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A Note from Connect Leadership

Wow! It was great to see everyone again. I cannot get over how much energy there is at the NonStop Technical Bootcamp! Considering how infrequently we get together these days, I look forward to this one gathering each year more than just about anything else. I hope everyone was able to attend as many sessions as they wanted to. I know I never seem to be able to make as much as I want.

As we prepare to enter 2018, I hope all is going well with everyone. The fourth quarter is an interesting one for all of us as we freeze all changes and begin preparing for a really busy time of year. It may be a time of celebration and reflection for much of the world, but considering how much of the payments industry relies on NonStop, it is a really stressful time for us.

Just like every year in the past, 2018 looks to be another great year for the entire industry and a fantastic one for NonStop!

This edition is all about "The Best of NonStop". What a difficult edition to put together! Considering the high standards that all expect from HPE and our vendors, I would consider this to include just about everything.

Thanks to everyone for making this platform what it is.

Please do me a favor and thank the Connect staff the next time you see them. They work really hard to deliver publications like this and the NonStop Technical Boot Camp (as well as other events). They make all these things look simple, but they can be a nightmare behind the scenes!

Thanks.

Rob Lesan

Rob Lesan
XYPRO Technology
Connect Worldwide President

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Connect Worldwide
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Hewlett Packard Enterprise

News from HPE's NonStop Enterprise Division

Karen Copeland
Manager WW NonStop
Product Management
Mission Critical Solutions

The 2017 Seasonal Holidays are almost here!

Seems like 2017 has just spun by and we're now only a month or so away from 2018. Looking back at the year, in spite of the terrible weather and events that happened, NonStop has had another good year with some big deals in Asia Pacific and the U.S. market.

We had our first sold out European show this year in May and it was one of the best events we've had in a long time. We just finished another exciting Technical Boot Camp in San Mateo California with some 90 talks and great moments for the participants. Our thanks to everyone who attended, we hope you found the information presented useful and helpful in planning your future NonStop scenarios. If you'd like a private meeting to discuss anything you heard in more detail please reach out to me and we can set up an online call. We also want to thank Connect and the whole Partner community for investing in the event to make it a grand time for everyone.

The week after the U.S. Thanksgiving, everyone is off to DISCOVER Madrid where we'll talk to even more customers about the new offerings coming from the NonStop Business.

This end of the year "Best of NonStop" issue of The Connection has some really engaging and interesting articles, Marty Edelman's article entitled, "Is Your Head in the Clouds?" talks about the challenges of managing IT in big companies and how some products in the NonStop ecosystem can make a big difference to helping you move your applications forward and modernizing access to your data. This article is a nice follow-on after Marty's Keynote speech on Tuesday at this year's Technical Boot Camp.

As a change of pace, the XYPRO article "Our Employees are as Important as our Customers" is a nice tribute to XYPRO's team and a reminder of the attitudes espoused by Tandem Management in the early years of the company. It is people's dedication to the NonStop platform and to keeping our customers happy that is a traditional factor in NonStop's success over the years. Congratulations to XYPRO in keeping these attitudes alive.

Gravic's article entitled, "Swapping Replication Engines with Zero Downtime" reminds us that there are ways to avoid downtime even when you modify the way you do replication to protect your business. Sheryl Wharff talks about how to protect your data from breaches by leveraging Micro Focus's Secure Stateless Tokenization (SST) in her article, "Neutralizing data breaches with Micro Focus SST and HPE NonStop". Our friends at Tributary Systems, Shawn Sabanayagam and Glenn Garrahan, contributed a nice article called, "The Case for Cloud Object Storage" with some interesting historic pictures of how tape devices and even disk drives used to look. We're come a long way baby! And don't miss this issue's "Women in NonStop" article that focuses on one of our NonStop matriarchs and mentor to so many over the years; Wendy Bartlett and her long career with the NonStop platform.

The Connection is always looking for good articles and welcomes your submissions. If you have a good story you'd like to tell, a technology you'd like to explain, a deal where you made a NonStop customer very happy or if you gave a talk at the NonStop Technical Boot Camp, please consider turning it into an article for the magazine. This publication goes out to the NonStop community six times a year and is available both online or as a hard copy. Stacie, Wendy and myself are happy to help you if you've never created an article before. Here's the plan for issues in 2018 and their topic themes.

The Connection Editorial Calendar 2018

Issue	Materials Deadline	Mailing Date	Technology Focus
Jan / Feb	Dec 17 2017	Jan 23, 2018	**TRANSFORM YOUR NonStop ENTERPRISE**
March / April	Feb 27, 2018	March 22, 2018	**DATA-DRIVEN RESULTS WITH NonStop**
May / June	April 12, 2018	May 24, 2018	**LIVING IN A VIRTUAL WORLD WITH NonStop**
July / Aug	June 13, 2018	July 19, 2018	**PROTECT YOUR ENTERPRISE WITH NonStop**
Sept / Oct	Aug 16 2018	Sept 21 2018	**NonStop APPLICATION DESIGN AND TECHNIQUES**
Nov / Dec	Oct 19 2018	Nov 22 2018	**BEST OF NonStop - YEAR IN REVIEW**

People who couldn't attend the Technical Boot Camp this year would love to read about your topic in a future issue of The Connection.

Finally, I want to take this time to thank our loyal and new customers, all of our sales and support staff, our Engineering teams who work so hard to bring new products to market and of course our Partner community who keep the spirit of NonStop products alive and the user community thriving at the many TUGs, RUGs and NUGs that happen all through the year, every year.

Best wishes to you and your families for wonderful holiday season and a Happy New Year!

Karen

Karen Copeland

Manager, WW NonStop Product Management
Mission Critical Solutions
Hewlett Packard Enterprise

A LOOK BACK AT CSP'S EVENING AT AQUA SHARD

One of the industry's social and business networking highlights in 2017 was the CSP-sponsored event at the beautiful Aqua Shard on May 09, 2017. All of those who attended had the benefit of experiencing the elegance of the spectacular venue, the amazing view, the ambience and the generous offering of delicious food and libations, all compliments of CSP and its management team.

Vernette O'Neill, President and CEO of Computer Security Products, Inc. (pictured below left) commented on how pleased she was to host this gathering and how thrilled she was with the positive turnout. Vernette mentioned that CSP, as sole sponsor of the affair, appreciated the collaboration of the EBITUG team in providing this opportunity. Such a successful occasion wouldn't have been possible without the flexibility and support extended by the EBITUG committee members.

As Computer Security Products, Inc. continues its growth, the organization is demonstrating strong commitment to further servicing its existing and prospective clients, as well as addressing the needs of an ever-evolving industry sector. CSP looks forward to ongoing successes for all.








COMPUTER SECURITY PRODUCTS, INC.

Once again ATUG version 2.0 thrives and continues to grow stronger. It is awesome to see the TUGS coming back to life. It is always great to go to Atlanta in September for the meeting. The weather once again shined on ATUG. The HPE NonStop (Tandem) community in the Atlanta area is still very strong and it was great to meet with the user community both old like myself and the new talent that ensures the NonStop lives on.

My name is Jay Price. I'm with XYPRO Technology supporting the sales team on covering the US and Canada. Previously, I covered the western US and attended a few TUGS that are still thriving; however the size and growth that I have seen attending ATUG is very strong and great to see. As ATUG continues to grow it will soon be #1 on the list of events for the NonStop community to attend.

This year ATUG consisted of 10 vendor presentations including an HPE update and a user presentation. From HPE we were joined by Keith Moore, Master Solution Architect, who gave us an exciting look into the future of NonStop. His presentation was titled "Transforming your Digital Enterprise" and it was filled with updates on the Mission Critical Server Roadmap, vNonStop, Database Compatibility and what HPE has planned for the NonStop moving forward.

Our user presentation was given by Jack Bresnahan from TYSYS and provided the 70+ attendees with insight into how our country's credit and debit cards are processed. This intro led perfectly into Jack's highlight on PCI compliance and its importance to the NonStop community.

The revival of ATUG began last year and some very special thanks go out to HPE's Ken Goldman and Nelson Alvarez as well as XYPRO's Dale Van Stratten for bringing this event back to life. They have managed to make this bigger and better and l look forward to seeing it continue to evolve and grow to meet the needs of the local community. It is also great to see the variety of NonStop vendors come out and support the event. This year the interest in ATUG has exploded, the number of users that attended prompted executive action.

Yash Kapadia, the CEO of OmniPayments took it over in place of the planned presenter and wowed the crowd with OmniCloudX. Presentation slots are limited do to the timeframes available but support grows regardless.

After the presentations concluded all of the guests were asked to put their name badges in a bucket for an incredible drawing. The gifts provided by the vendors (presenting or not) were outstanding. The one standing out to me was the drone that was given out from NTI as well as many others.

Like last year, a big thanks to the Home Depot for generously supplying a beautiful theatre for the revival and the technical support to keep it all going smoothly. The Home Depot again supplied the food and beverage throughout the day to keep us alive and chipper. Most of all a huge thanks to all the NonStop Users and vendors that attended. Please continue to pass the word along so that ATUG continues to grow and expand.

I cannot wait to see what the plans for next year are and look forward to seeing everyone again at the next ATUG Revival. From things that I have heard they are looking at some additional format changes that will make this even bigger and better. With the content and excitement growing even bigger I really hope to see even larger crowds in the continued Revival of ATUG.

I would love to hear everybody's opinion on this year's Revival and would be glad to pass this information along. We can only get better as we continue to grow and any input only makes it stronger so feel free to share.

Jay Price
XYPRO Technology
Jay.Price@xypro.com

MATUG

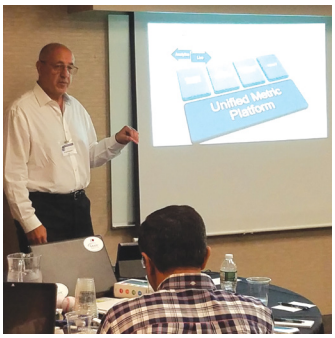
Mid-Atlantic Tandem User Group

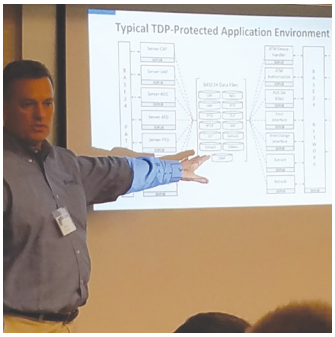
On Friday, October 13, MATUG (Mid-Atlantic Tandem User Group) hosted its annual meeting for HPE NonStop users, consultants, and vendors at the Courtyard Marriott BWI Airport in Linthicum, Maryland. This year, about 40 attendees participated. In the morning, we opened with introductions and enjoyed presentations from HPE and vendors on the latest NonStop advancements and software products.

Included in these presentations was one on the nostalgia of NonStop's peak usage—when it operated over 20 of the world's 25 stock exchanges. We caught a glimpse of the future with Paul Denzinger and Keith Moore discussing "Mission Critical Distributed Ledger – Leveraging NonStop for Blockchain-Type Ledgers." We learned how Blockchain works and how NonStop can provide mission-critical aspects to distributed ledgers.

Dr. Bill Highleyman discussed "Fat Fingers Ahead! The Real Hazards to IT of Human Error," an historical account of real-world mistakes that have caused major outages and problems to IT services. We reminisced on cases that failed due to these types of user errors, and then discussed best practices for avoiding these types of catastrophes.

Many thanks to John Vollers, Pat Boland, and Peter Schvarcz for helping us plan and manage the meeting. Additionally, we thank the customers, vendors, consultants, HPE executives and technical staff for supporting this informative event. We also discussed holding a future meeting to educate participants on how a NonStop environment could benefit them, and to ask questions and share best practices in a more interactive format. Next year we hope to hold the MATUG meeting at a customer site. Stay tuned!





SunTUG Summit

Tampa 2018

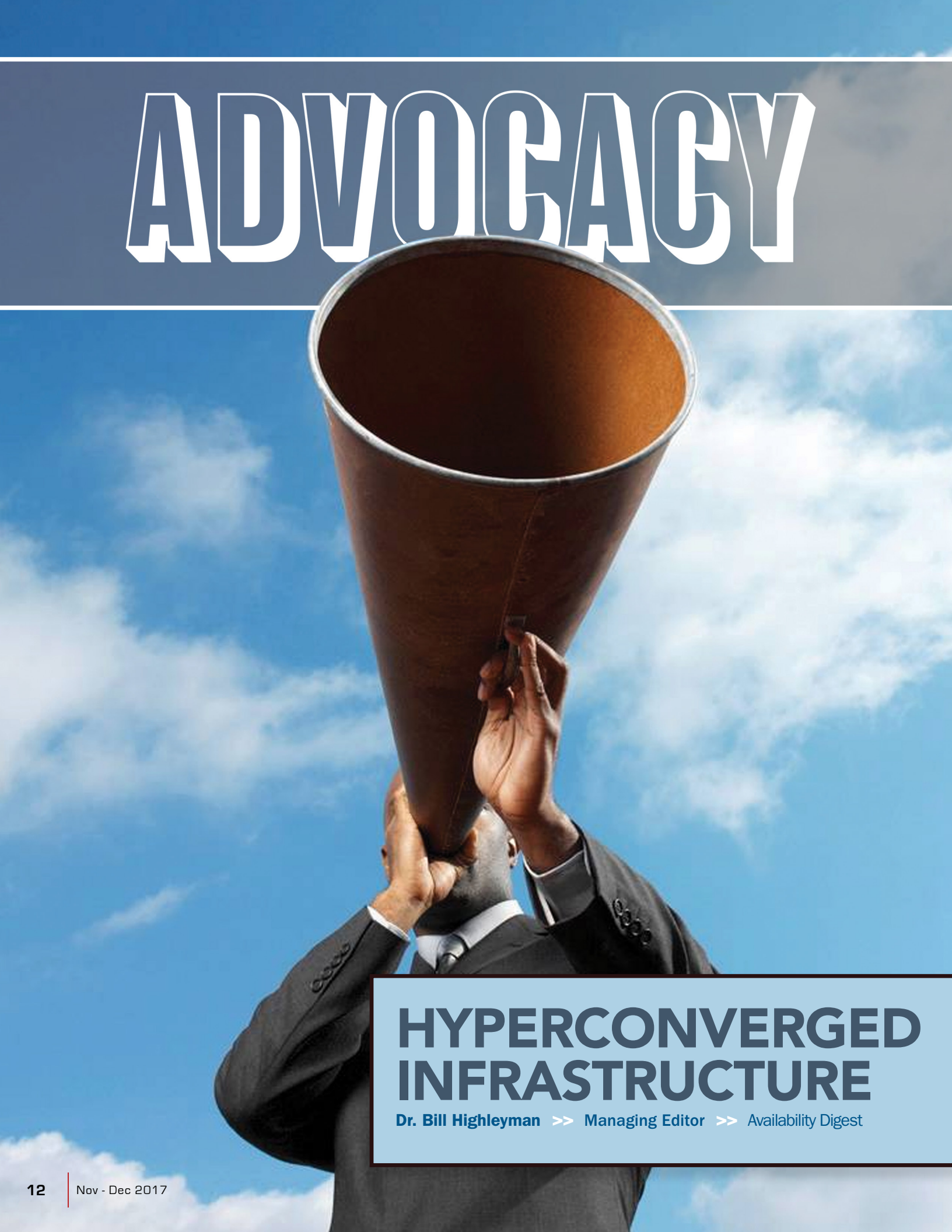
March 2nd, 2018
Conference
March 3rd, 2018
Annual Golf Tournament

With 2018 just around the corner, it is time to plan for SunTUG Summit 2018. The SunTUG Summit is scheduled for March 2nd, 2018 and the Annual Golf Tournament is scheduled for March 3rd, 2018. We will have a very interesting one-day agenda full of presentations from end-users, vendors and HPE. You will learn the latest about the Virtualized NonStop and get a product update from the vendors. We also have a special 5-to-7 evening for you to relax and do some networking with your peers.

