The Connection

A Journal for the HP Business Technology Community

Where's the Value in Application Modernization?

Modern Approaches to the Challenges of Archiving and Application Retirement

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With modern software technologies, an Eclipse™-based development environment, and support for industry standards like Java®, you can now modernize your applications to take advantage of HP Integrity NonStop's availability, scalability, and data integrity—to dramatically improve performance when deployed on the new HP Integrity NonStop X systems.

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News from HP's NonStop Enterprise Division

With the ever-increasing customer demands in today's globally-connected, always-on world, we know how much pressure you're under to make sure your most critical business processes and customer-facing applications are continuously available. Your complex, interconnected workflows must be nonstop, and downtime for any reason can cause irreparable harm - loss of customer loyalty, loss of reputation, or even financial disaster. And now, more than ever, you and your enterprises are being asked to deliver IT that serves, innovates, and transforms. It's a new style of IT that is defined by lower costs, rapid time-to-value, and rock-solid reliability.

In this mission-critical environment, business processing, online transaction processing (OLTP), and enterprise databases are the most-critical workloads to ongoing success—and what's 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. That's where HP Integrity NonStop comes in.
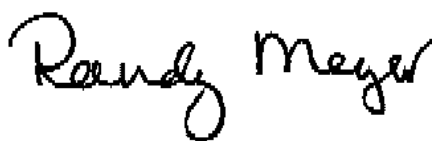
The unique value of HP Integrity NonStop is not only the fault-tolerant technology we deliver to our enterprise customers, but also the value delivered to their customers. Whether clients, consumers, callers, or citizens, these customers never wait. NonStop is at the heart of the business, running the most-critical, complex workloads.

It's in this environment that we introduced the HP Integrity NonStop X, the only fully-integrated, fault-tolerant compute for continuously-available x86 solutions. We began with a high end server, the HP Integrity NonStop X NS7 X1. It's off to a great start, and I'm excited about the future of NonStop and the value it brings to customers. I am now pleased to welcome the most recent additions to the product family: The entry-level HP Integrity NonStop X NS3 X1 system (NS3 X1), the HP NonStop X Cluster Solution (NSXCS), and additional licensing options for the NS7 X1.

The NS3 X1 is targeted for emerging markets, customers with standalone applications who need a cost effective solution for their mission-critical needs, and small to mid-size enterprise business. It also enables customers to have a development environment that runs the same software as the NS7 X1. For customers that need to expand their mission critical applications and Big Data processing beyond the boundaries of a single NonStop X system, the new NSXCS enables InfiniBand clustering for the NS7 X1 systems. Lastly, our new core licensing levels give customers the ability to meet future growth demands by upgrading their core count from 2 to 4 or 6-cores per processor nearly instantaneously, and without any downtime. For more information, visit www.hp.com/go/nonstop.

Finally, for those of you looking to 'connect' with the NonStop team, partners, and fellow customers, the Connect NonStop Advanced Technical Bootcamp is right around the corner. Join us in San Jose to hear more information and get a glimpse of the many ways we're continuing to innovate. Can't make TBC? Meet us in London the first week of December for Discover 2015. We'll have a full lineup of mission-critical sessions, demos and experts at the event. My team and I look forward to seeing you there! 🔗

Randy Meyer
VP & GM, Mission Critical Solutions
HP Servers

Two Cores and 120TB
Strike Up
A Beautiful Friendship!

M8801A/M8802A
24 Cartridge ACL
Rack-mount / Tabletop

M8805 SAS
Manual Tabletop

ALTERNATIVE THINKING ABOUT LOW COST DATA BACKUP

With the introduction of the HP Integrity NonStop X NS3 X1, cost sensitive customers now have the ability to migrate to the two-core version of the new NonStop X family of servers.

But what about backup?

Customers are covered there too, with the LTO 6 tape products. Offered in three versions, these simple to use, robust and reliable drives are the perfect match, offering safe and secure data storage at the absolute lowest cost available for NonStop X.

And performance?

The LTO 6 drives, coupled with the new NonStop X servers provide, by far, the fastest tape I/O interface ever offered on a NonStop system.

How about capacity?

A single LTO 6 ACL drive with 24 media cartridges can store 120 TB of data (at a very realistic 2:1 compression).

So let's see, LTO 6 and NonStop X: Enhanced performance, high capacity, simplicity of operation, lowest cost!
" You get what you pay for!" Not necessarily.

LTO 6 TAPE DRIVES

- High performance - up to a measured 180 mb/sec
- Simplest to install, simplest to use - plug and play, no host based software to deal with
- A fraction of the cost of any virtual tape library
- Available for all Integrity NonStop X, NB- and NS-servers
- Media compatibility with previous generations
- Supports HPE Volume Level Encryption (ESKM 2.1; ESKM 3.0)
- LTO 6 Datasheets at: http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-4891ENW.pdf

Tributary SYSTEMS, INC
www.tributary.com

Contact your HP NonStop representative for more information.

hp Business Partner

ADVOCACY
The 2015 Connect Worldwide Survey

Dr. Bill Highleyman >> Managing Editor >> Availability Digest

Connect, the Independent HP Business Technology Community, recently concluded a member survey regarding HP products and services as well as Connect activities. Almost 1,400 members responded, resulting in very meaningful input. Details can be found on the Connect web site at http://bit.ly/Connect_Survey. We summarize the survey results in this article.

About 60% of the respondents were HP product or services customers. Almost a third of these were NonStop users. One surprise was that the adoption of Big Data and cloud technology was only in the single digits percentage-wise, though many customers are making plans to incorporate Big Data into their enterprise computing environments.

Is your company reluctant to be among the first to adopt new technologies? Forty percent of respondents said yes, but an equal number want to be among the early adopters.

88% of Connect members rated the value of membership as good or better.

Ninety-five survey participants wanted information on starting new chapters. This could be a great growth opportunity for Connect. Twenty-five respondents have Connect or HP success stories they would like to share with the community. We encourage them to submit papers for The Connection or to provide presentations at Connect events.

Respondent Demographics

Connect received responses from around the world. North Americans were the most active, with 60% of respondents from the U.S. and Canada. EMEA (Europe, Middle East, and Africa) accounted for 25%. The remaining survey participants were from Latin America, Asia/Pacific, and Japan.

The corporate positions of respondents were well-balanced, with the bulk of responses coming from IT professionals, system administrators, and managers. C-level executives and purchasing personnel were also included.

A third of the responses came from the financial sector and manufacturing. Communications, health, and the public sector were also represented.

Interestingly, the bulk of the responses came from the smallest and the largest companies. Those companies with less than 100 employees accounted for 23% of responses, and companies with more than 10,000 employees accounted for 30%.

Sentiment on the adoption of new technologies was balanced. 40% of respondents wanted to be among the first to try something new, while 40% preferred to wait for reports from early adopters before moving forward.

59% of those involved were end users of HP products and services, while 14% were resellers. Fewer responses from ISVs, system integrators, consultants, and distributors were fairly well-balanced.

Questions Focused on HP

The survey listed twenty-seven product categories. The top ten in terms of usage by the respondents were:
- VMware – 67%
- Proliant – 56%
- Linux – 54%
- BladeSystem – 47%
- HP Networking – 37%
- 3PAR – 29%
- EMC Storage – 29%
- HP-UX – 29%
- NetApp Storage Systems – 24%
- Integrity Servers – 23%

17% of respondents were NonStop users. 21% were OpenVMS users. 7% of respondents were involved with a cloud infrastructure (Helion) and less than 2% with Big Data (HAVEn).

Cisco was by far the most-used non-HP product followed by Performance Center, Dell, Oracle, and Citrix. Only 7% used IBM servers. Of those running IBM servers, a little more than half are running core business applications on them and are considering database or application upgrades in the next year.

When asked about what the future Hewlett-Packard Enterprise company will mean after the HP split, over 50% of respondents mentioned terms such as a trusted partner, a solutions provider, and a hardware vendor.

Two-thirds of respondents felt that HP training certifications are valuable, and 79% felt that HP education was valuable. The preferred vehicle for training is the Internet (74%) followed in order by events, webinars, and colleagues.

The top technologies in which companies of the respondents are planning to invest are servers, storage, networking, security, Windows, and Big Data. 11% are interested in investing in cloud infrastructure (Helion).

HP Discover is HP's large annual event and is held each year in June in Las Vegas. One-third of all respondents have attended at least one HP Discover event in the last two years. 54% went to see new products or to gain new knowledge. Of those who did not attend, half said that it was due to company budget, time, or cost.

Questions Focusing on Connect Worldwide

44% of respondents are Connect members, and 23% of all respondents want further information on joining Connect. Changes that will induce past members to rejoin include reduced cost, more value, or free membership.

18% of respondents have attended a Connect event in the last five years. 34% of those attended the NonStop Technical Boot Camp (this represents almost half of all NonStop respondents), and 18% attended the OpenVMS Boot Camp.

A series of questions asked about the importance of various

Connect services. The importance to the responders of each was as follows:

- Connect's relationship with HP   63%
- Connect's publications   61%
- Boot Camps   57%
- Discounts on travel services   32%
- SIGS   60%
- Advocacy to HP   60%
- Philanthropy to aspiring tech leaders   39%
- Education   64%
- Online Community   62%
- Discounts on education and events   58%
- Chapter meetings   71%

88% of Connect members rated the value of membership as good or better. The top recommendations for improving Connect's value to their organizations included providing technology updates, hosting more events, and representing newer technologies.

When asked to describe how satisfied they are with Connect's Advocacy to HP, 61% are either very satisfied or somewhat satisfied. The top recommendations for improving Connect's Advocacy program included reporting Advocacy efforts and results to members and sponsoring more events with HP.

87% of members said that Connect provides the same value or better than other organizations to which they belong, and 70% agreed that Connect offers valuable information and resources to its members. 66% rated as important the ability of Connect to present member views and opinions to HP.

Most members preferred Connect to use email and the Connect web site as means to communicate issues on new technologies and issues.

More than 150 members requested additional information on becoming a Connect volunteer leader. 95 members wanted information on starting a new chapter in their communities. 29 members have a Connect or an HP success story they would like to share (time for a Connection article or an event presentation).

Most members don't follow Connect through social media (53%), but those that do prefer LinkedIn two to one.

Participate in Connect's New Instapoll

Let your voice be heard. Participate in Connect's new Instapoll. You'll find it on the Connect home page at http://www.connect-community.org/. New Instapolls will be posted periodically and will provide you with insight into many issues.

Summary

Connect's annual survey is an important means for Connect to understand how well it is serving the HP enterprise community. Connect will be studying these results to determine how it can improve its services to its membership. Ideally, Connect will present a later report in which the organization acknowledges changes it will make based on the survey.

One change is already underway. Connect's new Instapolls provide a means to continue the survey over the months to come.

Dr. Bill Highleyman is the Managing Editor of The Availability Digest (www.availabilitydigest.com), a monthly, online publication and a resource of information on high- and continuous availability topics. His years of experience in the design and implementation of mission-critical systems have made him a popular seminar speaker and a sought-after technical writer. Dr. Highleyman is a past chairman of ITUG, the former HP NonStop Users' Group, the holder of numerous U.S. patents, the author of Performance Analysis of Transaction Processing Systems, and the co-author of the three-volume series, Breaking the Availability Barrier.

comForte Supports Key Modernization Effort for HP NonStop Application at Gallagher Bassett

Thomas Gloerfeld >> VP Marketing >> comForte 21 GmbH

Executive Summary

Having been in business for decades, the team at Gallagher Bassett ("GB") had invested significant time, expertise, and resources in its HP NonStop-based claims management system. While core application functionality had been maintained and did a good job of supporting GB's business, the system continued to rely on outdated "green screens" for a portion of its user interface. These screens got the job done, performed well and were favored by veteran users, but lacked advanced functionality associated with more modern user interfaces, were difficult for new users to learn, and were beginning to hinder the company's sales efforts. With the help of comForte's staff and solutions, Gallagher Bassett was able to deliver a modern, intuitive interface that offered significant benefits from a usability and sales standpoint. Further, they were able to do so making minimal changes to the application.

The Challenge

Gallagher Bassett is a leading third-party property/casualty claims management company serving self-insured Fortune 500 clients and insurance carriers. It has more than 3,400 customers around the world and more than 100 branch offices and operations in the United States, Canada, the United Kingdom and Australia.

As a claims administrator, one of the main requirements of the system is to provide its primary users, commonly referred to as "claim adjusters," timely access to critical information and services.

Claims adjusters rely on a toolset that's comprised largely of web-based applications. However, they also used an application based on the HP NonStop platform, which was accessed through a legacy interface (see Figure 1).

While clients never had cause to use the legacy user interface directly, prospects did see the green screens when they came to visit Gallagher Bassett's facilities for tours and meetings. These green-screen displays, popular though they were with veteran adjusters, left others with the impression that the company's technology and services may be outdated.

"Our top competitors relied on systems with inferior functionality but entirely graphical user interfaces," explained Russ Pass, Executive Vice President and Chief Information Officer, Gallagher Bassett. "Their sales representatives would seek to draw attention to the legacy portion of our user interface, with the implication that core system functionality and even the quality of our adjusting were as outdated as the appearance of these screens. This issue presented an increasingly significant challenge to our sales efforts."

As Figure 1 reveals, the system's legacy user interface presented a lot of useful information, however it was not optimally presented and was difficult for newer employees to make use of. While the application's user interface had become a competitive liability, the application itself represented a key strategic asset, one that had come to encompass the lessons and expertise accrued by the company over the course of decades.

Figure 1: For Gallagher Bassett, a claims adjustment application was core to key business processes, however its green-screen interface posed a potential liability for the business.

Further, this application represented a core tool for the company's 3,500 claims adjusters and was relied on constantly. Therefore, while upgrading the interface was vital, it was also imperative that any changes didn't in any way compromise system availability, data integrity, employee productivity or customer service levels.

The Solution

The objective for Gallagher Bassett's IT staff was clear: They needed to modernize the user interface of their NonStop application, while ensuring the back-end application functionality remained stable and available.

The organization's IT staff sought to identify solutions that could help in this effort, and after seeing comForte's JPath offering, they decided to move forward with the solution. JPath offered the capabilities that Gallagher Bassett needed to extend the life of its claims management system—and did not require any changes to the back-end application.

With JPath, Gallagher Bassett could provide a user experience that offered more ease and intuitiveness, while retaining the required functionality. For example, the new interface offers more intuitive, point-and-click buttons, while still retaining the function-key commands that users were familiar with. In addition, JPath offered the performance users required, and the product road map aligned with the organization's future technology directions.

Further, JPath featured integration with other tools in the comForte portfolio, which offered a range of additional advantages:

- Security. Through its support for TLS encryption, which is made possible through the solution's integration with SecurTN, JPath supports the IT team's efforts to continue to strengthen the security of the HP NonStop environment.
- Flexible client integration. Gallagher Bassett also uses the Client Server Link (CSL) offering, which offers middleware that allows clients on any platform to access Pathway applications running on HP NonStop servers.
- End user convenience and administrative efficiency. Through its integration with SecurSSO, JPath will also support the organization's upcoming move to introduce single sign-on capabilities into its HP NonStop applications. With SecurSSO, Gallagher Bassett's users will be able to login using their existing Windows credentials and gain single sign-on access to HP NonStop servers and any other applications they're authorized to work with.

Beyond delivering its advanced solutions, comForte's product and integration specialists worked side-by-side with Gallagher Bassett's implementation team.

