Case Study: News UK Transformed Its Data Center To Become More Agile

by Sudhanshu Bhandari, December 6, 2013

KEY TAKEAWAYS

Resist Shortcuts When Planning Your Data Center Transformation

Data center virtualization and investments in high-density compute infrastructure alone aren't enough to get real, measurable benefits from a hybrid cloud data center. Organizations need to carry out data center transformation of all aspects of IT infrastructure delivery landscape.

Focus On Service Management As The Foundation Of Data Center Transformation

Service management processes will play an important role in managing the future IT infrastructure landscape, which is hybrid mix of legacy systems, private clouds, and the public cloud. As a result, it's important to have efficient processes and tools to facilitate the data center transformation and manage the new IT portfolio.

Avoid Creating Legacy IT Infrastructure Silos

Older technologies will limit your ability to innovate and will lead to overhead that will keep you busy in day-to-day operations. Step-by-step transformation to phase out legacy silos should be the focus for I&O pros and doing constant innovation will give immense business benefits and competitive edge.

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WHY READ THIS REPORT

In the past decade, news media companies have witnessed substantial disruptive changes in their marketplace, spurring them to significantly accelerate their IT transformation initiatives. As we have seen in other industries facing similar market conditions, transforming an organization's infrastructure and operations (I&O) is key to addressing these challenges. In 2008, News UK was one of a few news media companies embarking on infrastructure transformation. The firm's data center transformation delivered a modern, agile, lean, and resilient infrastructure in a colocated data center with automated disaster recovery and business continuity. But transformation is never easy, and News UK's journey was no exception. This Forrester case study examines News UK's successful approach to data center transformation to help organizations facing similar projects.

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Notes & Resources

Forrester interviewed News UK and HCL Technologies for this report.

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TRANSFORMATION DRIVERS: AGILE, SCALABLE, AND LEAN IT INFRASTRUCTURE

News UK, which is part of the diversified global media and information services company News Corporation, publishes The Times, The Sunday Times, and The Sun newspapers. As of 2008, News UK was operating four data centers in London, containing a total of 931 servers in 170 racks and drawing an aggregate 388 kilowatts (kW) of power. The firm was fast running out of spare data center space to scale up to business requirements, experienced frequent outages, and had proprietary systems that had reached their end of life and were due for refresh. At the end of 2008, News UK initiated a data center transformation program and selected HCL Technologies, an Indian IT services provider, as its partner. News UK wanted to:

- **Reinvent the company to thrive in a post-newspaper world.** Media markets are undergoing substantial and disruptive changes. Print media advertising revenues continue to decline, and income from online advertising and paid online content isn't growing fast enough to compensate (see Figure 1).[1] In order to sustain its place in the media landscape, News UK not only needed to provide distinctive, high-quality journalism, it also had to create a subscription model that people would pay for. The company realized that it needed an agile, scalable, and elastic infrastructure that could quickly adapt to change. The results have been positive: News UK was the first newspaper group in the country to charge for online content and as of October 2013 had 150,000 subscribers to the digital versions of The Times and The Sunday Times.[2]

- **Optimize existing IT operations.** News UK's holding company, News Corporation, carried out a high-level IT infrastructure assessment and found that it could save $21 million by centralizing its data centers. The company found that it could not only optimize operational expenditures (opex) by using new hardware platforms and technologies, it could also significantly improve IT capabilities and delivery performance by consolidating its infrastructure and abandoning its proprietary platform.

- **Replace end-of-life systems.** News UK's legacy IT infrastructure was due for replacement, as it had reached the end of its product life cycle. It hadn't patched or rebooted several of its IT infrastructure hardware components for years, leading to frequent outages. Failover to the disaster recovery (DR) site required significant effort and often did not work as expected. News UK coupled the hardware refresh with consolidation and virtualization to get maximum benefit from the transformation program.

