Utilizing the Modern Computing Capabilities of the HP NonStop Server

A business white paper from Creative System Software, Inc.

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Executive Summary

During a downturn, it's hard to see the upside, revenues are down and budgets have fallen along with them. Companies have frozen capital expenditures and the push is on to cut the costs of IT. This means intense pressure to do far more with fewer resources. For years, companies have known that they need to eliminate duplication of effort, lower service costs, increase efficiency, and improve business agility by reducing complexity. Fortunately there are some technologies that can help, the most important of which is the HP Integrity NonStop server platform. The Integrity NonStop is a modern, open and standards based computing platform that just happens to offer the highest reliability and scalability in the industry along with an outstanding total cost of ownership (TCO).

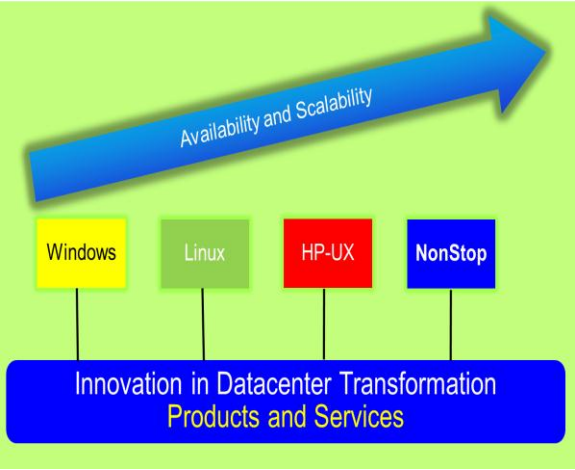
HP's Integrity Nonstop servers fully support open access to the data that is housed on them. This open access to data combined with the ability to use modern programming languages, web centric tools and industry standard software means that the same development and support resources can be shared across all of the open platforms (UNIX/Linux/Windows) in the IT enterprise. The ability to leverage these resources brings the cost of development and support down since less resources are now required, all while retaining NonStop's industry leading scalability, reliability and TCO.

The HP's Integrity Nonstop server is a great candidate to be part of the enterprises' service bus since it supports web standards. With its unmatched reliability it is a phenomenal choice to use for mission critical functions such as customer transaction processing. With its high performance, industry standard, SQL engine, NonStop is used by many corporations as their database of record.

Most people cannot go a single day without using the services of a NonStop. If you trade stocks, ship packages, use a credit or debit card, purchase goods or services from a myriad of retailers, use an ATM or just use your mobile phone, your transaction more than likely was made possible by a HP's Integrity Nonstop server. The reason these highly visible and mission critical functions are run on a NonStop is due to its unmatched reliability and scalability. Your company's transactions deserve this level of service, do they not?

The Road To NonStop

Business is all about serving customers. The job of every IT organization is to support their business partners. If an IT organization has an uptime of 99% - which sounds pretty good – it still translates into about 2 hours of downtime per week! If those two hours are during the peak business period, say lunch time on a Friday, the business will suffer. A very large retailer has determined that they lose $7,000,000.00 in sales per hour when their IT systems are not available. Can your business afford that kind of loss?



In order for an IT organization to support their business partners they must be able to quickly adapt to an ever changing business environment. That means being able to adopt new standards as they are embraced by the

industry, leverage the work of others, share data among many applications and platforms, scaling as the business grows, having a very quick time-to-market for their applications and of course *always* being available.

In the good old days of computing (the late 1990s and early 2000s) computer vendors sold closed proprietary systems that required customized programs to perform their functions. Today, IT organizations have determined that they can reduce time-to-market and decrease programming errors by leveraging open source software. Additionally, since the software has already been built and tested the IT organization can reduce costs significantly since they don't need to produce the normal artifacts that are associated with software development for these components (specifications, design documents, source code, etc.) or maintain the software. These savings can be significant! Open source software is well tested and easily integrated into an application and allows the development organization to concentrate on the actual business function instead of writing things such as protocol converters and data transformation routines. Simply put by using open source software, developers can get more done in less time.

Scalability and reliability are the holy grails of every CIO; they need systems that will grow as the business grows and that are always available to process transactions. The conundrum they face is that many systems support one or the other of these requirements. Only one system has proven over the last 35 years that it can support both. That system is of course a Tandem Computer. Tandem no longer exists having been acquired by Compaq

"The recent, highly successful, port of the product (which previously only ran on HP-UX, LINUX, and other UNIX operating environments) *onto the HP NonStop platform positions the company ideally to build on previous successful deployments. This process, completed in a very short timescale, was a testament to the architecture of the technology…" – Lusis Payments - Press release*

Computers which subsequently merged with HP. Tandem Computers produced many fine computing offerings but unfortunately they were built in the days of proprietary offerings.