Over the duration of the project, the functionality delivered through 400+ legacy screens including 43 newly designed screens—all without changing code in the back-end application.

Figures 2 and 3 provide examples of the new screens that were delivered—and highlight the significant difference in appearance and usability these new interfaces provide. Now, thousands of Gallagher Bassett employees see a modern application interface as part of their daily work experience.

The Results

By leveraging comForte solutions, Gallagher Bassett has been able to realize the following benefits:

- Enhanced user experience. By providing users with a more
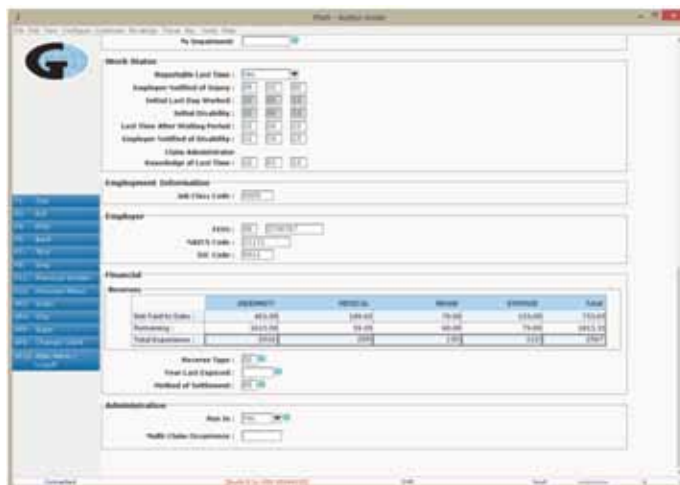
Figure 2: Part one of the redesigned screen.
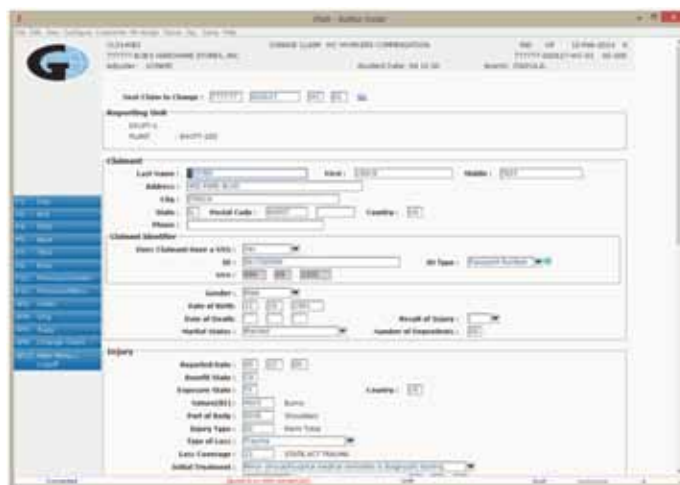
Figure 3: Part two of the redesigned screen.

intuitive and easy-to-use interface, Gallagher Bassett will be able to simplify user training and decrease user errors.
- Improved competitiveness. Gallagher Bassett's sales efforts are no longer being hampered by green screens, and the potentially negative impression they could have on prospects. Now, the sales team can compete more effectively, and position the organization to win more business.
- Leveraged investments. With comForte solutions, Gallagher Bassett was able to accomplish its objectives without changing back-end application code. At the same time, they could continue to leverage the significant investment that had already been made in the claims management application and the HP NonStop platform.
- Value Delivered by IT. With the help of comForte solutions, GB's IT organization was able to address a significant challenge confronting the sales team, while smoothly rolling out a new interface to more than 3,500 users.⌘

Thomas Gloerfeld, VP Marketing at comForte, has been associated with the NonStop community for over 20 years. Before joining comForte, he held various management positions at ACI Worldwide both in Germany and the UK. Thomas Gloerfeld can be contacted at t.gloerfeld@comforte.com.

Tape Backup for Disaster Recovery? *Really?*

Keith B. Evans >> Shadowbase Product Management >> Gravic, Inc.

A document recently passed across my desk and it got me thinking. It discussed a data backup and restore process, to be used during disaster recovery, such as restoring IT services on a backup system after some kind of production system outage. The DR process involved creating production data backups on the storage medium of tape or virtual tape, restoring the data to disk on a backup system, and then rolling forward the audit trail (updates performed since the backup was taken), to bring the data up-to-date.

This process might be perfectly reasonable for some less important applications, but the thought that came to mind was whether anyone still uses this approach to business continuity for a mission-critical application? Surely not? But when I mentioned it to Paul Holenstein, EVP of Gravic, Inc. and responsible for the Shadowbase data replication and integration product suite, he disagreed, stating that over the course of his 30-plus years of experience in the business continuity field, he has come across many organizations using this approach, even today!

But why is backup/restore such a problematic technique to use for disaster recovery? Here are a few of the more significant reasons that Holenstein cited:

- Locating a backup/standby system or datacenter may be difficult, assuming you don't already have one and need to go and declare an "event" at your recovery provider's datacenter.
    - Don't be last in line to declare your "event" either, as many DR service providers take customers on a first-come, first-served basis and you don't want to queue behind someone else's use of the datacenter/DR equipment.
- Downtime might be lengthy (higher Recovery Time Objective, or RTO) due to the time taken to find the right backup data, restore that data, roll-forward through any interim changes, load and then restart the application. This sequence often takes many hours or even days.
- Significant amounts of data are likely to be lost (higher Recovery Point Objective, or RPO). Data loss is governed by the frequency of sending the backups and interim changes off site, hence a frequent safe-store period is required or else significant data loss will occur.
- The recovery process has a high probability of failure, often referred to as a "failover fault." Many things can go wrong or not occur within specified Service Level Agreement (SLA) times, therefore making this form of business continuity replication far more risky than the forms discussed below.

Add the cost and inconvenience of periodically testing the failover process – assuming you even *do* failover testing, since budget cuts have decimated DR testing budgets – and this approach simply cannot be trusted for many applications.

All of these issues can lead to lengthy outages, often measured in *days* of downtime. In today's always-on world, a mission-critical application being down for days is simply unacceptable. Companies have gone out of business for less. Given the high value of some data, losing any of it is to be avoided.

However, there are solutions available *today* for disaster recovery and higher levels of business continuity protection which are comparatively easy to implement, relatively inexpensive when compared to the *total cost* of downtime, and which do not suffer from these egregious shortcomings. Figure 1 shows these various technologies and their relationship to the duration of the outage (RTO), and the amount of data loss (RPO) that each approach may cause to occur.

What is clear is that data replication is a far superior solution for ensuring business continuity of mission-critical applications than tape backup/restore methods, as it reduces outage times and amounts of data lost from days to seconds or sub-seconds, or even to zero in the case of active/active synchronous replication. Holenstein commented that there are several products on the market today which support one or more of the data replication architectures shown in Figure 1.

In conclusion, while it is interesting to read about an old-
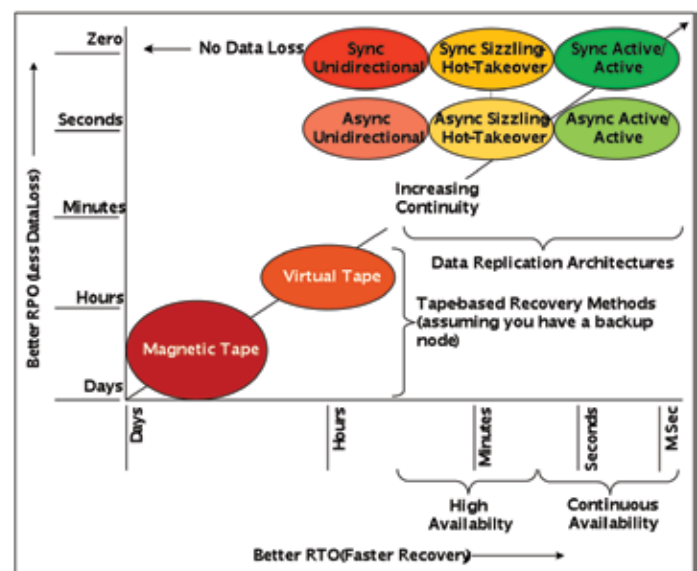
Figure 1 - The Business Continuity Continuum

school methodology for performing a backup/restore procedure in case of the need for disaster recovery, the real takeaway is that such techniques are insufficient for mission-critical applications, and come with significant and unnecessary risks. Organizations that still use such methods should immediately put these risks behind them, consider a data replication solution, and begin the move to continuous availability as soon as possible (Figure 2).
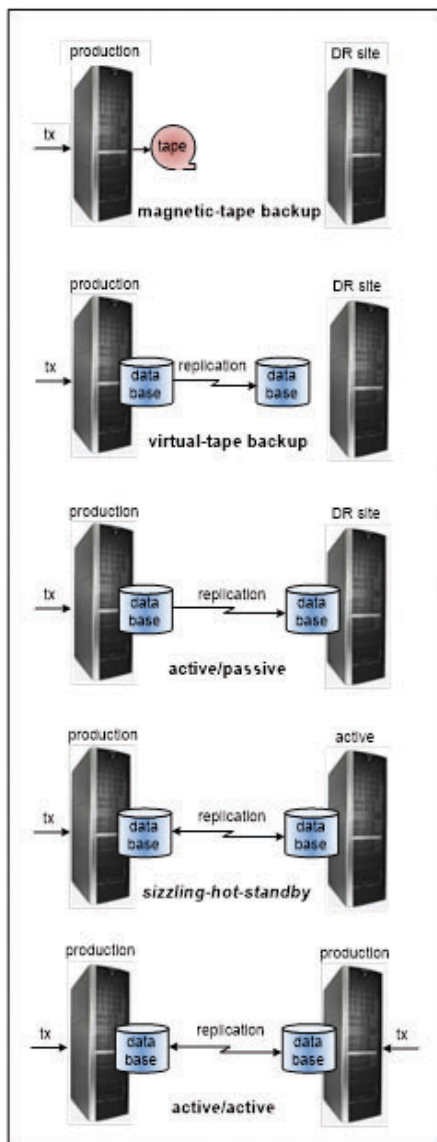
Figure 2 - Moving to Continuous Availability

Note: For more information about disaster recovery and improving your application availability profile, reducing risk, and how the more advanced architectures can satisfy your most-pressing business continuity requirements, please download the white paper, Choosing a Business Continuity Solution to Match Your Business Availability Requirements at www.gravic.com/shadowbase/whitepapers or email shadowbase@gravic.com.

Keith B. Evans works on Shadowbase business development and product management for the Shadowbase product suite, including business continuity, data integration, application integration, zero downtime migration, data utilities, and synchronous replication, a significant and unique differentiating technology. To contact the author, please email: SBProductManagement@gravic.com

Note, this article focuses on the use of tape/virtual tape backup/restore techniques specifically for the purposes of providing business continuity for mission-critical applications, such as applications that must always remain available, and be recoverable in very short timeframes (seconds/minutes). There are many other uses of tape/virtual tape backup/restore for which this technique is appropriate and perfectly suited to the task.

Where's the Value in Application Modernization?

Thomas Gloerfeld >> VP Marketing >> comForte 21 GmbH

Introduction

Your proven apps, some call them 'legacy apps', are doing their job as consistently as ever but most businesses are anything but consistent in these rapidly changing times. The advent of new technology itself has changed the expectations of our users and stakeholders. We hear, "Why do our users have to leave our site or application just to …?"

Whether the users might need to see information on a related product/project or integrate information into their decision cycle with something as simple as travel delays, weather or tools for any number of things from calculators to converters, to linking with another 'smart app' to do something even more sophisticated – our users expect our systems to be able to adapt – now.

The Cloud has transformed expectations, too. These 'services' are available, many times for no or very low cost, if we can only integrate them with our proven systems.

The building blocks for an application

As a vendor we have been keenly and intimately focused on helping customers to integrate and in the process modernize their proven systems, taking them to a whole new level, but a few basic building blocks are necessary to make the job feasible.

Since the beginning of time (i.e., circa 1950's - when computer science really began), business applications have been composed of four (4) discrete layers:

1. **Presentation Layer** – today called the User Experience
2. **Network Application Layer** – connecting the application components and users to the app
3. **Business Logic Layer** – the business rules (aka the secret sauce)
4. **Database Layer** – where we retain information about our products, services, customers and the interactions between them

Database Layer – this is the foundation for everything else, including the tools we will use to build and support the other layers. In many legacy environments, the only tools available are platform specific editors, compilers & debuggers. To contrast those with the feature-rich, modern software development tools and Software Development Kits (SDKs) which operate across multiple platforms – is as different as night and day. Having one set of tools for all developers, across all platforms, reduces costs for training, allows for better utilization of available skills and acquisition of new talent, too. These tools and virtually all other commercially available products/apps/services require a standard database that, most importantly, supports a rich subset of the SQL database language. The database also should support ODBC (Open Database Connectivity) or its Java based equivalent called JDBC, from Oracle, for direct remote access from applications or end users.

Beyond those two most basic requirements (SQL and OBCC/JDBC), the sky is the limit and this is where the various vendors (To name a few: HP NonStop SQL/MX, Oracle, IBM DB2, Microsoft SQL Server, MySQL) compete.

Business Logic Layer – this is where the business rules reside. Maintaining these existing business rules is critical. No one wants to upset the apple cart and break the main business functions that are working fine, BUT, we may need to add-on new functionality or rework pieces of the existing logic to accommodate for changes in the business. Again, having an open database and using modern development tools will be the key here. We want to keep the 'good stuff' (core business logic) and leverage 'new stuff' such as cloud based services – as/when/where they make sense, without breaking the core. As new functionality is developed, the current paradigm of software development has moved from building applications from scratch, to assembling new apps with a mix of custom development and reuse of open/cloud/3rd party 'services'. Again, these 'services' could be any of the plethora available, ranging from weather, traffic, GPS, converters, 'tools' from tape measures to geospatial planning and thousands more ready for your consumption.

A very important trend in the business logic layer is called "service oriented architecture" (SOA). It has been described in numerous articles in this magazine - the idea is to be able to call out for a "service" from within an application - which is implemented itself by yet another application.

Implemented properly, SOA changes big inflexible monolithic applications which do NOT interact into flexible pieces of software which readily share or consume information to provide more functionality to the business or end user.

Network Application Layer – also confusingly called just the Application Layer – this is the glue that connects users to the apps and the components of the apps to each other. In today's world, most people have heard of the Enterprise Service Bus or Information Bus and that's exactly what this layer provides. Unfortunately, on the technical layer there is an abundance of protocols competing to be "the" right one. The relevance of the SOA concept discussed earlier is that ideally a "service" does not care how exactly it is implemented. As long as I can get from Application A to Application B, I don't care whether I use CORBA, RPC, SOAP, JSON/REST. A famous quip in the SOA expert domain is that a "service" can in principle be implemented via fax or horse carriage – it is 'just' transportation.

Your company probably has a litany of legacy protocols still being supported from bi-sync, SNA, SWIFT and the list goes on. What you want is a modern information bus, - we call 'smart plumbing' – because when you buy a new sink for your home, you don't have to think about whether your home plumbing supports

that 'sink protocol', a sink-is-a-sink – plug it in (hook it up) and you are ready to go.

A smart information bus does the same thing by supporting a wide range of protocols – it just connects them all together, without you having to worry about the details. Without smart plumbing, you end up spending huge amounts of time and money building and testing special adapters. Unless you are in the plumbing (networking) business – leave the plumbing to the professionals.

