



**Hewlett Packard
Enterprise**

Brochure



Engineered for the highest availability

HPE Integrity NonStop family of systems



HPE Integrity 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 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 Integrity NonStop for industries that never stop.

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

AL4 defines fully fault-tolerant servers.

"In this level, the combination of multiple hardware and software components allows a near-instantaneous failover to alternate hardware/software resources so that business processing continues as before without interruption."

– Kuba Stolarski, IDC Enterprise Platforms

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 Integrity 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

"In solving the difficult problem of fault tolerance to the degree it has today with modern, open NonStop servers, HPE's engineers provided us with a server that not only is highly available, but can scale well past any other architecture... the loosely-coupled, shared-nothing, MPP capabilities of the HPE NonStop server remain unique to this day... As has always been the case with NonStop, its relevance for users transcends time—it's never old. It's timeless."

– Richard Buckle, CEO, Pyalla Technologies, 2014

¹ IDC, Worldwide and U.S. High-Availability Server 2014–2018 Forecast and Analysis, Doc #250565

² IDC, Doc #250565, September 2014 (see footnote 1)

That means **no** interruption of work, **no** transactions lost, and **no** degradation in performance. For nearly 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.

Applications

-  Modern application development tools
-  Middleware
-  Database and transaction management
-  System management and control
-  Security
-  NonStop operating system

Hardware

Fully virtualized integrated stack

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

- Continuous availability—delivering instant, continuous access to secure, accurate data
- Lowest TCO in class³—reducing complexity and operating costs
- 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 Integrity 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 Integrity NonStop systems scale up to 16 NonStop CPUs within a single system (node), each running its own copy of the NonStop OS, and scale out to 4,080 NonStop CPUs on 255 networked 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 Integrity NonStop is enabled by the 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 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 Integrity NonStop fault-tolerant systems for high-value business workloads and customer-facing applications—each with the same NonStop fundamentals.

³ HPE NonStop offers the lowest TCO in its class for mission-critical applications, Richard Buckle, Pyalla Technologies, Research Note, November 2014

Extending the HPE Integrity NonStop brand

The HPE Integrity NonStop product family of factory-integrated, fully tested, and verified hardware and software systems can be deployed on either the Intel® Itanium® architecture of the renamed HPE Integrity NonStop i platform or the Intel® Xeon® processors of the new HPE Integrity NonStop X platform.

NonStop has always adopted the best technology available to meet customer needs—and has successfully transitioned the NonStop software stack several times to new processor technologies. With the HPE Integrity NonStop X, HPE is redefining continuous availability and scalability for x86. This new family of NonStop X systems is the only fully integrated, fault-tolerant compute for continuously available x86.

The addition of NonStop X provides current NonStop customers with the flexibility to confidently make continued investments in their current Intel Itanium-based HPE Integrity NonStop i systems or in the future, to migrate to the NonStop X platform.



HPE Integrity NonStop X systems at-a-glance

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

NonStop X powered by Intel Xeon E5-2600 v2 series processors

HPE INTEGRITY NONSTOP X NS3 X1 SYSTEM

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

HPE INTEGRITY NONSTOP X NS7 X1 SYSTEM

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

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 192 GB Per system: • Maximum 3,0 TB
NonStop OS	L-series	L-series
System interconnect	InfiniBand	InfiniBand
Clustering	Expand-over-IP	Expand-over-IP NonStop X Cluster Solution
I/O controllers (Maximum number of CLIMs)	8	56
Telco industry hardware choices	N/A	N/A

New possibilities: HPE Integrity NonStop X

The introduction of the HPE Integrity NonStop X family, offered with the L-series version of the NonStop OS, extends the 100 percent fault-tolerant HPE Integrity NonStop platform to include the x86 architecture while delivering the same high level of availability, massive scalability, data integrity and low total cost of ownership (TCO). The HPE Integrity NonStop X systems are powered by Intel Xeon E5-2600 v2 series processors and are built upon an industry-standard InfiniBand system interconnect that provides up to 56 Gbps bidirectional-bandwidth for extreme scalability, fabric flexibility, high throughput, and low latency.