The SunTUG Summit will be held at:
The Double Tree By Hilton
4500 W. Cypress Street
Tampa, FL 33607
Registration are open now and it is free thanks to the vendors whom are sponsoring the entire event.

Go to http://bit.ly/SunTUG for registration.
Please join us for a great day of HPE and Vendor updates and for a very fun golf tournament. Your team might win the golf tournament and there are plenty of prices to win again thanks to our generous vendors.

ADVOCACY



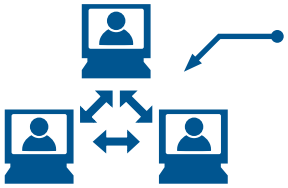
HYPERCONVERGED INFRASTRUCTURE

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

HPE recently released a Dummies book about hyperconvergence and the company's hyperconverged infrastructure solution. ***Hyperconverged Infrastructure for Dummies*** can be found at http://bit.ly/HyperInf.

The book highlights HPE's hyperconverged infrastructure product, SimpliVity. The technology combines compute, storage, networking, and data services into a single physical system. The software that enables hyperconvergence runs on standard x86 systems. Its distributed architecture lets you cluster multiple systems within and between sites that can be managed through a single interface.

To highlight hyperconvergence, we will reference in this article certain elements of the book - virtualization, the software-defined data center, and cloud computing.



Virtualization

Today, most services available in a data center run in a virtual environment. Applications run as virtual machines, many of which are hosted on a single physical server. Administrators consider the virtual environment for running new applications rather than building a new physical environment.

Virtualization helps organizations consolidate many of their servers to run on a common platform on top of a hypervisor, which allocates resources of the physical server to the virtual machines (VMs). Before virtualization, it was not uncommon to find a data center populated with hundreds of physical servers running at 15% capacity. As a result of virtualization, organizations enjoy a much higher return on their investments.

IT departments used to be required to maintain separate groups of people to manage separate hardware resources – servers, storage, networking. Furthermore, different workloads created resource challenges that pushed staff to develop infrastructure environments on a per-server basis. Virtual desktops, for instance, have vastly different resource usage patterns than server virtualization projects. Even worse, the devices often required separate management consoles.

Virtualization is heavily dependent upon storage. Many VMs are running on a single host and are accessing storage for their own needs. The database system has to jump all over the disk to service the combined load of the VMs. Continued consolidation of VMs contributes to random I/O workloads, each with its own pattern for reading and writing to storage. Highly random I/O streams adversely affect overall performance as VMs contend for disk resources.

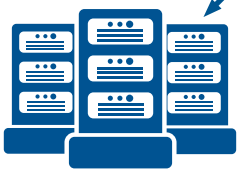
Virtual desktops are a particular problem. Sometimes they only need ten or twenty input/output operations per second (IOPS). However, when they are being brought up, IOPS can skyrocket due to the boot storms and login storms. This typically occurs at the beginning of the day.

The best outcome in any environment is to eliminate writes to disk before they ever happen. In a hyperconverged environment, many operations do not have to touch disk because of caching in RAM.

In the modern data center, disk capacity is not an issue. Capacity has become plentiful as vendors release bigger drives. However, performance has barely improved. With the addition of disaster recovery, the demand for WAN bandwidth has increased. Given this reality, the data center infrastructure needs to optimize for performance and latency, not capacity and throughput.

Inline deduplication provides the level of efficiency needed. It consists of only reading the data, applying deduplication, and writing the data as it is being transferred to another destination.

In a hyperconverged environment, backup and replication are applied directly to individual applications (or VMs).



The Software-Defined Data Center

A software-defined data center (SDDC) employs a high degree of virtualization. Storage, servers, and even WANs are virtualized. This eliminates resources that are traditionally locked within a single-purpose device and creates a shared-resource pool for applications. Instead, the SDDC uses commodity x86 hardware. Virtualization abstracts the hardware components of the data center and overlays them with a common software layer.

There are many advantages to an SDDC:

- **Predictability –** Services operate in a predictable way at a predictable cost.
- **Scalability –** The data center can't be a limiting factor when expansion becomes necessary.
- **Utilization –** Because a hyperconverged data center is built on common components, high utilization rates are easy to achieve.
- **Personnel –** A company can operate a data center with fewer personnel because there are no traditional resource islands.
- **Provisioning –** An SDDC offers agility and flexibility, which reduces provisioning times for new services.

Resource islands are inherently inefficient. The broader the IT environment, the easier it is to achieve operational economies of scale. Don't think about each individual resource as its own island. Instead, focus on the overall scale of all resources.

IT staff want to lower the risk in their operations. Applications must be highly available, and data must be safe. As more diverse hardware is installed, achieving these goals becomes more difficult. Companies can reduce these risks by adopting a hyperconverged infrastructure that can quickly and easily deploy new applications and services in response to business demands.

How the Cloud Is Changing IT

Major cloud service providers are changing expectations of how a data center should operate. The best architectural design elements from clouds have been brought to the hyperconverged world and packaged for affordability.

Major clouds are based on commodity hardware. It is the software in a hyperconverged environment that provides the services. This includes recovering from commodity hardware failures. Scalability is easily obtained by simply adding more commodity resources under the umbrella of the software. Thus, scalability can be achieved in small, bite-sized pieces.

Hyperconvergence brings cloud-type consumption to IT without compromising performance, reliability, or availability. Rather than making huge buys every few years, IT simply adds small building blocks of infrastructure to the data center as needed.

Converged Infrastructure

Convergence and SDDCs are aimed at reducing the infrastructure clutter, complexity, and cost of data centers. Converged infrastructure products combine the server and storage components in a single box. They provide a single localized resource pool, offering simplified management and faster time to deployment.

However, converged infrastructure has some limitations. Resource ratios, such as CPU:storage:network, are fixed, making them less flexible than some organizations require. The products cannot always be used by existing infrastructure.

Hyperconverged Infrastructure

Hyperconvergence delivers simplification and savings by consolidating all required functionality into a single infrastructure stack running on commodity x86 servers. Hyperconvergence brings many features that make legacy services obsolete in some IT environments:

- **Data protection via backup and replication**
- **Deduplication**
- **Wide-area network (WAN) optimization**
- **Solid-state drive arrays**
- **Public cloud gateways**

Advantages of a Hyperconverged Infrastructure

Hyperconvergence brings several advantages to an application:

- **Software Focus -** Since hyperconvergence is software-based, it provides the flexibility required to meet current and future business needs without having to rip and replace infrastructure components.
- **Centralized System Management –** Since all components are combined in a single shared resource pool, IT can manage resources across individual nodes as a single federated system.
- **Enhanced Agility –** All resources in all physical data centers reside under a single administrative umbrella. Therefore, workload migration is quite straightforward.
- **Scalability and Efficiency –** Hyperconvergence is a scalable building-block approach that allows IT to expand by adding units in small step sizes.
- **Cost-Effective Infrastructure –** Hyperconverged systems have a low cost of entry and a low cost of ownership.
- **Easy Automation –** All resources are combined under central management tools. IT doesn't have to worry about structures from different manufacturers since everything is encapsulated in one environment.
- **Focus on VMs –** Hyperconverged systems use VMs as the basic constructs of the environment. It is easy to move workloads around to different data centers.
- **Shared Resources –** Hyperconvergence enables an organization to deploy many kinds of applications in a single shared resource pool. Hyperconvergent systems include many kinds of storage – from flash to hard disks – in each appliance.
- **Data Protection –** Backup, recovery, and disaster recovery are built in.

How to Apply Hyperconvergence

Existing infrastructure does not have to be replaced in order for hyperconvergence to be of immediate value.

- **Consolidating servers and data centers –** Hyperconvergent products integrate seamlessly with the existing environment.
- **Modernizing technology –** The implementation of hyperconvergence is non-disruptive. New architectures can be phased in while old ones are phased out.
- **Deploying new tier-1 applications –** Deploy new workloads in a hyperconverged environment to gain its inherent operational benefits.

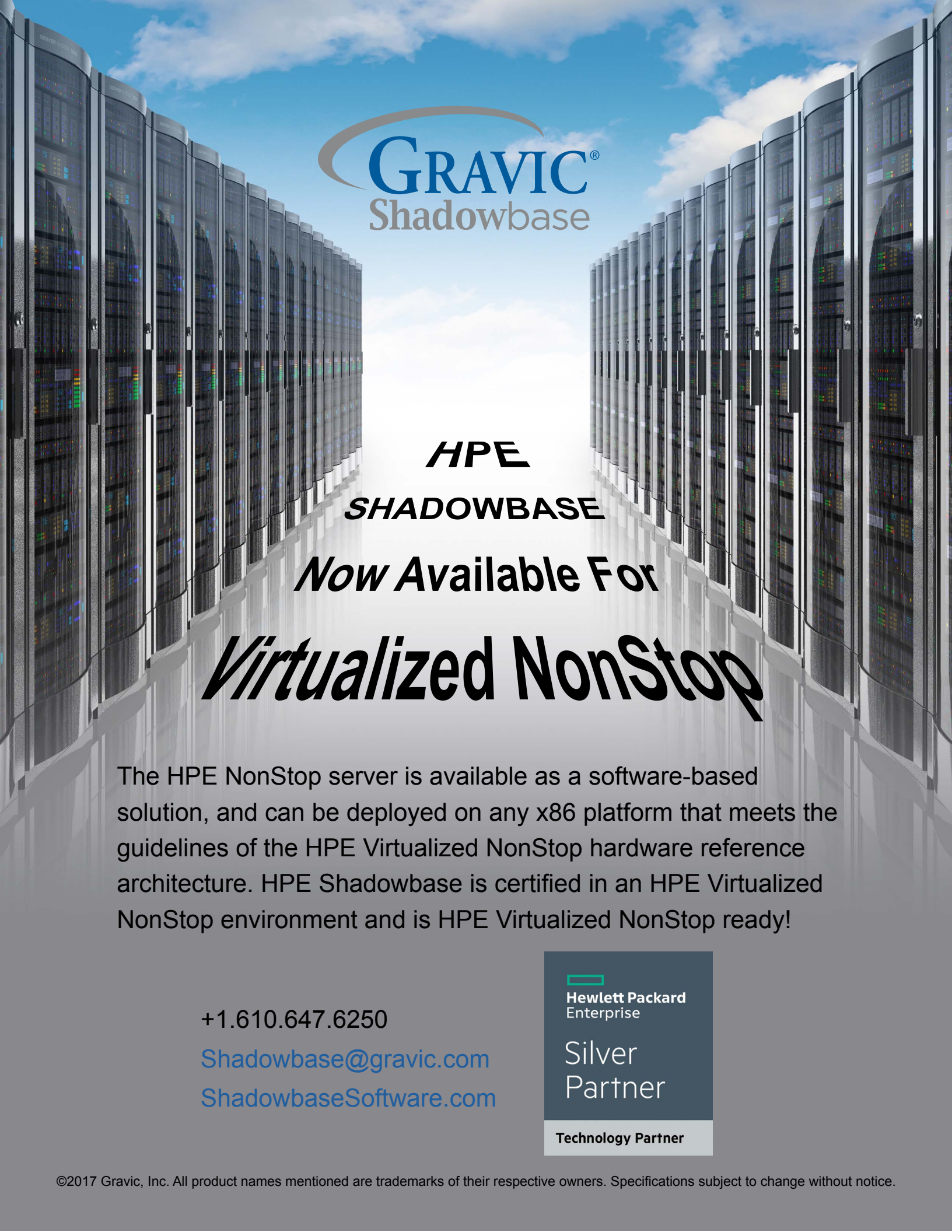
- **Deploying VDI –** Deploy virtual desktop infrastructure (VDI) in a hyperconverged infrastructure.
- **Managing sites remotely –** In a hyperconverged environment, the entire infrastructure from local to remote resources is controlled by a single management system.
- **Performing testing and development –** Create a test and development environment so that bad code isn't released into production. Hyperconvergence supports test and development with management tools that create logical separations between these functions and production.
- **Modernizing backup and implementing disaster recovery –** Hyperconvergence is a simple way to achieve backup and disaster recovery goals.

HPE SimpliVity

HPE's SimpliVity hyperconverged infrastructure delivers the performance, resiliency, and data protection that today's systems require. It provides a pay-as-you-go building block approach to IT infrastructure, workload-centric management, efficient optimization of capacity and performance, and built-in data protection and resiliency.

HPE SimpliVity delivers all infrastructure and data services for virtualized workloads on a pair of HPE Proliant servers. HPE SimpliVity provides a hyperconverged infrastructure with more agility, efficiency, and resiliency at less cost and complexity. For more information, go to **www.hpe.com/info/hc**.

Dr. Bill Highleyman brings years of experience to the design and implementation of mission-critical computer systems. As Chairman of Sombers Associates, he has been responsible for implementing dozens of real-time, mission-critical systems - Amtrak, Dow Jones, Federal Express, and others. He also serves as the Managing Editor of The Availability Digest (availabilitydigest.com). Dr. Highleyman is the holder of numerous U.S. patents and has published extensively on a variety of technical topics. He also ghostwrites for others and teaches a variety of onsite and online seminars. Find his books on Amazon. Contact him at billh@sombers.com.



The HPE NonStop server is available as a software-based solution, and can be deployed on any x86 platform that meets the guidelines of the HPE Virtualized NonStop hardware reference architecture. HPE Shadowbase is certified in an HPE Virtualized NonStop environment and is HPE Virtualized NonStop ready!

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Shadowbase@gravic.com
ShadowbaseSoftware.com

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Women in NonStop:

Wendy Bartlett Shares Her History with NonStop and Where She Sees It Heading in The Future

Mandi Nulph >> **Marketing Coordinator** >> NuWave Technologies

In our final Women in NonStop profile for the year, we talk with legendary HPE distinguished technologist Wendy Bartlett about her lengthy history with HPE and how she sees the future of NonStop moving forward.

Mandi Nulph: Thank you for taking time to chat with me! Please explain what your role and background in NonStop has been for people who may not be familiar.

Wendy Bartlett: I really have to go back to the beginning of Tandem, because my husband Joel Bartlett was one of the original employees who came from HP in late 1974. At that point, I was working as an application programmer for a social science research company. Then I began working as a programmer manager and I wound up going back to Stanford to get a Master's in computer science, mostly because I was getting branded as an application programmer and I really wanted to go to work developing system software for one of the manufacturers.