Figure 1 Rising Online Ad Revenues Aren't Compensating For Lost Print Ad Revenues

Advertising revenues at US newspapers
(millions)

Year	Print	Online	Total
2003	$44,939	$1,216	$46,155
2004	$46,703	$1,541	$48,244
2005	$47,408	$2,027	$49,435
2006	$46,611	$2,664	$49,275
2007	$42,209	$3,166	$45,375
2008	$34,740	$3,109	$37,848
2009	$24,821	$2,743	$27,564
2010	$22,795	$3,042	$25,838
2011	$20,692	$3,249	$23,941
2012	$18,931	$3,370	$22,314

Note: Numbers have been rounded.
Source: Newspaper Association of America

104001   Source: Forrester Research, Inc.

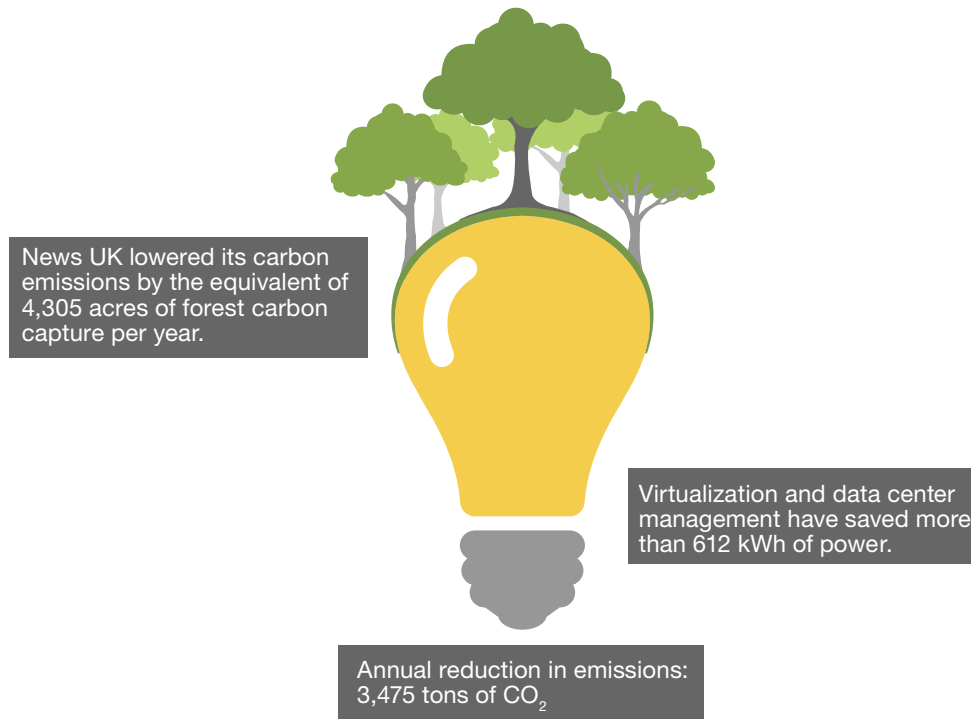## TRANSFORMATION AREAS: VIRTUALIZATION, COMPUTE, STORAGE, AND NETWORK

News UK's IT infrastructure transformation can be broadly classified into four main areas. In 2009, the I&O organization embarked on an 18-month transformation program, followed by a data center colocation project.[3] Starting in August 2010, News UK launched an aggressive timetable to look at public cloud offerings and make strategic investments to help it smoothly transition to delivering IT infrastructure via the public cloud. The firm considered all aspects of IT infrastructure delivery and implemented the latest technologies to achieve its transformation goals:

- **Virtualization.** In addition to refreshing its hardware, News UK virtualized more than 80% of its data center infrastructure, achieving a server consolidation density of 16:1.[4] Virtualization proved a logical step in creating virtual containers for legacy applications that could be moved to Amazon Web Services (AWS) cloud infrastructure. This also helped News UK simplify the management of multivendor storage and improve capacity planning and provisioning, automated DR failovers, and backup procedures.[5]

- **Compute and operating system.** News UK replaced its legacy SPARC servers running Solaris with HP ProLiant G6 x86 servers running SUSE Linux to get better performance at a much lower cost. It consolidated its 170 racks onto 12 HP BladeSystem C7000 Chassis with HP Virtual

Connect. The choice of x86 platform was based on the decision to move away from proprietary hardware and in consideration of the robust remote infrastructure management capabilities of HP's Integrated Lights-Out (iLO) and Onboard Administrator management tools.[6] The high server density reduced power consumption by 40% (see Figure 2).

- **Storage.** News UK wanted to replace multiple Hitachi, Oracle, and IBM storage area networks (SANs) with Hitachi network-attached storage (NAS) via the BlueArc HNAS appliance; it also wanted to implement common Internet file system (CIFS) network storage. However, the firm encountered I/O problems when it moved data from its existing SANs to NAS. In order to meet the business's capacity and performance requirements, News UK used Hitachi adaptable modular storage (AMS) as back-end storage for the HNAS appliance. It further transformed its storage infrastructure at the time of colocation by using the Hitachi virtual storage platform (VSP) to implement storage virtualization, thin provisioning, and tiering with flash drives. This reduced News UK's storage costs from £10,000 per terabyte (TB) to £4,000 per TB, reduced provisioning time, and automated the DR failover process using storage replication.

