPE offers a comprehensive selection of manageability products that provide self-management capabilities that can be adapted to customer-specific environments. These products provide you with choices that match the skills of your IT Staff and enables integration of your HPE NonStop systems into Enterprise Management frameworks.

Serviceability products — HPE iLO, Insight Remote Support, Open System Management (OSM)

Operations management products — Web ViewPoint Enterprise, Operations Agent for HPE NonStop, Availability, Statistics and Performance (ASAP), Sentinel

Performance management products — Measure, Local Analyst, Remote Analyst, Performance Agent for HPE NonStop

Payment application monitoring — DataEdge, C-Deep and Base24 and Connex plug-ins for Web ViewPoint Enterprise

Other management products — ViewSys, SeeView, RPM, EMS Analyzer, Enform Optimizer
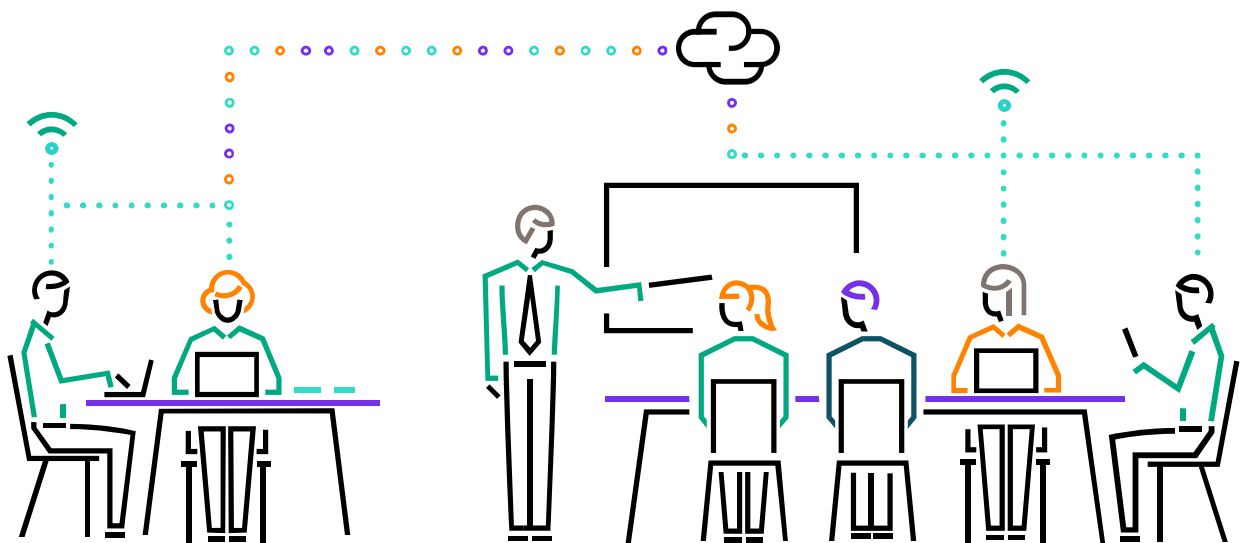
HPE NonStop cluster solutions
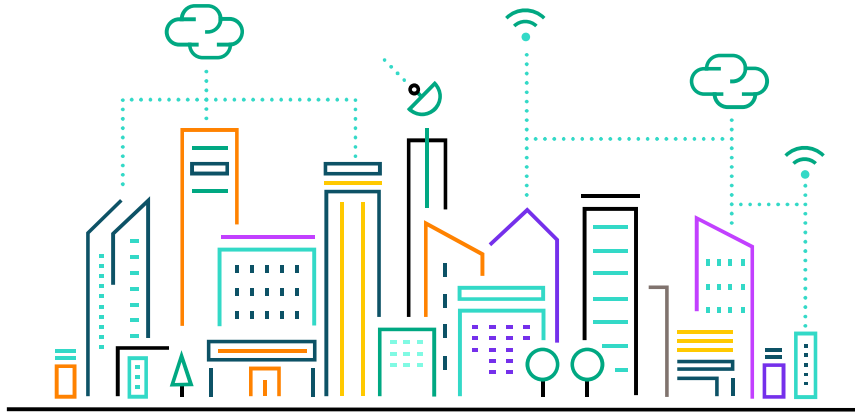
Massive scalability

HPE NonStop systems are well-known for extreme scaling, easily handling bursts of transaction processing, end-of-quarter application loads, business changes such as mergers and acquisitions that require expansion in capacity, or adding a large number of customers in a short period of time.