HPE Integrity NonStop X NS7 X1

Representing the high-end of the HPE Integrity NonStop X family, the HPE Integrity NonStop X NS7 X1 offers 2, 4 or 6-core software licensing options with more than double the performance capacity licensed at 6-cores when compared to the HPE Integrity NonStop BladeSystem NB56000c licensed at 4 cores. The NS7 X1 combines the economies of newly enhanced standards-based, modular computing with the trusted 24x7 fault-tolerant availability and data integrity of the HPE Integrity NonStop architecture. The continuous availability, manageability, and development features of HPE Integrity NonStop result in a low total cost of ownership (TCO) for hosting mission-critical applications.

Powered by Intel Xeon processors

The HPE Integrity NonStop X NS7 X1, built on proven HPE ProLiant BL460c server blades, supports up to 192 GB of memory per NonStop CPU, with single system (node) maximum memory capacity greater than 3 TB. The use of half-height server blades connected by InfiniBand enables the NS7 X1 to double the NonStop CPU density within a single c7000 enclosure.

InfiniBand for a 25 times increase in system interconnect capacity

At the heart of the NS7 X1 is a system interconnect based upon industry standard InfiniBand. The NS7 X1 leverages the modular efficiencies of the industry-leading HPE BladeSystem c7000 Platinum Enclosure with 4X FDR (Fourteen Data Rate) InfiniBand double-wide switches to create the foundation for the NS7 X1 system interconnect with a dual fault-tolerant switched fabric.

The NS7 X1 with the Cluster I/O Modules (CLIMs) provides significant I/O configuration flexibility with IP and Telco CLIMs for communications support and the Storage CLIM, which serves as a controller to attach hard disk drives (HDDs), solid state drives (SSDs), HPE enterprise storage disk arrays, and tapes.

“As customers move to more acceptance of things like Linux® in the data center and cloud-based applications, they realize that portions of their application world still need NonStop levels of availability that can’t be achieved using other models. I’m excited about the prospect of working with these new customers and partners.”

– Randy Meyer, VP and GM, Mission Critical Servers, HPE Servers



HPE Integrity NonStop X NS3 X1

The NS3 X1 system is the most recent addition to the HPE Integrity NonStop entry-class systems. Available with two or four NonStop CPUs, the NS3 X1 provides the flexibility to choose either 1 or 2-core software licensing per NonStop CPU. Built to take advantage of the same InfiniBand double-wide switches for the system interconnect as the high-end NonStop X systems and powered by Intel Xeon processors, the NS3 X1 supports up to 64 GB of memory per NonStop CPU.

Providing uninterrupted access to information and services

The NS3 X1 system can be configured with two or four NonStop CPUs in a factory-integrated, fully-tested and verified configuration and provides significant I/O configuration flexibility via Ethernet with Entry-class IP Cluster I/O Modules (CLIMs) or with Entry-class Telco CLIMs which support M3UA, Diameter, and Session Initiation Protocol (SIP) protocols. Disk storage is managed by Entry-class Storage CLIMs. These powerful I/O adapters provide evenly matched performance for the NS3 X1 platform as they decrease the load on the host processor to balance overall performance, and shorten response times.

The advantage of the NonStop software stack

HPE Integrity NonStop systems have been designed from day one with an integrated software stack that supports fault tolerance. HPE Integrity NonStop systems are delivered to customers as a fully tested and verified hardware and software solution for out-of-the-box efficiency.

The HPE Integrity NonStop X is offered with the L-series version of the NonStop Operating System. The NonStop X software stack that 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 NonStop OS. HPE NonStop SQL/MX and SQL/MP database products are both available on NonStop X with all the latest features for massive scalability. Middleware products are available, as are Java and Java-related frameworks. The NonStop Development Environment for Eclipse (NSDEE) and compilers were enhanced with x86 architecture in mind. Customers that are new to NonStop will find the NonStop Eclipse Development Environment friendly and familiar to their application development efforts on other platforms.

Running existing NonStop applications on NonStop X

Most existing non-native TNS (Tandem NonStop CISC) applications will run on the NonStop X architecture without change can be accelerated to take advantage of the new system's performance using the new NonStop X accelerator. Native Intel Itanium applications can take advantage of the new NonStop X compilers and with a simple recompilation, run on the new platform, requiring few, if any source code changes.

