



NonStop Software & Hardware Strategy and Roadmap

GTUG

24. September 2013, Bad Homburg

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This is a rolling (up to three year) roadmap and is subject to change without notice.

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Agenda

NonStop software

- NonStop – the platform for continuous business
- Software strategy
- Software product updates

NonStop Hardware

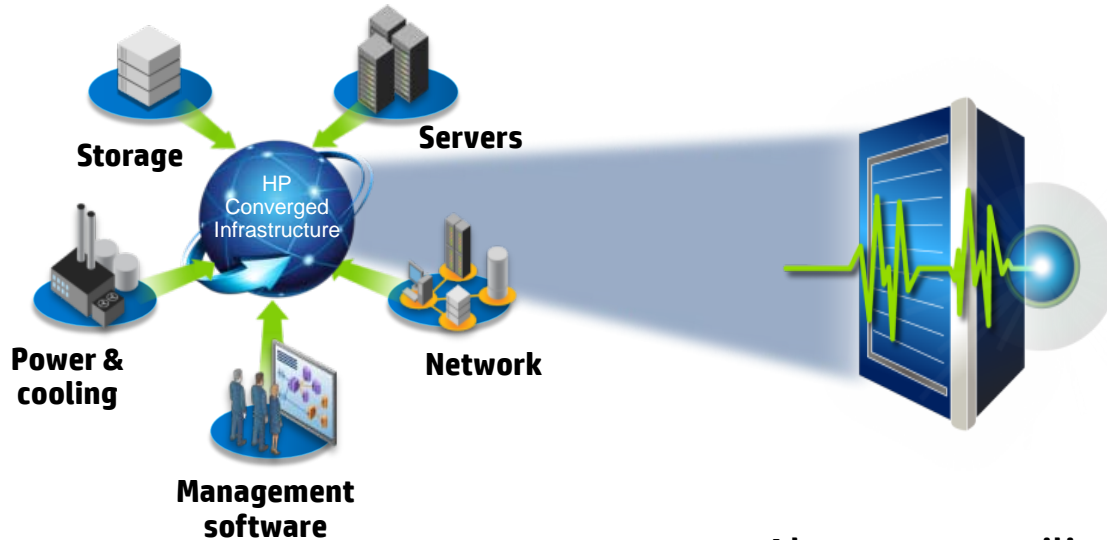
- NonStop and the HP Mission Critical Converged Infrastructure
- New platforms and roadmap
- New products and features



HP NonStop the platform for continuous business



HP Mission Critical Converged Infrastructure



The data center of the future is built on a Converged Infrastructure

Always-on resiliency and flexibility with Mission Critical Converged Infrastructure



IDC availability spectrum

Based on the IDC classifications of availability, HP NonStop is AL4

Availability level	Characterization	Impact of component failure	System protection factor
Availability level 4 (AL4)	Fault-tolerant server	Switch to alternate resources is not perceptible to end users	100% component and functional
Availability level 3 (AL3)	Clustered server	Short outage is needed for failover to take place	User workload fails over to alternate
Availability level 2 (AL2)	Workload balancing	Balancing may not be perceptible to end users because of retry	User request is redirected to alternate resources
Availability level 1 (AL1)	Not shipped as highly available	Need to switch to redundant resources before processing resumes	No special protection for availability

Source: IDC, Sept. 2012 , Doc #236946 Worldwide and U.S. High-Availability Server 2012-2016 Forecast and Analysis



HP NonStop software strategy

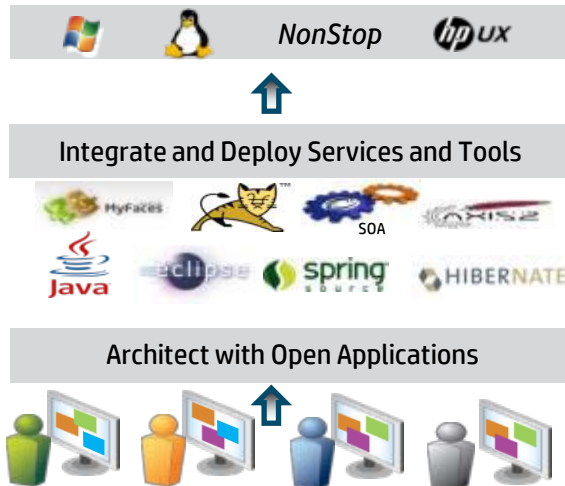


NonStop server strategy

Standard hardware



Modern software



Simplified integration into the data center

Easier to develop & deploy your apps

Integrate your apps with other apps in the enterprise

Lower cost of ownership

Ease of use

Part of HP's Mission-Critical Converged Infrastructure

Positioned for converged cloud



Software Strategy

- **Maintain our Mission Critical leadership**
 - Highest levels of availability
 - Scaling and flexibility that match your needs
 - Data integrity and security fundamentals you can count on
- **Modern technologies to help you develop applications**
 - More support for open, standard software
- **Integrate easily into your enterprise**
 - Choose from many commonly used management frameworks and tools
 - Support for enterprise solutions



NonStop Partners



APPLICATIONS

Modern application development tools

Middleware

Database and transaction management

System management and control

Security

NonStop Operating System

HARDWARE



HP NonStop Software Product Update



NonStop OS strategy and focus

- **Support new platforms and peripherals**
 - NS2100, CLIMs, SSDs, etc
- **Invest in enhanced OS and Open System Services (OSS) capabilities**
 - 64-bit support
 - OSS process pair support and increased limits
 - Updated/expanded utilities support
 - Dynamic language support – Perl, PHP
- **Increase system flexibility**
 - Core licensing for NB54000c & NB54000c-cg



Latest RVU (Release Version Update) Feature Summary

J06.15 / H06.26 (Feb 2013)

New Product Support:

- NSJ 7.0

Product Updates:

- SQLMX 3.2.1
- OSS Access to /G files on SMF Disks
- OSS authorization SEEP
- DSAP enhancement
- Serviceability enhancements
- Expand Auto Rebalance option
- TMF 3.7
- Safeguard V5R1
- XYGATE Merged Audit enhancements
- iTP Webserver 7.4
- NonStop SOAP 4.1
- eInspect for NSDEE 4.0

J06.16 / H06.27 (Aug 2013)

New Product Support:

- NSASJ, NSMQ

Product Updates:

- Safeguard Enhancements
- FastPTCP (native mode)
- TACL Enhancements (IPU Support, HighPIN, ...)
- FTP (runtime command enhancements)
- OSS Core Utilities
- OSS User Mgmt Tools
- ODBC/MX driver for HP-UX
- SSL for JDBC/MX T4 driver
- SOAP 4.2 Upgrade
- XYPro Xygate Merged Audit 2.15 (enhancements)
- Xygate User Authentication (SEEP SafeGuard Enhancements)



Security strategy and focus

- **Provide products to help you protect your sensitive data**
- **Help you monitor and demonstrate compliance**
- **Respond to reported security vulnerabilities**
- **Integrate with HP enterprise security products**
- **Expand OSS security capabilities**



System Manageability strategy and focus

- **Support new platforms and new system capabilities**
- **Make it easy for you to manage your NonStop server**
 - Products offerings to suit both expert and novice IT staff managing NonStop servers
- **Operate the NonStop server as part of the HP Converged Infrastructure or other enterprise management framework**
- **Maintain and enhance the original NonStop management products that you depend on**



NonStop management in Converged Infrastructure

HP IT Performance Suite

IT Strategy, Planning, and Governance

- IT Asset Management
- IT Financial Management
- Project and Portfolio Management

Application Lifecycle Management

- Application Lifecycle Management
- Application Governance
- Application Security
- Cloud Application Delivery
- Performance Validation
- Testing Center of Excellence
- Test Execution
- Test Management
- Application Transformation Software Services

IT Operations

- Application Performance Management
- Business Service Management
- Client Automation
- Cloud Service Automation
- Configuration Management System
- Content and Collaboration
- Data Center Automation
- IT Service Management
- Network Management Center
- System Management
- Hybrid Delivery Services

Security Intelligence

- ArcSight
- Fortify
- TippingPoint

Information Management

- Autonomy Information Management Solutions
- Archiving Solutions
- Data Protection Solutions
- Records Management Solutions

Business Analytics

- Business Intelligence
- Customer Management
- Partners for Information Management and Business Intelligence
- Services for Information Management and Business Intelligence

HP Systems Insight Manager

Insight Control for NonStop

Insight Control Power Management

NonStop Software Essentials

NonStop Cluster Essentials

NonStop Performance Essentials

NonStop I/O Essentials

Insight Remote Support Advanced

NonStop manageability portfolio

Adapts to your environment

Serviceability

OSM
Onboard Administrator (OA)
Integrated Lights Out (iLO)

Performance Analysis

Measure
Guardian Performance Analyzer (GPA)
ViewSys
NonStop Performance Data Collector (TPDC)
Open Database
Data Browser
NonStop Performance Reporter (NPR)
Disk Prospector (DiskPro)
System Performance Analyzer (SPA)
Pathway View

HP SIM –based products

HP Insight Control for NonStop
HP SIM
HP Insight Control Power Management
NonStop Software Essentials
NonStop Cluster Essentials
NonStop Performance Essentials
NonStop I/O Essentials
HP Insight Remote Support Advanced

HP IT Performance Suite

IT Strategy, Planning, and Governance
Application Lifecycle Management
IT Operations
Security Intelligence
Information Management
Business Analytics
Operations Agent for NonStop (OVNM)
Performance Agent for NonStop (OVNPM)
NonStop Tivoli Adapter

Original NonStop products

ASAP (Availability, Statistics and Performance)
Enform Optimizer
RPM
Reload Analyzer (TRA)
TCM (Tandem Capacity Manager)
Web ViewPoint
Pocket ViewPoint
Web View Point Plug-ins:
- Pathway plug-in
- ASAP plug-in
- Storage Analyzer plug-in
- Event Analyzer plug-in

Manageability Products Available Outside HP

NAGIOS (Open Source)
MOMI
Prognosis (Integrated Research)
TOP (comForte)
Many products from other NonStop
Partners



Converged Infrastructure integration

The NSC DVD package now also includes a DVD for HP Insight Control for NonStop, which provides the following products and functionality:

HP Systems Insight Manager (SIM)

- Hardware fault monitoring, alert monitoring, remote command and script invocation.
- NonStop BladeSystem graphical representation of racks, enclosures, blades and switches.
- Links to OSM Service Connection and Event Viewer.

HP Insight Control Power Management (ICpwr)

- Monitoring of power use, inlet air temperature, 24-hour peak temperature and CPU use for NonStop BladeSystems – per blade, per enclosure or per system.
- Support for NonStop BladeSystems and NonStop Integrity servers in Data Center Power Control for controlled shutdown.
- Power regulation support for NonStop Bladesystem, including support for Dynamic Power savings

HP NonStop Software Essentials

- Replacement product for all DSM/SCM Planner Interface and most DSM/SCM Maintenance interface functions.
- Inventory and history of installed software.
- Web interface, enhanced security, one-click software audit report, user management, product and user group support, cloning support.



NonStop Database strategy and focus

- **Focus on clustered OLTP database markets**
- **Lead with a scalable SQL architecture**
- **Lead in mission critical database availability**
- **Handle extreme volumes of data**
- **Exceed SLAs for handling data velocity**



NonStop Database

SQL/MX 3.2

J06.14/H06.25 (Aug 2012)

Modern Features:

- 64-bit support for embedded applications
- ODBC/MX Driver for LINUX
- Backup/Restore DDL with greater than 3000 characters

Migration Enablers

- Allow sub-queries with AFTER TRIGGERS
- Extended numeric precision up to 128 digits
- Improved performance for connect/disconnect times

Better Manageability

- SQL/MX Database manager (MXDM) GUI tool to manage SQL databases.
- Scripted interface to MXDM with Remote mxci
- Enhanced DBA tools

SQL/MX 3.2.1

J06.15/H06.26 (Feb 2013)

Modern Features

- SQL Support for NSJ7
- JDBC T2 64-Bit Driver
- IPv6 Support in MXCS
- U64 Dynamic SQL Support

Migration Enablers

- External Sequence Generator
- DATE_ADD, DATEADD
- DATE_SUB
- DATEDIFF

Better Manageability

- SHOWDLL enhancements
- SHOWSTATS
- Enhanced DBA Tools (CLEANUP, FIXUP, VERIFY)
- MXRPM Tool – support for Guardian modules

Future consideration

- User Defined Functions
- SPCs
- Table Maintain
- SQL Statement Logging and audit of schema privileges
- SPJ Debug and Profiling
- To_Date, Last_Day, Months-between
- MXDM integration with VQA, NSKBUSY and Listlocks
- Improved utility performance (Fastcopy, DUP, Import)
- Online MXCI help
- Native SSL Support in MXCS
- ODBC/MX Driver for AIX and HP-UX
- ODBC and JDBC Updates



NonStop Middleware strategy

- **Provide middleware products to connect your applications to the core fundamentals offered on NonStop using Service Oriented Architecture (SOA)**
- **Make it easy for you to develop applications for the NonStop server using Java methods and frameworks**



NonStop Java and Middleware Landscape

Pathway and TS/MP



Built for NonStop, Pathway with TS/MP provides application management services, such as load balancing, communications I/O, memory management, fault tolerance, and scheduling.