Presentation Layer – connecting people to technology. Some legacy applications still revolve around 'green-screen' command line interfaces as their method for user interactions. These non-graphical, non-intuitive interfaces generally require very significant training over a long period of time for users to become fully functional with the application. These types of interfaces remind me of the old adage, "don't tell me how to build a clock when all I need to know is the time." Users want to place orders, check stock levels, enter a trade or see the time-table. Intuitive interfaces, like those on most mobile apps, don't require lengthy/costly training. All you do is simply download the app and start using it. That's what enterprise users expect of their IT investments today, too. Many great enterprise applications have been discontinued or lost funding/support from senior management because 'they look old.' Certainly there will be existing (shall we call them 'proven') users that will want to keep the command line interface that they know, but new users will appreciate intuitive apps that allow them to be productive immediately and so the business gains from all the savings of time and money by not having to provide app training and can instead focus on business training.

What about the people?

Modernizing your most important asset, your people, is as critical as any technological thingy.

Certainly, bringing in 'new blood' and their new tricks (tools, knowledge and other skills) is important. Most of us "Tandem folks' have never Tweeted and don't have an Instagram account, but social media and the tools to exploit those new paradigms are in the DNA of those coming out of universities today.

While new tools and being fleet of foot are surely wonderful, knowing the business, your business, only comes with experience, and experience builds over time. The most experienced of our staff whom I'll call the 'proven ones' I see as the Sherpas, leading the business into the future. We can learn Java or Eclipse and we can even get used to a GUI, but when the skittles hit the fan, only the **proven ones** know how to run the business by hand if necessary and those skills are what makes the rest look easy.

Conclusion

There is significant value in modernizing your proven applications, making them more cost efficient, rapidly adaptive and allowing you to benefit from the best of modern standards whilst retaining the core business logic which has worked for decades. While the buzzwords might have changed, computer science 101 has not. The keys to modernizing your applications is a step-by-step, minimally-invasive approach positioning you for the future whilst retaining the 'secret sauce' you've worked so hard to create. 🔗

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Modern Approaches to the Challenges of Archiving and Application Retirement

Phil Menzies >> Vice President >> ETI-NET

The lobby of a major US bank's IT facility features large video displays cycling through screens with important topics for employees as they come and go. One of those topics warned to "be aware of records retention policies." Often that is easier said than done. Most companies are faced with a plethora of laws, regulations and company policies that dictate rules over storage of information. Keeping track of those requirements is usually relegated to the company's Compliance Officer, who conveys applicable ones to the various operating groups and ensures that they are followed. While the focus has generally been on which sets of data have to be retained for how long, there are also rules dictating when data must be destroyed and handling of exceptions, such as legal holds.

IT departments' traditional approach to satisfying retention rules has been to periodically back up associated sets of data from live systems and write them to magnetic tape, or more recently virtual tape, designating them for long-term storage. This simplistic approach, using the same methodologies used to protect systems against data loss, has been easy to implement using Backup/ Restore or BRCOM on NonStop systems. But there are numerous challenges:

- Rapidly increasing storage requirements for data that must be retained
- Superfluous content in backups, where only a subset of the data actually needs to be retained
- Ensuring readability of the data into the future, particularly where magnetic tape is involved
- Need for migration of stored content as tape or disk storage technologies and formats change
- Erasure of data that must be destroyed, where it is intermixed with data that must be retained
- Availability of applications years into the future that can interpret the data content

What to Keep and For How Long?

Laws and regulations for retention of information are complex, varying by category, such as medical or financial, and by jurisdiction: Country, state and municipality. On top of that, companies often have their own retention policies that may also apply to information. Iron Mountain publishes the European Document Retention Guide that, besides surveying requirements by country, explains best practices for compliant records management: Create a records retention policy, index and archive records, ensure certified destruction of records, and backup data storage off-site. Additional considerations include legal holds that may suspend normal retention during legal proceedings, and tracking of chain of custody. These are considerations in design of an archiving system or selection of a commercial product.

An interesting exchange on the BankersOnline.com blog, where someone was *"looking for a 'free' booklet or publication that gives guidelines for Record Retention Policies"*, got the following response: *"Unfortunately, there is no comprehensive free guide. The subject is so complex and requires so much research that the authors of such manuals understandably command a good fee."* So consult your Compliance Officer – they have the unenviable job of keeping track of the multitude of retention requirements and changes to them.

"Is It Safe?"

The line from Laurence Olivier's exiled Nazi war criminal character in the 1976 movie *Marathon Man* sent shivers down audiences' spines. So should the risks of archive storage on old media!

Over the many years of tape's existence it has kept pace with disk storage in both capacity and transfer rates. But to accomplish this has required many changes in technologies: reel-to-reel and then cartridge formats such as DAT, DLT, and most recently LTO. Lack of compatibility between formats causes major headaches. It has been necessary to periodically change tape technologies and even models within the same technology. LTO-2 cartridges are not readable by LTO5 drives for instance. In parallel with this, as computer systems evolve, support for attachment of older tape drive technologies atrophies – both in electrical interfaces and software drivers. For example, NonStop Blade systems could not connect SCSI tape drives and now NonStop X systems only support Fibre Channel-attached LTO-6 tape drives. Frequently the result has been hundreds or thousands of "orphaned" tape cartridges containing archived data, although some diligent users have implemented systematic migration of contents of each tape technology

Virtual tape products, such as BackBox for NonStop systems, have alleviated this problem. Storing backup and archive data as virtual tape images on disk eliminates the problem of changing tape media formats. Virtual tape subsystems can easily move these images from one storage type to another, transparently to the host system. And host system interfaces, both hardware and software, can be adapted to, generally increasing transfer rates in the process.

Where Is That File?

Unlike many aspects of IT systems, archives are seldom audited. And even less often is the existence of retained files checked against current retention rules. Files could be lost for a number of reasons:

- Data may become unreadable due to various physical tape media phenomena
- Tape cartridges may be lost
- Encryption keys for the media content may also be lost
- Retention rules in catalogs may be accidentally or intentionally changed
- Virtual tape media image files may be accidentally deleted or expired from Enterprise Backup System (EBS) servers
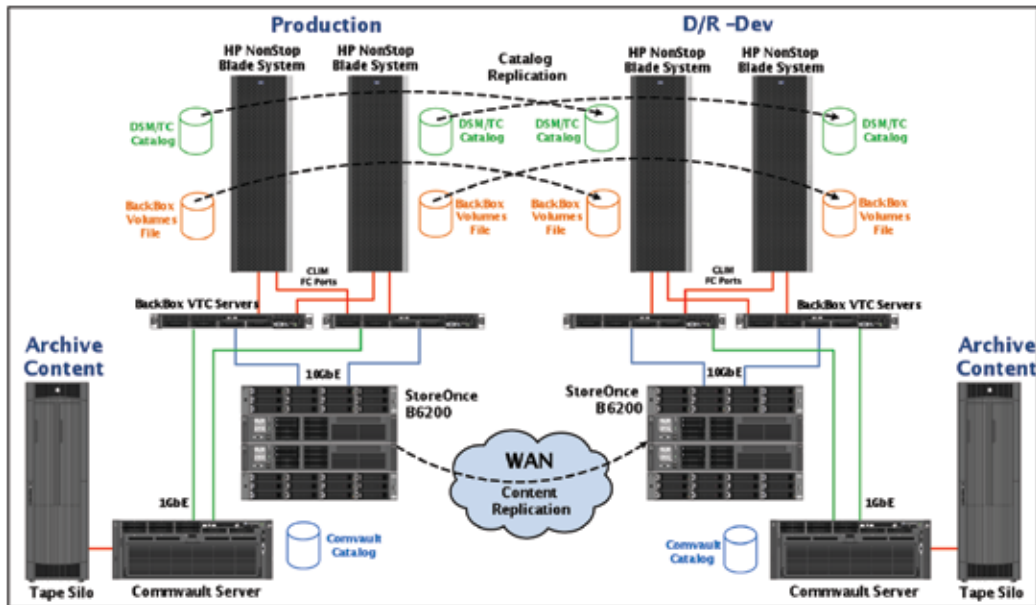
Fig. 1 Multiple catalogs manage archive data location and retention.

Data deduplication appliances have become increasingly popular for very efficient disk storage of backup data, such as via the ETI-NET BackBox product for NonStop. But long-term archive data often must be transparently "off-loaded" to EBS servers where they can be efficiently "stacked" on high-capacity tape media. Examples of such EBS products include Tivoli Storage Manager, NetBackup, HP Data Protector and Commvault. But the handoffs are not always problem-free. Recently a NonStop user discovered a significant number of archive virtual tape media missing from his EBS server. The cause: An erroneous retention policy on the EBS server, despite the correct policy in DSM/TC on NonStop.

To ensure compliance, archiving systems should be periodically audited. This involves correlation of the contents of the various catalogs involved, such as DSM/TC, virtual tape system media catalogs and EBS catalogs. ETI-NET's new product, Data Protection Auditor, provides such capabilities, as well as displaying current and historical storage utilization by the archives. Archive content retrievability can also be spot checked. Such auditing should be used to detect problems early, before significant quantities of archive data are lost, offering the possibility of "rescuing" erroneously deleted content before it is overwritten. In the above EBS loss incident, most of the "lost" virtual tape images were able to be recovered from EBS server media, but with a lot of effort required. Frequent archive auditing would have caught the problem early and minimized any loss of data.

Zombie Systems That Won't Die

Seldom are full databases directly archived, avoiding the complexity of having to restore them to operation to query their content. But files that are archived are usually in application-specific formats and may even have encrypted fields for which key retrieval by the application is required in order to be able to access the content. This leads to several levels of complexities:

- When updating applications, support for reading old archived file formats must be continued
- If an application is replaced by another, perhaps a commercial package, new archives may be handled differently – but old archives still need to be retrievable

- When an application discontinued or functionally replaced, the old application must be kept around as long as its archives still must be retrieved
- If encryption key management is used by the application, it must also be continued
- Personnel must be kept knowledgeable in maintaining the application

So "Application Retirement" planning must be considered with archive access in mind. Ideally applications that are superseded or discontinued would be able to be torn down ("retired"), saving on both personnel to maintain them and system operational costs. But data "backed up" in application-specific formats frequently requires that the applications be kept around.

And worse, if the application has not been ported to current system platforms like NonStop-X, then obsolete platforms such as NonStop S-series may have to be kept running – with significant support issues and costs. In many companies this has resulted in "zombie" systems, kept alive just for archive retrieval capabilities. Even without zombie applications and systems, some studies have shown that 60-80% of data retained in production applications is "inactive". This is a related area where significant cost savings could be realized.

Eliminating the Zombies

As with "real" zombies, eliminating zombie applications and the systems needed to run them requires drastic action – a fundamental change in the approach to archiving.

Some point solutions, such as InsiderTech's Sentra RTLX product, offload application transaction logs (or ingest previously backed-up logs) to a custom-built database on an industry-standard platform, enabling use of standard tools for querying. Where a single application, such as payments in the case of Sentra RTLX, is involved or the requirements are simple, this may be a cost-effective solution. But it defers longer-term questions of maintenance of the database and platform. For more complex situations involving multiple applications or application migration, and for true application and platform independence, a more general approach is needed.

This means abandoning application-specific formats for preserving information in favor of storing information in a

common, application-independent format. Such an approach enables:

- Indefinite life of preserved information without dependence on the creating application
- Ability to use common query tools for information retrieval
- Granular enforcement of data retention and destruction rules
- Granular access control of who can access which information
- Detailed logging of information access
- Elimination of wasted "collateral" storage – information stored by backup methodologies not actually required to be retained
- Independence of storage media
- Opportunities to utilize the archived information for data analytics

While cost savings from Application Retirement may provide the economic justification to modernize archiving, the benefits are numerous. Enter "application-independent" archiving.

The OAIS Information Model

Application-independent archiving can be traced to the work of NASA's Consultative Committee for Space Data Systems (CCSDS) that released the Open Archival Information System (OAIS) reference model draft in May 1999. While initially developed for the science and aerospace community, the OAIS reference model has been adopted by a number of vendors who have produced products embodying its principles (note: For an archive to be compliant the model does not require the use of any particular platform, O/S, DBMS, DDL, language, user interface or technology.) The OAIS model has also become ISO standard 14721:2003.

Under the OAIS model, information is represented in open standards formats within Information Packages: Submission Information Packages (SIP) that are ingested and Archival Information Packages (AIP) that are stored. Within each Information Package are four types of information objects: Content Information, Preservation Description Information (PDI), Packaging Information and Descriptive Information. PDI contains information necessary to adequately preserve the Content Information while Descriptive Information enables access to the Information Package via the archive's search and retrieval tools.

The Model describes five functional entities:

- Ingest, to populate the archive with information
- Archival Storage, to receive and manage storage of the archive content
- Data Management, to maintain a searchable database of the Descriptive Information
- Administration, including access control, security, etc.
- Access, to enable querying of the archive

Ingestion is critical to the ability to use such an approach. Data must be able to be transformed from its original application-specific form to populate the Content Information within a SIP as well as the Descriptive Information that enables retrieval.

The OAIS model enabled what is now referred to as "Active Archiving" - the ability to securely archive and retain data while providing real-time ability to query and report on it. This is essentially the opposite of traditional archiving approaches, where data was simply stored statically until needed for retrieval, usually with recent data more accessible and older data harder to retrieve.

Active Archiving Products

A number of OAIS-compliant products are available, including EMC's InfoArchive, OIA's Offline Web Archiv and iKeep's Chronos, as well as hosted services like that from ArchivesDirect and Swiss Post Solutions. There are also similar products that embody OAIS principles including IBM's InfoSphere Optim Archive, HP's Structured Data Manager and Iternity's ICAS. An overview of products in this area is available in the *"Magic Quadrant for Structured Data Archiving and Application Retirement"* from the Gartner Group.

Active archiving products offer two types of information ingestion: Synchronous and asynchronous. Synchronous ingestion handles individual data objects. This might be transactions from an active application for instance. Asynchronous ingestion batches handling of many objects, such as from saved transaction logs.

Within the products XML (which is platform and vendor neutral) metadata generally accompanies structured or unstructured data, enabling searching and retrieval. Structured data is usually also represented in XML and xQuery used to query archived data. Most importantly, the products permit granular policies for retention, destruction and legal holds. Rather than having to manage retention at the level of a whole backup
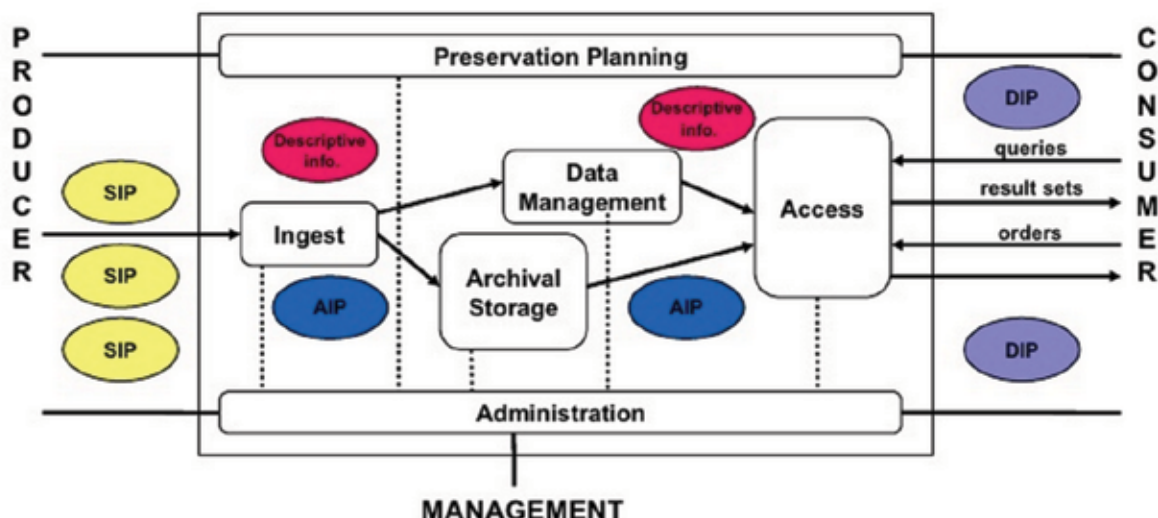
Fig. 2 OAIS Functional Model

(TAPEFILE generation for NonStop backups) specific information groupings can be retained or destroyed as required, or extended as appropriate for legal holds.

