Research Note

HP NonStop offers
the lowest TCO in its class for
mission-critical applications

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About the Author

Richard Buckle is the founder and CEO of Pyalla Technologies, LLC. He has enjoyed a long association with the Information Technology (IT) industry as a user, vendor, and more recently, as an industry commentator. Richard has over 25 years of experience with HP's NonStop platform, including eight years working at Tandem Computers followed by just as many years at InSession Inc. and ACI Worldwide.

Well known to the user communities of HP and IBM, Richard served as a Director of ITUG (2000-2006), as its Chairman (2004-2005), and as the Director of Marketing of the IBM user group, SHARE, (2007-2008). Richard provides industry commentary and opinions through his community blog and you can follow him at www.itug-connection.blogspot.com, as well as through his industry association and vendor blogs, web publications and eNewsletters.

Abstract

This Research Note addresses the total cost of acquisition and ongoing operations of HP NonStop Servers compared with other servers designed specifically for the very highest availability level, that being Availability Level 4 (AL4) – according to a September, 2014, IDC Worldwide and U.S. High-Availability Server 2014 – 2018 Forecast and Analysis.

In this year's update to the Gartner Market Clock for OS and Virtualization, published September 16, 2014, it states that, "HP's NonStop OS is the most extensively deployed and highly scaling solution of its kind." Furthermore, Gartner then notes how, "The next x86 generation will become even more harmonized with HP's mainstream server products" and in so doing, "With each new generation of NonStop architecture, HP leverages more-commoditized hardware to make the NonStop platform more cost-effective to build and support."

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Gartner Market Clock for OS and Virtualization
September16, 2014

The research now completed is based on customer interviews, HP NonStop Server and Software List prices from NonStop Enterprise Division as well as reports by IDC and Gartner. However, it also addresses the work being done by a vigorous ecosystem of solutions and middleware partners collaborating with HP NonStop developers to ensure competitive solutions are available for many marketplaces at competitive prices and this is an unmistakable truism – having the highest level of availability remains the unfair advantage for NonStop.

Tables, hard facts, user corroboration and numerous anecdotes have all contributed to this research note. As such, while individually they may contain little more than a

single observation or fact, in combination they provide a compelling argument for just how competitive HP NonStop systems have become – so much so, that decisions made in favor of NonStop are hard to ignore. Business today values solutions that just work and require little human intervention and for this reason, the TCO of NonStop remains ahead of what otherwise may be expected.

Defining Availability

HP NonStop is a key component of the HP Server Portfolio, and is designed specifically for the very highest application availability level. However, before further consideration is given to assessing TCO of HP NonStop systems, standardizing on a definition is important and for the purpose of this research note, definitions established by IDC have been used. When it comes to HP NonStop systems, being fault tolerant, they fall within the classification of Availability Level 4 (AL4).

Availability Level	Characterization	Impact of Component Failure	System Protection Factor
Availability level 1 **(AL1)**	Not shipped as highly available	Need to switch to redundant resources before processing resumes	No special protection for availability
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 3 **(AL3)**	Clustered server	Short outage is needed for failover to take place	User workload fails over to alternate
Availability level 4 **(AL4)**	Fault-tolerant server	Switch to alternate resources is not perceptible to end users	100% component and functional

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

According to the IDC AL4 definition, that means NO interruption of work, NO transactions lost, and NO degradation in performance. Absolutely, positively, 100% availability! Mission critical now takes on a whole new meaning where only AL4 systems should be considered.

AL4 (fault-tolerant servers)

This is the highest-availability level, connoting that **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 hardware/software resources** so that business processing continues as before without interruption.

HP Integrity NonStop and X86 servers from Stratus and NEC are examples of **fault-tolerant server**s. IDC includes IBM's System z Mainframe systems, running in Parallel Sysplex mode, because they support AL4 functionality through fast switchover to alternate resources within a parallel system configuration…etc.

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

Low risk options

HP NonStop remains the premier implementation of a fault tolerant system complete with integrated hardware / software stack optimized to ensure an "always-on" platform for mission-critical applications. IDC Group Vice President and General Manager, Enterprise Platforms Mission-Critical Business Applications, Matthew Eastwood, in November, 2013, published the report **The Need for Always-On Servers**. According to Eastwood, "The IT organization is almost always seen as having an important role in the mitigation of business risk of all types". Furthermore, "Savvy management and sound IT platforms are commonly seen as the best defense against potential business failures associated with business risks, which can be appropriately managed".