When I finished my Masters, I was supposed to come to work for Tandem, except they didn't sell anything that quarter, so I went to work for Four Phase instead. In 1978, I joined Tandem as the second person on the QA team and started testing the new Fortran compiler, which was kind of interesting and included running massive decks of punch-card based tests from NIST. The developer of the compiler had a minor heart attack the week I got there, and so I took over the compiler while he was on the mend. I then moved to OS QA and into the OS group probably a year and a half after that. I am fundamentally a system software person.

I got a good look at NonStop system operations pretty early on. As the rookie in the OS group, I was responsible for social system support, and I soon became the sole OS maintainer because everyone else in the OS group was off working on the NonStop2, Pathway, or TMF. I got a really broad NonStop education because, in addition to the OS and utilities, I was maintaining the disk process, terminal process and file system. It is one of the great opportunities that you can get when you're in a relatively small company for hands on exposure. Next, I did the operating system support for the TXP. I then managed the OS group for about a year and a half, which got so big that Cindy Sidaris and I wound up splitting it. I was still doing quite a bit of technical design work, and after a lot of thought decided I wanted to go back to being technical. I talked it over with my boss and stepped back into the purely technical side.

Wendy Bartlett - Distinquished Technologist

At that time in 1985-86, we were beginning to run into some system limits problems, in particular, the limit of 256 processes per CPU. We had externalized it in 8 bit fields through all the APIs, so Rich Larson and I were trying to figure out how we could raise the limit without breaking the entire world. Our research turned into the Exceed project, which shipped as the initial D-series OS releases. For me, that wound up being a 7-year project. After that, I continued working on limits for a couple of years, and then moved more directly into the NonStop availability side of the house leading the NonStop Availability Initiative. In late 2005, I moved into the security architect role, which is where I was for the rest of my career at HPE. I didn't stop caring about availability and system issues, but security became my primary focus.

Mandi: What did you think you were going to do when you were younger that maybe you did or didn't end up doing as you got into your career?

Wendy: As a kid, I was really good at math and I went to a really good public school. They decided to do an experiment and picked two of us out of my 5th grade class and started teaching us algebra, so I learned algebra early. When I was in high school I thought that I was probably going to be either a math major or do technical theatre because I grew up backstage and I had been doing tech theater as a volunteer. My mother was the one who was actually saying, "You should be working with computers."

I went off to Stanford thinking I was going to be a math major, but ran into a wall with freshman calculus. I think part of the problem is that I am a night owl and trying to learn new math concepts at 8:00 a.m. didn't work too well. I started working part-time for a group of guys doing a statistical package called SPSS. I was helping them write the manual for the package and they encouraged me to start taking computer courses, which I did. Unfortunately, at that point Stanford didn't have an undergraduate computer science degree, so those of us that were interested had to find homes in other departments. It became clear that I wasn't going to make it as a math major, and I really did want to make sure that I got out of school with a B.S. degree rather than a B.A., partly because I watched my mother feed two of us with a Bachelor of Fine Arts in drama, which limited her job options. Joel was not doing that well in math, either, though he hit the wall much further along than I did. We looked around and discovered that we could get a Bachelor of Science in statistics, so we started in as statistics majors junior year, which worked well because most of the electives were actually computer science classes.

I was not a great student. I really just wanted to get out and work, and was doing computer related jobs the last two years of college and was a summer intern at IBM after my junior year. I just assumed that I would go to work for IBM or HP or Control Data. However, by the time I graduated there was a recession and none of them were hiring. I found a job at a social science research company, American Institute of Research, which was analyzing huge data sets from two-day tests of 400,000 high school students that they did in 1960 and follow-up questionnaires. They were starting to analyze the results to try and figure out what kinds of skills led people to work in different kinds of jobs. They were building a handbook for guidance counselors that mapped this out by career. I worked on that for about three years, then I decided that I needed to go back and get my Master's in computer science, and then went to work at Four Phase. I came over to Tandem as soon as they had a suitable job for me, which is why I started in QA (which was a very valuable experience).

I did have a lot of encouragement for being interested in a STEM type career, which most girls and women didn't have at the time.

Mandi: Did you have any mentors or role models to help you?

Wendy: Yeah, quite a few. Joel was one. He's just an outstanding architect and system thinker, and I actually wound up being an apprentice to him for a while when I moved into the OS group. That turned out to be a little bit too much family closeness, but we survived it!

Somebody who really helped set me on a good path was my second manager when I was doing the application development work. He was a bit gruff in some ways, and a bit sexist, but still very supportive. He just naturally wrote structured code, and so I really learned how to write good code from him.

I also had a couple of male professors at Stanford, one as an undergrad and one as a grad student, who offered me a lot of encouragement. I didn't have many STEM female role models, but when I went back for my Master's there was another woman in some of my classes who was a Ph.D. student who was both technically strong and not shy about participating in discussions, and was a great model for how to be a successful woman in the field.

Mandi: What has been your experience working as a woman in NonStop or in technology in general?

Wendy: I think I had it better than most women in tech, especially watching what is going on right now. Tandem always had strong senior women from early on, though by and large the more senior women wound up going into management rather than staying purely technical. Andrea Borr and I were the main exceptions, though I did manage the OS group for a few years. I think we pretty consistently ran 15-20% female, and it was a place full of strong personalities, particularly in the first 15 years or so. You really just had to learn to hold your own and go head-to-head constructively with people.

Being a woman caused the most problems when I started being a tech lead, particularly when I was leading the Exceed project. This is an oversimplification, but I didn't and usually still don't lead in the traditional masculine style. I am more collaborative and team-oriented, and particularly in the earlier days was quieter and less visibly out front. It took me longer to establish myself as a leader in some people's eyes because I had been brought up to be ladylike and not push too hard. It was and still is hard for women to get

up there and lead in the kind of forward style that usually is associated with male leadership. For me, Tandem was a relatively good environment for being in that role. There was a certain amount of passive aggressiveness, but it was a relatively civil place to have technical disagreements and much of the behavior you'd see were more passive aggressive approach than out-and-out warfare.

Mandi: A lot of women that I have talked to when I've done these interviews in the past listed you as a great influencer and a great role model in the NonStop space and technology.

Wendy: Sometimes you don't even recognize that you're being a role model. You get more aware of it over time. I had someone come up to me recently who's quite senior herself and say, "I always wanted to be you when I grew up." It's easy to miss the influence that you can have on the people that you don't work with as closely. The tech leads on the India part of the security team were female the entire time that I was leading NonStop security, which is over 10 years, so the kind of mentoring relationship is a little more obvious in that kind of situation.

Mandi: Do you feel it's important for more women to join the NonStop community?

Wendy: Yes, I think it would be good to have more women in the community, for the same kinds of reasons that it's important to have women fully participating in any type of technical community.

Mandi: Do you have any advice for young people, men or women, who may be thinking about careers in technology and why they should consider getting into the NonStop space?

Wendy: It's an interesting community to belong to. There's so many bright people in the NonStop community and we all want the same things. There are jokes about the NonStop DNA, but it's real. People want to build products that are going to work, work well, stay up, scale, and be the foundation for people doing useful things in the world. The community is generally very supportive. In addition to the people being bright, the architecture has withstood the test of time, and it's a bunch of people that I've been very happy to work with. Many of our life-long friends are out of the Tandem community. People really bond and support each other, and I don't think that's always so much the case in other environments.

Mandi: So now that you have retired from HPE what are you up to?

Wendy: Short term, I have been up to getting more sleep and trying to catch up on stuff at home. Now I get to see Joel when we're both awake on weekdays. I also have more time to work on my singing outside of chorus rehearsals. I am keeping my hand in the community in the short term by helping Connect with TBC and running the program committee for the non-HPE breakout sessions, and I expect to do some part-time consulting. I don't want another full-time job, but I do want to stay involved in the NonStop community.

Mandi: Any final thoughts?

Wendy: It's good to see a lot more being done recently to get young women interested in the tech field and make it more like a place they will want to be. It seems to me that a good chunk of the problem for the last 20 years or so is that it looks too much like a man cave and I would love to see that change. I think that the NonStop world is a relatively good place to be female and technical and I hope that it stays that way.

Mandi Nulph is NuWave's marketing coordinator. NuWave specializes in HPE NonStop middleware, including their newest product, LightWave Client™, which allows applications running on NonStop servers to securely access REST Web services on any platform. With a degree in Mass Communication and Journalism, she boasts 10 years of professional experience writing and editing for a variety of publications, as well as an extensive career in marketing. She volunteers to help interview companies making innovations in the NonStop space for a variety of trade publications.

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SWAPPING REPLICATION ENGINES WITH ZERO DOWNTIME

Dr. Bruce Holenstein, President and CEO, Gravic, Inc.
Paul J. Holenstein, Executive Vice President, Gravic, Inc.
Dr. Bill Highleyman, Managing Editor, Availability Digest

A mission-critical application often runs in redundant systems to ensure that it is always available to its users. Such a system may be configured as an active/passive pair, in which one system runs the production workload while the other system is standing by, ready to take over application processing in the event that the production system fails. Alternatively, the system can be configured as an active/active architecture, in which both systems are processing transactions. A data replication engine is used to keep the databases of the two systems synchronized.

Sometimes, companies may decide to change data replication engines or to upgrade to a new version of the existing data replication engine. With mission-critical applications, it is necessary to do so without taking the applications down – a zero downtime migration (ZDM). Furthermore, it is imperative that a backup copy of the database is always available, ready to take over if the production database fails. The backup database must be kept synchronized with the production database while the data replication engine is being migrated.

In this article, we describe how a data replication engine can be changed without taking down either applications or the backup database.

Redundant Systems

As shown in Figure 1, changes to the active database in an active/passive configuration must be replicated to the database of the passive system so that the two systems are always in synchronism. These changes are replicated with a unidirectional data replication engine.

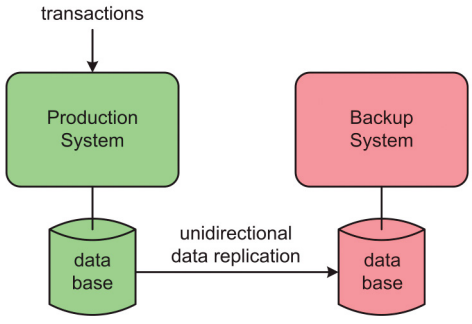


Figure 1: An Active/Passive Redundant System

In an active/active configuration, changes made to either database are replicated to the other database via bidirectional replication, as shown in Figure 2.

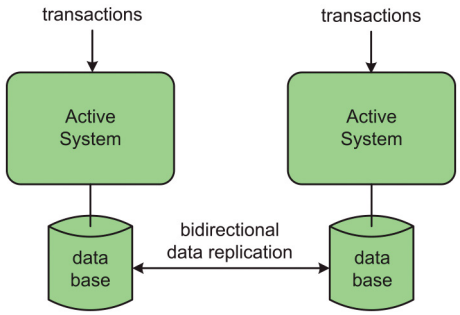


Figure 2: An Active/Active Redundant System

Changing the Replication Engine

There are cases where the replication engine may need to be changed or upgraded. For instance, the need may arise to migrate from RDF supporting an active/passive system to the HPE Shadowbase product suite to upgrade to an active/active system. Or it may be necessary to upgrade from one version of the current replication engine to a more recent version.

If the application is critical to the users of the system, it is important to migrate from one data replication engine to another with no application downtime – a zero downtime migration.

Interoperating Versions

In NonStop systems, changes to the source database are appended to an Audit Trail set of files by the NonStop Transaction Management Facility (TMF) for audited databases. Figure 3 shows version 6100 (v6100) of a data replication engine reading the changes from the source database's Audit Trail and sending them to the target system to be applied to the target database. In this way, the target database is kept synchronized with the source database.

The concept is the same for other transactional databases. For example, an Oracle database provides a REDO log that contains all changes to the source database and can be used as a source of database changes for a replication engine.

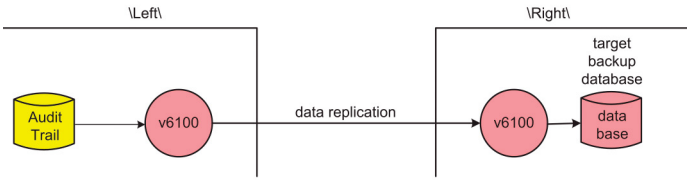


Figure 3: Replicating Data from a Source Database to a Target Database

Figure 4 shows what may appear to be a straightforward solution to this migration. There are two versions of a data replication engine – version v6100 and version v6400. Version v6100 is the current version of the replication engine. The objective is to migrate to version v6400.

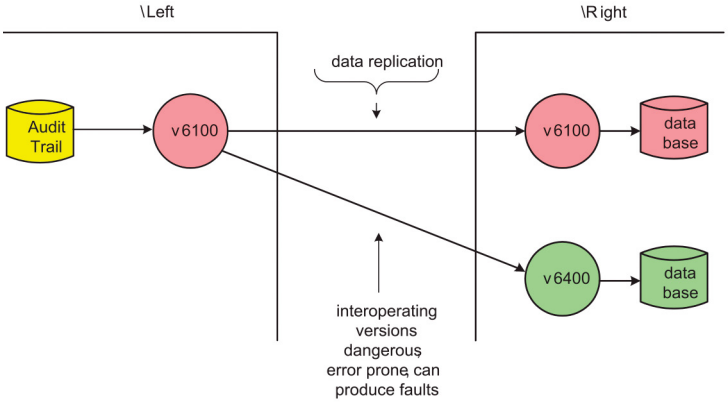


Figure 4: Data Replication Engine Migration by Intermixing Versions

The migration can be accomplished by installing version v6400 on the target system and beginning data replication from the original version v6100 on the source system (System \Left) to the new version v6400 on the target system (System \Right). As shown in Figure 5, when the database has been migrated from version v6100 to version v6400 database on the target system, version v6400 can be installed on the source system and version v6400 on the source system can then take over from version v6100 and continue replication. As shown in Figure 6, version v6100 of the data replication engine now can be retired. Replication has been migrated to version v6400 without having to take down the application.

However, this migration requires either different data replication engines or different versions of the same replication engine to interoperate with each other, as shown in Figure 4. Note, as described, this sequence is

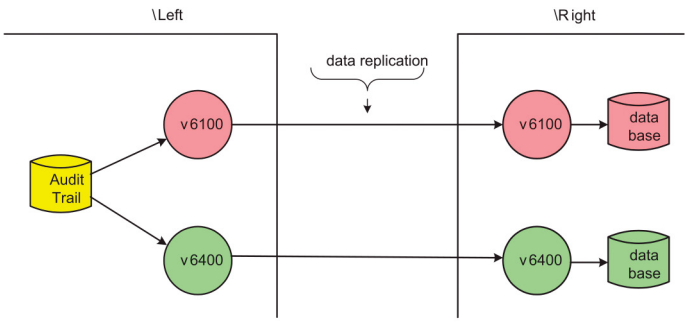


Figure 5: v6400 Takes Over Replication

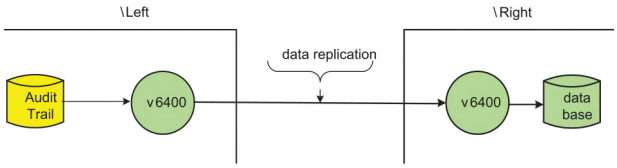


Figure 6: v6100 Is Retired

fraught with peril as the various versions have to be installed, tested, activated, and then interoperate for various periods of time during the process.