Products are typically storage-agnostic, so can utilize whatever storage products the customer has standardized on. Some products incorporate tiering, so that less-active archive content can be moved to less-expensive storage. Protection of archive content via backup or D/R functionality may be incorporated in the product or could be provided externally, by storage replication for instance.

Many major companies have already adopted one or more of these products for archiving some categories of information, including scanned documents, videos, emails, files from SharePoint servers as well as structured business data. Products can handle tens of billions of objects and intermix many different data types but with a common management interface. And archived data can be moved into a Hadoop environment for use with big data analytics.

Adopting Active Archiving

Key to the ability to move from legacy "static" archiving to active archiving is information ingestion. With InfoArchive for instance, that is done via a "Conduit". A number of standard conduits are available from EMC as well as its partners. Examples include ingestion from Microsoft Exchange and Sharepoint. But for an arbitrary application, particularly NonStop applications, specific conduits must be developed or adapted. If the application is no longer active and should be "retired", then only an asynchronous conduit is needed - to ingest information from previously saved files. But if the application is still active, a synchronous conduit may also be needed.

In some cases companies may choose to develop the conduits themselves, particularly where the team who developed the original application is still around. This can be beneficial where formats of saved files have changed through multiple generations of the application. In other cases it may be more expedient to have a third party, such as ETI-NET, develop or adapt an existing conduit for use with the application.

At the other end of the archiving product is development of query capabilities. While archiving products typically provide a standard GUI for query generation, specific query capabilities are frequently needed. This could include masking for particular user types, access control, and decryption of encrypted fields. Use of open standard tools, such as xQuery, and exposing of archive product APIs provides a rich tool set to use in building queries or custom UIs. This is also an area where there is a choice of in-house development or use of a third party.

Companies that have already adopted an active archiving product are best positioned to add NonStop application archiving. They have already gone through the initial expense and learning curve, and may even have staff available to assist in conduit and query addition.

Summary

Archiving in many customers, particularly for NonStop, is overdue for modernization. The first step is in understanding the actual requirements at a granular level, including retention, destruction and legal holds. IT departments should work closely with the company's Compliance Officer to determine those requirements. Auditing current archiving methodologies and content is essential to ensure that the required information is being preserved, retained for the requisite periods, and is actually retrievable. Vendor tools and services are available from companies such as ETI-NET, to automate such auditing and to evaluate the storage costs for current archiving strategies.

Although these steps are a minimum to ensure compliance while still using existing archiving methodologies, true modernization requires moving from "static" to "active" archiving. This involves adoption of new tools to store the required information in an application-independent format, manage retention at a granular level, and enable content queries without use of the original applications. In selecting an active-archiving product it is important that it be based on open standards with no proprietary formatting or packaging of content. Since many large corporations have already adopted active archiving products for some uses, and may have standardized on one, the first step should be to investigate whether your company does. The Compliance Officer may be a good place to start for that, also. Another consideration is finding a NonStop-knowledgeable partner to assist with conduit and query development.

By adoption of active archiving, not only can storage costs and operational complexity be reduced, but legacy applications can safely be retired, freeing up the system platforms that they run on, as well as their support staffs. The cost savings frequently exceed the cost of active archive implementation, resulting in a positive ROI and freed up staff to work on more strategic projects.

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Insecurity about Git: Myths and Solutions about SCM Security

Randall S. Becker >> President >> Nexbridge Inc.

Preamble

Jan woke up with a start. Her smart phone was beeping loudly. The CIO was demanding answers to why some of the company's critical ATM driver code had shown up in something called GitHub Enterprise. Wasn't access to GitHub blocked by the firewall rules? What was the exposure? Who had done it? A war room was being set up and she was expected to join the bridge immediately.

This was the sum of all fears for Jan and her team – not that security had been compromised, but that confusion about roles, tools, and access would have to be explained at 3am instead of during a weekly security briefing with the CSIO.

This was going to be a long night, with very little value to the company other than clearing up some misconceptions. Again.

What you have read is fortunately not based on real events, but on the fears that the author has had to explain whenever the subject of git comes up in conversation around NonStop. While git itself has been generally available since 2007 and available for NonStop since early 2014, adoption has been extremely slow. The primary cause is the perception, right or wrong, is that git is somehow less secure than Subversion, RMS, and CVS. This article discusses the reality of git's strengths and weaknesses, techniques to secure your code properly, and addresses the fundamental questions about the security of workstation-based development.

Disclaimer: Many products will be named in this article. None of the mentions are an explicit or implicit endorsement by the author or Connect for the suitability of the product in your environment and should not be interpreted as advice.

The Chaos of Terms

The name git derives from UK English slang meaning "unpleasant person". It was coined by Linus Torvalds, who had a penchant for egotistically naming things after himself, in some way. The name itself was intended humorously and possibly ironically as "The Stupid Content Tracker". Git itself refers exactly and only to the Distributed Version Control System software itself. You may have heard the terms EGit and JGit, which refer to the ECLIPSE Plug-in for git and the Pure Java implementation of git, respectively, that come bundled with the NSDEE ECLIPSE configuration.

What was inevitable in the world of Cloud services, and with the word distributed in it, is that people will almost automatically come to the conclusion that you can make a SAAS-like service out of it. Up popped services like BitBucket, Atlassian, GitHub, and a whole bunch of other service providers where you could host your git repository for free, for Open Source projects, or for reasonable fees for private secure repositories. This was the first bit of confusion in the git world.

The second bit of confusion came when GitHub decided to create a private Cloud service called GitHub Enterprise. Atlassian did the same with their Stash service. Both provide self-managed secure environments for hosting your repositories entirely inside your own firewall. It might have been better for our intrepid CIO had GitHub called their offering the "Private Really Secure Internal Cloud Git Thing", so that the hypothetical 3am call would have been avoided.

This article will go into the differences in security models for some of these layered services, but the most important thing to take away is that you have different domains for git repositories, and you need to know exactly what you are discussing when panic sets in:

Domain	Description	Examples
Clone	A working repository where a developer will be interacting directly with git to create activity and history.	Repositories created by a clone operation via git clone, ECLIPSE EGit, Atlassian's SourceTree.
Upstream	The Repository of Record (RoR) or mirror where changes are integrated. This may contain the sum of all history from all clones. Developers usually manage the merging of activities. Officially known as 'origin'.	Usually on a private server, including NonStop, Linux, and Windows.
Enterprise	A set of repositories or mirror backbones (See Article 3 in the series) that are managed in a secure environment. Changes are typically integrated into the mainline histories through merge operations by repository managers.	GitHub Enterprise and Atlassian Stash are examples of this type of structure.
Hosted	A Cloud SAAS environment where your upstream repository is outside your own network. You may have control of the security rules and policies, depending on the level of openness of your repository.	GitHub, BitBucket, and Atlassian are examples of these providers.

As you can see from the terminology, there is a lot of overlap in the brand names.

When talking about git, be clear about what domain you are discussing.

The biggest differentiation for corporations between the different layers comes at the Enterprise domain. Off-the-shelf products like Stash and GitHub Enterprise provide security that you would otherwise have to script yourself when in a simple upstream environment. There are many products to do just that, including branch-level security, from products like gitolite. With the enterprise-class products, you get a lot of structure, process, and security enforcement. With git alone, you must depend on OSS and SSH security rules. Publishing git through HTTP without any other authentication can leave you exposed.

Software at Rest

An important concern for all intellectual property managers and Corporate Security Information Officers (CSIO) is how to deal with a situation where your software could be stolen while sitting on someone's laptop, desktop, or jump-drive. This question has been present since large-scale software development on platforms like NonStop moved from EDIT/VS or TEDIT to workstations with the Enterprise ToolKit (ETK) back around 2002 and ECLIPSE NonStop Development (now NSDEE) around 2010. In fact, this has little to do with git, because software on a workstation, whether in CVS, ClearCase, PrimeCode, Control-CS, or Subversion, is still resident on a hard drive that can leave your data centre/development office. The preferred solution for this has been, and probably will continue to be, drive encryption – regardless of which Version Control System you have, whether distributed or not. Another option taken by some companies has been to do all development on virtual thin clients where the code only resides in a VM environment. Other organizations have taken control of the hardware on desktops and laptops to prevent jump-drives and other means of storing source code in a portable fashion, but that gets into the next question.

Software in Flight

Moving software is a more relevant concern for workstation development and DVCS systems like git. With git, being about to modify the upstream repository – the place where you got your copy of the code originally – to point to an open environment, is a very real concern. Preventing developers from emailing patches, or pushing your code to their private repository is a serious and very relevant security consideration. Firewall rules and email policies and filters are invaluable here – whether or not you have git. It applies equally to any code that resides on a network. Lock it down. Do not let your code get pushed up to a hosted facility, unless it is your own.

Don't be confused between GitHub Enterprise and GitHub. They may run the same software, but the former is inside your network, the latter is not.

Do not even let patches or code fragments get emailed to "friends".

Don't be confused between GitHub Enterprise and GitHub. They may run the same software, but the former is inside your network, the latter is not.

The above concerns are always with you when developers have their own devices, workstations, and laptops. But for git itself, as well as other DVCS facilities, there are some core questions around which you need to establish some solid policies around very real questions.

The Fundamental Questions

The questions of security in a DVCS world, come down to four basic areas:

1. Who has read and/or modify access to the code?
2. Are historical records secure and how visible should they be?
3. How is the Repository of Record managed?
4. Which branches need to be kept secure and protected?

It is a given that audit is a major concern – who is looking at your code, who has access to it, who is modifying it. But the fundamental questions will drive a lot of your decisions and are not really different from traditional centralized VCS systems. The core difference is whether history visibility represents a vulnerability. If you have code that needs to be protected using different access rules, put that in its own repository and lock it down, or add security management software like Stash.

Who has Access to Code

The biggest question is who can see your code. If you are an Open Source participant, the answer may be everyone. This is unlikely in our community, although if you participate in the ITUGLIB structure, some of your components may have external connections, relationships, and license requirements.

There are many mechanisms of security for your code within git. At the simplest, you can use OSS access control lists (ACL) or basic group ownership to define roles on a team. Developers normally clone repositories for projects for which they are a part. If you have something like Stash, you can do this on a per-user basis by adding people to a project. Using SSH, you can designate a functional user id with separate audit capabilities for known public key pairs – check that out, seriously.

When it comes to modifying code, the basic best practice out there is to designate a repository manager. Developers would make changes on their own topic branch – you should be familiar with this by now, and will request that the repository manager merge their changes into the main integration branch. This is known as a Pull Request. Have a look at the GitFlow Process for details on this. It is a useful reference. This structure gives companies a lot of control over who actually can contribute changes to production. It groups staff into two roles: developers and contributors – Open Source terms for people who make changes, and people who approve the changes.

More confusion: the git stash function and the Atlassian Stash product are completely different things. Don't confuse the two.

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- **HP NonStop Shadowbase Compare** software compares a target Enscribe file or NonStop SQL table to its source, and reports any discrepancies found, which is helpful for validating that a target database matches its source, and for satisfying regulatory/auditing requirements.

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More confusion: the git stash function and the Atlassian Stash product are completely different things. Don't confuse the two.

Stash provides a means of setting up a discussion for these Pull Requests (requests to merge my changes), and Gerrit takes it further by providing explicit code reviews on a change-by-change basis.

Visibility of Historical Records

A conundrum for git, perhaps its greatest value and its significant concern, is how visible is the sum of historical records of a project. In git, every commit made by the team in a project's repository can be visible to any other developer – this is not a requirement, but is a general practice. The capability allows developers to see the origin of any change, including how it was merged and who made the change. Some organizations view this as highly valuable, while others consider it a vulnerability. This is one area where you need to decide whether the change audit trails of source code modification are themselves subject to separate security rules. It is a serious question and one that needs to be answered early during the implementation of your improved software development process.

Management of the Repository of Record

In any DVCS, you will have a definitive copy of the code located in one or more repositories. This will include:

- The changes that come from developers;
- Release packages containing the commits being installed and built code;
- Hot fixes originated from development; and
- Production fixes originated from production environments.

Management of these repositories should be kept separate from development. It may be part of a Quality Assurance group or Production function, and your security policies will decide that. However, feeding production fixes back to development is really important or you will lose critical fixes.

Establishing a separate role for managing definitive repositories is really important, particularly if you have a requirement for separation of duties. This role will be responsible for pulling changes from development repositories – developers should not have uncontrolled access to the repository of record – and pushing changes back to development to ensure visibility of production fixes. This role will also maintain archives of supported releases and will clean up archives that are no longer necessary – repositories containing complete images can be very large.

Managing Branches

An early perception of vulnerability of git was its lack of protection of branches. For example, anyone on a project could merge code into any branch. This was done under the assumption that developers were essentially good people of conscience. This notion was quickly dismissed as risky despite very positive conduct overall. Separation of duty into developers, contributors, and reviewers, was physically divided into separate repositories to allow UNIX security rules to govern who did what. Products later evolved, including gitolite, Stash, and GitHub Enterprise to formalize branch security while simplifying and reducing the number of repositories companies needed to have. For ITUGLIB, as an example, there is a separation of physical access to the repository of record so that only contributors may merge developer changes into the official code.

Git branch management has evolved rapidly and effectively in the last few years. If you haven't looked recently, go look again.

Git branch management has evolved rapidly and effectively in the last few years. If you haven't looked recently, go look again.