NonStop SOAP



Supports the standard SOAP 1.2 protocol. When used with iTP Secure WebServer, provides the standard SOAP over HTTP protocol for invoking SOA services. NonStop SOAP leverages TS/MP to gain NonStop fundamentals.

iTP Secure WebServer



iTP Secure WebServer provides the HTTP and HTTPS protocol interface for SOA components on the NonStop Server.

Provides a fault-tolerant and scalable container for Web service execution, runs as a Pathway serverclass.

iTP Secure WebServer is the front end for both NS SOAP and NSJSP components.

NSJSP (Java Server Pages)



NSJSP is a fortified version of the Apache Tomcat Web container that offers NonStop availability and scalability while supporting standard Java Platform Enterprise Edition (JEE) Servlets and JSP programming models.



NonStop SOAP

NonStop SOAP 4.2

J06.16/H06.27 (August 2013)



- Product Update: Base Apache Xerces-C++ 3.1.1 / ICU 50.1.2
- Compliant to SOAP 1.2 Specs
- WS-Policy – Complies to security policy assertions
- WS-Security
 - X.509 certificates, private keys, digital signatures, symmetric/asymmetric encryptions,
 - Compliance to XML Signature, SOAP header signing by client and service, Message Authentication
- Supports both Service First & Contract First modes of development
 - Out of the box WSDL creation
 - Requires no SOAP specific coding, only user's business logic needs to be coded
- TS/MP scalability & availability
- Transaction integrity through TMF
- User written plug-ins
 - Supports modules/handlers and Message Receiver User Functions (MRUF) to modify default message flow
 - Can be applied on per-service basis or globally
- Hot deployment of new services
 - No need to stop SOAP and other services
- Allow loose coupling between WSDL & DDL element names
 - Support for Multiple DDL Dictionary files

Future consideration

- Provide RESTful Services
 - Support Axis2/C's REST implementation
 - Support exposure of a single service via SOAP and REST simultaneously
- Further compliance to WS-* specifications



NonStop Server for Java 7



Java™ 7
Standard Edition

NSJ 7 features

- Based on Oracle JDK 1.7.0_01 version
 - Certified Java implementation
 - Optimized for Intel Itanium architecture
- First NSJ release with 64-bit support
 - Supports a large Java heap (~484 GB)
- PUT Library
 - ZPUTDLL (32-bit) and YPUTDLL (64-bit)
 - More compliance with POSIX standards
 - All I/Os are non-blocking
- Improved garbage collection (GC)
 - Parallel and concurrent mark sweep GC
 - Reduces application pause time
 - Application developer need not know NonStop specifics

- Java Infrastructure Library (JI Library)
 - Enables deployment of Java applications as TS/MP serverclasses without any NonStop specific modifications
 - Application developer need not know NonStop specifics

NS Java ToolKit

NonStop JToolKit allows NS Java applications to access existing NonStop business applications and databases.

- Pathway and Pathsend
- Enscribe
- NonStop SQL/MX and NonStop SQL/MP Drivers



NonStop Servlets for JavaServer Pages (NSJSP)

NSJSP 7.0

H06.26/J06.15 (Feb 2013)

- Based on Tomcat 7.0.10
 - Deep port leveraging TS/MP scalability and availability
- Complies to Servlet 3.0 Specifications
 - Asynchronous request processing, Web Fragments, Annotations
- Complies to JSP 2.2
- Unified Management Interface
- Role-based Security
- 64-bit capability



Future consideration

- Improve scalability using distributed in-memory cache/persistent data store
- Rebase to most recent Tomcat version
 - Comply to the latest Servlet, JSP & EL specifications
- Manageability improvements
 - Configure alert conditions
 - View logs via NSJSP Manager
 - Display additional statistics and health of the container via the Manager
 - Installation script enhancements

SASH - Open Source Java Frameworks

SASH is a collection of the widely-used open source middleware and free Java frameworks for use in Java application development. HP has tested and certified these frameworks for deployment on HP NonStop.



Offers a JavaServer™ Faces implementation (APIs and modules). Used to develop UI screens for web applications

<http://myfaces.apache.org>



Provides the core Web Services / SOAP / WSDL engine that process incoming HTTP messages, does marshaling /un-marshaling of SOAP envelopes

<http://axis.apache.org>



Is a powerful and flexible collection of technologies to enrich enterprise Java application development by providing components & APIs for developing modern web applications

<http://www.springsource.org>



Provides Object-Relational-Mapping (ORM) and implements standard Java Persistence API, Query Language and Object Lifecycle Rules

<http://www.hibernate.org>

SASH: MyFaceS, Axis2, Spring, Hibernate

Artifacts from HP (Present)

- **T0874 - Sample apps**
- **T0873 – Hibernate Dialect file for SQL/MX**
- **T0937 – NonStop TMF wrapper for Spring applications**
- All three can be downloaded from Scout
- Fully integrated and tested by NED
- Hibernate + JDBC T2 driver tuning guidelines & configuration recommendations for connection pools
- Eclipse IDE has optional plug-ins to help in Java development

Future consideration

- **Java Socket Abstraction for TS/MP**
– Simplified creation of your favourite, highly available, scalable Pathway apps in Java
- **Provide certification, samples, configurations for more frameworks**



New NonStop Java Family Products – coming soon

NonStop Application Server for Java (NSASJ)