Even more pertinent, when it comes to understanding the true costs of any server, "Fault tolerance must also take into consideration planned and unplanned downtime where scheduled downtime is the function of a management-led event and unscheduled downtime is the result of a physical event such as a power outage, hardware failure, software failure, human error, or other datacenter anomaly. 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."

Mission critical not only takes on a whole new meaning mandating systems optimized for fault tolerance and choosing the wrong platform can add substantially to the costs should system failures cause outages that attract the attention of customers, business partners, and the media.

Integration at point of manufacture

The most recent market analysis by IDC, **Worldwide and U.S. High-Availability Server 2014–2018 Forecast and Analysis**, noted that even as "IDC tracks this evolving marketplace, it appears that customers want to have additional assurance that enterprise workloads that are being deployed on scale-out architectures will retain high uptime characteristics, and this outlook bodes well for growth in the HA server segment. IDC's demand-side research studies have shown that a lack of IT skills related to clustering (e.g., scripting of cluster-aware applications or installation of multiple software components that enable clusterwide functionality across multiple servers) as well as concerns about managing clusters of servers are inhibitors to the installation of clustered servers."

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Matthew Eastwood,
IDC Group Vice President and General Manager,
Enterprise Platforms Mission-Critical Business

When considering the costs of any platform, starting out with the most available platform on the market – a true IDC AL4 implementation - represents the best fit for running mission critical applications. But the value proposition doesn't end with such a decision. Instead, potential costs from outages as well as from attempts to "roll your own" are avoided with the selection of a NonStop system. In general, it is well understood that enterprises with requirements to run mission critical applications are not computer software vendors

and no matter the skills exhibited by those capable of building such a system, in time, and with changes to underlying chip technology and operating systems, prove unmaintainable.

HP NonStop systems are supplied with an integrated stack that includes the hardware, firmware, operating system, middleware, transaction processing monitor and an SQL database. Layered in such a way that applications can be virtualized in a manner that makes them unaware of the processor or node they are running on, such an environment simplifies system maintenance to where planned downtime is down to just a few seconds – add a second NonStop node, and it can be eliminated altogether – and this simplification reduces risk as it reduces complexity and the need for additional IT professionals.

Greater processing for the dollar spent

Enterprise class systems that have been the subject of this research note have included not just NonStop systems but IBM mainframes as well as large UNIX systems. In some situations, when comparing enterprise class systems to commodity servers the more general category of mainframe can apply equally as well to NonStop as it can to IBM mainframes. Bloor Research published on August 14, 2014, an opinion update, **So, what do I really think of the mainframe today?,** by Practice Leader, David Norfolk.

"One of the less reliable vendors in the mainframe replacement business was quite keen on announcing that it had achieved "5 nines availability, apart from planned downtime"— which turned out to be rather different to what 5 nines availability meant in the mainframe world, where you could change operating systems without bringing the system down, you didn't need to patch the operating system every week and unplanned downtime of a few minutes a year worried your vendor," observed Bloor Research's Norfolk. "Mainframes are all about high utilization and efficient use of resources and you need to be running them at 80% or higher utilization, not at the 5% that might be OK for a PC server."

Framing any discussion on TCO there's always a need to plot a number of points against which to compare the offerings of different vendors. In former times,

companies would invest significant sums in benchmarks – or require chosen vendors to perform such benchmarks for them. However, more recently it has become a case of, "Tell me what you would like to see, and I'll choose the benchmark to give you those results."

When it comes to HP NonStop systems, companies also have a choice about how high up the integrated hardware and software "stack" they are prepared to climb. NonStop development today provides APIs and services (e.g. NonStop TS/MP, NonStop SQL/ MX, Etc.) that when used, masks the complexities of developing applications capable of surviving outages, planned and unplanned. This results in a significant impact on the TCO as the further up the stack companies climb, the less staff that are needed to manage the application deployed.

> **"Customer needs, as well as logistics, change by the minute. But not our mission. With IT, we must realize a system capable of delivering the wide range of Yamazaki products on time *and without fail to our customers."***
>
> Ikuo Ishige,
> Manager, Computing Center,
> Yamazaki Baking Co., Ltd.