HPE NonStop X Cluster Solution

HPE NonStop X Cluster Solution (NSXCS) is a combination of clustering hardware and associated software that makes it easy to cluster multiple HPE NonStop NS8 systems (nodes) together in a tight interconnection using InfiniBand technology.

• Up to 24 nodes in one, two or three zones utilizing a pair of HPE NonStop InfiniBand Cluster Switches per zone.

• Up to 30 meters node to switch or switch to switch, up to 60 meters between nodes in the same zone and 90 meters maximum distance between nodes interconnected via any two zones.

• Up to 16 HPE NonStop NS8 CPUs per node, enabling a single cluster of up to 384 HPE NonStop CPUs. Supports mixed NSXCS environments with NS8 and NS7 systems.

Expand-over-IP networking

All HPE NonStop systems support Expand-over-IP networking, using high-speed Gigabit Ethernet links to interconnect multiple HPE NonStop systems over local and wide area networks.

• Up to 255 HPE NonStop systems (nodes), with up to 4,080 HPE NonStop CPUs either co-located or geographically distributed for disaster tolerance.

Security

In today's interconnected world, companies across all industries need to demonstrate that they maintain confidentiality, integrity, and availability — for both their customers' data and their own. Additionally, overlapping standards and regulations continue to emerge all over the world. This change in the business environment has made HPE NonStop customers even more aware of security needs for their individual businesses, and more demanding of sophisticated protection for their resources and data. HPE is meeting this demand by investing in new products and product enhancements that provide the security capabilities customers need.

On-platform: On-platform security is focused on reducing insider data theft and misuse by identifying users, controlling their access to sensitive data and system resources, and tracking their activities on the system. HPE Safeguard security software provides flexible authentication, authorization, and audit services based on a subject/object access control model that allows enterprises to appropriately restrict authenticated users' access to HPE NonStop Guardian system resources. Optional XYGATE Access Control and XYGATE User Authentication products have been added to the HPE NonStop portfolio to extend Safeguard's capabilities and enhance on-platform security.

Data in motion: Customers also need options for ensuring that sensitive data is protected when it is being moved. The HPE NonStop system includes HPE NonStop SSH and HPE NonStop SSL bundled with the HPE NonStop operating system to deliver end-to-end communications security, strong authentication, and auditing for system administration, file transfer, and applications connectivity.

Data at rest: Optionally, HPE offers HPE NonStop Volume Level Encryption, a fully integrated encryption solution for data at rest on disk and tape media for HPE NonStop multi-core systems. In addition, integration with HPE Enterprise Secure Key Manager provides high-availability encryption key generation and retrieval, and storage of millions of encryption keys, while helping to meet PCI/DSS requirements for key management.

The ability to recover from a ransomware attack without having to pay a ransom is becoming a requirement for enterprises. Ransomware protection is more important because a ransomware attack can infect and render unusable not only the primary production site data but also the disaster recovery (DR) site data, and even backup data, making recovery impossible unless special precautions are taken to protect the data. To neutralize the effects of such cyber-threats including ransomware attacks, Hewlett Packard Enterprise follows the digital resilience framework as set by the **National Institute of Standards and Technology (NIST)**. The goal of this framework is to protect IT environments to help minimize downtime, allowing customers to bring up their mission-critical workloads quickly and efficiently in case of a ransomware attack. More details on the NIST approach and how HPE NonStop handles this can be found in this digital resilience document.

HPE Services

HPE Services leverages our strength in infrastructure, partner ecosystems, and the end-to-end lifecycle experience, to accelerate powerful, scalable IT solutions to provide you the assistance for faster time to value. HPE Services provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation.

