

Itanium®-based Servers Power National Blood Database



“NHSBT has been operating across all aspects of blood donation and processing, testing and issue with a single national database. The effective implementation of IT technology has enabled a single resilient database which has improved efficiency, reduced data duplication and lowered business costs.”

– Lynda Hamlyn, chief executive, NHSBT



The U.K.'s National Health Service Blood & Transplant organization (NHSBT) initiated its “Pulse Renewal” project to enhance its core business—saving lives. The project delivered a multi-datacenter disaster-tolerant national system that manages the entire supply chain of blood products all the way from donors, through testing and blood product production, to the safe and timely issue of blood products across England and North Wales. The “Pulse Renewal” system holds the world’s largest single national database of blood donors.

The “Pulse Renewal” project combined several technical and business objectives:

- Evolve from multiple regional systems to a single national system with a consistent, merged national database.
- Enhance application functionality in specific areas.
- Increase availability, improve performance, and provide multi-site disaster tolerance using HP OpenVMS* clustering and host-based volume shadowing, running over a segmented infrastructure built on HP Brocade FC switches and HP ProCurve* network switches.
- HP AlphaServer* to Integrity* (Itanium) migration combined with HSG80 to EVA migration as existing servers and storage subsystems approached the end of their service lifetime.
- Ensure minimal loss of service and minimal risk during the implementation of the new system platform and during the data migration.

To meet this challenge, XDelta Limited (<http://www.xdelta.co.uk>) architected and led the implementation of the industry’s current best practice for the design and implementation of disaster-tolerant OpenVMS clusters on Itanium®-based HP Integrity servers.

Several organizations were involved in this mission-critical project:

- NHSBT: The end users (www.blood.co.uk)
- Savant: The application provider and system maintainer (www.savant.co.uk)
- Mimer: The database vendor (www.mimer.se)
- OCSL: The hardware reseller (www.ocsl.co.uk)
- HP: The manufacturer (www.hp.com)

Challenges

The changes required to migrate from the HP AlphaServers to the new HP Integrity Servers were extensive, including application development, storage migration from HSG80 to EVA, a new backup infrastructure, not to mention major version changes with the Mimer SQL database, the OpenVMS operating system and the server hardware platform. This complex and technically demanding challenge was divided into a number of phases:

- The first issue was to see if the project was feasible at all. A “proof of concept” system using the Integrity servers reduced an initial test data migration – the first hurdle to success – from several days down to a few hours.
- Next, the “go-live” data migration plan had to minimize the outage time while migrating and merging data from the existing three regional systems. The proof-of-concept system was again used to optimize and validate this plan.
- The remaining major challenge was to design a multi-site disaster-tolerant infrastructure capable of modification with minimal downtime. The team segmented the systems into separate environments with a common core infrastructure, divided the network into “availability domains,” and established an unambiguous naming convention for all of the components.

Results

In 2007, the team began porting the application and SQL database to the Integrity platform in parallel with the build and delivery of the new system platform. Then a three-stage data migration process was completed during August and September 2008. The process first moved data from one of the old regional systems to the new system. The new system established confidence and validated performance data. The second stage merged the second regional system’s data into the new system, thus proving the data merge process. Finally, the third regional system’s data was merged in to the new system to complete the single national database.

As a result of the project, the NHSBT has achieved its business and technical objectives:

- The Integrity servers reduced the data center space requirement from a total of nine 2m racks to just five, including storage, network and monitoring hardware.
- The servers provide four to five times the performance in a third of the physical space.

- Backup and restore times are between three and four times faster.
- Huge increases in overall system throughput and fiber-optic bandwidth slashed data replication times and deliver consistently rapid response times.
- Maintenance and support costs have been reduced.

Moreover, NHSBT has experienced zero system outages since the Itanium-based system was put into live production, helping it meet its life-saving mission.



Colin Butcher, Founder and President of XDelta Limited, led the Pulse Renewal project

System Configuration

Hardware: Three HP Integrity* rx6600, each with three dual-core Intel® Itanium® processors, 64 GB memory; six HP Integrity rx2660 servers, each with dual-core Intel Itanium processors and 16 GB memory; five EVA* 4100 storage arrays; two MSL4048 tape libraries; four ProLiant* DL380 management stations; four HP SANswitch 4/32B; four HP ProCurve* 3500yl; two physically separate inter-site DWDM fiber links.

Operating systems: OpenVMS* V8.3-1H1, OpenVMS clustering, OpenVMS host-based volume shadowing, OpenVMS TCP/IP services (HP)

Applications: Pulse applications (from Savant), Mimer SQL database (from Mimer)

Benefits of Itanium

With greater processing and I/O performance, the Itanium®-based servers can run the entire national system within a single physical machine while leaving room to expand both CPU and memory capacity.

OpenVMS* renowned compatibility between Alpha* and Integrity* simplified the porting of applications and minimized retraining for support.

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