Today, the choice of programming languages and development frameworks has expanded, according to Ajaya Gummadi, NonStop Data and Cloud Product Manager at HP. "We have also paid lots of attention to bringing the latest modern, standard, and open source technologies to NonStop and in so doing, we are normalizing the skill level required to develop, deploy, and manage NonStop systems aiding the TCO proposition even further. When it comes to the cost of planned downtime, NonStop systems now offers a Zero Downtime Migration; so this cost component in the TCO gets further reduced making the NonStop TCO story even better!"

Determining the true TCO must take into account the cost of ownership of the software and support in addition to the hardware and every bit as important, factor in risk, complexity (and the staff this mandates), and just how much of the system can be effectively used. Against this background, NonStop quickly ascends to the top

and this shouldn't surprise anyone – and the adoption of commodity hardware, the support of HP NonStop servers as part of a hybrid computing environment and the imminent arrival of support for NonStop on x86 architecture will see even greater separation of NonStop from the rest of the contenders when it comes to running always-on, mission critical applications for any enterprise.

Customers realize TCO benefits

In the preparation for opinions papers I have written on the HP NonStop server, including references to the value provided today with NonStop SQL/MX (SQL/MX), I had an opportunity to conduct several interviews with companies running SQL/MX as well as other SQL implementations. When it came time to write the first opinion paper "NonStop SQL: The path to the always-on, easily administered, out-of-the-box clustered, database server!" one data point that stood out for me was the need for teams of DBAs to oversee effective running of Oracle, an observation that led to me making the following observation:

"At a Spanish healthcare data center, where there is a two-node cluster of HP ProLiant servers, each with 16 cores, running Linux and Oracle Real Application Clusters (RAC) Release 10.2.0.3, there's a full-time team of five specialist DBAs responsible for the oversight of the gigabytes of SQL database. In my interviews with customers a two node cluster proved to be a typical implementation, and even though Oracle professes to support as many as 100 nodes very few sites manage to expand beyond two. The Spanish healthcare database is sizable; there are more than 1,700 tables, more than 3,000 indexes (of which, half are well used), and tables that have rows extending for several gigabytes."

The need for less staff, and the impact this has on the total cost of ownership (TCO) made its way into the second opinion paper I wrote, "Why more corporations today depend on HP Integrity NonStop mission-critical servers!" The availability of an integrated stack from the hardware through the operating system and into the relational database management in support of SQL/MX, resulted in less contention, easier management of the clustered database and support of mixed workloads all leading, as I wrote at the time, for me to observe how "Mission-critical, customer-facing, applications continue to rely on NonStop. Even as the platform available

today offers so much that is new, it has never veered away from providing the highest levels of availability and near-linear scalability of any server on offer in today's marketplace. And yet, HP NonStop servers remain an affordable option – with hardware, operating system, database and applications packaged as part of a well-integrated stack."

More recently, I completed another opinion paper, "**HP NonStop systems as you haven't seen them before - deployed in support of mission-critical applications in manufacturing and distribution, telecommunications, retail and wholesale banking, transportation and entertainment".** Among the NonStop users referenced was a Japanese bakery where margins are as thin as the crusts of their pastries. No premium could be afforded for technology that didn't add value nor would they stay in business long if time-sensitive products couldn't be delivered to consumers and yet, the TCO of NonStop proved inescapable. "Customer needs, as well as logistics, change by the minute. But not our mission," said Ikuo Ishige, Manager, Computing Center, Yamazaki Baking Co., Ltd. "With IT, we must realize a system capable of delivering the wide range of Yamazaki products on time *and without fail to our customers."*

HP is investing in Intel Xeon processor-based NonStop systems – replacing Itanium, and these systems will fall into the BCS container. HP has a history of building excellent business critical systems, so this is very interesting news."

John Appleby
Global Head of SAP HANA at Bluefin Solutions

Further follow-up with a consumer electronics manufacturer using NonStop in support of multiple applications, the value running multiple applications on a single, larger system, came to the fore. Combining applications this electronics manufacturer has gone from 14 heavily loaded (sometimes as high as 90% CPU utilization) HP NonStop MIPS-based S-Series servers to just one HP Integrity NonStop BladeSystem and seen CPU utilization drop below 20%. "The only thing we have removed is the manufacturing system; 14 systems replaced by one. We barely touch these new CPUs running the J-series

release of the NonStop operating system and we now have around 400 drives on this beast" according to my source.