The HP Integrity NonStop Server is an evolution of Tandem Computers. When HP acquired Tandem they immediately started to transform the Tandem systems into open, standards based, product offering. Today, HP Integrity NonStop servers are fully open and standards based; they run on HP's standard C-Class blades, utilize the same Java stack as HP-UX, support a myriad of open source software (POSIX, Eclipse, SOAP, Tomcat, MyFaces, Axis2, Spring, Hibernate, etc.), are managed by HP's Systems Insight Manager (SIM) and support HP's Business Technology Optimization (BTO) software suite.

In short, Tandem computers have been reborn as HP Integrity NonStop servers, retaining the reliability and scalability Tandem users relied on but with the open system capabilities today's IT organizations demand.

Software Development – Time To Market

The cost of IT personnel is one of the largest expenses an IT organization has. Some IT managers have stated that NonStop developers are hard to find and are expensive, fortunately this perspective is out of date, NonStop programmers are widely available today. All one has to do to find them is to visit a university campus, there they will find thousands of developers who have been trained on the latest and greatest technologies, technologies that all run on the NonStop. Most university computer science departments teach Java or C++ running on Linux systems. They use open source tools such as Eclipse, Tomcat, and SOAP since they are ubiquitous in the industry and can be used to teach good programming practices. Additionally, since they are open source products they are free for the university to use.

> *"Now we can develop our NonStop applications using standard programming techniques, and the databases are fully compatible with other systems in our heterogeneous infrastructure. This creates a seamless environment for our company's payments and POS transaction processing needs." – James Lance – CIO – Bonton Stores*

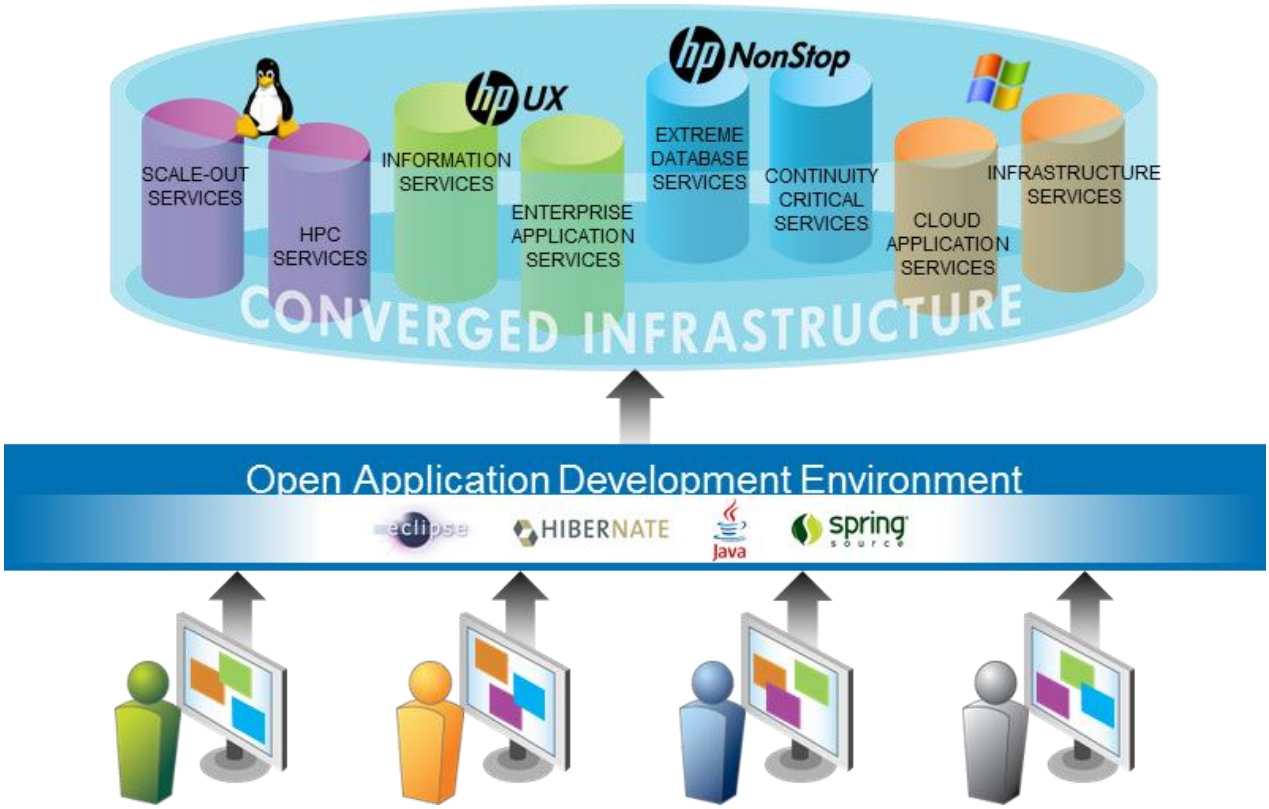
These *kids* are the future superstars of the IT industry, in order to attract them to work for your company you have to allow them to use their skills in the way they were taught. HP has spent tens of millions of dollars producing/porting a wide range of industry standard tools to the Integrity NonStop platform. HP's third party software vendors have also spent considerable sums of money to provide the same types of tools. Today the Integrity NonStop is as open and as flexible as any UNIX/Linux/Windows system but is much more reliable and scalable.