- **Network.** News UK had a legacy nondistributed 1 Gbps network from Cisco Systems that had also reached its end of life. Backup, network file system (NFS), video, critical, and best-effort traffic were uncategorized and used the same physical and logical network components. This caused multiple intermittent outages and affected critical applications. As a result, the firm deployed two Cisco 6500 Virtual Switching System pairs in its existing data centers to migrate from physical servers to virtual and blade servers. News UK deployed its new colocated data centers using the Cisco Nexus product line, significantly reducing the total number of devices.

Figure 2 News UK's Data Center Transformation Reduced Its Environmental Impact

News UK lowered its carbon emissions by the equivalent of 4,305 acres of forest carbon capture per year.

Virtualization and data center management have saved more than 612 kWh of power.

Annual reduction in emissions: 3,475 tons of CO_2

104001   Source: Forrester Research, Inc.

TRANSFORMATION APPROACH: PARTNER AND OPTIMIZE

News UK had to accomplish the data center transformation and optimize operational expenditures while both keeping the lights on and not affecting newspaper production. To do this, the firm needed to build some strategic partnerships and change its existing processes and technology. News UK followed a step-by-step approach to ensure a successful business outcome:

1. **Outsource infrastructure management.** In 2009, News UK began its transformation by partnering with HCL to outsource I&O management and transformation delivery, including support for the new IT infrastructure — skills that News UK did not have in-house. HCL led the project; it formed two separate teams (steady-state delivery and project) with common leadership to support I&O and transformation activities. News UK provided dedicated project managers for each initiative to ensure that day-to-day operations did not slow progress. The transformation was a turnkey project with fixed scope and a fixed price; News UK applied any outsourcing-derived cost savings to IT innovation.

2. **Transform service management.** It was important for News UK to have mature ITIL processes in place to ensure that outsourcing and transformation activities did not affect newspaper production. The firm created an in-house service management team comprised of incident managers, a change manager, and a problem manager reporting to the service operations manager. Part of the transformation was to define these roles, define service management, and deliver training.

3. **Consolidate the data centers.** In the midst of the service management transformation, News UK carried out capacity planning, design, and a proof of concept for data center consolidation. Once the firm finished the service management transformation, it began a production rollout of the data center consolidation — one of its main technology transformation objectives. The firm achieved this via virtualization and by consolidating services on high-density hardware, storage devices, file shares, file and print servers, and monitoring tools (see Figure 3).

4. **Migrate the data center platform.** During the consolidation, News UK also migrated from legacy proprietary hardware and software to open source (see Figure 4). The firm set up an automated build process for mass deployment of physical and virtual servers running SUSE Linux and Windows 2008 Server. In the end, News UK was able to migrate 95% of its servers to x86 boxes.[7] However, it could not migrate to CIFS due to HNAS performance issues.

5. **Colocate the data centers.** Colocation was not part of the original data center transformation project. But once News UK consolidated the data center and migrated to the new platform, it unveiled plans to sell the "Fortress Wapping" site and move the IT infrastructure within six months. The firm had the option of either moving the data center to its new office or to the DR site in Peterborough; in the end, it decided that lifting and shifting the IT infrastructure and performing a live migration of virtual machines to a third-party data center was less risky than building its own data center. With HCL's help, News UK seamlessly transferred its IT infrastructure to TelecityGroup data centers within three months; using the latest technology significantly reduced the duration and risk of the migration.[8] Currently, Telecity manages the data center facility and HCL provides offshore infrastructure management.

6. **Virtualize storage.** During the data center colocation, News UK further transformed the storage infrastructure, using the Hitachi VSP platform to introduce storage virtualization, thin provisioning, and tiering with flash drives. The multiple modular AMSes continued to be the back end for VSP; this, along with thin provisioning and tiering, kept per-terabyte costs low. With storage virtualization, the colocation was seamless; it did not disrupt the business or operations. Introducing thin provisioning helped reclaim nearly 250 TB per site — 500 TB across both sites. News UK used the reclaimed capacity for its newsroom project, which involved the transformation of the application landscape.