For instance, with HPE Shadowbase software, there are dozens of older versions. It is impractical to certify each older version of HPE Shadowbase software interoperating with each newer version and vice versa. The coding changes required can be quite extensive to revise the message structures upward and downward as well as the effort to fully exercise and test each such combination. A similar situation exists if the data replication products are from different vendors. It is a risky business having them interoperate at all. Additionally, the relative usage of each combination would be for a very small population of the installed base.

Therefore, the interoperation of different data replication engines or their versions is a dangerous procedure. It is not known how well they will work together or if they even will. As such, it is likely that this configuration will be error-prone and will produce replication faults.

Rather, a method is needed to install and configure a new parallel replication environment alongside the previous/existing replication environment so that the new environment can be tested and certified while the existing environment continues to run. Once trusted, the new environment can slowly "take over" the replication load from the previous environment until all such traffic has been moved to the new environment. At that time, the previous environment can be shut down and decommissioned. This is the essence of the zero downtime migration process.

Version Independence

An alternative migration that does not require version interoperation is reflected in the following figures. This example assumes an application with 1,000 tables is initially being replicated by version v6100 of the data replication engine.

As shown in Figure 7, a test environment for version v6400 is established before migrating to version v6400. Of course, the initial checkout of the new replication engine (version v6400) should be undertaken in a nonproduction test environment. ahead of time. The following sequence assumes that the initial checkout has already been completed and describes how to replace the previous version v6100 in the production environment.

A tentative target database (PROOF) is created, and a representative sample of 20 tables are loaded from the production database into PROOF. The tables can be loaded offline via a SQL tool or online via the HPE Shadowbase Online Loader (SOLV), which is an online loading utility for loading source files/table into target files/tables while the application continues to run. SOLV thereby allows both the source and the target databases to be online and active while the source data is copied into the target environment.

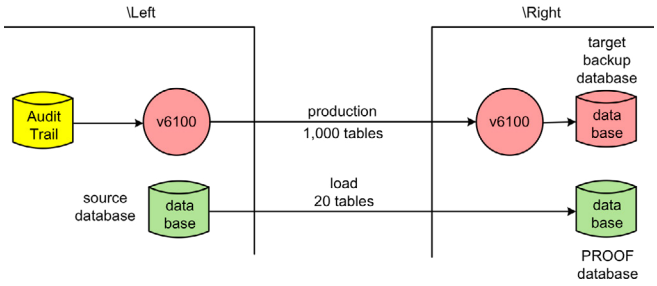


Figure 7: A PROOF Temporary Target Database with 20 Tables

As shown in Figure 8, data is replicated by the new data replication engine (v6400) to the 20 tables in PROOF and the updated data is compared to the target database. A database comparison tool such as the HPE Shadowbase Compare product can be used to verify the databases; it examines and compares the databases online while they are being updated.

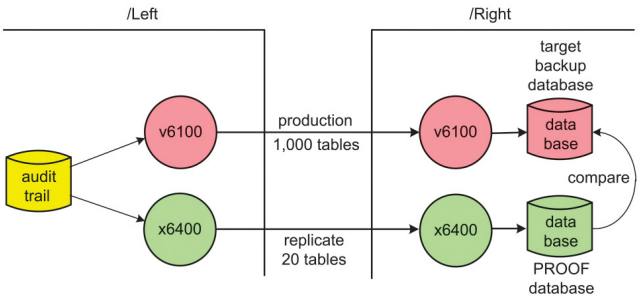


Figure 8: Test the Replicated Temporary Target Database

The PROOF replication is run for a period of time to ensure that the new version v6400 of the replication engine is operating properly in this quasi-production environment. If the results do not match, the discrepancies must be resolved and the test rerun. If the replication test is successful, if desired it can be expanded to more tables, for example 80, as shown in Figure 9.

If the 80-table replication test works properly for a period of time, then the new version v6400 of the data replication engine is now validated to be working properly – it is a trusted and known-working environment. If disk space is at a premium, the successfully compared tables in the PROOF database can replace the original target database tables, and they can be removed from the version v6100 configuration.

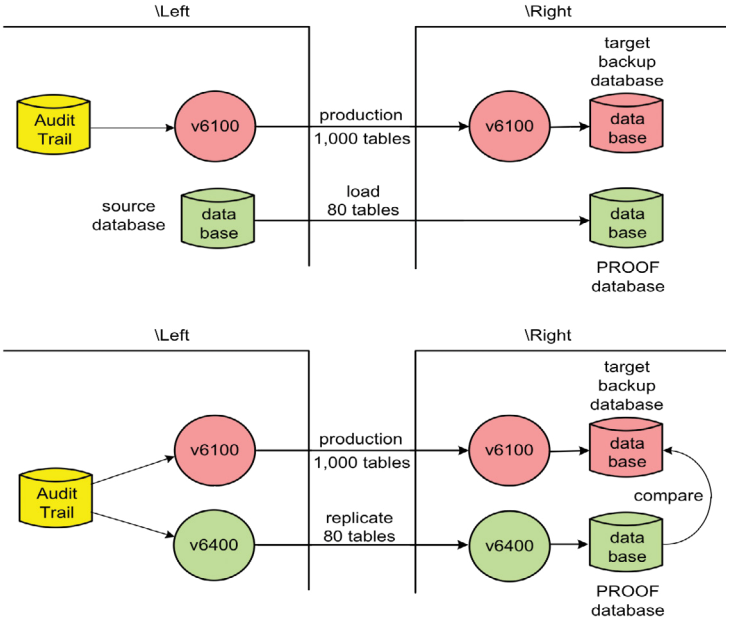


Figure 9: Replicate 80 Tables to PROOF and Compare

This step allows the data to be moved over to the new environment a few tables at a time, which can reduce the risk of a big-bang migration. The HPE Shadowbase product allows such a migration of the database objects from one replication configuration to another over time.

As shown in Figure 10, the test can then be expanded to replicate all 1,000 tables. If it is successful, the PROOF database can replace the production database, the data replication engine version v6400 can replace version v6100, and version v6100 can be retired, as shown in Figure 11. The 1,000 tables now are being replicated to the target system with the new data replication engine version v6400.

During the entire migration, the target database was available as a backup to the production database. At any

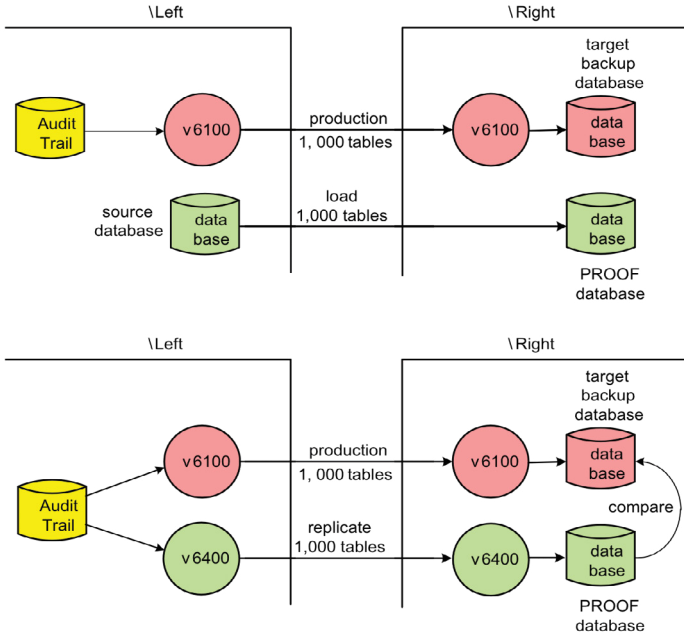


Figure 10: Replicate 1,000 Tables to PROOF and Compare

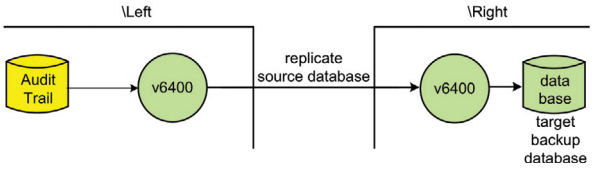


Figure 11: Configure New Version of Replication Engine

point, if an error with the new environment is identified, the PROOF testing can be stopped without affecting the production replication environment. The replication engine was migrated from version v6100 to version v6400 with no application downtime and with continuous availability of the target database – a zero downtime migration.

If disk space is limited, or if the environment is running as an active/active architecture, then as each PROOF test completes, the tables that were just validated should be removed from the old (v6100) replication environment and added to the new (v6400) replication environment using the production version of the target database. This step will allow for a phased cutover from the old environment to the new one over a period of time dictated by the speed in which the system operations team can complete the PROOF tests, rather than via a classic all-at-once big-bang scenario.

Summary

Sometimes it is necessary to change or update a data replication engine. Properly undertaken, such a migration will impose no downtime on either applications or users. We call this a zero downtime migration.

The results are greatly reduced risks for error as well as staff stress levels during the migration process. There is no big-bang cutover. The migration can take place at normal working times rather than late at night or on weekends, and it can even occur over an extended period of time. Furthermore, the backup database is always available and is fully synchronized with the production database the entire time. Thus, application availability is ensured during the migration process.

This migration technique is similar to the HPE Shadowbase Zero Downtime Migration (ZDM) technique that customers have been using for decades to upgrade their applications, database schema formats, file and table locations (or indices), operating systems, or perform a hardware refresh. For additional information, please see the white paper: **http://shadowbasesoftware.com/white-papers/2015/07/using-shadowbase-to-eliminate-planned-downtime-via-zero-downtime-migrations-white-paper/.**

Dr. Bruce D. Holenstein, President and CEO. Dr. Holenstein leads all aspects of Gravic, Inc. as President and CEO. He started company operations with his brother, Paul, in 1980, and is presently leading the company through the changes needed to accommodate significant future growth. His technical fields of expertise include algorithms, mathematical modeling, availability architectures, data replication, pattern recognition systems, process control and turnkey software development. Dr. Holenstein is a well-known author of articles and books on high availability systems. He received his BSEE from Bucknell University and his Ph.D. in Astronomy and Astrophysics from the University of Pennsylvania.

Paul J. Holenstein is Executive Vice President, Gravic, Inc. He has direct responsibility for the Gravic, Inc. Shadowbase Products Group and is a Senior Fellow at Gravic Labs, the company's intellectual property group. He has previously held various positions in technology consulting companies, from software engineer through technical management to business development, beginning his career as a Tandem (HPE NonStop) developer in 1980. His technical areas of expertise include high availability designs and architectures, data replication technologies, heterogeneous application and data integration, and communications and performance analysis. Mr. Holenstein holds many patents in the field of data replication and synchronization, writes extensively on high and continuous availability topics, and co-authored Breaking the Availability Barrier, a three-volume book series. He received his BSCE from Bucknell University, a MSCS from Villanova University, and is an HPE Master Accredited Systems Engineer (MASE). To contact the author, please email: SBProductManagement@gravic.com . Hewlett Packard Enterprise directly sells and supports HPE Shadowbase Solutions (www.ShadowbaseSoftware.com); please contact your local HPE account team.

Dr. Bill Highleyman brings years of experience to the design and implementation of mission-critical computer systems. As Chairman of Sombers Associates, he has been responsible for implementing dozens of real-time, mission-critical systems - Amtrak, Dow Jones, Federal Express, and others. He also serves as the Managing Editor of The Availability Digest (availabilitydigest.com). Dr. Highleyman is the holder of numerous U.S. patents and has published extensively on a variety of technical topics. He also ghostwrites for others and teaches a variety of onsite and online seminars. Find his books on Amazon. Contact him at billh@sombers.com.

Proximus moves to NonStop X,

stays far ahead of fierce telco competitors

Vikas Kapoor >> Marketing Manager >> Mission Critical Solutions >> HPE Servers

Belgium's largest telecom company, Proximus makes the move to NonStop X and achieves 100% uptime for its billing application and boosts performance for surging workloads

Proximus is the number one telecom player in Belgium—and they want to keep it that way. Competition is fierce, but Proximus has a unique advantage, offering customers fixed line, mobile, internet, and TV all under one leading brand. This "quadruple play" has been hugely successful, but it brought new challenges to the company's billing system.

The continuous rise of customers´ expectations applies across all industries. As consumers, we want information and we want it now. For Proximus customers, this means that they expect a single, consolidated invoice each month, yet they also want to see how their charges break down by service. In addition, they want the ability to check their account and usage information anytime, anywhere—whether online from home or on their mobile devices. These customer demands require a converged billing system based on real-time call data records (CDRs), which are generated for all user activity whether it's sending a text message, streaming a video, or calling a friend.

As interactions between users continue to explode, the growth in CDRs put a strain in Proximus' infrastructure. For nearly two decades, Proximus has relied on Hewlett Packard Enterprise and HPE NonStop systems to run its custom-developed billing application. However, the surge in CDRs resulting from converged billing and overall business growth pushed the previous-generation NonStop platform to the limits of its capacity, requiring an upgrade. Bernard Dellicour, infrastructure manager at Proximus, explains: "Our billing application is highly customized and built on NonStop SQL. Moreover, it has been providing us with 100% uptime, so there was never a question about not continuing with NonStop."

Proximus migrated from its previous Intel® Itanium®-based NonStop platform to the latest HPE Integrity NonStop X system based on the Intel® Xeon® x86 processor. "We chose to upgrade to HPE NonStop X because it made more sense to have a platform for the future that we can grow on and is fully long term supported by HPE," Mr. Dellicour explains. "The x86 platform also provides greater capabilities than the Itanium, and was expected to be significantly faster. Software licensing costs on the x86 platform are also lower than Itanium. So it was smarter to go with NonStop X."

Proximus engaged HPE Pointnext to assist with the system and data migration project, ensuring a successful outcome. The Pointnext team worked directly with Mr. Dellicour and his team to migrate each of five NonStop X systems, one per weekend, to avoid disruption of business services. Mr. Dellicour remarks,

proximus

"With NonStop X based on the Intel® Xeon® processor, we will be able to continue growing and expanding our billing application with no concern about performance, capacity, or stability."

Bernard Dellicour, Infrastructure Manager, Proximus

"The people from HPE Pointnext were onsite with us to manage the migration and handle any issues that came up. They really know what they're talking about, so it was a big help for the project. They provided good communication and collaboration with our team. Working with HPE Pointnext, I had no doubt that the migration would be a success."

Higher performance to improve customer satisfaction

Since moving to NonStop X, Proximus can now process CDRs two times faster than on its previous platform. And the billing application got a huge performance boost with online transactions now executing 1.5 times faster. This is central to improving customer satisfaction, as well as meeting local regulatory requirements. For example, any time a customer roams outside the country and usage charges reach a certain amount, Proximus is required to immediately notify the customer. With the speed and capacity of NonStop X, the company's online systems can cover CDR growth and upload CDRs in real time to continue supporting this notification.