The current trend in IT is to hire associates right out of university to do software development and support. IT Managers know that by hiring recent graduates they will get a well trained professional that perhaps needed some mentoring but who would be eager to come to work every day and prove their worth to the company. New hires are typically the first to arrive in the morning and the last to leave in the evening. They also know that they will inject new life and new thought processes into their environment which will translate into increased productivity.

A Tale Of Two Developers

An important milestone was fast approaching and the development team was one person short. It would take 2 to 3 weeks to hire a consultant from the outside so it was decided that since the development tasks that remained were all slated for the OSS (POSIX) personality of the HP Integrity Nonstop server, that a person from the UNIX development team would be recruited. The candidate was a good solid UNIX developer with about 7 years of experience. He was given the appropriate credentials and IP address and told to get to work. The next day at the daily project touch-base he was asked how things were going. He responded that he was confident that he would complete his tasks on time. When queried if he needed any help he got indignant and stated that he had been using UNIX for years. He completed his tasks ahead of schedule and when he was asked how he liked working on the NonStop he responded that he had never worked on one and had no intention of ever working on one since he was a UNIX developer. In order to convince him that he had indeed been working on the HP's Integrity Nonstop server he had to be taken to the datacenter where he plugged his laptop into an Ethernet port on the server, upon logging on he finally believed that he had indeed been working on an HP Integrity Nonstop server.

A recent university graduate was challenged to port the open source JPetShop application to a HP Integrity Nonstop server. He was given access to a NonStop, the source code for JPetShop, the NonStop plugin for Eclipse and access to the NonStop manuals via the HP website. He was then left to his own to get it done. Two weeks after he started he demonstrated the application running on a Linux machine and on the NonStop – it was impossible to tell the two apart!



Modern Tools And Technologies

Many of HP's Integrity Nonstop server customers use Eclipse as their development environment. With the latest plugins installed into the Eclipse environment developers can execute the entire software development lifecycle in a single place. Eclipse allows developers to develop, deploy and debug an application all within a single tool – a tool that they learned and became comfortable with in school. For developers that are more comfortable with the Microsoft Visual Studio environment Nonstop also has a plugin for Visual Studio which allows for the development and deployment of application code within that environment. No matter which tool you use you will find that NonStop supports it – and supports it well! The bottom line is that intense training is not required to make a developer productive on a NonStop.

Since the job of an IT organization is to support the business in a timely fashion, time-to-market is the name of the game. To get quicker time-to-market a lot of organizations are now creating reusable components, that is programs that can be reused to create new functionality. This is usually referred to as creating a Service Oriented Architecture (SOA). An SOA can reduce integration cost, increase business visibility and agility, increase asset reuse, and ease regulatory compliance.

An SOA is not something that is purchased, it is an architectural pattern based upon decomposing architecture down to its primitives and then building it up again as sets of services that can be configured and reconfigured into the necessary solutions.

By using the SOA model IT organizations can react to the business desire for new functionality A Fortune 25 company was able to improve their productivity by adopting the SOA model, where they were previously only able to produce a single software release every twelve months, now they produce five releases every eighteen months – all without hiring more staff or reducing the size of a single release. These amazing improvements were possible because they first converted from Enscribe to SQL and then used the standard web offerings available on the HP NonStop server. An added benefit of the SOA was the reduction of defects that went into production since the majority of code was already well tested and understood by the development organization.