Conclusion
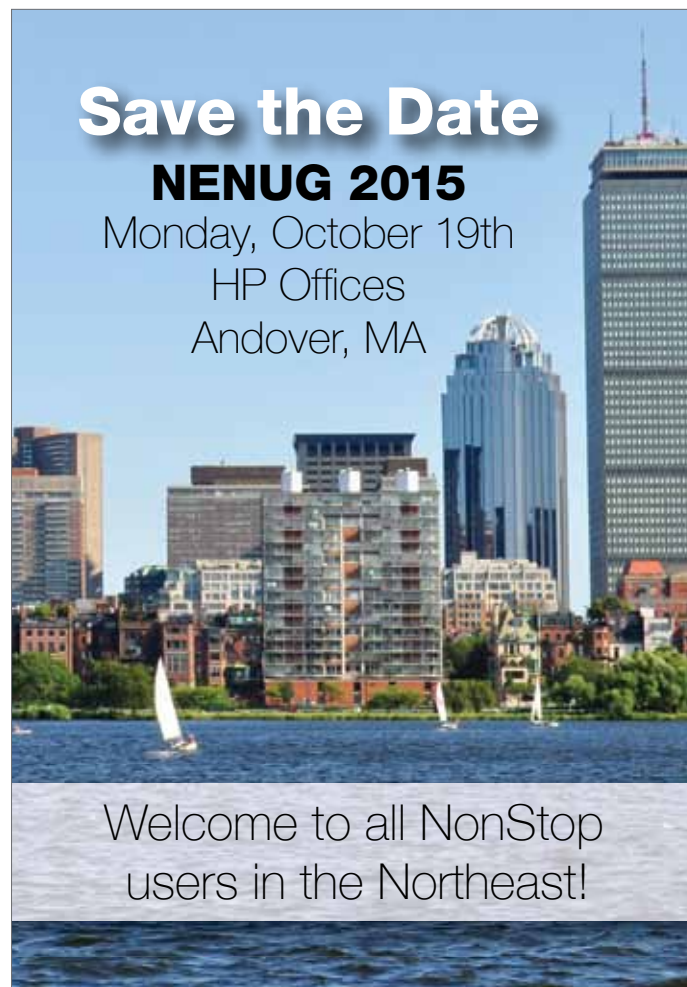
Git has a standard set of security concerns that are common to most DVCS and central VCS systems. When looking at git as a choice of SCM solution, take into account the capabilities and consider carefully the security rules you need to have in place in your organization for workstation-based development. And importantly, try to get past the very confusing git nomenclature; whether you are trying to convince your management to embrace the git DVCS or having that dreaded 3am conference call. ⌘

How will NonStop fit into the Internet of Things?

PART III – Leveraging NonStop and Large-Scale Hybrid Solutions

Justin Simonds **>>** Master Technologist **>>** Americas   Dean Malone **>>** NonStop Architect **>>** Caleb Enterprises Ltd.

As we've shown in Parts I and II of this series, NonStop on x86 with InfiniBand (IB) has all the foundational underpinnings required for participation in the emerging Internet of Things (IoT) processing environment. Clearly NonStop's OLTP and message-switching history make it a strong contender for new applications. The special features of NonStop: Availability, scalability, security, and parallelism are known requirements for many of the applications that will be developed in the coming years. In Part I and II we discussed the benefits of InfiniBand (IB) and some IoT use cases with connected cars, smart meters and the concept of informational messages versus critical messages - such as remaining oil life versus air bags deployed. Some use cases will require the fault tolerance of a NonStop. In Part III we want to discuss hybrid systems and how a combination of utility servers and NonStop would be the perfect architecture.

Why is this important? It is most definitely true that a large percentage of applications or portions of an application can tolerate a failure as long as a failing server can be quickly replaced. It is now a standard for virtually every operating system to do this. Microsoft has MSCS (Microsoft Cluster Solution). Linux systems rely on products like VMware. Web-based systems use DHCP server clusters and front-end processors. If a signal or data point being lost does not result in serious consequences, having it reside on conventional architectures is acceptable. If it does indicate something serious - your house is burning down, a car just crashed and the air bags deployed, or your boat is taking on water – losing the signal as a result of a single point of failure takes on much greater importance. This is the sweet spot for NonStop. And memory persistence is entirely possible because NonStop supports process pairs that can keep copies of memory in sync in two CPUs. In the event of a failure, the backup takes over and it can thus survive any single point of failure. With IB, this state checkpoint capability could even be extended to a process on a remote node or even a different data site without substantial latency. With some new thinking and products from NonStop partners it would be possible to integrate NonStop closely with these other systems to create a powerful high-performance hybrid platform.

EXTENDING NONSTOP FUNDAMENTALS TO CONVERGED INFRASTRUCTURE

At Discover 2011 and 2012 NonStop demonstrated an approach to cloud and commodity server processing known as Persistent Cloud. Please see Connect March/April 2012 Volume 33, No. 2 "Persistent Cloud Computing Architecture" for a refresher. The main idea was the extension of Pathway (TS/MP) off platform to Linux, Windows, UNIX and even cloud-based systems. Pathway has provided a number of transaction middleware features. The first is persistence, which allows programs to avoid complex

NonStop process-pair programming and yet have their applications overseen by Pathmon and automatically restarted if there was a failure, retaining database consistency if TMF is used. Additionally, Pathmon provides some load-balancing of transactions between the various instances of the application, known as the serverclass members. It also provides elasticity based on response time. If response time slows down, Pathmon can automatically start additional application instances to maintain response time performance. Likewise once the additional load has dissipated, Pathmon can shut down the surplus copies, thus freeing up system resources. The idea behind persistent cloud was to extend these features off-platform and to create a composite application or service where those portions that needed fast and cheap processing were run on Linux, Windows or a cloud platform. The portions that could not afford any outage would run on NonStop.

The persistent cloud was a demonstration developed by the HP Enterprise, Solutions and Architecture organization of the Americas. Seeing a market for this service, Infrasoft licensed this demonstration code and has rewritten and productized this service; see:

http://www.infrasoft.com.au/maRunga.html

It has been released as maRunga and is sold through comForte; see:

https://www.comforte.com/products/modernize/marunga/

This solution was developed over standard TCP networks. It runs well, but what if the hybrid connections could use an InfiniBand fabric rather than a network? It would create an exponential increase in speed and performance between the hybrid components in cases where data transport costs were a significant contributor. The NonStop and Linux systems might seem to be a single system, based on performance. Imagine NonStop on x86 surrounded by a number of inexpensive Linux systems, interconnected by InfiniBand and voila! We have the architecture for a killer IoT appliance.

MaRunga serves the NonStop community well by enabling large scale-out of Pathway-based systems. Consider being able to add NonStop fundamentals of high availability and massive scalability to existing SMP-based applications that could be moved to NonStop with minimal porting effort. Is that possible? We think so, but not without constructing some new tools to leverage IB shared memory capabilities over MPP.

NONSTOP AND HP'S BROADER MACHINE INITIATIVE

The question of greatest importance to NonStop customers and vendors is how will the new x86 NonStop fit into HP's stated Enterprise corporate strategy? Can it map to The Machine capabilities that Martin Fink presented in his keynote address at 2014 HP Discover?
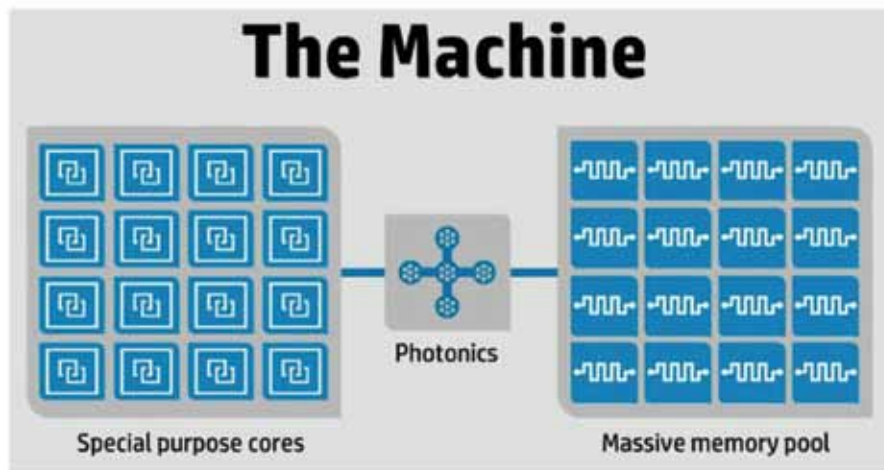
Figure 1 - HP's Ultimate Vision for its Products

This is a classic example of "a picture is worth a thousand words" but let's add a few more words anyway just to incorporate some NonStop perspective.

Electrons Compute: Let's start with *special purpose cores.* NonStop architecture supports from 2 to 16 logical processors – each comprised of multiple cores– to comprise a node. Each of these processors are directly connected to each other via IB. These nodes can be clustered together in an EXPAND network to support 255 inter-connected nodes, just like they always could. When IB clustering is announced a number of nodes will be inter-connected using IB so that Inter-Process Messaging (IPM) between nodes in the cluster could theoretically become just as fast as IPMs within a node.

Photons Transmit: How does IB fit into the picture? It is similar to the *photonics* piece in Martin's diagram and will be the fastest networking option until "The Machine" releases photonic networking. IB is the special sauce that makes all of this possible because IB is to our x86 processors and storage as photonics is to special cores and memory. NonStop uses IB as its interconnect "photon" bus.

Ions Store: Finally, how does the *massive memory pool* fit into the picture? Again IB provides the answer with two mechanisms; TCA (Target Channel Adaptor) for non-volatile storage and RDMA (remote direct memory access) for volatile storage whereby a process in one CPU can write to or read from the memory of a target CPU without interrupting processing on that target CPU. What this means is that context switching can be completely eliminated in the exchange of data between a process and either secondary storage or volatile memory. This means that any process residing in any one of the 4080 NonStop CPUs of a 255 node network could, in theory, scale vertically to access the memory of any other CPU. It also means, in theory, memory could be scaled horizontally by allocating memory across the RAM of up to 4080 processors to create a single universal resource pool. This does for memory what partitioning files across disks does for file I/O.

As Martin Fink said at HP Discover 2014, "But wait; it gets better!" NonStop processes can survive any single point of failure using our proven capability called NonStop process pairs, whereby a primary process residing in one CPU can checkpoint its state to a backup process residing in another CPU. This

means that if memory access occurs with a remote process using IB Queue Pair (QP) messaging instead of RDMA, then that process pair can keep memory identical in two processors and the shared memory data can thus survive any single point of failure. NonStop can own a powerful and unique space within this marketplace – a massive fault-tolerant shared memory address space.

There are several mechanisms required for hybrid computing. The first is the ability to do RDMA between IB hybrid host end points. The second is a high-performance synchronization mechanism (i.e. semaphores) to coordinate shared resource access and enable light-weight publish/subscribe group notifications. A third is queue-based messaging. This is fundamentally what the IPC services API provide on UNIX platforms in support of SMP architectures – but only on a single node. In the case of OSS, this is presently only possible in a single CPU. Ideally, these resources should be accessible from any program – compiled image or containers (i.e. JVM.) What about DNS-like capability for discovery and late binding to these resources, or metrics that are distributed across the entire fabric, or fine-grained security authorization and authentication? There remains much to be built but the foundational capabilities are all there. This has not even been possible until recently.

So let's put it all together, NonStop has the potential to inter-communicate with Linux and potentially Windows servers in a hybrid computing environment at blazing speed. This brings to market a concrete product that realizes what Martin Fink said in his June 11 blog titled Accelerating The Machine when he said "Remember I said we want working prototypes as soon as possible? We can get there sooner if we use plain old DRAM as a stand-in for the perfect memory technology. No, DRAM isn't persistent, but we can emulate persistence." Now if only the capabilities of the IPC subsystem could be implemented in this hybrid computing environment; the picture would be complete! NonStop would be at the pinnacle of reliability as the only platform that could provide these resources persistently and survive any single point of failure.

Speculation and conformance to Martin Fink's Machine vision is a good thing, but what sorts of things can NonStop do in the near term that are a little less visionary and more practical and actionable?

NONSTOP AS INTEGRATION HUB

NonStop is particularly good at OLTP. It is also particularly adept at managing workflow integration. A decade ago, this capability was marketed as Zero-Latency Enterprise (ZLE). Indeed, this framework was a cornerstone of HP's own business systems where it managed and integrated all of HP's product ordering and fulfillment across its many product lines. An integration hub is more than ZLE. It is workflow orchestration and transaction integration in an explicitly hybrid computing environment. It meets the high bar of "the right compute for the right workload" by being able to scale massively and reach deeply into your enterprise's data lakes – wherever and whatever they may be.

What will it be able to do? Here are a few specific examples. Assuming that a "transaction" will originate from a "client" and that it must be processed on an all-or-none basis with fault tolerance built in so that the client is isolated from failures as much as possible:

1. The client application submits its cookie information about the customer engaging with us via their web browser. If we can identify the customer, we can initiate information lookup on several fronts.
2. If we can't identify the customer, we can ask them for basic information (name, address and email) in return for a one-time discount coupon.
3. Armed with customer-specific information we can:
   a. Look them up on our customer database to see if they have ever purchased from us before.
   b. Look through the click base to assemble a list of items they have shown a past interest in but did not purchase.
   c. Assess if any past purchases have follow-up sales

opportunities (e.g. vacuum bags for a vacuum cleaner, v-belts for a lawn-mower, a replacement for something that has reached expected end-of-life, etc.)
   d. Perform a lookup in our data lake for any information about them that could help us personalize the interaction. For example, if they recently moved, won an award, had a birthday, etc.)
   e. Perform the same lookup on the web.
   f. Assess them for potential fraud.
   g. Invite them to the nearest bricks-and-mortar store with an incentive offer if they are accessing via a mobile device.
   h. Construct a special offer that can be dynamically offered on the browser based on the past-purchases and past-clicks analysis.
   i. Look them up in our credit-bureau information database to see if they qualify for our credit card.
   j. Evaluate complementary accessories and make a one-time special offer before committing the transaction if they make a decision to buy, as a final step in the shopping experience.
   k. Store everything in the corporate data lake about the interaction for future use in the above-described work flow.
4. Much of the workflow activities identified above will be analyzed on hybrid servers that the workflow engine will initiate. The work queues should reside on NonStop where they can live through any single point of failure by using process pair checkpoints. If any downstream servers fail, and they are supported by MaRunga the workflow stream
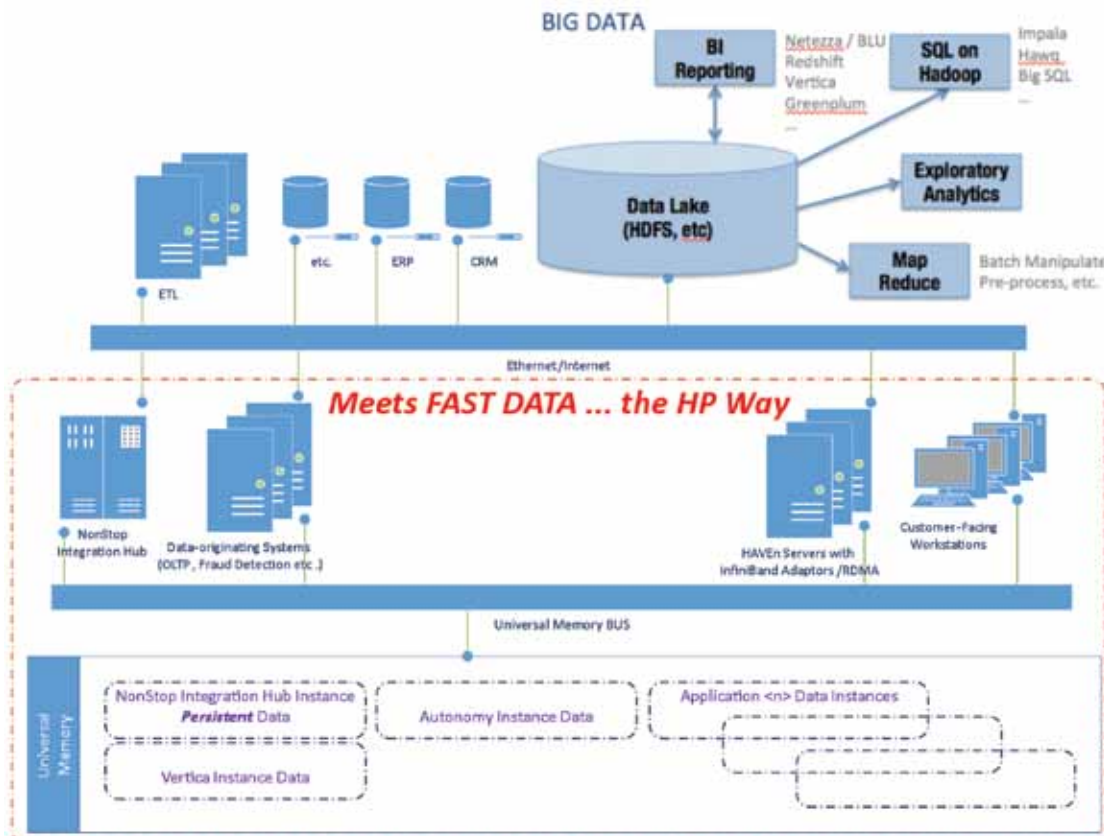

Figure 2 - Big Data meets Fast Data

will be restarted by the integration hub.