Running mixed workloads in support of multiple applications, deploying HP NonStop SQL/MX in a manner that requires no planned system downtimes, and at price points the local bakery can afford strongly indicates a TCO better than many had expected. As reported in the March 5, 2014, post **Death of the mainframe – again!** to the web site, ***diginomica.com***, Global Head of SAP HANA at Bluefin Solutions, John Appleby, noted, "HP is investing in Intel Xeon processor-based NonStop systems – replacing Itanium, and these systems will fall into the BCS container. HP has a history of building excellent business critical systems, so this is very interesting news."

Cluster-in-a-box prevails

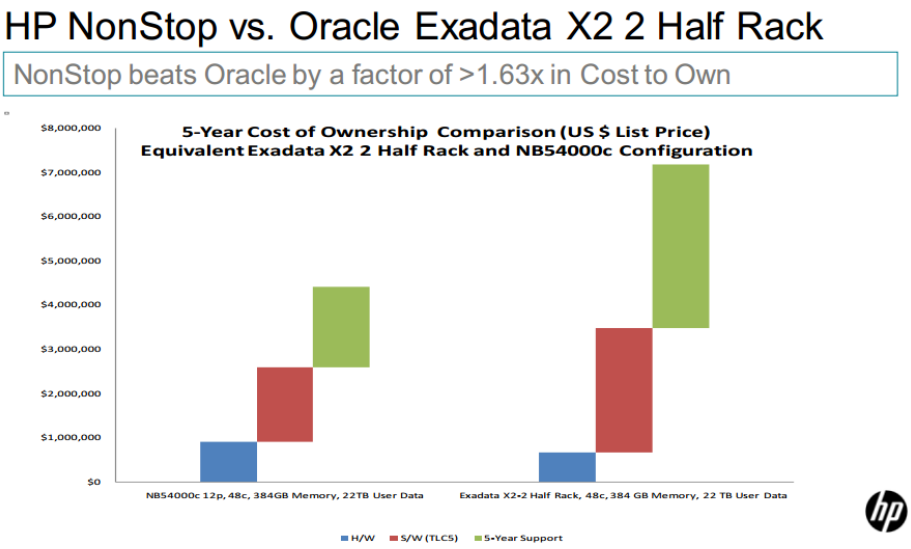
In the preparation for this opinion papers I not only had the opportunity to interview customers and vendors, but to see the results of comparative tests run on a variety of platforms, including NonStop and Oracle. When factored in, the support costs of software, the software license fees, and all the hardware required, and then compared to equivalent NonStop server configurations, the Oracle RAC and Exadata systems were nearly twice as expensive – in some instances, even more.

"Enterprises look at cost of purchases and quantify them as hardware and software costs, since it is the easiest part of their investment to quantify," said NonStop Product Manager Ajaya Gummadi. "But when we work with our customers, we tell them that the hardware and software costs are only one part of their technology purchase, and recommend that they take a holistic view and include all the soft and hard costs – what is the cost of supporting and maintaining the software and the application? How easy is it to train people to work with this new system? And not just look at the initial 1-time costs, but take a multi-year view. When our customers take this broader view, they understand the TCO savings as a result of their NonStop investment."

When it came to the software itself, many of the utilities and tools so heavily-relied upon by Oracle DBAs are a part of the SQL/MX offering on NonStop – an integral part

of the product offering. This too results in considerable savings immediately at time of purchase as well as over the five years of required license and support fees.