NonStop X is a high performance environment that fits comfortably into your existing data center, is ready for your mission-critical applications, and is 100 percent NonStop.

HPE Integrity NonStop i systems at-a-glance

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



NonStop i powered by Intel Itanium 9500 series processors

HPE INTEGRITY NONSTOP I NS2300 SYSTEM

Entry-class, cost-effective commercial system for small businesses and emerging markets

HPE INTEGRITY NONSTOP I NS2400 SYSTEM

Excellent price-performance solution with Telco industry choices for small to mid-size enterprises

HPE INTEGRITY NONSTOP I

BladeSystem NB56000c system Virtually unlimited scalability with high-level performance for enterprise workloads

NonStop CPUs per system	Minimum: 2 Maximum: 4	Minimum: 2 Maximum: 4	Minimum: 2 Maximum: 16
Software licensing	1-core fixed software license	2-core fixed software license	Core licensing, 2 or 4-core software license
RAM	Per CPU: • Minimum 16 GB • Maximum 48 GB Per system: • Maximum 192 GB	Per CPU: • Minimum 16 GB • Maximum 48 GB Per system: • Maximum 192 GB	Per CPU: • Minimum 16 GB • Maximum 96 GB Per system: • Maximum 1.5 TB
NonStop OS	J-series	J-series	J-series
System interconnect	ServerNet	ServerNet	ServerNet
Clustering	Expand-over-IP	Expand-over-IP	Expand-over-IP, NonStop BladeCluster Solution
I/O controllers (Maximum number of CLIMs)	6	6	48
Telco industry hardware choices	N/A	-48 V DC Seismic rack	-48 V DC Seismic rack NEBS Level 3 Certified

Unmatched awards and recognition



Most Innovative Companies 2014 BCG Perspectives Ranked #11



Quality
CRN ranks HPE product quality #1 over Dell, IBM, and Lenovo



Customer relationships
TBR ranks HPE customer likely to recommend and likely to buy again #1 over Dell and IBM

HPE Integrity NonStop i

HPE Integrity NonStop i BladeSystem NB56000c

As the top of the line offering of the HPE Integrity NonStop i family, the NB56000c offers 2 or 4-core software licensing options and is built on the proven HPE Integrity BL860c i4 server blade powered by Intel Itanium 9500 series processors. It leverages the HPE BladeSystem c7000 Platinum Enclosure with fault-tolerant ServerNet double-wide switches and the J-series version of the NonStop OS to greatly improve the computing capacity of the platform.

The NB56000c with the Cluster I/O Modules (CLIMs) provides significant I/O configuration flexibility. The Storage CLIM serves as a controller to attach hard disk drives (HDDs), solid state drives (SSDs), HPE enterprise storage disk arrays, and tapes. In addition, it offers integrated volume-level encryption functionality that provides data-at-rest security. Network connectivity is delivered through the IP CLIM, which provides support for IPv6, IPSec, and SCTP. The Telco CLIM supports M3UA, Diameter, and Session Initiation Protocol (SIP) telecommunications protocols. For additional communications connectivity choices, the G16SE is available.

A carrier-grade version of the HPE Integrity NonStop i BladeSystem NB56000c-cg is DC-powered and Network Equipment-Building System (NEBS) Level 3 certified to meet telecommunication marketplace requirements. NEBS is the most common set of safety, spatial, and environmental design guidelines applied to telecommunications equipment in the United States.

HPE Integrity NonStop i NS2300 and NS2400

The HPE Integrity NonStop i NS2300 and NS2400 system family are the entry-class HPE Integrity NonStop i systems. Designed to deliver the same high levels of availability and data integrity that all NonStop systems are known, for in a cost-effective manner, both the NS2300 and NS2400 can be configured with two or four NonStop CPUs in a pre-assembled and integrated rack-mount configuration.

The NS2300 system provides the most-affordable price point and is designed to meet the needs of standalone applications and emerging markets. The HPE Integrity NonStop i NS2400 systems are ideal for small- to mid-size enterprises in the financial services, healthcare, manufacturing, public sector, and telecommunications industries.

