

# HPE NonStop X Cluster Solution

## InfiniBand clustering for HPE Integrity NonStop X



### Scale up to match growing business demands

HPE Integrity NonStop X NS7 X1 delivers:

- Two times the NonStop CPU density<sup>1</sup> in a single enclosure
- Up to double the memory capacity for improved application performance
- Industry-standard InfiniBand as the system interconnect for increased system capacity and lower latencies
- Fully integrated solution stack and proven NonStop fundamentals for industry-leading fault tolerance
- Factory-integrated, fully tested and verified hardware and software solution for out-of-the-box efficiency

### Engineered for the highest availability level

#### Advanced clustering for NonStop X systems

Hewlett Packard Enterprise announces a new clustering capability for HPE Integrity NonStop X NS7 systems. NonStop systems are well-known for supporting sophisticated, out-of-the-box clustering solutions that simplify deploying applications on a fault-tolerant, shared-nothing system that scales from 2 to 16 CPUs. By clustering individual NonStop X NS7 systems, customers create a single system image for a large processing entity with hundreds of CPUs distributed on up to 24 systems (nodes).

#### When downtime is not an option

The NonStop X Cluster Solution is made up of both hardware and software components. A pair of HPE NonStop FDR (Fourteen Data Rate) InfiniBand Cluster Switches provides

the foundation of a fault-tolerant, dual-fabric InfiniBand cluster solution for the HPE Integrity NonStop X NS7 system running the requisite L-Series version of the HPE NonStop Operating System. Clustering can:

- Enable customers to smoothly meet the needs of rapid application growth, either from customer demand, end-of-quarter/end-of-year load increase, or mergers and acquisitions
- Make it possible for customers to architect application load balancing via front-end and back-end systems for efficiency
- Make it easy to deploy backup systems separated by up to 90 meters
- Support IB to use the fastest HPE Integrity NonStop X NS7 data transfer method between nodes in the cluster

<sup>1</sup> Compared to NonStop BladeSystem NB56000c with greater than eight NonStop CPUs, HPE NonStop Product Management, 2015

The NonStop X Cluster Solution delivers a significant increase in throughput and latency reduction. Each NonStop X system connects to the NonStop X Cluster Solution through a pair of 4X FDR InfiniBand links (one link per fabric), which provides up to 56 Gbps bidirectional bandwidth.

#### Key features and benefits

- Delivers higher performance than any other connectivity option between HPE Integrity NonStop X systems
- Provides fault tolerance
- Requires no change to applications
- Supports clustering of up to 24 NonStop X NS7 systems (nodes) with up to 16 NonStop CPUs each for a maximum of 384 NonStop CPUs in a single NonStop X Cluster Solution
- RoHS compliant
- Supported by OSM and HPE SIM for efficient monitoring and manageability

## Another major step for HPE Integrity NonStop X

### Cluster up to 24 systems (nodes) within a zone

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. It enables clusters of up to 24 nodes connected in one, two, or three zones utilizing a pair of HPE NonStop 4X FDR IB Cluster Switches per zone. Each node can have up to 16 HPE NonStop X CPUs, enabling a single cluster to have up to 384 NonStop X CPUs.

NSXCS support distances up to 30 meters node to switch or switch to switch. This allows up to 60 meters between nodes in the same zone and 90 meters maximum distance between nodes interconnected via any two zones. Node-to-node messaging performance is similar to typical messaging<sup>2</sup> performance between CPUs in the same NS7 system. NSXCS performance will vary depending on your application, message sizes, cluster configuration, and other conditions.

For connecting more than 24 nodes, NonStop X systems also support Expand-over-IP networking, using high-speed Ethernet links. In the largest Expand-over-IP configuration a maximum of 255 nodes, and 4080 HPE NonStop CPUs can be supported.

### 4X FDR InfiniBand offers 25 times increase in system interconnect bandwidth<sup>3</sup>

At the heart of the NonStop X system is a system interconnect based upon industry standard InfiniBand. NonStop X leverages the modular efficiencies of the industry-leading

HPE BladeSystem c7000 Platinum Enclosure and 4X FDR InfiniBand switches to create the foundation for the NonStop X system interconnect. These switches, configured in dual fabrics for fault tolerance, provide up to 56 Gbps bidirectional bandwidth per fabric to each node for extreme scalability, fabric flexibility, high throughput, and low latency.

### Integrated management, monitoring, diagnosis, and troubleshooting

Standard NonStop-centric manageability through Open System Management (OSM) and data center manageability through HPE Systems Insight Manager (SIM) with NonStop Essentials plug-ins are available to perform management of NSXCS.

OSM delivers highly automated, integrated system management, monitoring, diagnosis, and troubleshooting solutions, similar to that on NonStop i systems. HPE SIM with NonStop Essentials plug-ins provides a data center manageability solution, where NonStop systems can be monitored and managed with other HPE platforms in the same data center. OSM can be invoked from HPE SIM providing access to all functionality of OSM from HPE SIM.