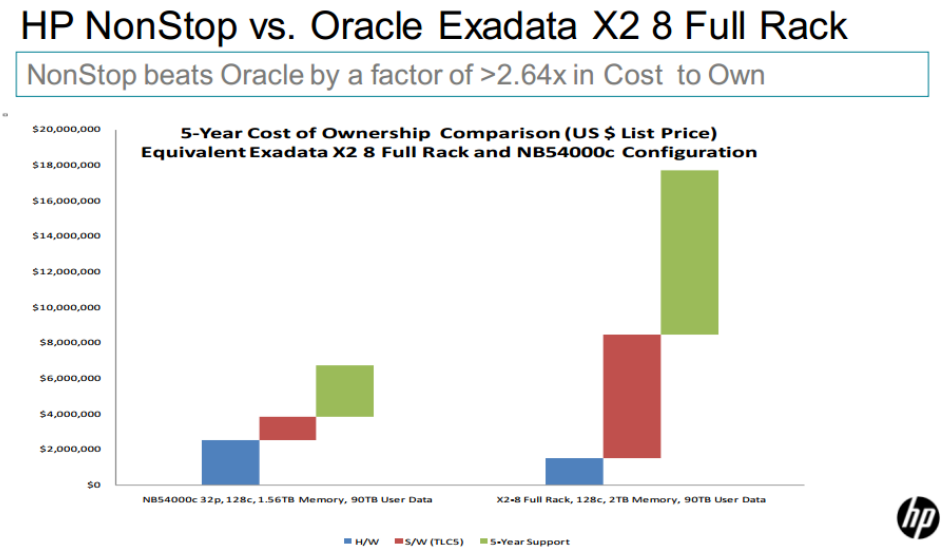
But it is the greatly reduced hardware costs that prove difficult to ignore. In easily-repeatable tests, when it came to comparing HP NonStop server with Oracle RAC / SUN server, the NonStop server enjoyed a greater than 2.2x lower cost of ownership where a single node (16 processors / 64 cores with comparable main memory and disk storage) was tested and enjoyed a greater than 2.7x lower cost of ownership when a cluster of 8 nodes (again, each node 16 processors / 64 cores with comparable main memory and disk storage) was tested. For each test, no extraneous middleware was included in the price calculations, simply the operating systems and all the required software in support of a clustered database engine, but it did include the licensing, as well as the cost of support, for five years.



When these tests were repeated against much larger databases – those typically associated with what required Oracle Exadata, NonStop enjoyed a greater than 1.60x lower cost of ownership. For these results, a NonStop system of 24 processors and 96 cores with 768 GB of main memory and 45 TB of user data was evaluated alongside an Exadata X2 (2 Full Racks) 96cores, 768GB of main memory, and 45 TB of user data. When repeated on like configurations, but involving the smaller, half and quarter racks (of Oracle), almost the same lower cost figures were attained, but moving to larger configurations the pendulum swung even more favorably in HP

NonStop's systems direction.

It should be noted too that these tests were performed before the latest HP NonStop NB56000c was released and that together with the imminent arrival of support for Intel x86 architecture, the gap between NonStop and Oracle will widen further. Again, when looking at the data that is within these two charts, all comparisons reflect the total cost of acquisition and haven't been made simply on the basis of hardware – for HP NonStop, this includes out-of-the-box integrated software stack that is clustered from the outset, as well as support for five years.



Needing fewer DBAs is a great starting point for NonStop. Letting these DBAs benefit from an integrated HW / SW stack, lessening the need for them to do as much as their counterparts and producing a far simpler environment to oversee ensures there's less potential for errors and mistakes to find their way into the system. A "cluster-in-a-box" as NonStop systems have so often been described, built, tested and delivered by the primary vendor, as is the case for NonStop systems from HP, will always win out financially over any self-assembled equivalent in the long run no matter what parameters may be set for the TCO model. However, having significantly cheaper components as well represents the kind of change business continues to demand.

Vendors realize TCO benefits

Less DBAs, less complexity – a better availability signature with near-linear scalability – and yet businesses still demands more from their vendors. And at the heart of the requests is the requirement of business for solutions that cost-effective and affordable – at the time of purchase and through a typical five-year maintenance and support cycle. Nowhere is this better appreciated than among the growing ecosystem of solutions vendors focused on HP NonStop. Irrespective of the excellence of the solution, having access to a family of products with low enough starting prices is absolutely necessary to gain business. NonStop systems are fast – and getting even faster with new Intel x86 processors. This is good news when it comes to satisfying the toughest business demands on availability, and with new entry class systems, with entry class prices providing more opportunities to new customers, the initial purchase price is less a factor to these businesses. No TCO calculation will stand up to scrutiny if the price of entry is high.

"Our success in selling NonStop systems to new clients over the past two years has been influenced by price and … we couldn't have met customer expectations without the entry-level pricing HP provided."

Yash Kapadia
OmniPayments, Inc.

"Without providing an entry-level system, such as we have with the rack-oriented HP Integrity NonStop NS2200 server and the NS2400 server, OmniPayments would not have won business in emerging markets. Our success in selling NonStop systems to new clients over the past two years has been influenced by price and while the latest NonStop systems are every bit as powerful as NonStop systems of only a few years ago, we couldn't have met customer expectations without the entry-level pricing HP provided," admitted OmniPayments, Inc. CEO, Yash Kapadia, following his second big win in Columbia, "NonStop today is truly a family of systems catering to the needs of the very largest user. However, it's rare for any user new to NonStop systems to buy one of the bigger systems so having access to powerful, entry-level, systems has opened the doors to clients who only a few years ago could never have justified buying our OmniPayments solution running on NonStop."