These entry-class systems deliver the highest built-in reliability, availability, and serviceability in the most cost-effective manner by making use of industry-standard components, including the Intel Itanium 9500 series processor.

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 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 NonStop, the HPE NonStop BackBox management software, catalogs, and metadata are resident on the HPE NonStop system, enabling protection via Transaction Management Facility (TMF). The HPE NonStop BackBox solution consists of the HPE NonStop BackBox host software for H-series or J-series platforms that resides on the HPE NonStop system and the Microsoft® Windows®-based BackBox controller software on the HPE NonStop BackBox Virtual Tape Controller.



HPE NonStop clusters

Massive scalability

HPE Integrity 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.

NonStop X Cluster Solution

HPE Integrity NonStop X Cluster Solution (NSXCS) is a combination of clustering hardware and associated software that makes it easy to cluster multiple NonStop X NS7 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 4X FDR InfiniBand Cluster Switches per zone, providing up to 56 Gbps bidirectional bandwidth.
- 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 NonStop X CPUs per node, enabling a single cluster of up to 384 NonStop X CPUs.

Expand-over-IP networking

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

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

HPE NonStop BladeCluster Solution

HPE NonStop BladeCluster Solution (NSBCS) is a combination of clustering hardware and associated software to cluster multiple HPE Integrity NonStop i systems and previous generation NonStop systems using HPE NonStop ServerNet III technology.

- Enables local clusters (zones) up to eight nodes within a data center and up to 410 feet (125 meters) between nodes.

Provides for clustering up to three zones together—for a total of 24 nodes linked in one cluster. The inter-zone distance can be up to 40 miles (65 kilometers).

HPE NonStop software

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 NonStop application community.

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 NonStop build tools and compilers have been integrated into both the Microsoft Visual Studio with the Enterprise Toolkit (ETK) NonStop Edition and into Eclipse with 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.

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 Integrity NonStop can play an important role in an SOA architecture as a first-class platform for the provision of SOA services.

Using the HPE Integrity 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.

“Since implementing the HPE Integrity NonStop BladeSystem, the average application response time on the Web has been reduced to 10 milliseconds or less. That’s a tremendous improvement to POS transactions and to the consumer experience.”

– Greg Bohn, VP Data Center Operations, Stored Value Solutions

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

HPE iTP WebServer

HPE iTP WebServer software provides the HTTP and HTTPS protocol service for all the other SOA components. Built on the HPE NonStop Transaction Services/MP (NonStop TS/MP) infrastructure, iTP WebServer software provides a fault-tolerant and scalable container for Web service execution, hosting both NonStop SOAP and 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 NonStop SOAP software provides the standard SOAP over HTTP protocol for invoking SOA services on the HPE Integrity NonStop system. 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 NonStop availability and scalability while supporting the standard Java Platform Enterprise Edition (JEE) Servlets and JSP programming models. NonStop Servlets for JSP software runs as a scalable serverclass using the iTP WebServer and NonStop TS/MP infrastructure. This integrated environment transparently inherits the scalability, reliability, and fault tolerance of the HPE Integrity NonStop system.

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

HPE Pathway with NonStop TS/MP

HPE Pathway with NonStop TS/MP software provides application server functionality that allows businesses to develop and deploy business-critical OLTP applications on HPE Integrity 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.

Database and transaction management

HPE NonStop SQL is the mainstream database product for the HPE Integrity NonStop systems. 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 NonStop cluster and increase throughput linearly at greater than 98 percent.⁴
- Continuous availability—The NonStop platform and 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—NonStop SQL supports industry standards (ANSI SQL, JDBC, ODBC) as well as numerous extensions to support porting of database applications from other platforms.
- Automatic load balancing—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 NonStop SQL can seamlessly accommodate rapid growth without adding labor costs, compromising on service levels, or causing user disruption.

⁴ Internal lab tests conducted by HPE NonStop Advanced Technology Center

- Lower database administration costs—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.