5. If the customer navigates away from our web site, we will make them a special offer to keep shopping.

6. If the customer leaves our site, we will construct a special offer to email them.

7. If the customer leaves our site, we will clean up all the dynamic memory queues related to downstream workflow items and send downstream cancellation notifications for any work that is pending.

The main driver behind all of this is the notion that data should remain at rest and access to data by workflow participant processes should be direct across a fiber-optic network. This was not even possible until the advent of InfiniBand RDMA and OFED (see www.openfabrics.org to learn more) drivers. In this new world, it becomes important to make sure memory-based operations – queue-based messages, semaphores and direct memory updates - can survive any single point of failure. These may be things that NonStop can bring to the party in the future.

What we are describing here is a specific framework for big data to intersect meaningfully with fast data using HP's HAVEn framework to yield increased revenues. Figure 2, on page 28, illustrates what that looks like.

PUTTING IT ALL TOGETHER

In conclusion, the data deluge that the IoT will bring provides some unique challenges and opportunities that NonStop, with its fault tolerant, MPP architecture, can take a leadership role in addressing. Key to meeting these challenges will be to incorporate fault-tolerant versions of shared memory distributed across a hybrid computing environment on an IB Fiber Network. This new hybrid computing environment will offer the massive scalability, openness, performance, and reliability that will be required in the Internet of Things era. ∞

Justin is a Master Technologist for the Americas Enterprise Solutions and Architecture group (ESA), a member of the HP IT Transformation SWAT team, and a member of the Mainframe Modernization SWAT team. His focus is on real-time, event-driven architectures, business intelligence for major accounts and business development. Most recently he has been involved with modernization efforts, Data Center management and a real-time hub/Data Warehouse system for advanced customer analytics. He is currently involved with HP Labs on several pilot projects. He is currently working on cloud initiatives and integration architectures for improving the reliability of cloud offerings. He has written articles and whitepapers for internal publication on adaptive enterprise, TCO/ROI, availability, business intelligence, and the Converged Infrastructure. He is a featured speaker at HP's Technology Forum and at HP's Executive Briefing Center. Justin joined HP in 1982 and has been in the IT industry over 34 years.

Dean is one of the pioneers of Message Oriented Middleware (MOM), having chaired three panels on MOM in '93, '94 and '95 at COMDEX. He developed the world's first fault-tolerant shared memory (XIPC on NonStop in 1995) deployed that product as the first customer implementation of active NonStop process pair (four programs implemented) and also ported Seer HPS/NetEssential 4GL-middleware to the NonStop. His biggest middleware achievement was the porting of IBM MQ-Series to NonStop as Chief Architect in 1998. He was the infrastructure architect for the Province of Ontario responsible for implementing the world's first wireless WAN-based mobile workstations for OPP, regional police, carrier enforcement and ambulance services. His customers include banks, brokerages, retail, EFT/POS switches, funds wire, vendor products, airlines, reservation systems, industrial automation and more. He has built systems on NonStop, VMS, Stratus, Unix and PDP-11 and has played roles as architect, technical lead and hands-on technical problem solver as a consultant for over 30 years. He is presently completing an RDMA Middleware product that will implement distributed shared memory, semaphores and queue-based messaging between NonStop, Linux and Windows servers over InfiniBand.

Modernizing the "Unbanked" with NonStop

Yash Kapadia >> CEO >> OmniPayments Inc.

The "unbanked" are individuals who have no association with a financial institution. As a consequence, they live without our modern financial conveniences. They do not have bank accounts. Nor do they shop with credit or debit cards. They do not have loans or mortgages. What they do have is cash, and their financial transactions revolve around cash payments and bartering.

The OmniPayments financial-transaction switch, running on fault-tolerant NonStop servers, is primarily used by retailers to route payment-card transactions to the card-issuing banks for authorization. However, OmniPayments has undertaken a mission to serve the unbanked by providing local financial services with its OmniPayments switch. OmniPayments systems extend many of the benefits of banks from cosmopolitan areas to those whose homes are too remote for the banks to serve. By doing so, it is bringing the unbanked into the modern financial world. In some cases, modernization is accomplished by providing financial services to the unbanked. In other cases, modernization takes place by actually providing bank accounts to the unbanked, thus removing them from the ranks of the unbanked.

The unbanked are everywhere. They can be found in the wealthiest of nations (the U.S. Federal Deposit Insurance Corporation – FDIC – says that 17 million U.S. citizens currently are unbanked) as well as in the most impoverished societies. Usually, but not always, the unbanked fall into the categories of low-income and less educated. At other times, it is a matter of geography that determines the increased presence of individuals with no relationship to a financial institution. In many countries, small communities are located in the mountains or in the jungles far from population centers. Here, there are no banking facilities available even for those who would like the conveniences of modern-day financial services. The World Bank's Global Findex (http://bit.ly/1qwTEGm) indicates that 3/4 of the world's poor do not have a bank account, not only because of poverty, but also due to costs, travel distance, and the paperwork involved.

We describe in this article several examples of OmniPayments bringing banking services to the unbanked. One example is the provision of a *payment services hub (PSH)* to interconnect participants who engage in a common business and who interact with each other through bartering or cash. Many of these participants are unbanked – they have no bank accounts – and they are required to deal with the other participants on a cash-and-carry basis. The OmniPayments payment services hub allows them to deal with others through payment transfers via PSH banking accounts.

Another example is *correspondent banks*. OmniPayments cooperates with sponsoring banks to establish branches in communities that are too remote for sponsoring banks to service directly. In such communities, OmniPayments sets up local merchants as correspondent banks. With banking terminals provided by OmniPayments, the merchants can establish bank accounts for local residents, thereby removing them from the ranks of the unbanked. The OmniPayments financial-transaction switch routes banking transactions from the correspondent banks' terminals to the sponsoring banks just as if the terminals were located in a bank branch.

An extension of correspondent banks is for the payment of periodic stipends to unbanked indigent mothers. In some Latin American countries, the government provides bimonthly or monthly payments to poor mothers to help them feed, cloth, educate, and protect the health of their children. For mothers living in rural areas without bank branches, the stipends are made available to the mothers via payment centers that are established with participating local merchants. The OmniPayments financial-transaction switch routes mothers' payment requests from the payment centers to a government-appointed bank for authorization, allowing the local merchant to provide the mother with her cash.

Supporting Unbanked Enterprises with the OmniPayments Payment Services Hub

OmniPayments financial-transaction switches are no longer just for large banks and major retailers who can afford their own
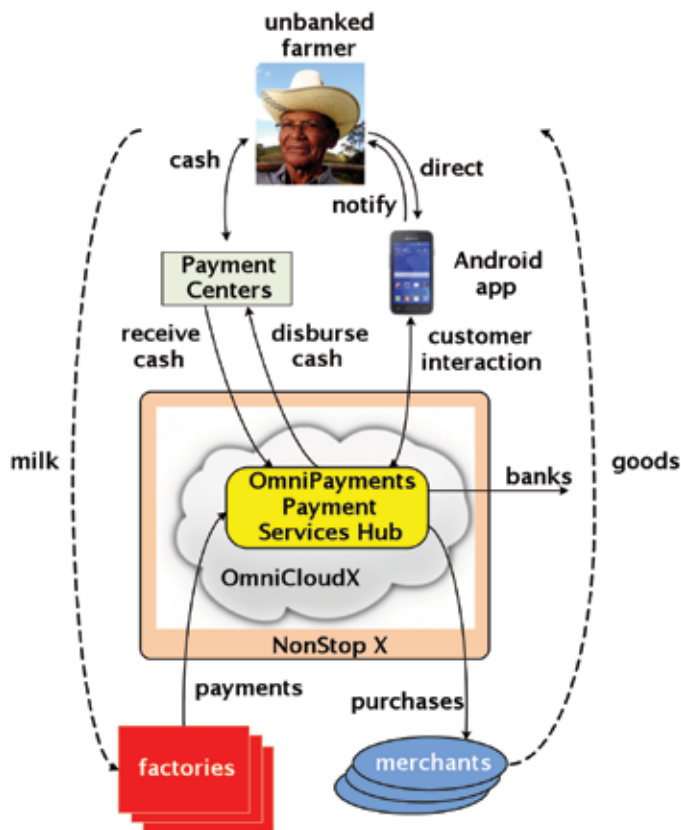

Figure 1 - OmniPayments Payment Services Hub

NonStop systems. OmniPayment instances are now available in the OmniPayments cloud. OmniCloudX, running on HP NonStop X servers, hosts multiple instances of the OmniPayments switch. Users can now have their own dedicated OmniPayments switch for just the cost of the CPU and storage resources that they use.

In addition to their normal function of routing payment-card transactions from point-of-sales terminals to issuing banks for authorization, low-cost OmniCloudX switches are supporting unbanked business operations. Groups of unbanked participants in a barter-and-cash enterprise without the availability of banking services now can be integrated with financial services via the OmniPayments Payment Services Hub (PSH). No longer do the unbanked participants have to transfer physical cash, nor do they need to establish their own bank accounts. Rather, they can receive payments or pay their merchants via the banking facilities provided by the PSH.

One example is the OmniPayments Payment Services Hub that supports milk producers in a Latin American country, as shown in Figure 1. The independent milk producers have organized themselves into a major enterprise that sells milk throughout the country. Over 700 factories pasteurize and distribute milk supplied by millions of farmers. The milk is sold through four country-wide corporations. Many of the farmers are unbanked and have no banking facilities close enough for them to use. They sell their milk products to the factories for cash, and they use the cash to purchase products such as feed to support their farms. Until now, this has been a cash-and-carry business. Pick up cash when they deliver their milk to the factory. Travel to the feed store to pick up feed for cash.

The OmniPayments Payment Services Hub provides a virtualized marketplace for the farmers. The Hub acts as a central clearing house for all transactions. The factories, the farmers, and the merchants who wish to sell goods to the farmers and factories register with the Hub to become members. As part of the registration process, the factories, merchants, and those farmers with bank accounts register their accounts with the Hub so that the Hub can credit and debit the accounts.

To support the unbanked farmers, OmniPayments has established a network of participating merchants local to the farmers to serve as Payment Centers. Unbanked farmers can deposit cash into their accounts via one of these Payment Centers, and they can withdraw cash from their accounts. Each Payment Center has an account with a bank, and this bank account is registered with the Hub so that the Hub can credit and debit the accounts as transactions are made.

The farmers communicate with the Hub system via a phone-based Android app developed by OmniPayments. The app serves as a mobile payment center. Farmers can direct activity via the app and are notified when their accounts have been credited or debited.

The process starts with a farmer delivering his milk to one of the factories. The factory pays the farmer for his milk by crediting his account via the Hub. The farmer is notified of the payment via his Android app, and he can go to his Payment Center to withdraw part or all of his cash.

Alternatively, he can leave cash in his account to pay for supplies that he purchases via his Android app from one of the registered merchants. For instance, he can purchase feed for delivery to his farm from a feed merchant. Payment for the feed is deducted from the farmer's account and is credited to the merchant's account via the Payment Services Hub.

Thus, with the OmniPayments Payment Services Hub, unbanked farmers benefit from all of the banking conveniences enjoyed by compatriots with banking services.

Correspondent Banks Serve the Unbanked in Rural Areas

Correspondent banking is not new to the financial community. For decades, banks have extended their services to other countries via correspondent banking relationships. In such interactions, a foreign bank is used by a domestic bank to service transactions originating or terminating in the foreign country. The foreign bank is a *correspondent bank* to the domestic bank.

OmniPayments has instituted a different form of correspondent bank in cooperation with sponsoring banks. In many rural communities, there are no banking facilities. The communities are too far away for any of the banks in cosmopolitan areas to set up satellite branches. Consequently, residents in these areas often are among the unbanked. Though they would like to have the convenience of modern financial services, they are unwilling to (or cannot) travel to remote bank facilities. OmniPayments correspondent banks fulfill this need by bringing bank accounts and other services to those who are geographically challenged.

A correspondent bank is a local merchant such as a grocery store, a gas station, a pharmacy, a post office, or a retail outlet. The merchant extends the services of the sponsoring bank to local residents in the rural population. Correspondent banks typically offer a limited set of financial services for their rural populations. They provide bank accounts for the formerly unbanked residents. Cash withdrawals, cash deposits, account queries, cash transfers, and payment services usually are supported.

The merchant may have many sites in a rural area, and each site can serve as a remote banking branch. The merchant is provided terminals for handling banking transactions. Each of the merchant's sites may have several banking terminals. The sponsoring bank maintains the accounts of its rural customers. Often, a sponsoring bank may have thousands of correspondent banking terminals spread throughout the country.

Of course, every transaction must be sent to the sponsoring bank for processing and/or approval. This role is also provided by OmniPayments. The OmniPayments financial transaction switch services the remote correspondent banking terminals by sending transactions from the terminals to the sponsoring bank and by returning the bank's responses, as shown in Figure 2.
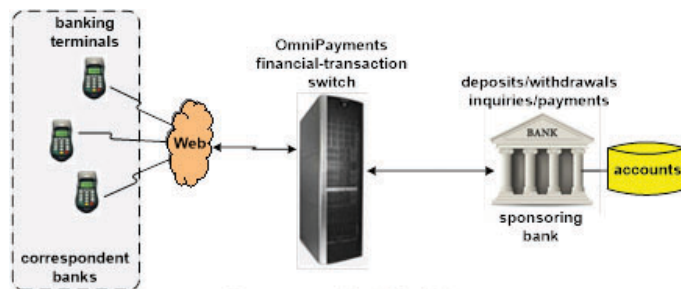

Figure 2 - Correspondent Banking

OmniPayments provides the rural residents with an identification card that carries a PIN. By swiping his card in a merchant's terminal and entering his PIN, a resident can execute any of the financial services provided by the correspondent bank. However, cards get lost; and PINs are forgotten. Therefore, an alternate form of identification is also provided – fingerprints. When a resident registers with a correspondent bank, he provides his national identification number and his fingerprints.

The merchants' correspondent banking terminals are equipped with fingerprint readers. If a resident has forgotten his PIN, a merchant's terminal can read his fingerprint and verify his identification. If he has lost his card, he can provide his national identification number and his fingerprint to complete the banking transaction.