The converged billing application also affects other aspects of the business. More than 40 systems are integrated with NonStop X to extract CDR and billing data. One example is customer relationship management (CRM), which is critical to understanding customer interests and concerns. By ensuring high performance for billing, Proximus can run CRM and other business applications faster to improve responsiveness and service for its customers, driving greater retention and uncovering opportunities to offer additional services.

Enables ongoing business growth

Proximus continues to expand its market reach and develop new capabilities and products to enhance service offerings for its customers. One on-going project is deploying high-speed fiber connections to the households the company serves. This will require additional development in the billing application to manage services on the fiber network. Mr. Dellicour is confident NonStop X will handle the additional workload.

He concludes "With NonStop X we will be able to continue growing and expanding our billing application with no concern about performance, capacity or stability." And this will only help Proximus keep its #1 place in the Belgian telecommunications market.

Proximus achieves 100% uptime for mission-critical billing application

Our Employees are as Important as our Customers

When reflecting on XYPRO's longevity and success (we recently welcomed our 100th employee and have celebrated many years of consistent gains), we often assess whether we're continuing to do the things that got us here, even as we grow. Why do our customers continue to buy from us? What differentiates us from our competition? Do we have our finger on the pulse of the industry? Are we innovating? Maybe they like our sales team, or our professional services rep that helped them with the installation. Maybe they had an excellent experience with our customer support team. Maybe it's some or all of these things.

At XYPRO, we cultivate relationships with our clients for years. Even decades. In addition to investing in our software, they're also investing in us. People buy from people and we like being the ones you want to work with. The same is true for the people that work here.

What does it take to become a company that workers want to be part of? Inc. magazine says it's more than good pay and good perks – it's also about having a clear purpose, a sense of humor, and leadership that makes the two work together.

We recognize that a willingness to try new things in both technology and mindful corporate culture engages employees and attracts the type of open minded, hard-working, forward thinking employees we want on our team. XYPRO endeavors to let our **core values** guide our decisions and help motivate. Many XYPRO programs are specifically put in place to achieve an environment in which the customer experience is paramount, employees feel valued and want to stay and contribute their best, long term.

XYPRO is one of the honorees of **Inc. Magazine's Best Places to Work 2017**. As part of a prominent inc.com feature, the list is the result of a wide-ranging and comprehensive measurement of private American companies who have created exceptional workplaces through vibrant cultures, deep employee engagement, and stellar benefits. Out of thousands of applicants, Inc. singled out just over 200 winning companies and we were one of those companies

At XYPRO, we're not here to mark the time between 8 and 5. Our customers deserve our best effort, as coworkers we deserve each other's best efforts and in a company of our size, everyone plays a part in the success. XYPRO Leadership is responsible for the example we set and the appreciation we show our team & our customers. We take that responsibility seriously. It's always about more than just business.

Going beyond the sale

It is often said "people do business with people they like" but more importantly, people do business with people they trust. "Like" is a byproduct of that trust.

Halloween 2017

At XYPRO we understand that what we do today, matters today. It also matters tomorrow, next month, next year and even next decade. Like our customers, XYPRO is in business for the long haul and in a niche, global market with incremental, yet consistent growth, our honesty, integrity, and trust are just as important to our customers as are quality, innovation and our best of breed products and services.

Whenever a decision is made to purchase a XYPRO product or service, whether for the first time or for the 21st time, the people our customers are most directly engaged with are our Sales Team. For this reason we strive to make sure our sales team are the right fit for the role and don't just produce the right results.

Our sales team is made up of sales professionals with extensive backgrounds in enterprise level sales and service, NonStop security fundamentals and an underlying compassion for the needs of our customers. "Sales" and "professionalism" aren't always combined in the same sentence or in context with each other, but the XYPRO sales team is different.

Our sales and sales-support team is spread across the globe; USA, Canada, Australia, Japan, Germany, Mexico, the UK and Argentina. They are as close to you, our customers, as they can be and are driven to serve.

It takes a unique individual to be a XYPRO salesperson. You will most often see our sales team at your place of work, in your home city or at a trade event in another city. There can be a sense of glamour associated with the life of a traveling salesperson and to some level, that may be true yet the reality is that your place of work, your home city or the city you are in for a trade event is rarely, if ever, their place of work or their home city, and they do this day in and day out. They understand this is their profession and like all other professions, they have a purpose and are needed. They too understand that they are an integral part to XYPRO's success and that the corporate culture that XYPRO has fostered over the last 35 years is also the culture they enjoy and are part of, regardless of where they are in the world. Our primary intention is to serve our customers in the best way possible and in doing so, that culture also serves to create one of the best working environments anyone could hope for.

As one of our customers put it

"SecurityOne is a game changer"

Innovating for the future

"The only thing constant is change"

The allure of innovation is what drives a lot of people. Everyone wants to be part of the next big thing.

However, change for the sake of change doesn't always equal progress. Innovation in most cases is a diminutive experience requiring multiple iterations and a lot of time and patience to execute an idea to move it forward, but there is no room for complacency. To be successful, one must find the balance between innovating and delivering genuine value to the customer. This is ultimately what technology companies are after.

At XYPRO, we are not afraid of change. Leveraging the technology we have built over the last three decades has allowed us to identify new opportunities to innovate while staying true to our roots. We felt the NonStop should benefit from the modern technology available to other platforms. This strategy has allowed our customers to take advantage of the existing XYGATE product suite as well as benefit from the exciting new technologies we are investing in: Security Intelligence, machine learning, blockchain, modernization and much more.

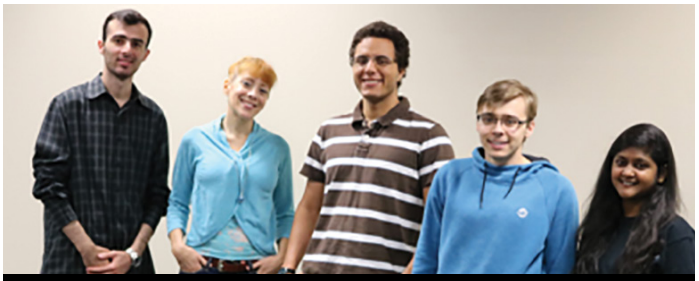
One of our largest projects to date is XYGATE SecurityOne (XS1), which is a security analytics solution. Data is what drives everything; from business decisions to where to eat lunch. Security is no different. We realized that the existing XYGATE product suite supplies a gold mine of security data that can be used for contemporary purposes. With XS1, we took a nontraditional approach toward development and it has paid off. Embracing Agile Development methodologies allowed our teams to quickly and continuously deliver deployable product. Combine that with a web enablement framework, modern programming languages and some of the newest technology available and we're cooking with gas! Innovating in this manner also allowed us to attract top tier talent to work on XS1 ensuring high caliber execution. As part of the process, we brought in seasoned User Experience Developers, Machine Learning Scientists and other senior development resources. This all culminated into the most

modern and easy to use security solution for the HPE NonStop server...and beyond.

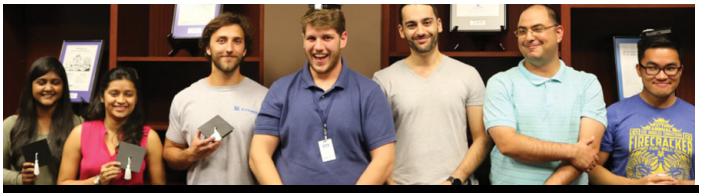
Our product development and innovation efforts don't stop there. We unflinchingly look forward to identify where our research and development investments should be made to best serve our customers. This commitment has led us to new areas that will provide even greater value and security to NonStop customers and integrating the NonStop with the rest of the enterprise.

Inspiring the next generation of NonStop users

In the continuing effort to keep the HPE NonStop server modern and "young", XYPRO has a proven effective internship program where students from local universities get to participate and grow their skills in different areas of a software development company. Being an intern at XYPRO means participating in real projects, building sophisticated security solutions for mission critical operations and solving real problems for real customers. The year-round internship program hosts between 10 and 15 interns at any given point in time.



Some of our 2017 Interns



Xypro 2017 Spring Graduates

Through this ongoing internal education and mentorship program as well as external education opportunities, our young engineers learn the principles of information security, the NonStop server and how it fits into today's global economy.

XYPRO's talent recruitment program means some interns stay on with us as part-time or full-time employees and genuinely contribute with new ideas and modern approaches to research projects, modernization of legacy technology and expansion of our current suite of security solutions. Since the establishment of the internship program in 2011, XYPRO has converted over a dozen interns to employees in the areas of IT, systems administration, customer support, software development, QA, Business Analysis, and Project Management.

Those that end up moving on to other ventures, do so with our best wishes, an understanding of information security, NonStop concepts and principles and a genuine appreciation for the unique capabilities of the platform.
https://www.xypro.com/xypro-technology/time-xypro-got-today/

In this issue of the Connection Magazine highlighting "The Best of NonStop", we're proud to discuss our clients and our team members. When one describes their ideal professional situation, it is a privilege to work for and with those we can honestly say are simply the best.

There are some really exciting times up ahead - so stay tuned!

- XYPRO Technology

Neutralizing data breaches with Micro Focus SST and HPE NonStop

Sheryl Wharff >> Global Product Marketing >> Micro Focus

Data breaches continue to be everywhere

Cyber criminals have proved adept at thwarting existing IT defenses and exploiting weak links in the payments ecosystem. Merchants, enterprises, e-commerce businesses and service providers face severe, ongoing challenges securing payment card data from capture through the transaction lifecycle. Businesses are also under pressure to achieve scope and cost-reduction goals in meeting compliance mandates such as the Payment Card Industry Data Security Standard (PCI DSS).

Tokenization, which is used as a way of replacing credit card numbers with randomly generated replacement values, is one of the data protection and audit scope reduction methods recommended by the PCI DSS. By tokenizing payment card data, the scope of the PCI audit and cardholder data environment is limited because the storage of payment cards is being substituted by tokens. The footprint for attacks shrinks accordingly because token data is useless if stolen. Tokenization has emerged as a powerful technique for removing live data from systems while achieving PCI scope reduction.

Why tokenization?

Tokenization, when applied to data security, is the process of substituting a sensitive data element with a non-sensitive equivalent, referred to as a token that has no extrinsic or exploitable meaning or value. Tokenization is the act of breaking up a sequence of strings into pieces such as words, keywords, phrases, symbols and other elements called tokens. Tokens can be individual words, phrases or even whole sentences. In the process of tokenization, some characters like punctuation marks are discarded.

In credit card tokenization, the customer's primary account number (PAN) is replaced with a series of randomly-generated numbers, which is called the "token." These tokens can then been passed through the internet or the various wireless networks needed to process the payment without actual bank details being exposed.

So what's the draw back? Tokenization requires a token vault. A token vault is a secure centralized server where issued tokens, and the PAN numbers they represent, are stored securely. Security is paramount as the token vault is the only area in which the token can be mapped back to the consumer's original card details.

Your breakthrough tokenization solution

To help you protect your data, today there is a different type of tokenization – Secure Stateless Tokenization (SST). Secure Stateless Tokenization (SST) is an advanced, patented data security technology that provides enterprises, merchants and payment processors with a new approach to help assure protection for payment card data, with significant Payment Card Industry Data Security Standard (PCI DSS) audit scope reduction.

So what make SST different you ask? SST provides data-centric protection, so data is protected in-use and in-transit, across multi-platform ecosystems including payment devices, gateways, data stores, and applications. As a native, stateless tokenization solution on HPE NonStop, it eliminates the token database that is central to other tokenization solutions and removes the need to store cardholder data. Eliminating the token database significantly improves the speed, scalability, security and manageability of the tokenization process. Every application handling the tokenized data, including backend applications such as fraud analysis and loyalty programs, may then be removed from PCI audit scope.

Secure Stateless Tokenization advantages

Let's look at some of the advantages SST offers over regular tokenization techniques for customers.

Reduced compliance audit scope

SST technology is format-preserving, which means tokens can be configured to exactly match the format of the original data, such as a credit card number (between 12 and 19 digits) or to

substitute alpha characters for certain digits (enabling tokens to be immediately identified as tokens). This simplifies and reduces audit scope and costs, accelerates compliance initiatives and mitigates the risk of breach of highly sensitive data.

Neutralizes data breaches

By eliminating token databases, SST eliminates stored high-value sensitive customer data like credit card numbers that could be targeted through an attack.

Maintains current business processes

PCI DSS allows certain digits of a credit card number to remain "in the clear"—normally the first six digits or the last four. SST optionally preserves these digits, allowing many business processes to work with tokens without the need to de-tokenize or require any changes to the existing process.

Leverages advanced technologies

SST allows fully native tokenization without requiring separate Web Service calls, permitting high-speed operations. A single operation can now be used to both decrypt and tokenize incoming sensitive data, for example, Primary Account Number (PAN) data. This single operation reduces latency by eliminating the need to send tokenization requests to a separate server.

Voltage SST and HPE NonStop fundamentals

Voltage SST technology on HPE NonStop assures high availability and throughput to support business processes. For transaction processors, including payment switches, tokenization service providers and card issuers, as well as enterprises and merchants, SST supports the business with high performance, payment processor-grade high availability and 100% data consistency. Scalability is linear, providing capacity for distribution of tokenization across geographies and systems, and predictable capacity increases for high-growth businesses and seasonal demand peaks.

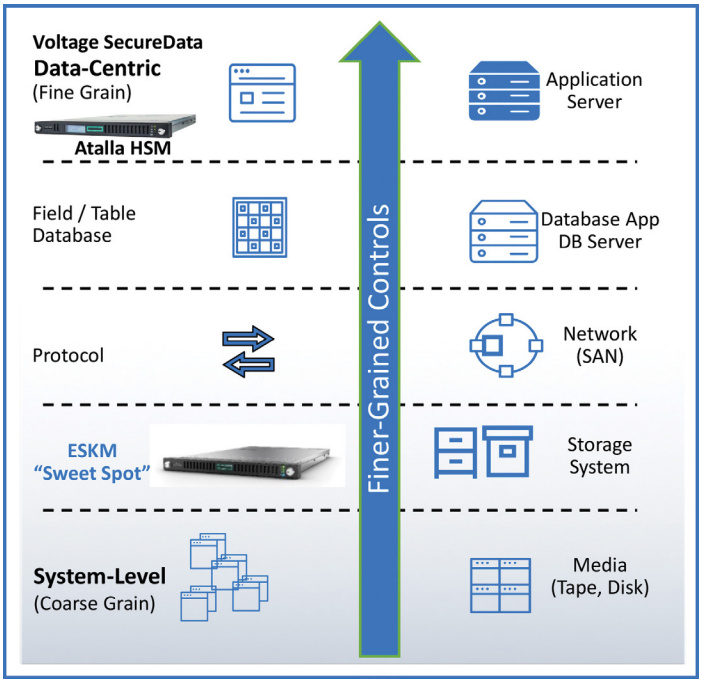
Cost savings are key! Optimizing the costs of IT operations is a key objective for every organization today. HPE NonStop servers have the lowest TCO in its class for complex, mission-critical application environments.