Operational Services

HPE Complete Care Service: HPE's most comprehensive support solution tailored to meet your specific data center support requirements. It offers a wide choice of proactive and reactive service levels to cover requirements ranging from the most basic to the most business-critical environments. HPE Complete Care Service is designed to scale to any size and type of data center environment while providing a single point of contact for all your support needs for HPE as well as selected multivendor products.

HPE Critical Service: High-performance reactive and proactive support designed to minimize downtime. It offers an assigned support team, which includes an account support manager (ASM), technical account manager (TAM), and hardware specialist. This service offers access to the HPE Global NonStop Solution Center, 24x7 hardware and software support, six-hour call-to-repair commitment, enhanced parts inventory, and accelerated escalation management.

HPE Proactive 24: Provides an integrated hardware and software support solution that combines technical assistance with proactive account services to improve the stability, availability, and operation effectiveness of your IT environment. Delivered under the direction of an ASM, and offers 24x7 support with four-hour on-site hardware response.

HPE Support Plus 24: Support for HPE NonStop servers combines high-quality remote software service and reactive on-site hardware support. Offering 24x7 support with four-hour on-site hardware response, with two-hour response from the HPE Global NonStop Solution Center on software issues.

HPE Basic: Support for HPE NonStop servers combines high-quality remote software service and on-site hardware support. Offering 8:00 a.m. to 5:00 p.m. M–F excluding HPE holidays next business day response hardware support with two-hour response from the HPE Global NonStop Solution Center on software issues.

HPE Managed Services for HPE NonStop

With unique IP and automation and a team of global experts, this service delivers comprehensive monitoring, operations, administration, optimization, and continuous improvement across your entire HPE NonStop environment – freeing up your resources to focus on critical business applications.

Reduce the risks for your business and reputation.

Trust the experts to manage your HPE NonStop business-critical environment.

Providing management services that monitor, operate, optimize, and administer your entire HPE NonStop stack – delivered consistently and globally to give you unified control and let you focus on innovation.

Unique combination of people, process, and platform, with full-stack expertise across edge to cloud.

Delivering simplified and centralized insights to manage the entire HPE NonStop stack, including infrastructure, operating system, database, and software.

Comprehensive 24x7 service monitoring

Maintaining system health, generating reports, escalating business-critical requests, and completing basic troubleshooting.

Operations

Managing service requests, first-step incidents, first level problems, and daily tasks.

Administration

Completing system changes, resolving business-critical issues, managing in-depth incidents and problems, and performing root-cause analysis and determinations Providing Day 1 value and beyond.

Advisory and Professional Services: In today's fast-paced hybrid cloud world, being at business speed means overcoming IT complexity to match the speed of actions to the speed of opportunities. Deploy the right technology to respond quickly to market possibilities. Let HPE Services help accelerate your business transformation and simplify your IT journey. HPE Services designs the transformation and builds a road map tuned to your unique challenges including hybrid cloud, Workload and Application Migration, Big Data, and the edge. Hewlett Packard Enterprise leverages proven architectures and blueprints, as well as integrates with partner products and solutions.

HPE Services creates and integrates configurations that get the most out of software and hardware and works with your preferred technologies to deliver the optimal solution. Services provided by the HPE Services Team, certified channel partners, or specialist delivery partners include installation and deployment services, mission-critical and technical services, and education services.

The platform for continuous business

If you require support for high volumes of online transactions, continuous access to information, and rationalize infrastructure and operational costs, HPE NonStop can help you address these critical enterprise business issues.

- The confidence that your business will be continuously on
- The agility to quickly respond to ever-changing market and IT demands
- The ability to implement new business processes and keep pace with new initiatives
- The elimination of complexity and cost
- The protection of data and resources

The HPE NonStop platform offers so much that is new, and continues to provide the highest levels of availability and near-linear scalability of any server in today's marketplace — with hardware, operating system, database, software, and applications packaged as part of a well-integrated stack.

For real-time processing of payment transactions, telecommunications service, follow-the-sun access to operational data, or on-demand health information, you can trust it will be available.

Learn more at

HPE.com/info/NonStop

Visit **HPE GreenLake**

Chat now (sales)

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