Another benefit of the SOA is that the NonStop is now able to offer its services to applications running on other platforms. The Nonstop is

Partial list of third party products that run on Integrity NonStop Blades

- ✓ ACI – Electronic payment solutions
- ✓ RSA – Security products
- ✓ TIBCO – Enterprise software solutions
- ✓ Logica – Electronic payment solutions
- ✓ Oracle – Golden Gate Software – Database replication software
- ✓ IBM WebSphere MQ – Message oriented middleware
- ✓ Fidelity Information System – Electronic payment solutions (CONNEX)
- ✓ BEA Weblogic – Enterprise application infrastructure
- ✓ Carr Scott – Enscribe to SQL
- ✓ Integrated Resources – System monitoring products
- ✓ Attunity – Database middleware

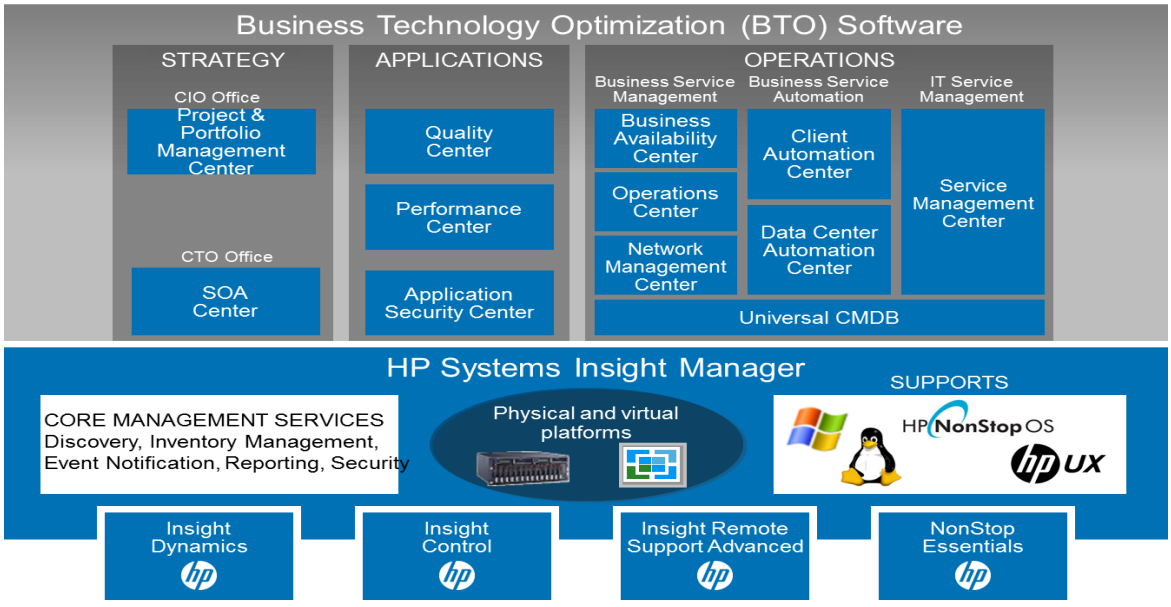
used for business critical functions – Functions that must always be available and scale as the business grows – while letting less critical functions run on other platforms such as MS Windows/UNIX/Linux. This separation of functionality allows an IT manager to use the right tool for the job. Since the NonStop uses industry standard tools such as SOAP and Java the decision as to where to run the component doesn't need to be made until after the program has been coded. For instance the program can be written in Java on a Linux machine and deployed to a NonStop for production, or a program that wasn't deemed to be critical can be moved to the NonStop once it becomes mission critical, all without program modifications.

System Management

Just as development managers don't want to hire and train developers to only work on a single platform, Operations Managers don't want to hire and train operators, system management professionals, security analysts and performance specialist for each platform they run. Integrity NonStop servers are a part of HP's recently launched Converged Infrastructure initiative. HP's Business Technology Optimization (BTO) and Insight Manager Software fully support the NonStop. This means that the industry's most comprehensive suite of IT management software for automating key IT processes on Windows, UNIX and Linux can be used to manage the NonStop. This translates into direct cost savings and increased flexibility.