Figure 3 Key Actions In News UK's Data Center Consolidation

Replaced Oracle SPARC servers with HP ProLiant G6 x86 servers with HP Virtual Connect.
Decommissioned 33 units of legacy IBM storage and eight legacy SAN switches. Consolidated more than 700 terabytes of data on Hitachi AMS and an HNAS storage unit.
Consolidated multiple Windows NT and Windows 2000 file and print servers onto a four-node Windows 2008 Server cluster.
Transformed NFS file shares from four-node NFS servers to an HNAS appliance.
Consolidated Solaris servers providing FTP services and migrated to Globalscape's EFT secure file transfer.
Consolidated multiple instances of HP Operations Manager and HP Network Node Manager.

104001   Source: Forrester Research, Inc.

Figure 4 Key Actions In News UK's Platform Migration

Replaced Oracle Solaris with SUSE Linux.
Migrated its network information system (NIS) and SunOne LDAP to eDirectory.
Migrated Ethershare and Samba to ExtermeZ-IP.
Replaced its Check Point firewall with one from Juniper.
Replaced its Bluecoat proxy appliance and Zscaler with ScanSafe Proxy.
Migrated Nimsoft Indicative monitoring to HP Operations Manager and Cacti.
Migrated and transformed 190 complex file shares to HNAS, which resulted in the decommissioning of four-node Solaris servers.
Replaced Symantec Veritas Cluster Services (VCS) with VMware High Availability, Distributed Resource Scheduler, and Site Recovery Manager.

104001   Source: Forrester Research, Inc.

RESULTS: CLEAR FINANCIAL SAVINGS AND A SCALABLE IT INFRASTRUCTURE

The transformation lowered News UK's opex from £6 million per year to £3.4 million — a savings of 46% — and allows the I&O team to quickly deliver IT infrastructure to the business. Server provisioning, which used to take months, now takes only a few days. Between 2010 and 2012, the amount of information News UK stored grew by 175%, from 800 TB to 2.2 PB — which itself bears testimony to the IT delivery capability. The company realized several benefits:

- **Fewer servers.** News UK reduced the number of physical servers by 80%, from 931 to 194.

- **More efficient storage.** The company decommissioned 33 units of legacy IBM storage and eight legacy SAN switches. It also consolidated more than 700 TB of data onto Hitachi AMS and an NAS appliance.

- **A seamless colocation process.** Storage virtualization helped ensure that News UK's data center colocation was smooth and did not disrupt the business. Thin provisioning also helped the company reclaim an additional 500 TB of storage.

- **Greater energy efficiency.** News UK reduced its power draw by 40%, from 388 kW to 230 kW, equivalent to a 20x fully loaded legacy blade chassis. The company thus significantly reduced its carbon footprint.

- **A smooth transition to the cloud.** Having virtualized 90% of its data center environment, News UK is now working with AWS to move these virtualized containers to a public cloud infrastructure. One-fifth of its current IT infrastructure already runs on the AWS infrastructure-as-a-service cloud.[9]

R E C O M M E N D A T I O N S

RECOGNIZE THE VALUE OF PLANNING, PARTNERING, AND OPTIMIZATION

IT infrastructure management requires significant investment. You need to plan a data center migration and consolidation, even if you still plan to invest in your existing data center, use a third-party data center, or scale up using the public cloud. News UK's experience is relevant for medium-size enterprises struggling to manage operational expenditures while at the same time providing innovative IT resources at the speed demanded by the business. I&O professionals should:

- **Adopt cloud in incremental steps.** You can get quick wins by moving some of your existing IT infrastructure workload to the cloud — but moving the majority of your IT infrastructure there *and* getting measurable benefits will require a substantial amount of planning and time, as well as a lot of iterations. It's important to have right IT transformation architects, processes, and partners in place to design a data center of the future that will share instances across a mix of private, public, and hybrid cloud deployments.

- **Segregate duties to speed up data center transformation.** Keeping the lights on is I&O's first priority, so transformation projects often miss deadlines due to the requirements of day-to-day operations support. It's important to finish data center transformation programs in 12 to 18 months; any longer and the technologies you plan to use will be obsolete and the lack of standardization will yield diminishing results. For production rollout, it's important to have designated internal roles and a dedicated transformation team that is responsible for completing the transformation project within the stipulated timeline. However, you also need to involve various departments, including the I&O team, from the onset of the data center transformation program and ensure that they are committed to achieving the transformation goals.

