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Fluid Data Management: Cure for Storage Headaches

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Within the Republic of Ireland's Health Service Executive (HSE), small teams of dedicated IT professionals face a constant challenge to maintain the systems that enable thousands of different health and social services to be delivered in hospitals and communities all over the country, 24 hours a day. In this environment, innovative technology solutions that help alleviate and automate the burden of data management make an enormous impact.

Coping With the Data Explosion

The last few years have witnessed nothing short of a data explosion in the health sector. The Galway University Hospitals are a prime example of the impact of such a surge.

Galway University Hospital is one of the major academic teaching hospitals in Ireland, made up of University Hospital Galway and Merlin Park University Hospital Galway.

Our two constituent hospital facilities provide secondary, regional and cross border services for the HSE. We have nearly 40 departments, ranging from haematology to hepatology, cardiology to geriatrics. Each of these departments demands multiple complex IT systems, and each of these systems has its own server and storage requirements, ranging from clinical databases, patient data, and file and print. I and my colleague Richard Malone, GUH's server and storage manager, look after all of these server and storage requirements.

When HSE began incorporating facilities in Galway into one overarching management unit, scalability, flexibility and ease of use were vital requirements in the technology evaluation process. Our own IT team is very small, employing no more than five technical operatives at any one time, so we have to cut our cloth to fit our resources. That's why when we look to deploy new technology; we have to select solutions that are intelligent and intuitive while also being manageable by any member of our team. We need something that will work straight out of the box without the need for hand-holding.

The move to a consolidated, virtualised server environment only accelerated the need for true storage virtualisation. Legacy storage systems couldn't cope with the allocation needs of the virtualised machines. The hospital departments were unable to accurately estimate their ongoing storage requirements – some of our bespoke clinical applications were only using a fraction of their estimated allocation while others were using more than expected and hitting their assigned limits.

As a result, the team and I spent the majority of our time administrating and fire-fighting issues arising from storage concerns. The wastage of disks and complex out of hours' storage were particular issues. By June 2008, our storage levels were at a critical level; not only were we on the verge of running out of storage, but we were close to capacity on the storage area network (SAN) we were currently using.

Our problems were compounded further by the fact that our existing SAN was also past its end of life and could not be upgraded. Our only option was to buy a new one. However our incumbent SAN vendor was unable to make the necessary reassurances that an expansion project wouldn't simply run into the same problems again after a few years. It was time to find a permanent solution that could help the GUH break free from the boundaries of its legacy storage environment.

Breathing New Life into the Storage Environment

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The team and I searched for a solution to resolve five key storage issues. These were:

1. Easy administration that would relieve some of the burden from an overworked team.
2. Smarter storage allocation for a wide range of departmental needs.
3. Scalability for the foreseeable future without 'rip and replace' expansions.
4. No fear of an end-of-life full upgrade for at least the next five years.
5. A more efficient SAN that reduced day-to-day running costs.

After approaching and considering solutions from more than half a dozen leading SAN technology providers, HSE Galway University Hospitals chose to implement a virtualised storage solution from Compellent.

We made this decision after the fluid data technology capabilities of the SAN won the team over. This new storage framework could also be utilised through the entire organisation, and for me in particular, the ease of management promised from such a flexible and powerful system was the key factor behind our switch.

Another compelling benefit was that we could get a huge array of advanced features and expansion possibilities with fewer overheads. With the new SAN we have been able to reduce the ever increasing costs associated with managing a storage infrastructure. These costs are usually made up of: data centre space, power and cooling, acquisition costs and the cost of storage administrators.

Immediate Efficiency Benefits

Having installed the solution, the team and I have found immediate efficiency benefits. Fluid data technology such as advanced thin provisioning automatically optimised capacity utilisation for the hospital. Today, Galway University Hospitals are able to expand their storage capacity on demand without over-purchasing upfront. In fact we have eliminated the need to preallocate storage and server space altogether.

As our data requirements grow, we can add more drives on the fly without any downtime. The system's thin provisioning technology has proven extremely effective in maximising capacity utilisation across such a diverse and departmentalised infrastructure. This feature of the new storage solution radically reduced the number of disks that the IT department needed to purchase. The new SAN only consumes disk space when data is actually written, which therefore results in less storage being taken up, but this does not sacrifice overall performance. Since implementation, the hospital's average disk utilisation has increased by 30 percent.

At the same time, the automated tiered storage functionality optimises data placement and increases performance. The solution's built-in intelligence classifies and dynamically migrates block-level data to the ideal tier based on usage patterns. As a result, we can now store infrequently accessed data on lowercost SATA drives.

Today, 70 percent of all of our data has migrated to lower tiers that are SATA drives. The new system's fast track technology has also ensured that the most frequently accessed critical data is always located on the outermost, fastest tracks of our toptier fibre channel drives. If our storage requirements continue to expand at the estimated 20 percent each year, the hospital will realise huge benefits by scaling with SATA drives rather than the more expensive fibre channel drives.

Achieving Peace of Mind With Fluid Data Management

To further increase operational efficiency within the IT system, the system's advanced storage virtualisation has proved to be the perfect complement to our VMware virtualisation environment. The new system creates a smart, shared pool of storage resources that streamline administration for the hospital's physical servers. This fluid data management allows the team and I to provision new virtual servers and dynamically allocate resources across that pool of virtual machines as demands dictate.

The IT team at Galway University Hospitals now manages an environment consisting of 52 virtual servers and 20 physical servers. By deploying a virtual data centre, we were able to more effectively manage our data centre resources and shrink our data centre footprint through reduced expansion costs and facility limitations. Crucially for our bottom line, this means that we save significantly on disk costs.

From a human resource perspective, the new SAN solution is much easier to administer; which frees up administrators time and eliminates the need for extensive out of hours or weekend work. While the team used to spend four hours a week solving storage administration issues, we estimate that we now spend less than one hour a week managing the new SAN. With so much more time at our disposal, we can now return to our key focus: working to provide the most secure and efficient environment to enable our staff to carry out the best possible care for all of our patients.

As a final benefit, through using less physical servers we have significantly reduced our power and cooling costs, enhancing our green

credentials in doing so. Using the SAN's enterprise manager resource management software, the IT department is able to view a 'Green Report' a powerful tool to assess energy and CO2 costs emissions. For all these reasons, we are now working towards 100 percent data centre virtualisation across all departments.

After installing the new system, it is clear that data management is, quite simply, a whole lot less stressful. There is more sanity and space in the data room and more services are coming onboard across the virtualised environment to support medial certification requirements.

The IT team and I can now rest easy knowing we have a simple yet advanced up to date solution, but also the flexibility and facilities for future growth. Overall, our experience with our new storage architecture has been ten out of ten.

HITM Analysis –Bulging at the Seams: Healthcare Data

Hospital data centres are no longer tucked away in departmental basements – out of sight, out of mind. They have moved to the hub of hospital management concerns, driven by both techno-operational factors as well as the explosion in healthcare data. Much of this is required for clinical decision making, often in real-time.

Today's data centres are also increasingly centralised, and space is becoming a premium. So is power. Though newer technologies permit storage of far more bits and bytes per cubic metre, they also generate much more heat – and require dedicated cooling solutions—which use both extra power and space. As hospitals grow or rationalize, those who prepare pathways for their data centre requirements will be best positioned for the future – in both operational/financial as well as clinical terms.

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