To manage the SOA environment, HP's BTO software provides Project and Portfolio Management Center software which provides the Chief Architect and CTO with governance and management capabilities to help ensure a successful SOA deployment. This software runs on all of HP's offerings which will ensure a seamless implementation.

Operations Managers will be able to use HP's Universal CMDB to track all of the components in their shop. The BTO software dashboards provide role-based, real-time views of the enterprise along with their related KPIs. This complete picture allows for much quicker problem resolution. Instead of monitoring individual components (network, CPU, applications, database, etc.) the system management personnel see the entire application in a single view. This reduces the number of people that need to be involved to resolve a problem thus reducing costs and time to repair while increasing IT's value to the business.



Security

Security and compliance are high on every CIOs list of concerns. In the last few years PCI DSS (Payment Card Industry Data Security Standard), HIPAA (Health Insurance Portability and Accountability Act), and corporate accountability legislation such as Sarbanes-Oxley in the US, have entered the mainstream vernacular. Securing the enterprises IT assets involves much more than firewalls and anti-virus software. When choosing a platform for an application or database it is imperative that all aspects of it are looked out to ensure that it is safe and secure. HP's Integrity NonStop servers have an unparalleled level of security.

Implementing a proper security infrastructure requires a layered approach. It isn't good enough to have strong passwords that are changed regularly anymore. Today's security infrastructure must take a holistic approach. Systems must be secured from unauthorized users; data must be protected while it is in motion and at rest. Audit tools must exist that show what has been done and by whom. Without all of these components a system isn't truly secure. HP's Integrity NonStop servers deliver all of these security features and more.

The HP NonStop Safeguard product creates a strong foundation for security on the NonStop platform. Safeguard provides authentication extensions and fine-grained access controls, auditing of their use, and audit reporting. Guardian ACLs (Access Control Lists) allow customers to protect volumes, subvolumes, and files by controlling access by specific users.

Data must be protected while it is in motion across communication networks, and while it is at rest on mass storage mediums. In order to protect data in motion HP's NonStop server support the latest industry best practices; the SSH2 (Secure Shell version 2) protocol specification, SFTP (Secure FTP), and secure generic port forwarding for applications based on TCP sockets. For data at rest the NonStop server offers a choice of cryptographic algorithms for disk encryption. This disk encryption is configurable on a device basis to ensure maximum flexibility. To ensure that data at rest is fully protected, routine key rotation is performed, this key rotation does not require any application downtime. Applications that access protected disks do not need to be modified in any way to take advance of this very powerful feature.

HP NonStop SSH supports Public Key Authentication with key sizes of up to 2048 bit. Various ciphers such as Advanced Encryption Standard (AES) or Triple Data Encryption Standard (3 DES) and MACing algorithms can be selected.

Auditing is a key component of any security infrastructure and HP's Integrity NonStop server provides an advanced auditing capability. NonStop SSH makes it easy to find out who is accessing your system via SSH or SFTP and what operations were executed, enabling customers to comply with internal and external security policies. The NonStop server is fully integrated into the HP Compliance Log Warehouse for centralized log management, security controls monitoring and compliance reporting.

Since its introduction in 1976, the NonStop server platform has ***never*** had a virus or successful "hack" reported against it!

Make Your Data Accessible

To realize the cost savings and modern development techniques discussed above, IT managers need to release the data that has been trapped on their systems. If they are NonStop users today, and if all of their data is in a SQL database, this task is trivial; install HP's JDBC/ODBC software and allow other applications to access the data. If the data is contained in an Enscribe database it will need to be converted to SQL in order to take advantage of the tools and utilities that the development organization expects to be able to use. The safest and easiest way to convert the data to SQL is to use the Carr Scott Software, Escort SQL product. This product converts and transforms Enscribe data to industry standard SQL without requiring any program modifications. Since source code is not required the Escort product can be used to convert third party's application databases to SQL therefore opening up the data they house to other applications for additional uses. **Escort SQL allows IT organizations to use the most reliable, most scalable platform for their database of record.**

Another product to consider is Attunity Connect which provides SQL-like access to non-SQL data. The Attunity product provides out-of-the-box, real-time connectivity to a wide range of relational and non-relational data sources on platforms ranging from Windows to Mainframes. Using this product an IT organization can build an enterprise wide data bus that allows all computing platforms in the enterprise to access whatever data it needs in whatever format that data happens to be in. Making the enterprises' data accessible is the first step on the road to modernization.