NSASJ is a port of JBoss Application Server (AS 7.1.2) to the NonStop platform

- Provides an EJB container from JBoss with persistence and transaction management
- Compliant to EJB Specifications 3.1
 - Types of beans supported: Stateless Session Bean and Stateful Session Bean
- Java Persistence API provided via Hibernate Entity Manager
- Interoperability with both on- and off- platform clients
 - Off- platform clients will use JBoss Remoting
- Integrated with:
 - NonStop TS/MP for out-of-the-box scalability and availability
 - TMF to provide JTA API for Apps
 - NSMQ JMS Broker
- SSL 3.0 Security for RMI/IIOP

NonStop Message Queue (NSMQ)



NSMQ is a port of Apache ActiveMQ 5.6 for the NonStop platform

- Supports persistent and non-persistent messaging
 - In both point-to-point and publish/subscribe messaging models
- Supports both on- and off-platform clients
- Supports P-to-P and Publish/Subscribe mechanisms
- Integrated with NonStop Application Server for Java (NSASJ)
- Scalability and load distribution using cluster of ActiveMQ Brokers
- Fault tolerance through ActiveMQ Master-Slave configuration
- Integration with TMF
- JMS persistence through SQL/MX
- Broker Authentication and Authorization of clients before allowing access to the queue
- TCP and UDP transport layer protected by SSL 3.0



NonStop development environment strategy and focus

Modern, Open and Standards Based

- **Make it easy for you to develop and maintain applications that run on NonStop servers**

- Develop your applications on Microsoft Windows PCs
- Use an Eclipse based Integrated Development Environment (IDE)
- Industry standard programming languages
- Use NonStop server cross-compilers

- **Continue to offer new features and capabilities**

- Integration with HP Fortify
- Support for GNU utilities
- Java environment frameworks



NonStop Development Environment for Eclipse (NSDEE)

Software development for NonStop servers using industry standard development tools

- **Industry standard environment and tools for developers**
 - Native C/C++, COBOL, and pTAL languages
 - Java development
 - NonStop SQL/MP and SQL/MX database support
 - Integrated GUI based debugger for C/C++ and COBOL programming languages
- **Flexible build options**
 - Build projects locally (using cross compilers)
 - Deploy and test on remote NonStop systems over a secure link OR
 - Build projects on remote NonStop systems (using host based compilers)
- **Managed Build System**
 - Automate project builds
 - Flexibility to update based on developer's requirement
- **Secure communications between PC and NonStop Servers**
 - Using SSH and SFTP
- **Application security analysis using Fortify**
 - **Fortify**, the leading source code security analyzer can be integrated through NSDEE to analyze NonStop Java and C/C++ applications for security issues



Future consideration

- Support Eclipse 4.2 Functionality
- Enhanced debug capabilities
 - Integrate Eclipse DSF
 - pTAL language support
- Support VI comparable features
- Enhanced security



NonStop Development Languages

Available today for NonStop Application programming

Cross compilers for NonStop



Use NSDEE to build your application on a PC
Run your application on the NonStop server

Java, C/C++, COBOL, pTAL

Native compilers



Build your application on the NonStop server to run on the NonStop server

Java, C/C++, COBOL, pTAL

NonStop Debuggers



Debug your application using tools created for the NonStop server environment

Inspect Visual Inspect
eInspect NSDEE Debugger

Native CISC compilers



Continue to build applications for CISC based architecture on the NonStop server

C/C++, TAL, COBOL 85



HP NonStop Future direction



HP Software Future

On-going investment in open features and system flexibility

Common standards, uncommon advantages

Develop

Modern, state of the art programming methods

Deploy

Fault-tolerant applications and database

Direct

Efficient Management with HP's Converged Infrastructure Portfolio

Depend

Unique NonStop fundamentals for availability, integrity and security

- Modern Development Environment with NSDEE
- New Java technologies like NSASJ and NSMQ
- Middleware that allows you to leverage NonStop fundamentals to build robust, fault-tolerant and scalable application environments
- Scalable SQL Database built for Mission Critical environments that handles extreme data volume at high velocity
- System management using the product/tool of your choice including tools used to manage IBM and LINUX servers
- Security out of the box which you can depend on
- Ongoing OSS enhancements
- The fault tolerant operating system built from day one for the Mission Critical environments you depend on



HP NonStop Platforms and Roadmap



Execution of NonStop strategy - delivered



Leveraging Standards



Mission Critical
Converged Infrastructure



NonStop S-series

Proprietary design

- Custom Rack
- Custom Power & Cooling
- Custom proprietary CPU with internally designed components
- Custom memory
- Custom IO and interconnect
- Non-Standard Drives
- ServerNet switches

Integrity NonStop

Moving to standards

- **Standard** HP Rack
- **Standard** Power & Cooling
- **Standard** BCS Server with modifications for FT
- **Standard** DIMMs
- *Custom* IO and Interconnect
- **Off the Shelf** Drives
- *ServerNet* switches