- **Design the right operational matrix.** Data center transformation program success is often associated with virtualization targets, consolidation densities, power savings, and number of servers decommissioned. It's often easy to meet, and even surpass, these targets, because the influx of server commissioning requests will increase once the new infrastructure is commissioned. You'll also find that you can decommission 20% of the configuration items without transforming them. The key is to demonstrate to the business that you're doing what's crucial for them: reducing service provisioning times, improving application performance, and reducing the number of outages.

- **Accurately assess existing storage performance requirements.** If you're considering storage transformation, it's important to properly assess your current storage performance requirements. Look at future business growth and the storage requirements to enable storage-level replication. Your storage growth forecast should be aggressive — the amount of data that companies store is growing by 20% to 25% each year.[10] It's also important to have the right monitoring tools to measure end-to-end performance statistics to troubleshoot performance issues.

- **Do not limit the data center transformation to compute, storage, and networks.** Look at all aspects of IT infrastructure delivery and carry out a series of back-to-back transformations so that you can build a robust, scalable infrastructure. The transformation road map should avoid creating infrastructure silos that are difficult to manage and which keep you from adopting the latest technologies. In addition to transforming its compute, storage, and networks, News UK also transformed its FTP servers, NIS and LDAP services, file shares, firewalls, proxy servers, monitoring tools, and relational databases. The rationale was to increase cost savings via automation and create a cloud-ready infrastructure.

SUPPLEMENTAL MATERIAL

Individuals Interviewed For This Report

We would like to acknowledge the contributions of the following individuals to this report:

Chris Birch, News UK

Dinesh Bishnoi, HCL Technologies

Mahesh Karpur, HCL Technologies

Nick Leake, formerly of News UK

Anuj Mehrotra, HCL Technologies

Pankaj Sharma, HCL Technologies

Danny Tedora, News UK

ENDNOTES

[1] For every $15 in lost print revenues, there's only a gain of $1 in digital revenues. Source: Rick Edmonds, Emily Guskin, Amy Mitchell, and Mark Jurkowitz, "Newspaper: By the numbers," The Pew Research Center's The State of the News Media 2013 report, May 7, 2013 (http://stateofthemedia.org/2013/newspapers-stabilizing-but-still-threatened/newspapers-by-the-numbers/).

[2] Source: "World-class content of The Times and Sunday Times has delivered over 350,000 subscribers," News UK press release, October 17, 2013 (http://news.co.uk/2013/10/17/world-class-content-of-the-times-and-sunday-times-has-delivered-over-350000-subscribers/).

[3] A colocated data center is a type of data center that rents equipment, space, and bandwidth to customers. Third-party colocation providers provide space, power, cooling, and physical security for the server, storage, and networking equipment and connect them to a variety of telecommunications and network service providers.

[4] News UK used VMware vSphere Hypervisor for server virtualization and Hitachi Virtual Storage Platform for storage virtualization. It did not virtualize backup media servers, legacy sunset applications on Solaris, or Oracle database servers, instead migrating them to a physical x86 blade host.

[5] News UK used storage-level replication along with VMware site recovery manager for site DR; it used vStorage API for virtual machine backups.

[6] In 2010, HP provided converged network technology that allowed a new class of blade interconnect using the Virtual Connect Flex-10 10 Gb Ethernet Module. This allowed News UK to move, add, and change the servers inside BladeSystem transparently to external network connections. Virtual Connect reduced costs and simplified connections to LANs and SANs.

[7] News UK did not transform 47 Solaris servers hosting legacy apps due to the application support matrix and because they were sunset applications. The transformation team was not able to move the entire SunOne LDAP to eDirectory because of legacy Solaris operating systems. It also encountered performance issues in migrating Ethershare Mac share volumes to Samba, and resolved this by implementing ExtremeZ-IP. There was a plan to replace the Bluecoat proxy with a ZScaler proxy, but in the end News UK chose to replace it with a ScanSafe proxy.

8 News UK leased the swing kit for the compute and storage migration. The company purchased new network devices for colocation that allowed it to consolidate networking equipment as part of the colocation project. News UK used Cisco Nexus to consolidate network devices, reducing the number of devices from 120 to 30.

9 News UK is working on using AWS Direct Connect to establish a private network connection to reduce cost, increase bandwidth, and provide a more consistent network experience than Internet-based connections.

10 The average volume of data held by enterprises in North America and Western Europe increased almost 50%, from about 2,200 terabytes (TB) to 3,200 TB over the last two years, as unstructured data grew fastest. See the June 24, 2013, "Hardware Trends 2013: Data-Intensive Firms Lead Adoption Of Next-Generation Computing" report.

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