A robust solution for your data breach protection needs

SST uses static, pre-generated tables containing random numbers created using a FIPS random number generator. Lookup tables with random numbers cannot be related back to sensitive data. Compared to legacy offbox tokenization systems, eliminating token databases from the SST solution. This means it:

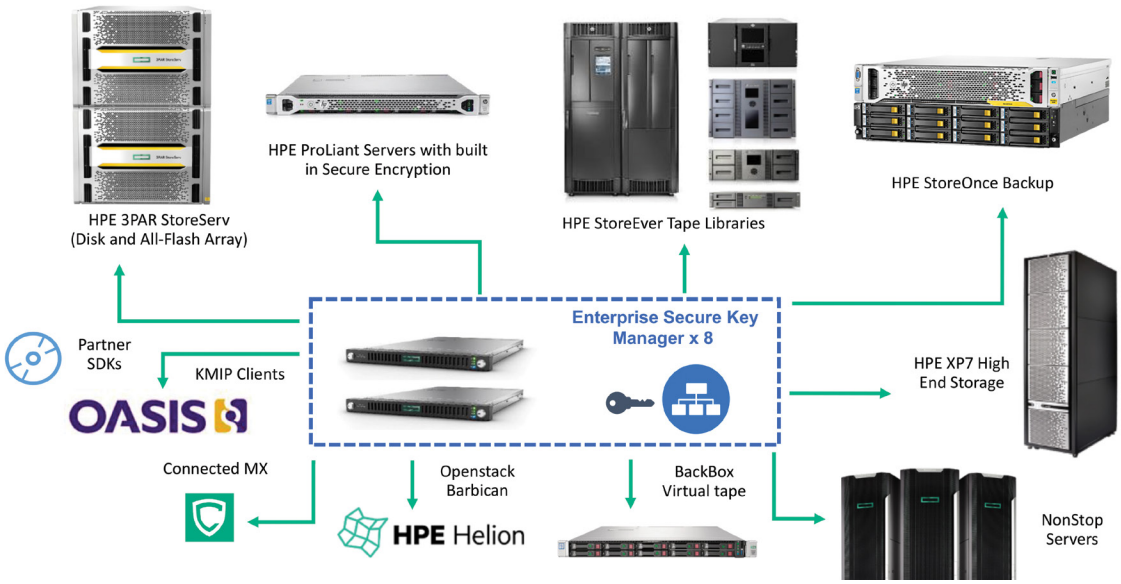
- Eliminates stored credit card numbers and removes the high-value sensitive data that could be targeted through an attack
- Reduces the cost of external database hardware and software acquisition and/or licensing and replication software that a customer would have to maintain
- Eliminates database growth over time that often causes performance degradation—and no replication and backup issues

For neutralizing security breaches



Protecting data-at-rest, in-motion & in-use

A critical component of any neutralizing data breach solution is the technology infrastructure. SST offers you the reliability, availability and scalability to combat data security breaches. HPE NonStop is designed specifically for the very highest availability levels. This means you can protect your business from data breaches continuously, a "must have" for all customers.



Security & business continuity with market-leading interoperability

The proven reliability and virtually unlimited scalability of HPE NonStop and Voltage SST, will provide compelling business value for retailers and card-accepting enterprises that must secure sensitive customer credit card data, accelerate PCI compliance initiatives and achieve significant cost savings through PCI audit scope reduction.

Protecting Data-at-Rest

And, let's not forget the last line of defense. Protecting data-at-rest. Encrypting sensitive information that is sitting at rest is critical and is an "easy target" if not done properly. Once data is encrypted it requires protection of the encryption keys. This is where secure appliances and key management comes in to play.

Key management is a data center security practice that provides management access millions of encryption keys for your data center. The keys are as valuable an asset as the data they protect and must be protected and preserved for the life of the data. Key management appliances support these assets by automating key generation, protection, and management based on your business's security policies.

A hardened security appliance, the Micro Focus ESKM is fully validated to the FIPS 140-2 Level 2 standards and is Common Criteria EAL2+ certified. You can deploy ESKM in multi-node, high-availability, geographically extended clusters. They can also support enterprise-scale infrastructures across a diverse set of products and applications. For HPE NonStop servers, the ESKM should be installed in pairs or larger clusters for high availability. You can install ESKM cluster nodes anywhere (in the same or other data centers) as long as they remain network-accessible. HPE NonStop Volume Level Encryption takes advantage of these capabilities to bring you an enterprise-class key management capability fully integrated to generate, store, and serve keys.

The ESKM automatically replicates keys across clusters of up to 8 nodes and performs backups and restores of the key database. It also provides a built-in local Certificate Authority to help create client certificates for strong TLS (transport Layer Security) authentication of CLIMs to the key manager. In addition, the ESKM offers identity-based administrator access, dual-control administration, and event logging. It is deployed in high-availability clusters with built-in client load-balancing and failover to make sure that it is as highly available as the HPE NonStop environment that it supports.

Yes - encryption for data-at-rest is your last line of defense. Protecting your encryption keys is critical. Lose the keys – lose access to your data! Because we know it's only a matter of time before you will be breached, we offer protection at each layer of your infrastructure and payments ecosystem – from data-at-rest, to data-in-motion and in-use. The bottom-line? Secure transactions throughout the payments lifecycle and ensure happy safe customers!

Hilton

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REWARDING

with the Hilton HHonors App

The Hilton HHonors App uses technology to streamline travel.

Check-in from Anywhere

And your key will be waiting for you. Smartphone to laptop, any online connection makes it happen.

Choose Your Room in Advance

In addition to date and location, guests can choose the actual room they prefer – before they arrive.

Make Special Requests

Want extra pillows? A favorite beverage? Guests can have their favorite things waiting for them in their room.

Carry a Digital Key

Guests use their phone as their key. At select hotels, any HHonors guest can use the HHonors app to Wow-enable a mobile device.

ROCCO LAFORGIA
Director of Sales
Technology Associations
p. 212-820-1715
e. rocco.laforgia@hilton.com

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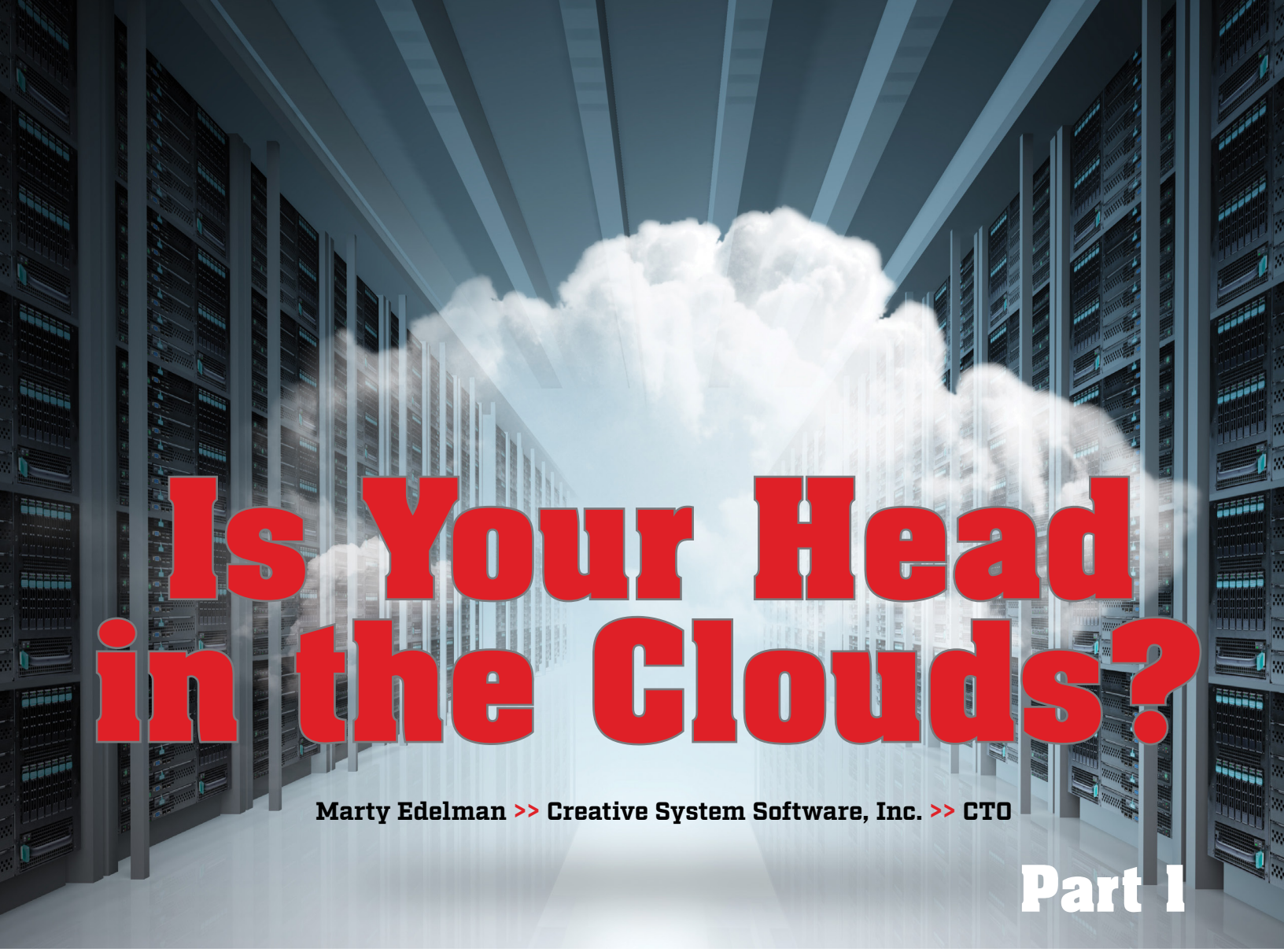


Is Your Head in the Clouds?

Marty Edelman >> Creative System Software, Inc. >> CTO

Part I

"You are traveling through another dimension, a dimension not only of sight and sound but of mind. A journey into a wondrous land whose boundaries are that of imagination." Your next stop the datacenter.

It is full of the latest and greatest technologies. Rows and rows of servers sit surrounded by flash disk arrays and enough fiber to reach to the moon and back. This is the new home for your software, the life-blood of your company. You reflect proudly on what you have helped to create and then, doubt begins to cloud this wonderful vision. Is my software worthy of running on all of this shiny new technology? Can my software take advantage of all of these technologies? Is my software ready to run in the cloud?

Cloud Computing

The practice of storing regularly used computer data on multiple servers that can be accessed through the Internet.

– Merriam-Webster

Folks who run NonStop might take a slight pause while they ponder the cloud and wonder if they can fit their software into this new paradigm but upon reflection they will realize that Tandem was one of the first cloud providers. Back in 1976 they had envisioned applications being able to be run on independent CPUs with access to data hidden by a messaging system. You could add new hardware without having to change the application, if you needed more of a given resource you just added it. Sounds awfully like the definition of cloud computing, doesn't it?

If you are reading this you must be an IT professional. Information Technology short and to the point, it is two words: Information and Technology. The technology is the 'magic' that makes the information available to our users. Most users don't care about the technology but the information they definitely do care about. Information is the life-blood of a company, without it the company cannot operate. There isn't a single major corporation that could survive if they suddenly lost all of their data. Data is one of the most important assets a company owns!

Providing access to our corporation's data has never been easier either. There are plenty of tools that allow our business partners to mine company data for the precious nuggets that will provide real value to our company unless (cough) that data is still stored in Enscribe files. It is the year 2017 and the last statistic I heard about the NonStop customer base still has about 50% of the data stored on NonStop being stored in Enscribe files. Imagine the value that IT can provide to the company if they simply unlocked that data. Since IT organizations only exist to provide value to their company this should be at the top of everyone's wish list.

Enscribe is not a database, it is a set of files, most likely badly designed to save a few bytes on a disk. It has no tools to query it (NO! Enform isn't a user-friendly tool), to run what-if queries, to dynamically access it using whatever tools the user wants to use. Yet for some of us Enscribe is all we have. There are a few ways to deal with this Enscribe data: 1) Ignore it and pray it goes away 2) Throw it over the wall to the person in the next office 3) Nuke it all and start from scratch 4) Pick them off one-by-one. Option 1 is what most people seem to be doing, option 2 is great if you're not the guy in the next office, option 3 never works as the amount of risk vs. reward is too high, which leaves us with option 4 where we pick each file off one-by-one (for US readers I sometimes refer to this as the Tony Romo method) which is how we did things at The Home Depot (See the Summer 2007 24x7 magazine for details).

Data Becomes Knowledge

There are hundreds of examples where 'random' bytes sitting on a computers mass storage device have provided real, actionable, information to corporations. One that comes to mind as the United States enters hurricane season is the ability to visualize a company's supply chain to see best how to deploy their assets to help the folks impacted by a hurricane. Imagine a map of the US with all of the company's assets shown on it along with the path of the hurricane. The company had the data but it wasn't accessible to folks who needed it when it was locked in an Enscribe file, by moving it to a SQL database they were able to load it into a piece of software they purchased from a 3rd party. Once loaded it turned into a valuable tool.

It is relatively easy to convert Enscribe files to a modern SQL database using a tool such as comForte's Escort SQL **(https://www.comforte.com/solutions/modernization)**; this incredible software product converts Enscribe

According to Gartner cloud computing has been among the top technology trends for six consecutive years. Cloud computing continues to experience major growth as companies of all sizes embrace it to reap the benefits of scalable, cost-saving compute

applications and files to NonStop SQL without requiring any changes to existing programs (i.e. no source code changes). This allows an organization to focus on creating new applications that provide the business with new capabilities instead of spending time rewriting existing functionality.

When Home Depot was building their modern platform we used Escort to transform the Enscribe files which were a mess into an eloquent SQL database. Our Enscribe environment was designed, in what was typical for the time, as a single file that was then redefined depending upon different values stored in the record. In the early 1990s when the application was built this was considered state of the art but it quickly became a problem when trying to build modern components. By using the Escort product, we were able to focus on the real task which was to provide new functions to the business.

Instead of developers spending their time writing reports they will be able to develop new functions and features. Hiring will be easier as most folks don't graduate from university knowing Enscribe and probably have no interesting in learning it. And perhaps most importantly other groups will be able to access the data using industry standard techniques which has immense value for the company, adding a web front-end will take days instead of months.

The conversion process couldn't be any easier and can be described as a two-phase process. In phase one the SQL database is designed. The Escort utility provides the user with the ability to convert the Enscribe files into normalized SQL tables. A single Enscribe file can be mapped to an unlimited number of SQL tables and data fields can be expanded, added, or eliminated. Once the database has been architected the Escort utility creates the new SQL database and loads it using an ultra-quick parallel loader.