Integrity NonStop BladeSystem

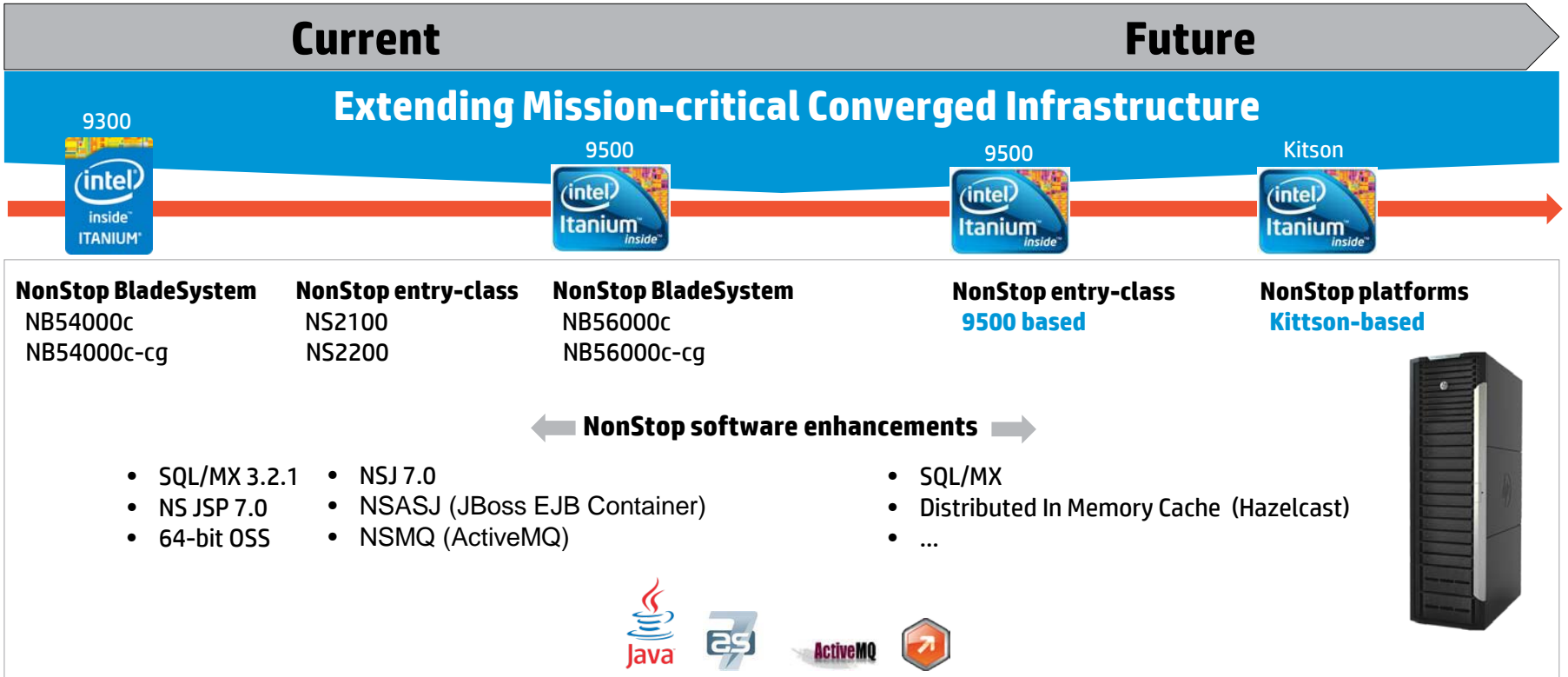
Converged Infrastructure

- **Standard** HP Rack
- **Standard** Power & Cooling
- **Standard** HP Blade Chassis
- **Standard** Blade with unique interconnect mezzanine card
- **Standard** DIMMs
- **Standard** IO
- **Off the Shelf** Drives
- NonStop-unique HW *ServerNet*



HP Integrity NonStop

The platform for continuous business



HP Integrity NonStop BladeSystem

NB56000c

Third generation of Integrity NonStop BladeSystems

Built on proven HP Integrity Blade BL860c i4

- Intel® Itanium® 9500 series 4-core capable processor (AKA Poulson)
- 2-core or 4-core software licensing (Core Licensing)
- Up to 96 GB of memory per NonStop CPU

Up to 1.5X* the performance capacity compared to the current NB54000c
(2-core to 2-core, 4-core to 4-core)

HP NonStop OS RVU J06.16 (or later)

On-line migration from NB54000c

Next generation HP BladeSystem c7000 enclosure

Gen8 CLIM I/O components

BladeCluster advanced clustering – up to 24 nodes using 3 zones

* Performance is based upon NonStop Order Entry benchmark from HP NED, actual application performance will vary.

NB56000c



HP Integrity NonStop BladeSystem **carrier-grade**

NB56000c-cg

Third generation of **carrier-grade** Integrity NonStop BladeSystems

Built on proven HP Integrity Blade BL860c i4

- Intel® Itanium® 9500 series 4-core capable processor (AKA Poulson)
- 2-core or 4-core software licensing (Core Licensing)

Up to 1.5X* the performance capacity compared to the current NB54000c-cg
(2-core to 2-core, 4-core to 4-core)

HP NonStop OS RVU J06.16 (or later)

On-line migration from NB56000c-cg

Next generation HP BladeSystem **carrier-grade** c7000 enclosure

Carrier-grade Gen8 CLIM I/O components

BladeCluster advanced clustering – up to 24 nodes using 3 zones

NEBS level 3 certified

* Performance is based upon NonStop Order Entry benchmark from HP NED, actual application performance will vary.



HP Integrity NonStop BladeSystem details

NB56000c and NB56000-cg

System

- 2-core or 4-core software licensing (Core Licensing)
- 2 – 16 processors per node
- Clustering up to 16,320 cores (via expand)
- Flex Processor Bay Configuration
- HP NonStop OS release J06.16
- On-line migration from NB54000c or NB54000c-cg

Processors

- 2 – 8 BL860c i4 blades per c7000 chassis
 - Intel® Itanium® processor 9500 series
 - 4-core capable 2.4 GHz processor with 32MB last level cache DDR3 memory
 - 16, 32, 48, 64, 96 GB main memory per logical NonStop CPU
 - ServerNet mezzanine card

Blade enclosure

- NonStop c7000 R3 enclosure
- Fault-tolerant BladeSystem ServerNet double-wide switches

Networking and storage

- IP CLIMs (Ethernet)
- Storage CLIMs: SAS disk subsystem and Fibre Channel connect
- Telco CLIMs (M3UA, SIP, Diameter)