Providing ownership opportunities to enterprises in need of HP NonStop systems but in a way that allows them to embrace on their terms is every bit as important as the monetary savings over time. "We've been very successful with the entry-class NonStop servers, all the way back to the original NS1000," said Randy Meyer, VP and General Manager, Mission Critical Systems, Hewlett-Packard Server Group. "It's enabled customers who may not need the scalability of the largest systems to benefit from NonStop's fault-tolerance and ease of management, making world-class levels of availability accessible to lots of new customers. We absolutely intend to continue serving that market segment." Longer term, these enterprises will grow their transaction base to where larger systems will be needed and this too isn't lost on Meyer.

"We took the stance of a competitive price point for our software solutions for the entry level NS2100 / NS2200 servers in order not to undermine the better ROI / TCO logic that HP provided …"

Thomas Gloerfeld
Marketing VP
comForte GmbH

Middleware vendors know all too well the significance of a positive TCO result – riding strongly on the coattails of successful solutions vendors, they cannot afford to be in a position to skewer TCO results and yet today, so much of the value that comes with NonStop is provided by middleware vendors. "The HP Integrity NonStop NS2100 / NS2200 servers have been around for a while and the HP Integrity NonStop NS2300 / NS2400 servers are replacements launched earlier this year. We took the stance of a competitive price point for our software solutions for the entry level NS2100 / NS2200 servers in order not to undermine the better ROI / TCO logic that HP provided when introducing these systems," reported comForte GmbH Marketing VP, Thomas Gloerfeld. "In order to prove this point we kept our competitive pricing as is for the NS2300/NS2400 servers and expect this to be well-received by our customers."

Adopting a similar stance to comForte has been that of equally long-time middleware provider to the HP NonStop community, Integrated Research (IR). It's market

leading monitoring product, Prognosis, is the benefactor of additional pricing options such that "Large HP nonstop users tend to embrace the new iterations of power / speed / and capacity ," said IR America's Sales Director, Jay Horton, "so we have tried to price Prognosis in line to ensure continued usage and functionality." Just as importantly, all three vendors have products in place that support adjacent platforms apart from NonStop to help boost overall TCO – from running monitoring dashboards on Windows to web and application servers on Linux. Hybrid computers? The first hybrids that include NonStop as part of the hybrid offering have begun shipping and once again, it has been the solutions vendors leading the way. In so doing, such integration is only adding to the TCO reductions all enterprises want to see.

OmniPayment, Inc. CEO, Yash Kapadia, anchored HP standard chassis for rack-mounted processors with enough NonStop processors to support the key components of his payments solution. He then threw in a couple of HP Atalla security modules before topping off with Intel-Xeon processor-based HP ProLiant servers running Linux and Windows. This single "Yash-tested system" could serve up Web pages — potentially video — while retaining the flexibility to run whatever security options customers required, and servicing the needs of operational and business managers. "If HP built such a system themselves — yes, it's all HP components — then great," Yash said. Moreover, according to Yash, "Shortly HP will engineer NonStop to support x86 architecture, allowing OmniPayments to run an optional all-blades chassis, but the real benefits here are twofold — removing the complexity while increasing the flexibility. At OmniPayments we have focused on providing value and when it comes to NonStop systems, we are seeing an intersection between value and good performance – NonStop systems today that are much faster than previous iterations of NonStop systems." In other words, making this hybrid computer much cheaper than any other alternate offering!

OmniPayments are not alone when it comes to providing value as at DMBGroup, the company behind DataExpress, the question most often asked is whether cheaper is better? Michelle Marost, President of DataExpress, providers of managed, secure, file transfer, is quick to point out, "Anyone can move bits and bytes between business units, customers and machines, but have you asked yourself if your business, your relationships and your reputation could survive intact should the integrity of that data be compromised." Furthermore, observed Marost, "We see the value provided

by HP NonStop systems being recognized among our customers. In embracing commodity hardware, based on the Intel Xeon architecture, today's NonStop systems are rapidly closing the price / performance gap on the competitions less robust product offerings."` We should remember that the previous systems have been surpassed by the systems available today," noted HP NonStop Product Manager, Mark Pollans. "While the NS2300 and its slightly larger sibling, the NS2400, are entry class systems, current NonStop users have found migrating from NonStop S-Series systems to NS2300 / NS2400 systems an attractive option."