### NonStop X Cluster Solution overview

The NonStop X Cluster Solution is comprised of cluster topologies that interconnect NonStop X NS7 systems as nodes. These interconnected nodes use InfiniBand networking technology to pass information from node to node functioning as one large processing entity. A pair of HPE NonStop 4X FDR InfiniBand Cluster Switches is used for each zone in an InfiniBand cluster to support the NonStop X Cluster Solution. For multiple zones, the HPE NonStop 4X FDR InfiniBand Cluster Switches are interconnected to each other.

<sup>2</sup> Applies to non-security checked messages over short distances defined as less than or equal to 90 meters, HPE NonStop Product Management, July 2015

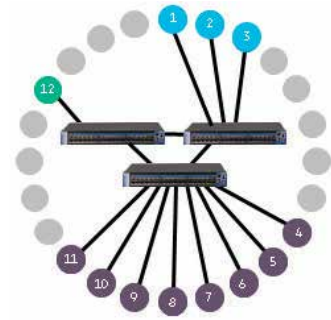
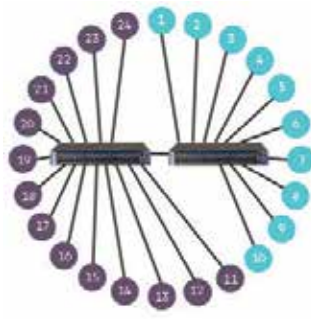
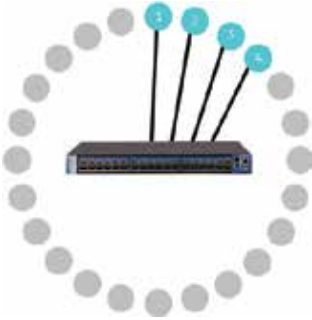
<sup>3</sup> Comparison of HPE Integrity NonStop i ServerNet bandwidth with HPE Integrity NonStop X 4X FDR InfiniBand bandwidth, HP (now Hewlett Packard Enterprise) internal testing, December 2014

## HPE NonStop X Cluster Solution

### Technical specifications

<b>NonStop X supported systems</b>	HPE Integrity NonStop X NS7
<b>Supported NonStop OS</b>	L15.08 or later
<b>Number of supported zones</b>	One, two, or three zones
<b>Number of supported nodes</b>	Up to 24 nodes
<b>Maximum node to switch distance</b>	Up to 30 meters
<b>Maximum node to node distance</b>	Up to 60 meters for nodes in the same zone Up to 90 meters for nodes interconnected via any two zones
<b>Number of HPE NonStop FDR InfiniBand Cluster Switches for NonStop X Cluster Solution</b>	One pair of HPE NonStop FDR InfiniBand Cluster Switches is required per zone

### Examples of possible NonStop X Cluster Solution topologies



- Each zone requires one pair of IB switches.
- Node-to-switch distance: up to 30 meters.
- Each node has two links: X and Y switch fabric.
- Number of supported nodes.
- Two zones require two pairs of IB switches.
- Switch-to-switch distance: up to 30 meters.
- Node-to-node distance across zones: up to 90 meters.
- Each node has two links: X and Y switch fabric.
- Three zones require three pairs of IB switches.
- Switch-to-switch distance: up to 30 meters.
- Node-to-node distance across zones: up to 90 meters.
- Each node has two links: X and Y switch fabric.

**Note:** Only one fabric is shown in each example. Node numbering is for illustration purposes only.

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## HPE NonStop X—the platform for your continuous business

HPE NonStop X Cluster Solution is a major advancement in the ability to cluster NonStop X systems together in the same data center. The NSXCS is a combination of hardware and software designed to facilitate clustering of systems, while still presenting a single system image. NSXCS can cluster up to 24 nodes together in a single zone tightly linked via InfiniBand technology. Each node can contain up to 16 NonStop CPUs, which allows NSXCS to cluster up to a maximum of 384 CPUs.

The HPE NonStop X Cluster Solution is designed for customers who need the ability to scale applications up to very high levels, who need the flexibility to divide their applications architecturally across several systems with “ready-to-deploy” clustering logic, and whose applications will benefit from the higher performance clustering technology. In a world that never stops, you must be there, continuously—because your customers won’t wait. HPE NonStop X Cluster Solution is your answer for continuous business.

## Support when and how you need it

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 it.

Hewlett Packard Enterprise recommends the following services for HPE NonStop servers:

- **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 the HPE Global Mission Critical Solution Center, 24x7 hardware and software support, six-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 hardware support with four-hour onsite response, 24x7 software support with two-hour response, and flexible call submittal.
- **HPE Installation and Startup Services**— Provides efficient and effective deployment of HPE hardware components.

## Training and education

Gain the skills you need with ExpertOne training and certification from Hewlett Packard Enterprise. With HPE NonStop training, you will accelerate your technology transition, improve operational performance, and get the best return on your HPE investment. Our training is available when and where you need it, through flexible delivery options and a global training capability. [hp.com/learn/nonstop](http://hp.com/learn/nonstop)

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