NEBS Level 3

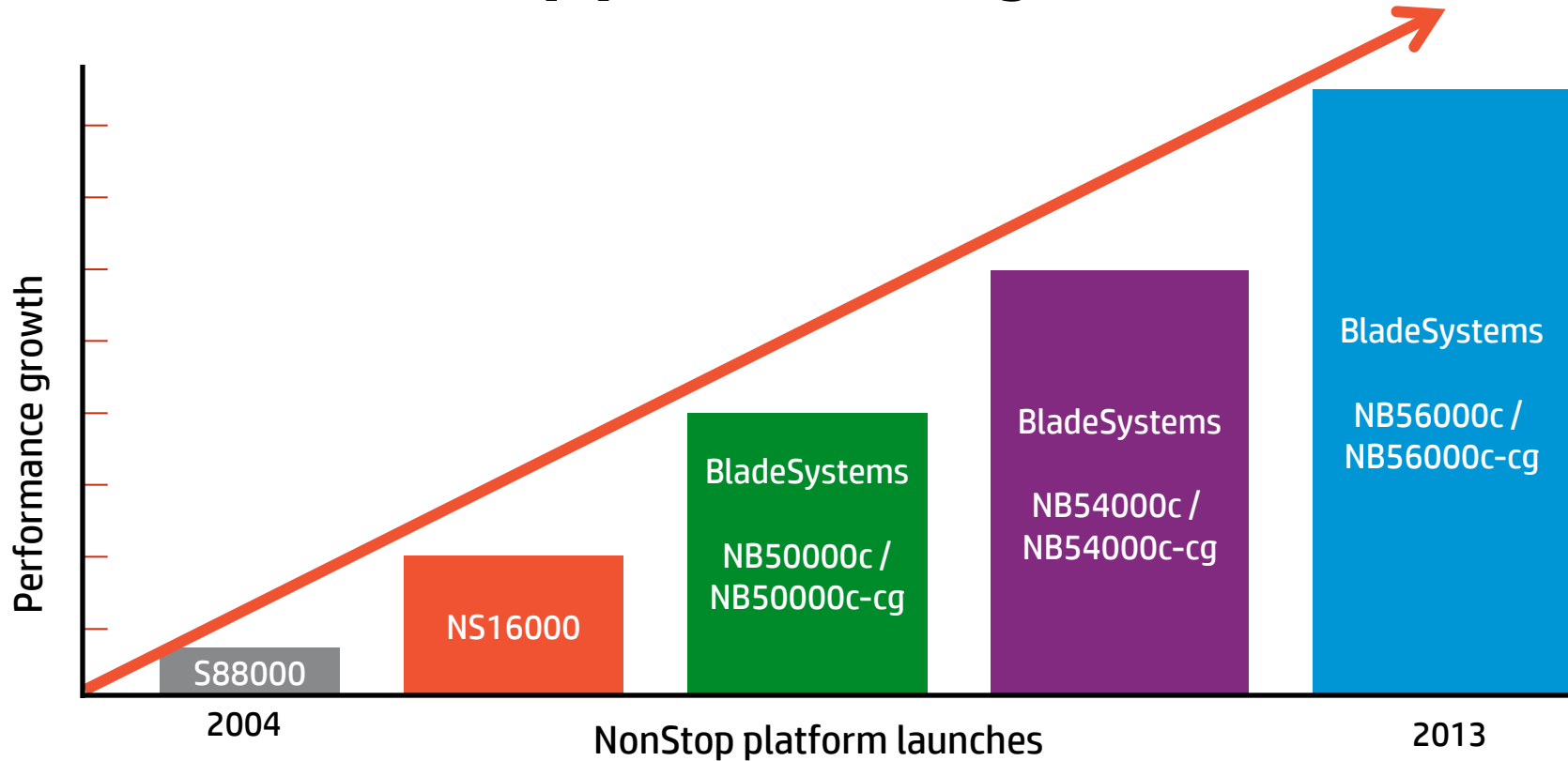
Network Equipment-Building System

Criteria highlights:

- Industry requirement, but not a legal requirement
- Seismic resistance
 - Earthquake, shock, and vibration
 - HP NonStop seismic rack
- Fire resistance
- Environmental
 - Thermal margin testing (operating and non-operating)
 - Humidity
 - Altitude
- RF emissions and tolerances
 - Unique for NEBS Level 3
 - Different from regulatory
- Airborne contaminants
 - Exposure to various gas mixtures for 14 days



Sustained NonStop performance growth



HP Integrity NonStop NS2200 platforms

Entry-class

Designed specifically for

- Emerging markets and stand alone apps
- Migration platform from small to mid S-Series servers
- J-series development and test

Rack mounted entry-class servers

2- core enabled Intel® Itanium® Processor 9300 series

Up to 4P (8 cores); each with 8 GB, 16 GB, or 32 GB memory

Modular I/O components (AKA CLIMs)

- RAID1 CLIM OS disks
- 6G SAS 2.0 storage subsystem

36U and 42U cabinets (AC or DC powered – T, ST)

Minimum RVU J06.12

Clustering via Expand-over-IP



HP Integrity NonStop NS2100 platform

Entry-class

- Designed specifically for
 - Emerging markets and stand alone apps
 - Migration platform from small S-Series servers
 - J-Series development and test systems
- Rack mounted entry-class server
- 1-core enabled Intel® Itanium® Processor 9300 series
- Up to 4 CPUs each with 8 GB, 16 GB, or 32 GB of memory
- VIO Ethernet & Cluster I/O Modules (CLIMs)
- 42U and 36U cabinets
- Clustering via Expand-over-IP
- Minimum RVU J06.14



HP Integrity NonStop Servers

Meeting Mission Critical customers' needs

HP Integrity NonStop BladeSystem NB54000c

Complex application environments
Large databases
Option for 2 or 4-core licensing
Highly expandable I/O

HP Integrity NonStop NS2200

Medium / emerging markets
Stand-alone applications
2-core enabled
HW bundles

HP Integrity NonStop NS2100

Price sensitive markets
Development & test
1-core enabled
Preconfigured HW bundles

Common across all J-series NonStop servers

- NonStop fundamentals – availability, scalability, data integrity, common modular architecture and security
- CLIM based storage and networking
- NonStop J-series OS



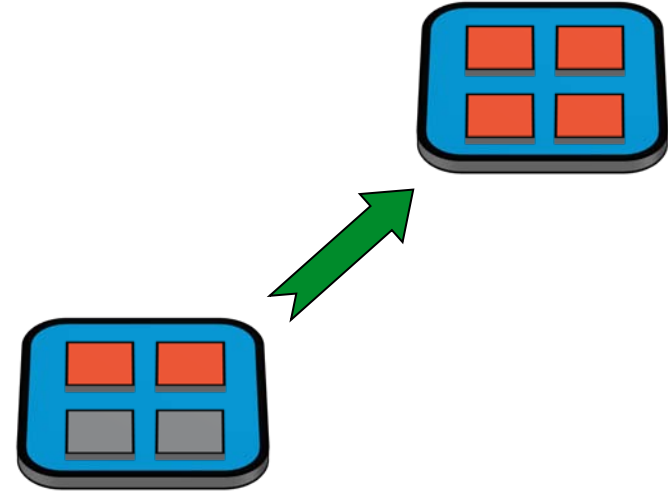
New products and features



Core Licensing: 2 or 4-core

Brings new dimensions in scalability for Integrity NonStop BladeSystems

- Customers can purchase an NB54000c (or NB54000c-cg) with 2-cores enabled at a lower software price point
- Upgrades to 4-cores can then be done at any time during the life of the system
 - Increase system performance and capacity in the same footprint
 - No hardware changes or downtime required
 - Single software command to enable additional cores (from 2-core to 4-core)
 - Software price points are based upon the core license option selected