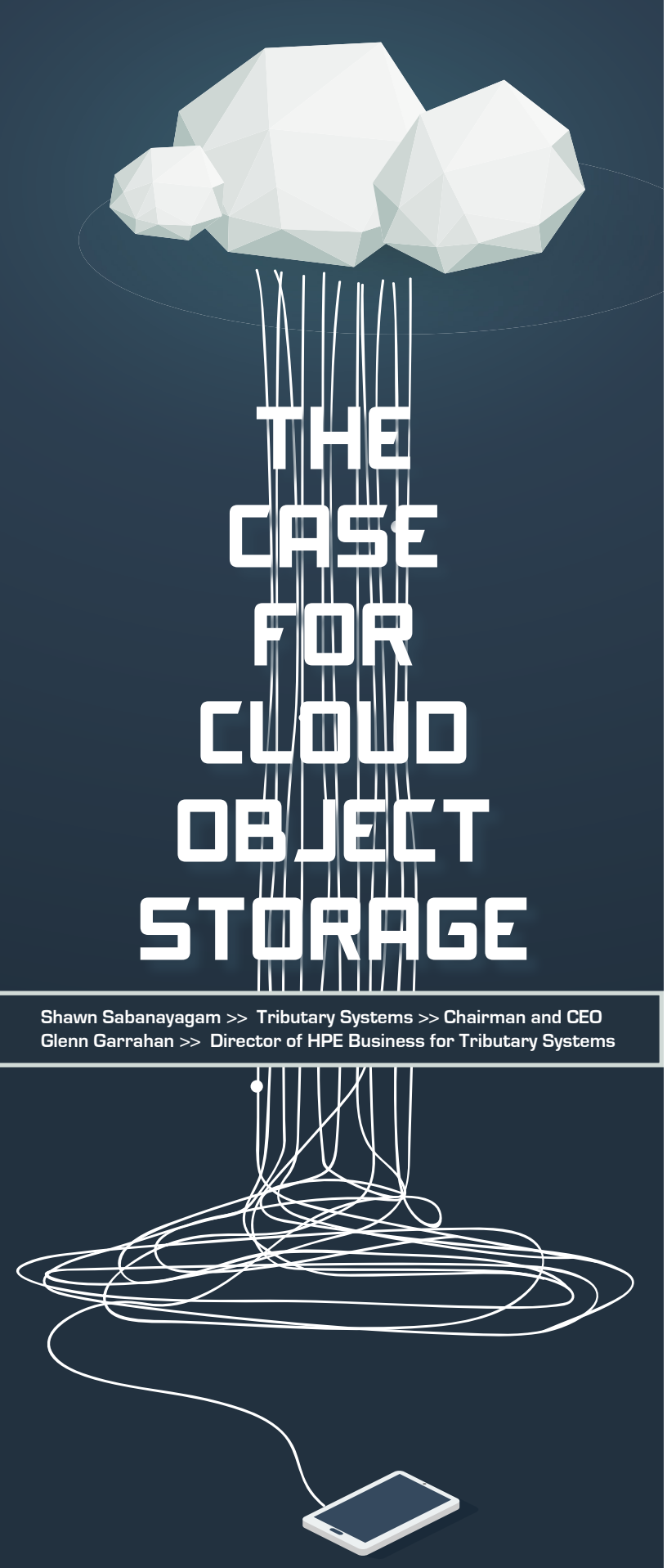
In phase two the application object files are 'prepared' using a provided utility to use the new SQL database. In this stage, a provided library is linked to your existing object. Once this has been done your programs will now access the new SQL database using the existing Enscribe I/O calls.

That's it, nothing else is required! From this point forward your data is now housed in one of the best SQL databases in the industry and the developers can begin to build new applications that utilize SQL verbs (Select, Insert, Delete, …) that co-exist with the existing applications that are using Enscribe calls (Read, Write, Writeread, Readupdate, …). Additionally, tools such as JDBC/ODBC, Tableau, and QLIK can be used by the entire organization to access the previously unavailable data. You can also take advantage of all of the great features of the NonStop SQL engine including the ability to generate test data automatically as described in Paul Denzinger's article in the September 2017 Connection magazine.

Once you have converted your files to tables you have taken the first step on your journey towards the cloud. The next logical step is to start working on the mountain of technical debt you have in your legacy applications. There are a number of great tools that can be used to provide web interfaces to your existing servers and in the next Connection we will explore them in detail.

Since leaving The Home Depot Marty Edelman has provided strategic guidance to organizations wishing to modernize their IT infrastructures. While at Home Depot he was responsible for the interconnected payments team which has responsible for all payment processing.

Edelman has been involved in the IT field for more than 30 years. As an independent consultant, he founded a small consultancy firm that specialized in developing high-volume mission-critical solutions for Fortune 500 companies. He and his team helped to build the UPS Tracking System, the NYSE Consolidated Trade and Quote systems, and the S.W.I.F.T. next-generation computing platform.



THE CASE FOR CLOUD OBJECT STORAGE

Shawn Sabanayagam >> Tributary Systems >> Chairman and CEO
Glenn Garrahan >> Director of HPE Business for Tributary Systems

"I've looked at clouds from both sides now
From up and down and still somehow
It's cloud's illusions I recall
I really don't know clouds at all"

— Joni Mitchell, "Both Sides, Now" 1967

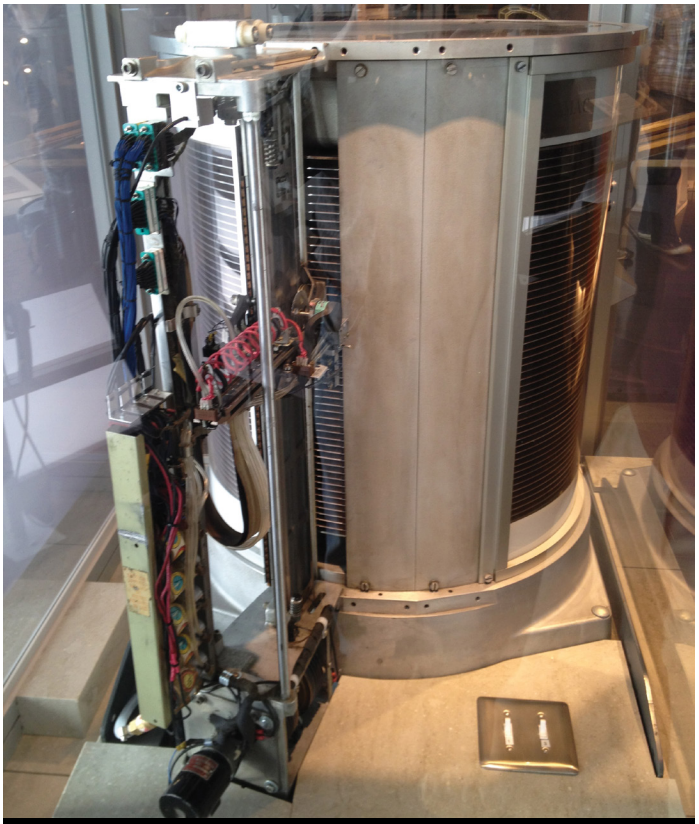
Well, Ms. Mitchell certainly wasn't thinking of Enterprise Cloud Object Storage when she wrote "Both Sides, Now" a half-century ago, but there is some small truth in these lyrics when applied to NonStop and cloud based backup.

The Evolution of Storage:

The first use of tape for storing computer data was in 1951, in conjunction with the UNIVAC 1. The media was a one-half inch wide thin metallic strip, with a recording density of 128 characters per inch on eight tracks. Cartridge style media began to gain popularity in the 1980's, and it wasn't long before this media type displaced the open reel-to-reel units, due to the ease of use, simplicity of archiving cartridge based media, and reduced possibility of media damage when manually reloading large reels of loose tape. Cartridges have been available in several formats, modern types include DAT DDC, DLT, and of course the most ubiquitous format of all, Linear Tape Open, or LTO. Along with cartridge style media came tape automation, including massive tape libraries and silos such as those manufactured by StorageTek (STK) and IBM. With the use of robotics, these silos could hold thousands of tape cartridges, and required host based media manager software to perform the backup/restore functionality.

IBM 2401 Reel to Reel Tape (circa 1964)

The first hard disk drive, the IBM 350, was developed in the early 1950's, and the first production drive was shipped in 1956. The size of a small refrigerator, this unit had a capacity of approximately 3.75 megabytes. The groundbreaking "Winchester" drives were introduced by IBM in 1973. This drive technology and its derivatives, using low mass/low load heads and lubricated platters, remained state-of-the-art for over 40 years, and was emulated by most disk drive manufacturers. Of course, every succeeding generation of new disk drives endeavors to replace large, cumbersome, sensitive and costly devices with smaller, cheaper more robust and more reliable units, and always with greater storage capacity. That's why today, Enterprise Class 3.5" HDD's are available in capacities of up to 12 TB, at a cost of about $0.04 per gigabyte.



IBM 350 Disk Drive (circa 1957)

The latest offshoot of disk drive technology is the Solid State Disk (SSD). While the basic technology goes back to the 1950's, with magnetic core memory and charged capacitor read-only storage, the development of SSD's was hindered by the rapidly improving and lower cost electro-mechanical HDD's. Modern SSD's have specific advantages over HDD's, such as the lack of moving components, and in the case of NonStop, enhanced I/O performance, especially random reads and writes. However, the cost per gigabyte for SSD's is about $0.24, or roughly 6x the cost of HDD storage.

The Data Explosion:

It's no secret, the amount of digital information continues to grow, and the rate of growth is rapidly accelerating! In fact, IDC calculated the total amount of digital information created and replicated at 4.4 zettabytes (one zettabyte is equal to 1000 exabytes), way back in 2013. They figure this number will grow to something like 44 zettabytes by 2020, only three years from now. Another starling fact, 90% of all existent data was created in the last 2 years!

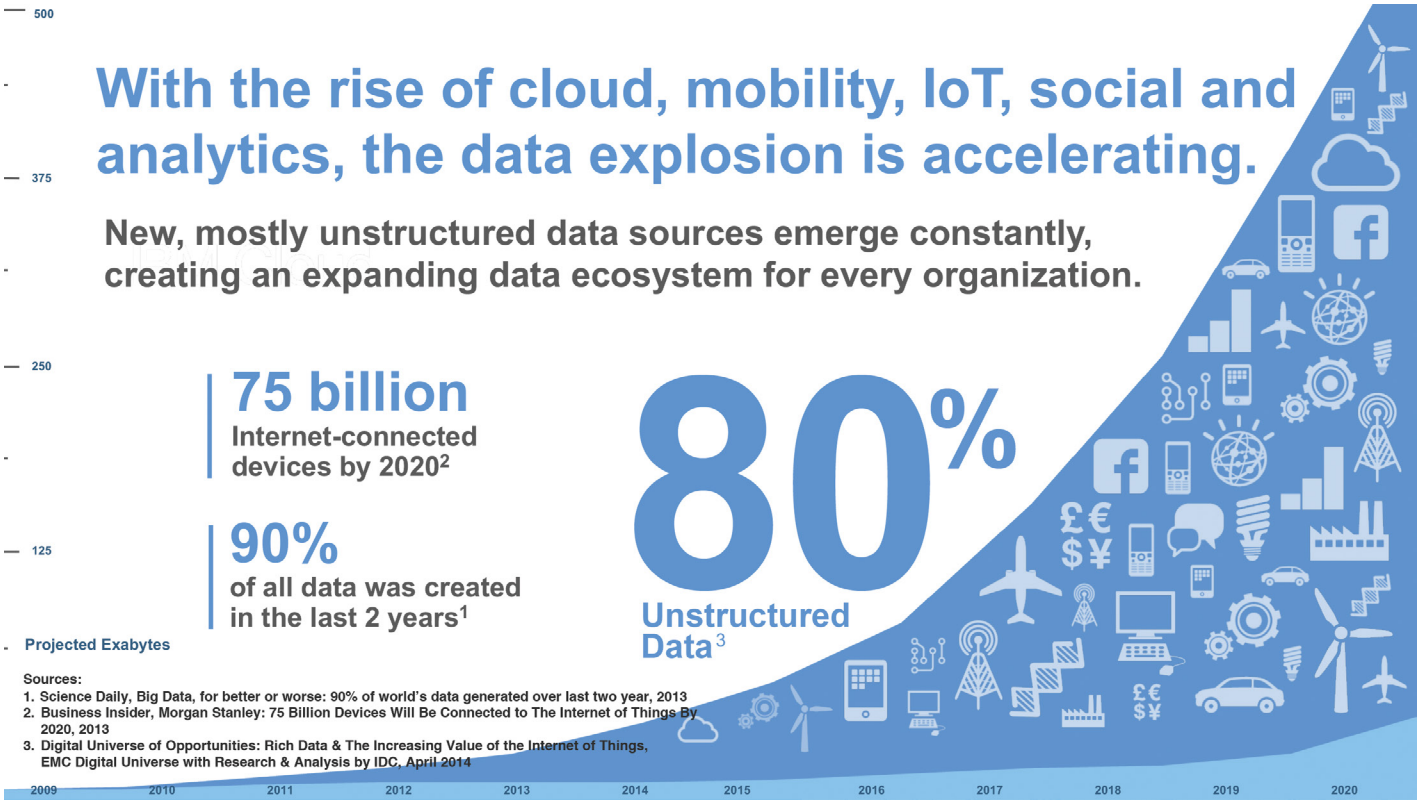
And while most of this data is created by individuals, enterprises handle about 85% of this information at some point in its lifecycle. This means organizations take on the responsibility for architecting, delivering and maintaining information technology systems and data storage systems to meet this demand.

So massive amounts of data must and are being archived!

But with massive data archival comes multiple challenges for traditional storage systems. As the petabyte-scale is reached:

- Data integrity suffers when system size is 10 billion times larger than the bit error rate of a hard drive
- Data availability suffers when hundreds of drives fail every day and require lengthy rebuilds
- Data security suffers with millions of devices and multiple copies in multiple locations
- Costs spiral out of control as it becomes necessary to add more and more hardware to meet archival requirements

Fortunately, there are two immediately accessible technologies, data deduplication and object storage, which massively reduce data redundancy and overheads. However, data deduplication, by its very design, has several issues which must be considered prior to new deployments:



- Backup windows increase, especially with dedup VTL appliances, due to front end data processing
- Rehydrating massive amounts of deduped data for restores may become unwieldy
- As the cost of disk drive storage decreases, the case for deduplication of data becomes less significant. And the cost to store a terabyte of data continues to spiral downward…..
- Certain data sets are conducive to dedup; incremental changes from backup to backup favor this technology, others, such as massive imaging data, do not

Yet, data storage, by being a long-term strategy and investment, has made it difficult and usually expensive for CIOs to embrace newer technologies and systems, especially at a time when enterprises are witnessing unprecedented growth data generation and retention. Consequently, many enterprises still use legacy applications running NonStop mission-critical servers with legacy data backup devices. Nonetheless, it is important for players in these sectors to reduce their 'long-term' data backup and archival expense by leveraging low cost advanced technologies available today, such as Cloud Object Storage technology, which has the capability to economically accommodate Petabyte-scale data backup and long-term retention.

NonStop and Cloud Object Storage:

Object Storage architecture manages data as objects, unlike traditional file systems which manage data as a file hierarchy or block storage which manages data as blocks within sectors and tracks. Each object includes the data itself, some amount of metadata, and a globally unique identifier. Object storage can be implemented at multiple levels, including the object storage device level, the system level, and/or the interface level. The advantage of object storage is it enables capabilities not addressed by older storage architectures. Examples may include interfaces that are directly programmable by the application, a namespace that can span multiple instances of physical hardware, and data management functions like data replication and data distribution at object-level granularity.