If the sponsoring bank is not capable of fingerprint verification, the OmniPayments switch provides the function, as shown in Figure 3. It maintains a fingerprint database. When a fingerprint is presented for authorization, the OmniPayments switch compares the fingerprint to that stored in its database under the card number or national identification number of the resident. If the fingerprint matches, the OmniPayments switch informs the merchant's terminal to process the transaction. If the fingerprint does not match, the terminal is informed to reject the transaction.
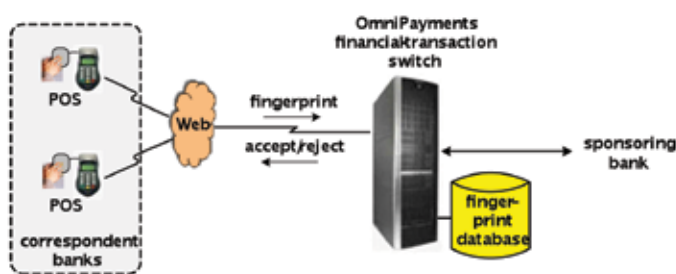

Figure 3 - Fingerprint Identification

Social Services for Unbanked Poor Mothers

Several Latin American countries such as Colombia and the Dominican Republic have established financial safety nets for poor mothers. In Colombia, for instance, cash distributions are made to eligible mothers twice each month. In order to qualify, mothers must agree to provide for the health and education of their children. They must participate in nutrition and hygiene classes; and their children must attend school, be vaccinated, and undergo periodic health checkups.

Mothers living in cities or towns have access to ATMs from which they can withdraw their cash stipends. However, mothers living in remote rural areas are generally among the unbanked. They have no bank accounts and have no access to financial services. There are neither ATMs nor Internet access in their rural areas. The Colombian government was faced with the problem of getting cash to these mothers.

OmniPayments has established specialized Payment Centers with banking terminals to provide these mothers with the limited financial services they need to obtain their stipends. As with normal correspondent banking, each mother is provided with an identification card and a PIN. To compensate for lost cards or forgotten PINs, the mothers also provide their national identification numbers and fingerprints.

The sponsoring bank credits funds to each mother's account semimonthly. A mother can use her card at a local Payment Center terminal for only two purposes – to make a balance inquiry and to withdraw cash. If she withdraws funds, the merchant managing the Payment Center gives her the cash. The merchant will be reimbursed for cash distributions and will be paid a service fee for each transaction. Though the mothers remain among the unbanked, they are now provided the modern banking services they need to obtain their stipends on a timely basis.

One technical problem faced by this system is that funds are provided only twice per month. On each of these days, millions of mothers line up to make withdrawal transactions. This represents a tremendous spike in activity that the OmniPayments switch must be configured to handle.

Another challenge is that the system must be absolutely available. If the system should fail on one of the critical days, the result will be a great social inconvenience. Mothers might not be able to buy food or pay critical bills. Availability of the system is assured via the use of NonStop fault-tolerant servers by OmniPayments. In addition, each OmniPayments system is backed up by another NonStop system in the OmniPayments cloud at the company's headquarters in California.

This Colombian social support program has significantly reduced malnutrition among poor children. The dropout rate from secondary school has decreased dramatically, and students are more employable as a result. Furthermore, with their healthier children regularly attending school, poor mothers now can enter the workplace. Consequently, the number of families below the indigent level has declined.

NonStop Availability and Scalability

All of the unbanked applications addressed by OmniPayments require 24x7 continuous availability. Like any banking system, if a server fails, commerce stops. The OmniPayments financial-transaction switch therefore is hosted on fault-tolerant HP NonStop and NonStopX servers to provide exceptional availability. However, even these servers occasionally fail. To cover outages, OmniPayments provides backup facilities in its cloud, based at its headquarters in California. The logs for transactions made by all OmniPayments switches are replicated to the cloud. Therefore, should an OmniPayment switch fail, all further transactions are routed to a cloud-based OmniPayments switch instance. Since the backup system has a record of all transactions for the day up to that point in time, it can continue processing transactions and can properly submit transactions for settlement at the end of the day.

The OmniPayments switch must also be highly scalable. As the unbanked find that they can obtain banking services in remote locations or for virtual enterprises, the use of OmniPayments systems for these purposes will grow rapidly. With millions of unbanked worldwide, such growth could be virtually unlimited for some time to come. The NonStop server is inherently scalable. Based on a shared-nothing architecture, each system can be scaled linearly from two to sixteen processors. With the new NonStop X, each processor is powered by a powerful multicore x86 microprocessor. Up to 255 such systems can be networked to provide the processing capacity of up to 4,080 processors.

The OmniPayments Financial-Transaction Switch

The OmniPayments financial-transaction switch (www.omnipayments.com) is a layered architecture and is built upon the fault-tolerant HP NonStop server (Figure 4). The core layer of OmniPayments is the OmniDirector Enterprise Service Bus. OmniDirector services include data transformation, encryption, intelligent routing, and communication-failure recovery. OmniPayments also provides ISO and XML interfaces to support those protocols required to communicate with financial interchange networks.
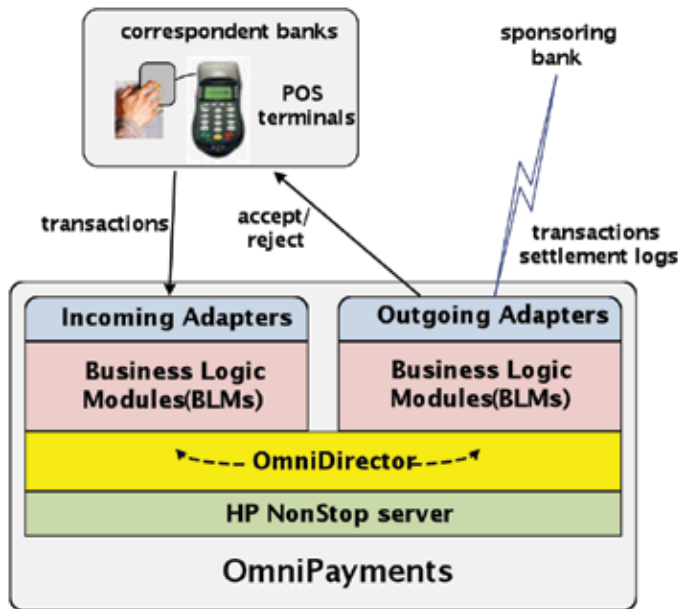

Figure 4 - OmniPayments NonStop Financial-Transaction Switch

OmniPayments offers customers all the requisite functionality to manage financial transactions. Business logic modules, or BLMs, supply the business functions of OmniPayments. OmniPayments provides complete logging of all transactions. The logs contain the transaction information needed at the end of each day for clearing and settlement.

Based on modern technology, OmniPayments' SOA architecture allows it to be easily expandable internally and to other external systems to provide additional functionality when needed, such as the fingerprint authentication used by correspondent banks. A JSON interface is provided for mobile devices. OmniPayments supplies complete security functions for every financial transaction that it handles, including encryption-at-rest and encryption-in-flight. Available around the clock, OmniPayments will survive any single fault, requires no downtime for maintenance or upgrades, and supports a range of disaster-recovery solutions.

OmniPayments' pricing policy is attractively based on the number of NonStop processors used rather than on transaction volume. Customers benefit from transaction growth. OmniPayments benefits from the technology.

With successful implementations in many financial-transaction networks, OmniPayments is just one member of the Opsol family of solutions for the financial industry. Opsol Integrators (www.opsol.com) specializes in NonStop mission-critical applications and is HP NonStop's largest system integrator.

Summary

OmniPayments has extended the application of its OmniPayments financial-transaction switch to service the millions of unbanked people throughout the world. Already, in several projects, this approach has shown its worth to individuals who do not have access to everyday banking services. From milk farmers to rural residents to indigent mothers, life has been remarkably improved by these new approaches.

In some cases, the unbanked remain unbanked but are able to benefit from certain financial resources. In other cases, the unbanked can open their own accounts and can take advantage of other banking services. In all cases, the plight of the unbanked is being addressed by OmniPayments via its modern approach to extending monetary conveniences to those who exist outside of the banking mainstream. ⊂⊃

When CEO Yash Kapadia left his tenure as a developer at Tandem Computers, he did not abandon the NonStop platform. Instead, he founded Opsol Integrators, whose team is known worldwide for successfully completing mission-critical custom integration projects on time and well within fixed-price requirements.
At Tandem, Yash participated in numerous assignments for customers such as Wells Fargo, United Airlines, and John Deere. Yash's experience with the financial and retail industries led to the creation of OmniPayments, a financial-transaction switch that runs on NonStop but has a modern SOA architecture that easily ports to open-source applications.

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It's bright! It's shiny! But is it modern?

Richard Buckle >> CEO >> Pyalla Technologies, LLC

Real Estate agents everywhere can recognize a modern house with only a quick check of the kitchen and an even shorter glance into the bathroom. Stainless steel appliances, granite countertops and subway tile backsplashes – it's as if missing any of these items in 2015 a home is dismissed as being "outdated", and for potential buyers the prospect of facing major renovation. Yet recognizing modern computers isn't quite that easy, given that so much that's important to business is out of sight.

The theme of this issue of The Connection is Application Modernization and there will be considerable coverage of the topic, but perhaps it's worth taking some time to consider what actually is modern when it comes to a computer? Furthermore, before we begin looking at application modernization, one question does need to be addressed - what would we consider to be possible attributes of a modern computer system and would the NonStop system qualify as being modern? Maybe even more importantly for the NonStop community, is there a definitive line separating legacy from modern and if so, are NonStop systems approaching this line or have they already crossed it? There's little point in spending resources modernizing an application if the result is still something that's out of synch with everything else in the data center.

When it comes to defining a modern computer even the experts have trouble defining exactly what constitutes a modern computer and of course individual vendors are only willing to add their own spin. However, as a place to start, there is a correlation between what is successful in todays' marketplace with what is modern – the Intel x86 architecture has pushed almost all other processor architectures to one side, Internet protocols prevail when connecting modern systems to the world, SQL is the dominant database management system, although NoSQL (Not only SQL) is gaining popularity, and Java usage is almost a given but even here, JavaScript is gaining ground. Suffice to say, we all appreciate what helps sell systems and with popularity, an appreciation for what is modern.

In the lead up to writing this article I interviewed numerous vendors, including HP, and while I will refrain from referencing all the feedback I received, there was clearly a consensus as to what this group thought constituted a modern system. HP has identified a number of megatrends, or high-level focus areas – Mobility, Security, Big Data and Clouds. By implication, according to HP, a modern system needs to integrate well with all that's happening in the world of smartphones and tablets, be readily secured, support Big Data frameworks and be capable of populating clouds. However, for the NonStop community there are positives along with drawbacks to such megatrends being used to define a modern system even as it's clear that after years of effort expended by NonStop R&D, great strides have been taken to bring NonStop into the modern era.

If the HP megatrends only help frame the discussion, what then needs further thought if we are to consider NonStop modern? As one vendor noted early in our exchanges, "to be considered as modern, a system needs to be cloud ready, redundant, commodity, scalable and user (including developers) friendly." [1] While this touches on some rudimentary properties that on first glance suggests NonStop systems may have a leg up on the competition, I think even the staunchest supporter of NonStop would be wary of relying solely on just these properties. Another vendor noted that the assumptions in 'modern' are "high efficiency, utility and its ability to provide value in the emerging areas across IT of Cloud, (Data) Analytics, Mobile and Social Media while providing the best security available today." [2] Providing value is at the very core of why some computer systems succeed in the marketplace and value today is equated to exploiting industry standards and open software.

Of relevance to this discussion on defining modern computer systems is the idea conveyed by one vendor that the system you equate with being modern "has to support where you want to go even if you don't know precisely where that will be at the time you acquire the systems, middleware and solutions; that means a level of flexibility and indeed compatibility with languages, tools and frameworks common across the broadest pool of developers that will be likely candidates to develop these new solutions." [3] It's hard to argue against this, even as we deal with the changes being thrown at us whether it's a new application, a new database technology or even new protocols. For instance, will wearables take off as a smart device and will they be easily accommodated?

Following these discussions with vendors, and before I attest to what I consider as being important requirements of computer systems in the modern era, the one thing that became very clear was that there were as many explanations of what a modern computer meant as there were vendors. Not surprisingly, even with their experience with NonStop systems dating back decades, each was anxious to ensure nothing was left out. After all, if application modernization was being pursued, each of them could point to a product or service that clearly helped the application modernization process. And yes, each of them viewed the latest iteration of NonStop systems – the just released NonStop X family of systems based on the Intel x86 architecture – as belonging to the modern era. Industry standards together with support of open software clearly stand out as recognizable attributes of a modern system, so for those looking to modernize applications, and to best exploit a modern computer, NonStop X more than met the basic criteria.

My own view of what constitutes a modern system has been influenced by these exchanges with the vendors even as I have come to appreciate that there's more at stake than just embracing the latest megatrends. What I have come to appreciate from all the work NonStop R&D has done over the past decade is that HP has definitively pushed today's NonStop systems into the modern era and there's a reason why industry analysts have started taking a fresh look at NonStop. Recent analyst reports from both IDC and Gartner published just this year, and available on the HP web site, represent a change of heart among the

analyst community and in itself, is also a confirmation that NonStop is modern – few industry analysts would bother publishing research for computer systems not a part of the modern era.

However, apart from how I was influenced over the course of these vendor exchanges, from my perspective there are a couple of items I believe characterize a computer system as being modern and as such, warrant their applications being modernized. And the cold hard fact is that the initial purchase price – the all-important Total Cost of Acquisition (TCA) – is becoming increasingly important. This is not to say we should all run out to the local discount store and buy up all the cheapest servers we can find (that's already been done by the big internet companies) but rather, understand the fact that CIOs continue to be influenced by the initial purchase price. As another vendor reminded me, "Perhaps overlooked in any discussion about today's modern systems is the price. Many companies have become a little jaded over discussions about the TCO as increasingly, every vendor puts their own spin as to what to include in the calculations." [4]

I know I am on dangerous ground here and welcome your feedback but for me, the decision taken by NonStop R&D to provide entry-level NonStop X systems, attractively priced to compete aggressively with equivalent commodity clusters, fulfills the most important criteria of all when it comes to what CIOs expect of modern systems. Bottom line? Everything else that follows here is purely of academic interest to IT if we cannot move NonStop through the front door. I may sound evangelical on this point but again, the truth is that nothing says modern as much as does affordable and NonStop R&D have performed miraculously in bringing to market systems that are now affordable.

Once through the data center doors, perhaps the next attribute that defines a modern computer is the presence in the marketplace of a deep pool of knowledgeable personnel to draw from. As one vendor I talked to stressed, "Can we say that modern systems attract the largest pool of developers? Would it be equally true to suggest that modern systems are defined by the languages and tools they support? As for the current generation of programmers they have whole-heartedly embraced the saying, 'don't reinvent the wheel' and 'why solve problems that have already been solved?' In so doing, they depend heavily on open source libraries which are predominantly Java based. Any technology going forward HAS to have a highly functional Java execution platform; otherwise development projects will become cost and time prohibitive." **[5]**

Modern computers become successful by proving to be popular, affordable and attracting a deep pool of knowledgeable experts. But there's more. No discussion on modern computers would be complete without a reference to virtualization, indeed, the inclusion of cloud computing into discussions about modern computers invariably turns to discussions about the merits of virtualization. Here NonStop may have some work to do, but for many, the shared nothing architecture fundamental to NonStop already supports an application virtualization layer through TS/MP (Pathway). It's quite legitimate to talk about NonStop in this manner even though it will gain few outside supporters. Virtualization goes much deeper than just application support. My own understanding is that – and this is pure conjecture at this time – NonStop properties and indeed, actual code, may end up in a new

hypervisor as part of the march to The Machine. Could this be possible and what does HP senior management believe constitutes a modern system? Perhaps a little peek into the future by someone much closer to the product could prove enlightening.