NonStop's investment protection strategy

Direct upgrade to next generation platform

- Relicense the software and choose either a 2 core or 4-core licensed
- No recompilation required
- Software migration credits
- Hardware trade-in credits
- Keep **all** existing I/O: communications, disks, and tape
- Swap the processor blades (CPUs)

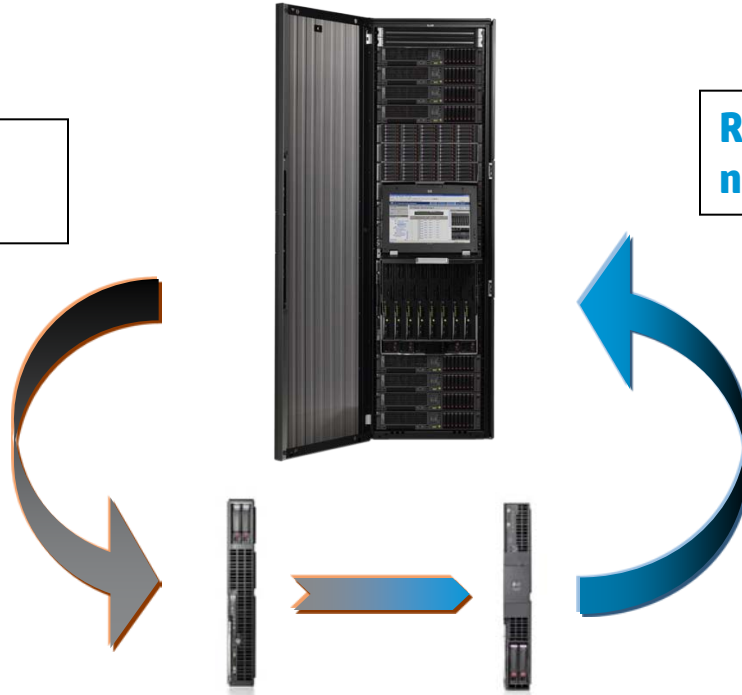


NonStop's investment protection process

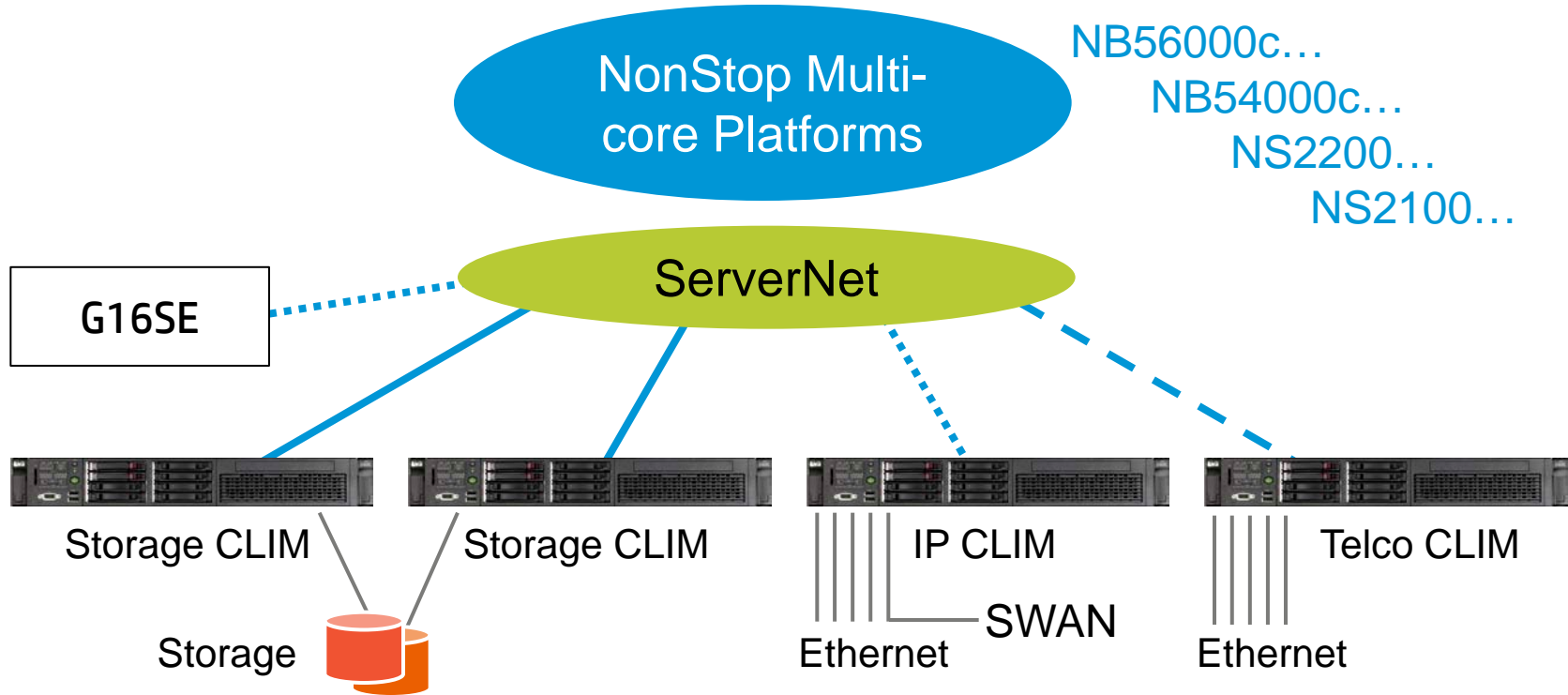
An easy hardware upgrade

Remove HP NonStop
older blade

Replace with HP NonStop
next generation blade



NonStop CLIM I/O infrastructure



What is the G16SE

- **Replacement for the IOAME & G4SA Ethernet functionality**
- **Provides automatic IP failover**
- **Is RoHS compliant beyond 2.04**
- **A total of 16 ports or 8 pairs of ports**
- **Cannot co-exist with an IOAME on the same system**
- **Supported on the NB54000c and NB56000c only**
- **Attaches to a NonStop BladeSystem exactly as an IOAME with the same configuration rules**