"We see the value provided by NonStop systems being recognized among our customers … today's NonStop systems are rapidly closing the price / performance gap on the competitions less robust product offerings."

Michelle Marost
President of DataExpress

Within the NonStop community there are price-sensitive customer situations including start-ups and those wanting to test a new application on NonStop where the availability attributes of NonStop are highly prized and for these reasons, NonStop development maintaining entry class pricing is important to their business objectives.

Fast, good … and cost effective!

Today, HP NonStop systems represent a family of products from entry-level systems through midrange systems all the way up to some of the biggest enterprise systems imaginable. While there's been considerable attention paid to entry-level systems it hasn't been to the detriment of much larger members of the family. In any study of TCO and of the impact HP NonStop systems has on new users, providing an attractive entry price for HP NonStop systems usage plays an important role in ensuring new users embrace NonStop. NonStop systems are highly scalable as well as backwards compatible and in any measure of TCO, these are important considerations – will investments made in NonStop be protected and will the plug and play nature of modern HP NonStop systems in support of hybrid computers

attract more business?

Less staff needed for the support of the operating systems and key subsystems including the database, more value-priced solutions and middleware from a thriving ecosystem, greater reliance for mixed workloads requiring less physical systems, and increased reliance on industry standard components and open software ensure that NonStop offers the lowest TCO in its class across the entire customer base and that today's NonStop systems remains extremely attractive to every business needing support for their mission critical applications. "As our customers tell us, they are experiencing enormous amount of data and transactional growth and even more and more challenging Service Level Agreements (SLAs), observed HP Product Manager, Ajaya Gummadi. "They are continuously looking to improve their cost economics and Nonstop has always delivered on best TCO for mission-critical applications in every industry."

In the first release of this research note it was the input from users that influenced my findings but now I have the input from vendors developing solutions for NonStop systems as well. The input provided by these vendors further enhances the TCO picture for NonStop systems, a fact that is reinforced by just how much of their own funds they are investing in products and services for NonStop systems. Furthermore, this is evidence too that they are not observing any decline in markets for their products and services on NonStop systems as any evidence to the contrary would have resulted in vendors investing elsewhere. In embracing hybrid computers that include NonStop systems, as one vendor has done already, and adding support of cloud computing based on NonStop systems selling their products on the basis of Software as a Solution (SaaS), this vendor is at the forefront in helping HP further reduce the TCO of applications running in part or in whole on NonStop systems.

However, it the ongoing work by NonStop development cannot be overlooked. In the time between the writing of these two research notes, testing has begun with NonStop supporting Intel x86 architecture and "server consolidation continues to take place, something we began to see as customers moved from NonStop S-Series servers to NonStop NB56000 servers," according to HP Product Manager, Ajaya Gummadi. "This directly results in reduced data center costs (e.g. real estate, power and cooling, network and storage infrastructure etc.) adding yet more to the savings

that directly impact customers' bottom line. And with the reduced number of processors, deployment time (e.g. the time needed to bring up the system), also goes down and further contributes to your HP NonStop systems availability profile."

"We're very early in the lifecycle of NonStop on x86 (we haven't even reached general availability yet), but we are seeing a strong degree of interest both from our traditional customer & application base, along with some very interesting potential in new and different market/application areas," said HP's Meyer. "In particular, 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."

NonStop offers the lowest TCO in its class across the entire customer base … remains extremely attractive to every business needing support for their mission critical applications.

It was the American independent film director, Jim Harmusch, who once reduced complex economics to a more readily understandable model. "Fast, cheap and good … pick two," he said. "If it's fast and cheap, it won't be good. If it's cheap and good, it won't be fast. If it's fast and good, it won't be cheap." The goal of TCO models "is to provide an organization's executive leadership with financial projections with which it can make informed information systems business decisions related to a specific project" according to one source I turned to. From what I was able to determine from interviews with HP and its customers and partners, there is more than enough examples to demonstrate that projections covering hardware, subsystem and staffing all lead to a lower TCO than may otherwise be anticipated. Perhaps two out of three refers to systems of the past as today, with renewed dependence upon Intel roadmaps, it's more than likely that NonStop users will have it all. Yes, "it's fast and good … and it's more cost-effective" is a message that the NonStop community knows only too well.