“Because fault-tolerant systems deliver resources that are optimized end to end for reliability, availability, and serviceability, the system cannot easily be confused with a more general-purpose system serving a workload with potentially lower business value. Additionally, it's important to remember that in general, high-availability fault-tolerant systems require less human intervention to restore operations following a failure, with the most common cause for an IT service outage still being human error.”

– Matt Eastwood, Group VP & GM, Enterprise platforms, IDC, 2014

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 NonStop SQL database unique in effectively handling all types of workloads executing 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 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

“Customer needs, as well as logistics, change by the minute. We must realize a system capable of delivering the wide range of products on time and without fail to our customers. We (use) HPE NonStop servers with their unrivaled reliability and flexibility.”

– Ikuro Ishige, Manager, Computing Center, Yamazaki Baking Company

interfaces from Microsoft Windows and Linux platforms, and an on-platform JDBC Type 2 driver and Open System Services (OSS) ODBC/MX driver. 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 (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 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, 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 (NonStop RDF) software extends the HPE Integrity NonStop system's legendary fault tolerance to disaster tolerance. By geographically dispersing HPE NonStop systems, 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.

Simplified management and control

With an eye toward improving TCO, HPE offers a comprehensive selection of manageability products and solutions that provide self-management capabilities that can be adapted to customer-specific environments. HPE NonStop is managed by HPE Systems Insight Manager (SIM), NonStop Essentials, HPE IT Performance Suite and other enterprise (e.g., Tivoli, Netcool, Unicenter, Patrol, etc.) and open source management solutions (Nagios, etc.) in heterogeneous enterprise environments. NonStop manageability products can be categorized as follows.

- HPE SIM-related products—HPE Insight Control for NonStop includes HPE SIM, HPE Insight Control Power Management, and NonStop Software Essentials. These products work together to provide an HPE SIM-based single-pane-of-glass management environment for customers. Additional SIM-related products include NonStop Cluster Essentials, NonStop Performance Essentials, NonStop I/O Essentials, and HPE Insight Remote Support Advanced.
- HPE IT Performance Suite—Products for IT strategy, planning and governance, application lifecycle management, IT operations, security intelligence, information management, and business analytics.
- Serviceability products—Onboard Administrator (OA), Integrated Lights-Out (iLO), Open System Management (OSM).
- HPE Web ViewPoint-based products—Web ViewPoint, Pocket ViewPoint, Pathway plug-in, ASAP plug-in, Storage Analyzer plug-in, Event Analyzer plug-in.
- Performance Management Bundle—Measure, Guardian Performance Analyzer (GPA), ViewSys, NonStop Performance Data Collector (PDC), Open Database, Data Browser, NonStop Performance Reporter (NPR), Disk Prospector (DiskPro), System Performance Analyzer (SPA), Pathway View.
- Other manageability products—ASAP, RPM, TimeSync Reload Analyzer (TRA) Enform Optimizer, TCM, Nagios.

HPE Systems Insight Manager (HPE SIM)

HPE SIM unifies the management of servers, storage, and networking devices. It gives customers a single tool for managing virtual and physical infrastructures. HPE Systems Insight Manager builds on field-proven technology that supports Microsoft Windows, Linux, and UNIX® operating systems and provides virtualization and automation capabilities, with plug-ins that complement and extend management solutions for HPE NonStop systems.

HPE NonStop Essentials

HPE NonStop Essentials plug-ins provide integration between HPE Systems Insight Manager and HPE NonStop. HPE NonStop Cluster Essentials provides the management solution for both homogeneous clusters of HPE NonStop systems and heterogeneous clusters of NonStop and Linux systems. It provides integrated solutions for health monitoring, alert monitoring, event monitoring, integrated provisioning, virtualized configuration and control, unified account management, and software consistency checks.

HPE NonStop Performance Essentials seamlessly integrates with HPE NonStop Cluster Essentials to provide real-time, as well as trend-monitoring, solutions for both homogeneous clusters of HPE NonStop systems and heterogeneous clusters of NonStop and Linux systems.

NonStop I/O Essentials provides the management solution for managing the I/O subsystem of HPE NonStop systems—reducing training costs and operator-induced errors.