NonStop Solid State Drives - SSDs

Enterprise class 6Gb SAS 2.0 200GB SLC

- State of the art SAS solid state drives (SSDs) for NonStop
- Enterprise performance suitable for unrestricted read/write workloads
- Single Level Cell (SLC) NAND flash technology
- 6Gb SAS interface – dual ported
- 200GB SFF (2.5 inches)
- Delivers higher performance, lower latency and lower power solutions (when compared to traditional rotating storage drives)
- Hot pluggable
- Up to ten SSDs per CLIM pair



Features of NonStop SSDs

Adding new dimensions in NonStop storage solutions

- Okay to **mix** SSDs and HDDs in the same NonStop SAS disk enclosure
- Supported with **host-based mirroring**; four paths to each volume
- Up to **8 disk partitions**, each with its own DP2 cache
- Supports **VLE** (Volume Level Encryption)
- Write Cache Enable – **WCE** optionally available, enabled per SSD
- OSM Service Connection has an action to display SMARTSSD Wear Gauge information
 - Percentage of SSD wear already used
 - Estimated remaining life based upon projected usage
- OSM generates EMS event, alarm, and dial-outs when an SSD nears end of life
- Excellent IOPS throughput and **random** I/O performance



NonStop Solid State Drives - SSDs

Similar on the outside



Hard Disk Drive

- ✓ Same SAS interface
- ✓ Same physical format
- ✓ Same fault tolerance



Solid State Drive

NonStop SSD performance

Base platform: HP Integrity NonStop NB54000c server

Benchmark: Random 4KB reads/writes at 90/10 %

SSD IOPS = ~50x HDD IOPS when using 10 threads for parallel access

SSD ~22,000 IOPS; HDD ~450 IOPS ~50x



- 4KB structured files similar to what NonStop SQL database uses
- Tested on an un-mirrored volume (single drive)

[These are peak numbers and not intended for sizing production systems](#)



Will SSDs and partitioning improve your application performance

Yes

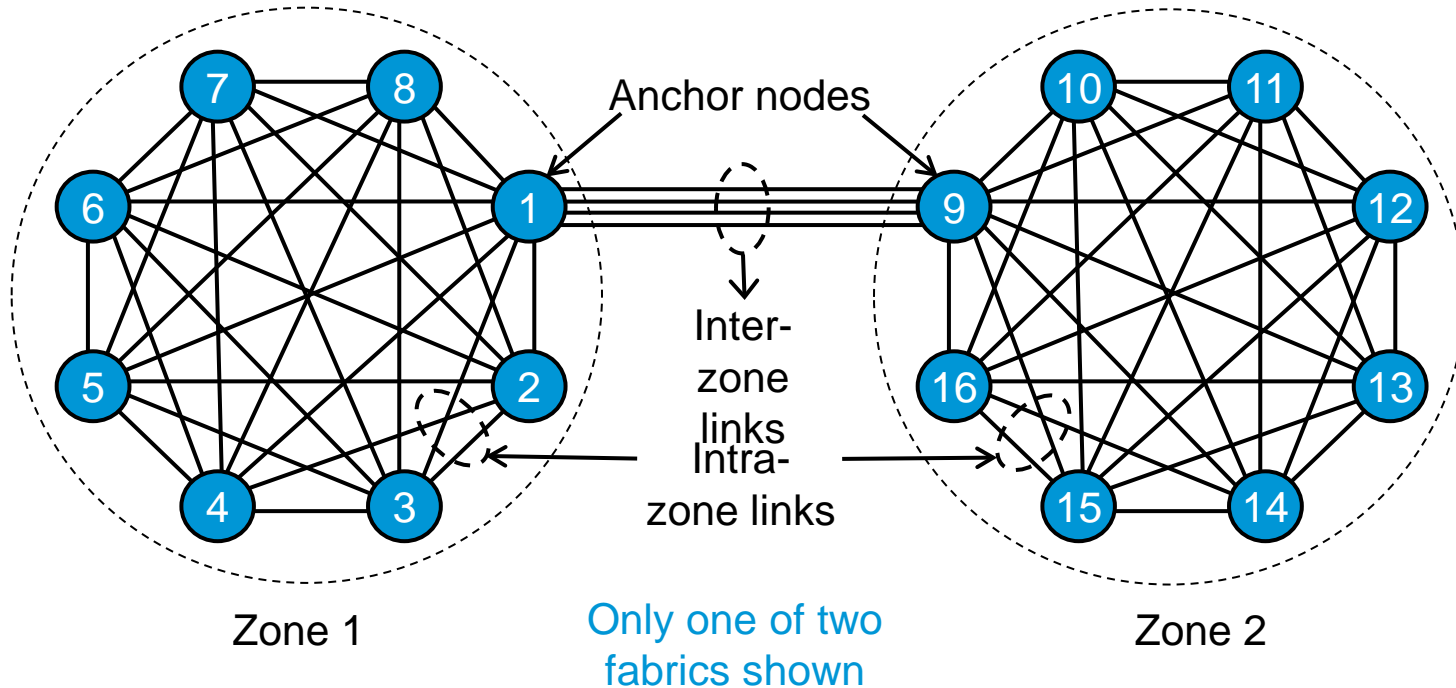
Maybe

no

- Faster transaction response (**random I/O**)
- Increased transaction throughput (**more IOPS**)
- **More DP2 cache** per physical device with partitioning (faster response time with higher DP2 cache hit rate)
- Potentially smaller system footprint



BladeCluster solution two-zone connections



No single point of failure with high-availability anchor node option

BladeCluster solution key features

Operates at ServerNet 3 speeds

- 250 MB/s versus 125 MB/s in 6770 and 6780 ServerNet clusters
- Up to 16 times more aggregate bandwidth than in 6770 and 6780 ServerNet clusters

RoHS compliant

Supported topologies

- Up to 8 nodes per zone; up to 3 zones; up to **24 nodes** per BladeCluster solution

Longer distances

- Up to **65 Km** (August 2011) versus 15 Km in 6780 ServerNet Clusters

Designed for BladeSystem platforms and NS16200 clustering

- BladeCluster solutions can also be used with 6770 and 6780 ServerNet Clusters
- Offers connectivity options for S-series and NS14200 platforms



Key takeaways

New products and features

New high-end system the **NB56000c** and **NB56000c-cg**

Increased BladeSystem memory size to **96 GB**

Online migrations

Solid State Drives - SSDs

NonStop is positioned for a bright future

Strong roadmap

Investing for the future

NonStop is part of the HP Mission Critical Converged Infrastructure



Thank you