"Agility is a key requirement for us—we have to meet the needs of the business in a timely fashion, providing exactly what the business needs, when it needs it. SOA in the NonStop environment has made this possible for us. With the software tools HP has released over the last few years, the NonStop server supports SOA just as well as a UNIX or Windows box does" – Marty Edelman – Director Advanced Technologies – The Home Depot

As we have discussed, even if your data is housed in Enscribe files you can easily modernize it; **there is no longer a reason for any enterprise's data to be inaccessible!** The NonStop platform supports numerous methods to allow this access via industry standard SQL. Once an IT organization has opened up their data they are well on the road to a new, modern, state-of-the-art computing environment. This new open platform allows them to be more responsive to the needs of the business.

"From our product perspective, we entered the marketplace by developing the framework underpinning the solution suite and offering it on UNIX platforms. However, after HP offered support for NonStop on Blades, the price point for supporting NonStop became attractive. Additionally, the availability of modern and open system tools on the Integrity NonStop system made the port very straightforward. Today we have a single code base across UNIX and NonStop." – Jose Thattil – Head Business Systems – Opus Software Solutions

The Proof Of The Pudding Is In The Eating

In early 2003 one of the largest retailers in the world needed to implement a new return processing system to increase customer satisfaction. Their current system was running on a NonStop computer and was written in TAL and COBOL using Enscribe as its database. The messages that were passed back and forth between the NonStop and the POS devices were binary in nature and very hard to maintain. The retailer knew that they had to modernize these applications so they could deliver new services to their stores. They knew that they had to maintain the stellar uptime and response time that they had enjoyed with the NonStop but they also needed a modern system that would last them for the foreseeable future. Their in-house development team was small and not experienced with newer technologies so they supplemented the team with 4 consultants (2 senior and 2 junior developers) this team of 6 developers then set off to create a new state-of-the-art system.

Working with the POS development team they decided to use XML messaging, this allowed them to utilize 3rd party tools to build, debug, and maintain the system. The NonStop team knew that the first thing they needed to do was to convert the database from Enscribe into industry standard SQL. They purchased the Carr Scott software Escort SQL product and used that to convert the data. Not only did they convert to a SQL database but they also were able to redesign the database to a more modern format all without changing the existing application.

Now that the database was in an open SQL format, the team began to design the next generation system. They decided to use the NonStop iTP webserver as the gateway between their application and the POS devices. They implemented a simple CGI process that acted as a router which gave them the flexibility to add new services to the NonStop without having to change the rest of the application. They also decided to architect and design the entire system using SOA principals to allow flexibility in the future. Armed now with a SQL database, XML messaging, and a SOA mindset they started to rewrite the system.

Using SOA principals they designed all of their programs as reusable components. These components handled a single function and were all designed for reusability. The database was comprised of 25 SQL tables all tied together using a common key. Four skeleton programs were written, one to insert data, one to update a record, one to read the data and one to delete the data. These skeleton programs contained all of the non-business logic required by a program: initialization, cleanup, read and reply to a message, logging, statistic collection, error handling, etc. This skeleton greatly simplified development and support since all of their programs have the same look and feel.

Once the skeletons were thoroughly debugged and documented, they were given to the rest of the developers to add the necessary business logic for each table. In parallel with these database programs, an XML parser was developed that parsed the incoming XML, sent it to the database servers, and in general acted as the workflow engine. Eight weeks after development was started the entire system was delivered to QA, 6 weeks after that it went into pilot. Now 7 years later that system has been running and supporting the business as they have grown. Due to the reliability and ease in which new features and functions can be added, the NonStop has become the payment hub of the enterprise. The database servers that were created for the returns system have been reused to support many features that were not thought of at the time of development, all without having to be modified The users of the system are amazed at how quickly new functionality can be added to the system and the IT team gained the respect and admiration of the entire corporation.

SUMMARY

With the introduction of new servers, software, storage, and services, along with the powerful and flexible NonStop Advanced Architecture, HP's Integrity NonStop servers now offer the marketplace the best platform for delivering the highest application service levels at the lowest total cost of ownership, with a very rapid return on investment.

The HP Integrity NonStop platform not only capitalizes on the proven traditional NonStop capabilities, but also extends them to a new and open paradigm thus enabling a larger market to experience the benefits of the Integrity NonStop Server. When user services levels are paramount, customers can trust NonStop Servers for their most critical business applications.

For more information on the HP Integrity NonStop family of servers please visit www.hp.com/go/nonstop

CREATIVE SYSTEM SOFTWARE

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