NonStop Software Essentials is a software installation and management tool for all NonStop systems. It modernizes NonStop software management and is an HPE SIM plug-in that assists in planning, configuring, and installing HPE, third-party, and customer-developed NonStop software packages.

HPE IT Performance Suite

HPE IT Performance Suite is an open, modular platform designed to enable integrated continuous lifecycle management that automates and optimizes planning, delivery, deployment, performance, availability, and security. It simplifies operation with a complete self-service environment that provisions and configures IaaS from public or private clouds and your middleware and applications stack.

HPE IT Performance Suite provides information lifecycle management solutions to help manage all information—structured and unstructured—and unified security layers that integrate with operations monitoring, executive views, and automated response to threats for complete security.

HPE NonStop is supported in key HPE IT Performance Suite products such as Application Lifecycle Management 11, ArcSight ESM, ArcSight Logger, Business Process Insight (BPI), Discovery and Dependency Mapping Advanced Addition (DDMA), Fortify Source Code Analyzer (SCA), Fortify Real-Time Analyzer (RTA), LoadRunner, Network Node Manager i (NNM), Operations Manager, Operations Manager i, Operations Orchestration (OO), Performance Center, Quality Center, Service Manager, SiteScope, Sprinter, Storage Essentials, TransactionVision (TV), and Universal CMDB (UCMDB).

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 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 insuring 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.

Compliance

HPE is committed to helping customers achieve and demonstrate security compliance on their HPE Integrity NonStop systems. To achieve this, HPE offers two products specifically targeted to help customers with security auditing and compliance.

XYGATE Compliance PRO allows enterprises to analyze and establish appropriate security settings on their system in order to close security vulnerabilities and deploy best security practices on the system.

XYGATE Merged Audit allows enterprises to consolidate event logs and enables real-time reporting and alerting about security events that have occurred. These NonStop security events can be integrated with HPE ArcSight SIEM using XYGATE Merged Audit. Use of HPE ArcSight SIEM allows businesses to view all security events across their entire enterprise from a single interface.

Vertical applications

Many industries, such as financial services, telecommunications, manufacturing, and healthcare are leading the way in delivering a continuous business environment—and HPE Integrity NonStop is there at the heart of their business.

- Processing over 1.4 billion credit and debit cards with a charge volume of over \$3.6 trillion USD⁵
- Servicing over 450 million subscribers in advanced Telco network applications such as Home Location Register (HLR), Home Subscriber Server (HSS), and other network applications⁶
- Powering mission-critical applications at the leading global manufacturers⁷
- Supporting several of the world's leading medical institutions⁸

As the de facto platform for card processing and electronic funds transfer (EFT) in the financial services industry, HPE Integrity NonStop can quickly scale resources for real-time, high-volume transactions. Global financial services leaders have improved bottom-line results from the comprehensive HPE portfolio of technology-based and services-led solutions, including applications from HPE partners such as ACI, AJB, BPC, ECS, FIS, Lusion, Opsol, and ReD.

⁵ HPE customer list, cross-referenced with Nilson Report, 2014

⁶ Infonetix Service Providers Report, 2013 and TRAI Report, 2014

^{7,8} HPE, May 2014 (see footnote 5)

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HPE Technology Services

HPE Technology Services help build an infrastructure that is reliable, highly available, and rooted in best practices. We offer a support experience that is proactive, personalized, and simplified—delivering support when and how you need. HPE recommends the following services for HPE Integrity NonStop systems:

- 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). This service offers access to HPE's Global Mission Critical Solution Center, 24x7 HW and SW support, 6-hour Call-to-Repair commitment, enhanced parts inventory and accelerated escalation management.
- HPE Proactive 24
Provides proactive and reactive support delivered under the direction of an ASM. It offers 24x7 HW support with 4-hour onsite response, 24x7 SW support with 2-hour response and flexible call submittal.
- HPE Installation and Start-up Services
This service provides efficient and effective deployment of HPE hardware components.

For more information on Support Services for HPE Integrity NonStop systems, [click here](#).

The platform for continuous business

If you require support for high volumes of online transactions, continuous access to information, and rational infrastructure and operational costs, HPE Integrity 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 Integrity 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 ATM or 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



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