"Software defined everything," said Bob Kossler, Director Technology Strategy and Planning at HP, in response to my question on what is a modern system. "Disaggregation of system resources is a must-have requirement for any future system to be considered modern but for now, no vendor has the complete story. Network Function Virtualization (NFV), for example, is a work in progress with technology rapidly moving from the vendor's lab to PoC (Proof of Concept) to production." Such a move to software defined everything implies a different view of all of the assets within the data center. Rather than ordering a single system we are likely to see future orders made on the basis of so many cores of such-and-such processor, so many terabytes / petabytes / exabytes of storage and this amount of bandwidth where configuration and reconfiguration are routinely done to meet the needs of business users.

"At a time when C-level executives are taking a long hard look at turning their IT assets from a cost center to a revenue generator," noted Kossler, "monetizing the data is important to them. Rather than simply treating IT as a utility serving the business, they now are looking at how to best generate revenues from the data they accumulate." As for my own observations of how this may play out, it's very likely that customers will proceed cautiously as they negotiate with vendors and set up their own labs to do PoCs but the good news here for the NonStop community is that despite everything we may read, it's very early days and customers are aware that nothing substantive is shipping from vendors as yet. Having said this I believe it would be foolish for any of us to rule out NonStop playing an important role in future modern systems from HP.

For any system to be considered modern, it might all come down to the combination of TCA and with it, utilization of industry standard, open, commodity building blocks. Access to a large pool of developers is important, too and with that, the recognition that modern systems support a variety of popular languages and frameworks. As for the third attribute of a modern system increasingly that has to do with virtualization not in the manner we think of today but in the manner of supporting so-named software defined everything. And with this, today's NonStop X systems, particularly as part of the upcoming NonStop X hybrid systems now being developed, the pieces are coming together. Should NonStop find a role as part of a virtualized hypervisor nothing will be able to detract from NonStop being every bit as modern as any other system on offer from HP or any other vendor. And for this, even as we see so much chaff being thrown into the wind, NonStop may be the very needle left uncovered for all in IT to see – modern yes, shining and very, very, visible! ∞

[1] Sami Akbay Cofounder and EVP, WebAction, Inc. and a client of Pyalla Technologies, LLC
[2] Shawn Sabanayagam CEO, Tributary Systems, Inc.
[3] Peter Shell Managing Director, Infrasoft Pty. Limited and a client of Pyalla Technologies, LLC
[4] Yash Kapadia CEO, OmniPayments, Inc. and a client of Pyalla Technologies, LLC
[5] Billy Whittington CEO, DataExpress and a client of Pyalla Technologies, LLC

Richard Buckle is the founder and CEO of Pyalla Technologies, LLC. He has enjoyed a long association with the IT industry as a user, vendor, and more recently, as an industry commentator. Richard has over 25 years of research 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.
The quotes come from some of Richard's clients including HP, Integrated Research, comForte, DataExpress, WebAction, Inc., and OmniPayments, Inc.

HP NonStop X - What a Modern, NonStop World We Live In!

Andrew Price >> VP Technology >> XYPRO Technology Corporation

The recent release of the new HP NonStop X Server has been creating a lot of positive press in our industry this year, and at XYPRO we've been enthusiastically rolling out our XYGATE suite of products on the new server line. XYGATE products have been certified for NonStop X since the first servers shipped in March, and XYPRO recently ordered our own NonStop X Server. We're looking forward to using its capabilities to enhance and deliver our Mission Critical Security solutions for our customers.

The HP NonStop X Server is an excellent example of modernization. With a commodity-based hardware set, including the new Intel Xeon processor and Infiniband interconnect, NonStop hardware can now fully divest itself of the "proprietary" label that has become less and less applicable over the last decade.

As a software development company, at XYPRO we're also keenly aware of the significant progress being made to modernize and standardize the HP NonStop Server software line. Most of us remember the old days where the NonStop was a small(ish) black box in a sea of Big Blue in the data center, and was sometimes viewed as not playing nicely with those blue boxes, nor most of the other platforms present. In recent years HP, working with a number of partners, has made great strides in this area, and we can assert that the NonStop is standards-based, while maintaining the fault tolerant fundamentals that it has always exhibited. As HP marketing collateral has recently stated, NonStop has "Common Standards, Uncommon Advantages".

HP and partner products not only modernize the NonStop, but through greater standardization, make it more secure and better integrated within the enterprise security infrastructure. A great example of this improved integration is XYGATE Merged Audit (XMA), included on all new NonStop Servers since 2010, along with support for HP ArcSight. As one of the leading Security Incident and Event Management (SIEM) appliances in the Gartner Magic Quadrant, ArcSight has long been recognized for the value it provides in securing large-scale enterprises. Using XMA, NonStop customers can easily and quickly implement these solutions for their NonStop audit data. Now NonStop audit data is seamlessly integrated as a standard part of the enterprise security audit.

XMA allows the HP NonStop Server to integrate into the Enterprise Security Model by aggregating and normalizing events from disparate NonStop based sources (i.e. Safeguard, BASE24, BASE24-eps, XYGATE, EMS, etc.) and forwarding this data to the ArcSight SIEM. By filtering and translating the HP NonStop security event data stream into ArcSight consumable Common Event Format (CEF) messages via syslog, the NonStop Server becomes a standard source of audit data. HP customers have easily integrated their audit sources into the greater enterprise monitoring system by simply applying the XMA ArcSight adaptor to their existing data store. New or historical data can be sent and consumed by the SIEM retargeting the responsibility for threat management back to the teams that do it best for the entire ecosystem.

The availability of HP Security Voltage solutions (www.voltage.com) on NonStop represents another great modernization and standardization story for the NonStop Server. Voltage's Format Preserving Encryption (FPE) and Secure Stateless Tokenization (SST) are standards-based, industry proven, and are supported on virtually every platform in the enterprise. Support for NonStop means that data encrypted or tokenized on the NonStop can be decrypted on other platforms, and vice-versa, allowing for NonStop applications to participate in a comprehensive data-centric security implementation. This is great news for NonStop users that have sensitive data that needs to be protected, end-to-end, throughout their enterprise. A common example here would be credit or debit card data, often processed on NonStop, but also frequently passed to other platforms as part of the payments life cycle. When this data is only protected at rest on the NonStop, security gaps are introduced, which may create opportunities for hackers to access the data.

When used with XYGATE Data Protection (XDP), Voltage capabilities can be easily implemented on NonStop, often without any code changes to existing applications. This can be a major benefit, where application changes may not be possible due to a variety of reasons.

Authentication controls via XYGATE User Authentication (XUA) coupled with Identity Access Management (IAM) provided by IdentityForge allow the NonStop Server to integrate and take advantage of the modern tools and services available to the rest of the enterprise, such as Single Sign On, enterprise password vaulting and Active Directory integration. Regulatory compliance frameworks mandate strong user authentication and watertight password

The 50 Most Used Passwords

1. 123456	11. 123123	21. mustang	31. 7777777	41. harley
2. password	12. baseball	22. 666666	32. f*cky*u	42. zxcvbnm
3. 12345678	13. abc123	23. qwertyuiop	33. qazwsx	43. asdfgh
4. qwerty	14. football	24. 123321	34. jordan	44. buster
5. 123456789	15. monkey	25. 1234...890	35. jennifer	45. andrew
6. 12345	16. letmein	26. p*s*y	36. 123qwe	46. batman
7. 1234	17. shadow	27. superman	37. 121212	47. soccer
8. 111111	18. master	28. 270	38. killer	48. tigger
9. 1234567	19. 696969	29. 654321	39. trustno1	49. charlie
10. dragon	20. michael	30. 1qaz2wsx	40. hunter	50. robert

controls, yet weak user passwords and default access credentials are still one of the leading causes of system breaches.

PCI-DSS, HIPAA, NERC, FFIEC among others require hardening of user credentials to become compliant. As the industry adapts to the constantly changing breach landscape, these requirements become stricter with each iteration. To the security administrator, this typically means receiving corporate policy or compliance mandates and manually applying and enforcing these policies separately. There are quantifiable costs and operational overhead using manual methods, not to mention the human-error factor involved in ensuring the policies on the NonStop are applied consistently with the policies of the rest of the organization.

XUA, which is shipped on every new NonStop Server as part of the Security Bundle, assists with enterprise security integration in other ways as well. XUA enables the NonStop Server to take advantage of commonly used protocols such as LDAP, allowing it to authenticate and grant users access using an enterprise directory service such as Microsoft Active Directory - used by 95% of Fortune 500 companies. LDAP integration through XUA federates the user's credentials, enabling the NonStop to participate in the enterprise's Single Sign On environment, taking advantage of security modernization capabilities like centralized password and access management, allowing users to use their enterprise credentials to authenticate on the NonStop. In addition to reducing the issues associated with weak passwords and insecure storage locations XUA also reduces the need for password resets at the systems level, enabling automatic lock out of accounts enterprise wide when suspicious activity is detected.

Providing two-factor authentication is also a necessity in today's security landscape and the NonStop is no different when it comes to these security requirements. XUA enables the NonStop Server to leverage two-factor technologies such as RSA SecurID to reduce the risk of account compromise. A properly configured XUA environment with LDAP authentication and a second factor solution will greatly harden your NonStop's security posture and position your NonStop Server environment to efficiently deal with threats.

Enterprises worldwide are seeing the benefits in incorporating modern technologies into their NonStop ecosystem. Another such solution that opens the NonStop to participate into consolidated enterprise processes is the Advanced Adapter for HP NonStop from IdentityForge. Companies can now include the NonStop in the identity management lifecycle by standardizing and seamlessly interfacing between their Identity Access Management infrastructure (IAM) such as Oracle OIM, IBM Tivoli, Microsoft FIM and their HP NonStop Servers. The Adapter supports automated provisioning of users, reconciliation, compliance attestation, group management, ability to enforce password vaults such as CyberArk and much more. Typically, the IAM tool would create access credentials based on enterprise policy and push them across every system in the network, then the request would go to the NonStop administrator to manually add the same IDs and accesses to the NonStop. With the IdentityForge solution in place, the NonStop adapter now becomes the virtual administrator, greatly reducing administration time and security risks, while at the same time increasing operational efficiency.

Recently, a major card issuer in Asia incorporated their HP NonStop Server into their IAM infrastructure using the Identity Forge Advanced NonStop Adapter. This enabled centralized management of user logins and effective control of authorization for access privileges based on job functions. This long time NonStop customer is thrilled to markedly reduce the overhead needed to separately manage these mission critical systems.

These examples show the significant lengths that HP, and their partners, have gone to in recent times to modernize, standardize, and secure the HP NonStop Server platform. With its completely standardized hardware, excellent software options, and comprehensive product roadmap, longevity of the NonStop platform looks to be well assured. ⬭

Andrew Price is VP of Technology at XYPRO. He joined XYPRO in 2011, and has over 25 years' experience in the mission-critical IT industry. Prior to joining XYPRO, Andrew was with ACI Worldwide for over 11 years, where he held roles in Product Management, Development and Architecture. At XYPRO, Andrew has engineering and product management responsibility for the XYGATE suite of products, ensuring that they continue to meet XYGATE users' stringent requirements for security and compliance on the HP NonStop. He can be reached at andrew.price@xypro.com

Back for More...

Richard Buckle >> CEO >> Pyalla Technologies, LLC.

These past few weeks reminded me of just how fragile technology can be and just how terribly wrong things can go when you least expect it. Over the course of a few days I ended up having no vehicles to drive, apart from a motorcycle or two, and it was a real wake-up call. While it may seem trivial to some, coming to terms with the fact that not a single car in the garage is available to drive and that I have to rely on the generosity of our daughter to get around in one of her cars – yes, this is the U.S. and public transport isn't up to par compared to Europe, Australia and parts of Asia. For some time now I have contemplated getting a dog or two and the joke in our house has always been whether I would call one dog Primary and the other Backup, but the serious side of this discussion had escaped me – if these recent events had have happened in the depth of winter, I could have been in a real trouble.

Vehicles and pets to one side, so much of what we do, these days comes with an expectation that the service will be fine. However, it's a growing reality that when it comes to service, we have gradually lowered these expectations. Just recently a strategist from the HP Mission Critical Server group talked about our use of phones and whereas in the past we expected a dial tone immediately after lifting the receiver from a handset, today we just sigh whenever we see too few signal "bars" or indeed the "No Service" message. As a society, the progress we have made in the transition to a globally connected world has come with the penalty of diminished service and yet, with a sigh and a shrug, we accept the lack of availability even when we need it. Just think of how you would react in a situation where a 911 call needs to be made, but your mobile phone displays a "No Service" message.

For the NonStop community nothing raises the hairs on our necks faster than reading of a major corporation or institution reporting an outage. This is happening so often now that any press coverage is pushed away from the front pages of news publications and even the television news channels rarely lead with such a story, unless of course the outage has left a city in the dark or people trapped in buildings or subways. No, even as we shrug our shoulders and accept the bad news and dismiss it as just a part of progress, it needn't happen with the solutions we have on hand. For the NonStop community, not only is such news frustrating and annoying it leaves us all wondering why the message of NonStop has diminished to where it's barely a whisper.

It should come as no surprise to the NonStop community that I belong to a variety of LinkedIn Groups covering numerous platforms and solutions. In one such group, the Mainframe Experts Network (with 25,000+ members), a discussion developed around a column published in the Enterprise Systems Journal, Rehabilitating the Perception of Mainframes. One comment made struck a chord when the columnist observed how, "former OPM (Office of Personnel Management) Director Katherine Archuleta's statements that she failed to address the vulnerabilities found by the Inspector General's office because her agency was focusing on replacing the 'old legacy'." The vulnerability? Well, of course security! "We, the Information Technology industry, are facing a crisis in the security of the data we collect. Citizens who provide information to our Government have a right for that information to be protected," the columnist adds.

When it comes to modernization should we accept diminished levels of availability and is an important aspect of the availability story connected to security? Picking up a phone and getting a dial tone came with the expectation (for a very long time) that we would be connected to the party we dialed and that the conversation would remain just between the two of us. Courts could overrule the privacy but in general, the phone lines were considered secure and private. However, today, when we discuss availability and should a system be up and running, but compromised with our personal information unprotected, is the system really available? Shouldn't we pull back from using that service when we aren't sure of what the fall out may be following the exchange? For me, an unsecure system is not available – it's as simple as that.

There are numerous charts available today that quantify the cost of downtime by industry. But there's also charts illustrating the loss that comes from stolen personal information (together with the fines that are being levied of late). Just recently the Federal Communications Commission (FCC) fined AT&T $25 million for privacy violations stemming from a security breach last year that exposed more than a quarter million customers' names, full or partial Social Security numbers, and account-related data. Surely, making a phone call but unsure of who else is listening in on the call doesn't sound like a level of availability the NonStop community would welcome.

Many reasons for outages exist and there are steps we can take to ensure we can continue to remain in business. Replicating data centers, transferring key business files to remote protected sites, and simply tapping multiple infrastructure services like power and communications are all well known to the NonStop community. And yet for many in business and government even as they push to "modernize" according to preconceived ideas as to what modernization means, the story of true availability seems to have been pushed to one side as focus is solely on replacing. But a secure, available, NonStop system has a place in most of the data centers referenced here and like many I am hopeful, indeed borderline anxious, that as we are done with the HP split and HPE emerges, the story of NonStop finds greater market visibility and that corporations and institutions everywhere see the connection; poorly secured systems simply aren't available at all! ∞

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