There's no doubt, the future of archiving is object storage. Object storage is rapidly replacing on premise tape, disk, and dedup disk technology as an archival or backup methodology. Massive amounts of unstructured data may be retained

efficiently by object storage as it is ideal for purposes such as archiving medical imaging, photos, songs, videos, etc.

This is why Amazon S3, Google Cloud, MS Azure and all other public clouds use object storage. Its flexibility, scalability, and cost are all substantive advantages realized when retaining huge amounts of unstructured data in the cloud. Object storage (outside of back up and archive) can also be flexible with users being able to access data from anywhere.

For NonStop users in particular, there are definite concerns when contemplating a move from legacy tape or disk archiving methodologies to Cloud Object Storage, Generally these concerns would fall into one of four categories: Scalability, Security, Performance and Cost:

Scalability:

- Dispersed storage technology, employing Information Dispersal Algorithms, available with Cloud Object Storage, provides massive scalability with significantly reduced administrative overhead.
- Cloud Object Storage can grow easily from terabytes to petabytes to exabytes, and may be implemented on premise, or in public, private or hybrid clouds.
- These advanced scalability capabilities are ideally suited to rapidly growing data backup environments.

Security:

- Cloud Object Storage is a highly secure object storage archival technology that has been in the marketplace for 13 years.
- The use of Information Dispersal Algorithms (IDA), otherwise known as Erasure Coding, in addition to AES 256 bit encryption, greatly enhances data security.
  - IDA's separate data into unrecognizable "slices" that are then distributed via network connection to storage nodes locally or across datacenters. Think of it this way, if you store a classic Ferrari in a single garage, a thief can break in, hotwire the car, and make off with it. If you disassemble the Ferrari and store the components in multiple garages, it's very difficult, if not impossible, to steal and then reconstruct the vehicle.
  - IDA eliminates the need for data replication.
  - No complete copy of the data resides in any single storage node, and only a subset of nodes needs to be available in order to fully retrieve the data.

Performance:

- With an appropriate and compatible front end device, ingesting data from any backup application including NonStop, TSM, Commvault, NetBackup, Veeam can be optimized, this will allow rapid data ingestion and caching, reducing backup windows while streaming the data policy based pools to Cloud Object Storage at the back end.
  - With the use of FlashSystem for the cache layer, backup data to Cloud Object Storage at rates of up to 10.4 GB/sec or 37.4 TB/hour per node, and restore data at rates of up to 9.6 GB/sec or 34.6 TB/hour are possible.

Cost:

- Cloud Object Storage typically delivers significantly lower total cost of ownership for storage systems at the multiple petabyte level, reducing or in many cases eliminating the need for data replication and the need for multiple copies
- Cloud Object Storage is 55-60% of the cost per GB of archived data when compared to any dedup VTL
- Cloud Object Storage may be purchased as a service (Storage as a Service, SaaS), thereby eliminating the need to procure and maintain backup hardware on premise or in remote DR sites. Storage capacity can be varied in the short term to deal with peak periods, and increased over the long term as a natural function of data growth.

Forged by Power and Partnership:

For NonStop customers, a great answer is Tributary System's Cloud Object Storage Solution. Employing advanced COS technology coupled with Tributary's proven Storage Director® as the "front end", NonStop customers can transparently take advantage of IBM's Cloud Object Storage® (COS), formerly known as Cleversafe®, without any changes to their NonStop applications.

Storage Director, is a policy-based, tiered, and virtualized software product especially designed

for backup which can be seamlessly integrated with any media, including tapes, disk drives, virtual environments and NonStop or other proprietary environments, plus open systems. Storage Director can group data into different pools and apply different protection policies at different times across any storage medium simultaneously. Tributary Systems has gained a massive strategic edge as it has entered into a synergistic partnership with IBM to revolutionize enterprise cloud data backup/restore, archive and DR. Combining the capabilities of Storage Director while endorsing long-term archival to Object Storage is where Tributary sees the data backup and retention market evolving. Tributary claims to be the only company in the marketplace that can backup all NonStop mission-critical servers using a single solution. In addition to Storage Director's AES 256-bit encryption, data is also erasure-coded in the storage tier. From a performance standpoint, Tributary's solution can ingest data at a rate of 12TB per hour and restore at about 8.5TB per hour. Should a flash storage be used in the cache layer, the ingestion rate goes up to 37TB per hour and restores at 35TB per hour; these are metrics that are unmatched in the market. Thus, Tributary's IP, when combined with the leading Cloud Object Storage solution imparts exclusive cutting-edge data storage and management capabilities that can be well extended beyond public cloud models—into hybrid and on- premise environments—and also offers double-layered security for NonStop clients. Finally, the Storage Director and IBM Cloud Object Storage solution can be implemented with a monthly fixed cost model unlike all public cloud providers such as AWS who charge customers for accessing their data through additional fees for "puts and gets." Employing a cloud backup solution where costs vary widely from month to month, based on access to their own data, is challenging for most enterprise customers.

Conclusion:

Massive data growth coupled with the continual need to reduce cost, and concurrently improving backup and restore performance may seem like incompatible goals for the NonStop professional. But really, with judicious use of the most modern Cloud Object Storage solutions available today, perhaps we can look at clouds from both sides now; data retention capacities and performance go up while costs go down. That's no illusion at all...

Shawn Sabanayagam is Chairman and CEO of Tributary Systems. Shawn is intimately involved in the information technology and services industry, particularly in Storage, Go-to-market Strategy, IT Strategy, Professional Services, and Management.

Glenn Garrahan is Director of HPE Business for Tributary Systems. Prior to this, Glenn spent 17 years as a Product and Program Manager with HPE NonStop.

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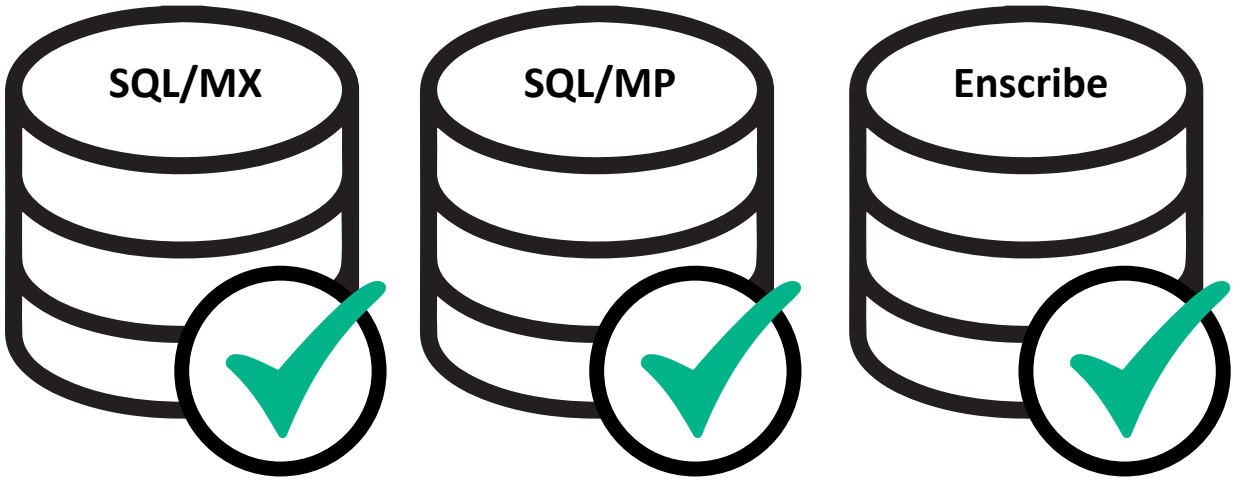

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Back*for*More

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

On first reflection 2017 has continued to deliver many surprises. When it comes to writing about the best of NonStop it is hard to look past the simple fact that we all have made it through yet another year. Despite the naysayers and those industry pundits that continue to dismiss the relevance of NonStop it remains a force to be reckoned with in several markets. And for good cause – there is just too many incidents of applications going offline and of major outages, whether financial, airline or mobile phone related. As for security breaches, not enough can be written about the many times we as NonStop professionals are left shaking our heads and wondering, who did leave the front door wide open?

This time last year, as we also looked back on the best of NonStop, I wrote of how a reoccurring theme of many of my posts and commentaries that year, 2016, had been about the need for greater visibility of NonStop at the CIO level. Another reoccurring theme of mine had also been my continuing push for everyone in an IT organization where NonStop is present to show pride in NonStop systems. This pride in NonStop just has to become a lot more visible and it starts with IT organizations making sure every piece of information about NonStop appearing in the ether is shared with all of IT. The good news is there's now many publications focused on NonStop so, when it comes to finding stories that feature NonStop, it's much easier than in times past.

However, before digging further into what transpired this year when it comes to social media, this year was also a time to renew friendships and to catch up with folks I hadn't seen for some time. While attending the hot air balloon fiesta in Albuquerque, New Mexico, a knock on the door of the company command center saw former Tandem Computer development program manager, Mark Bydalek, who came to chat with Margo and me. We had lost count of how many years had passed since last our paths crossed, but there was no disguising the passion for NonStop that is present in Mark. Closer to home, we have reconnected with another former Tandem Computers sales manager, Jim Miller, who just happens to reside on the same hole of the same golf course as we do. Dropping by, simply to say Hi!, conversation turned quickly to Tandem and NonStop when back in 1988, Jim and I attended the same three week sales training course Tandem used to run for all new sales and marketing hires.

Of course, this year also saw the well-attended reunion of former Tandem employees where former Tandem CEO and Chairman, Jimmy Treybig, dropped by to give an even bigger Texas Hi! While I was not able to attend the reunion, it was hard to escape the myriad collection of happy snaps that quickly appeared on sites like Facebook. What I was able to attend was events put on in Texas, the N2TUG, as well as the really big event held in Las Vegas, 2017 HPE Discover, where I participated as one of the independent bloggers.

Returning to the topic of the best of NonStop, it was the personalities and the venues that struck a chord with me and continue to resonate as I look forward to this year's NonStop Technical Boot Camp.

When it comes to personalities, there are countless passionate individuals working diligently for many NonStop vendors – incredibly important and indeed crucial stakeholders within the NonStop community. Their investments in NonStop middleware, tools and utilities as well as solutions continue to drive NonStop forward. While the NonStop development team have moved mountains to first bring us support for the Intel x86 architecture and more recently, support for virtual machines, without the breadth and variety of vendor offerings, HPE would be hard-pressed to convince even the hardiest of NonStop user to stay with the platform. Few enterprises have the skill or the desire to build their own applications from scratch. And for good reason, too - there is a dearth of NonStop expertise other than what resides within the NonStop development.

Like many vendors, I wouldn't be sticking around if I couldn't make money from working with NonStop. Looking back on 2017 two major events occurred that were very important for Pyalla Technologies. New clients were added (and the additional workload was a major factor in my inability to attend some events as I had planned) even as the digital publication NonStop Insider gained greater traction. Who could have imagines this time last year that we would be celebrating the first anniversary of this publication with twenty submissions covering a diverse mix of topics.

As I look back to when each issue of NonStop Insider was being put together, like everyone else who is involved in publications you often wonder where the next story will come from but, almost like magic, the vendor community stepped up and began providing materials on a regular basis.

As for more mainstream publications, The Connection, it continues to be the premier vehicle for both vendor and user features, updates and columns. When you stop to think just how long this publication existed, in one form or another, dating back to the earliest days of ITUG, the NonStop community has much to celebrate. What is new for NonStop? Well, you are reading about it in this issue and I suspect there will be a lot of references being made to how strong the NonStop community continues to be – to come out of the spin-merge exercise and not be bracketed with other software elements viewed as being non-core for HPE is a message all of itself. Yes, NonStop is core and yes, HPE IT continues to depend on NonStop and NonStop SQL/MX and yes, virtualized NonStop (vNS) is about to make waves in select markets. And yes, let's continue to support our peers as we all recognize that keeping the spotlight firmly focused on NonStop is going to take all of our best-efforts!

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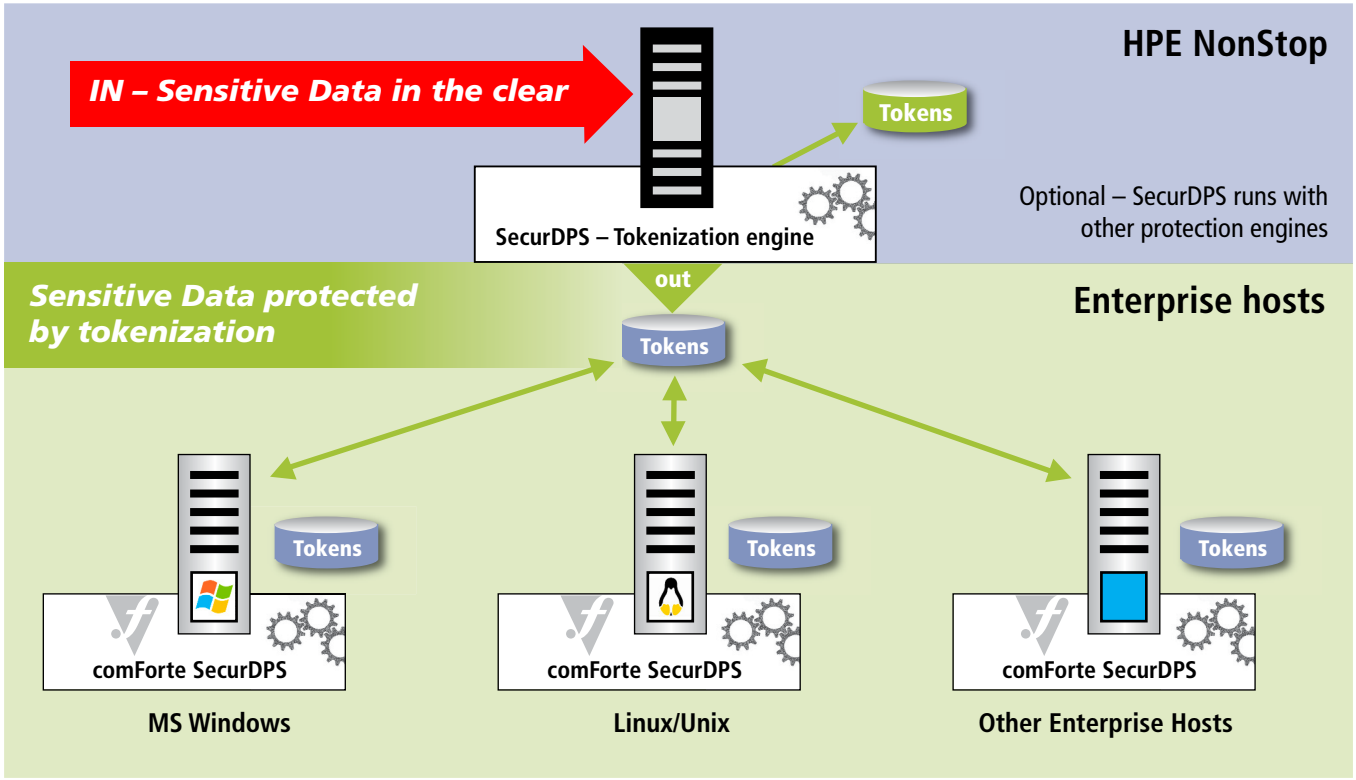

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