# Building a Community Cloud for Employees and Businesses

## City council uses Cisco FlexPod to offer community cloud services to staff and for small and medium-sized businesses

### EXECUTIVE SUMMARY

**Customer Name:** Salford City Council

**Industry:** Public Sector

**Location:** United Kingdom

**Number of Employees:** 11,000

#### Challenge
- Support growth of small and medium-sized businesses
- Overcome infrastructure capacity constraints
- Transform IT from cost base to revenue stream

#### Solution
- Community cloud based on FlexPod

#### Results
- Up to 99 percent server virtualization, helping provision private cloud services to local businesses
- Server capacity increased by 50 percent, improving delivery and responsiveness of applications
- Five-to-one reduction in data center floor space requirements, providing room for revenue-generating hosting services

### Challenge

Salford City Council is one of 10 metropolitan district councils within Greater Manchester in the northwest of England. Covering an area of 9957 hectares and with a population of 230,000, Salford includes inner city, residential, and rural areas.

The Council is an eager adopter of new technology and is keen to put its technological expertise at the service of employees and citizens. It was one of the first government organizations in Europe to use Cisco® voice over IP (VoIP) technology on a large scale, creating the continent's biggest public sector VoIP deployment in 2003.

Salford has highly advanced data facilities by public sector standards. However, capacity constraints were beginning to appear. "We put a lot of virtual servers in there," says Jonathan Burt, corporate infrastructure architect at Salford City Council, "with 32 hosts on top of one storage array, effectively forming a single point of failure. A lot of network cables ran from the individual servers, each of which had four network, two fibre channel, and two power connections. That was a lot of infrastructure to support and manage. Also, we had multiple back-up platforms with different arrays, so it was a very complex design indeed."

A 12:1 consolidation ratio, going from almost 400 physical servers down to 32 hosts, had been accomplished. This was a major achievement, but the infrastructure's power, cooling, cabling, and switch port requirements were still considerable.

Also, employees were consuming IT in new and different ways. Increasingly, devolved Council departments and subsidiaries were deploying their own IT equipment and operating independently. As well as duplicating effort, this fragmentation led to security and compliance problems. In response, the Council wanted to offer IT services in a more controlled and cost effective way, both internally and for other organizations in Greater Manchester. Salford would need to stop thinking about building a private cloud for its own users and instead move to a multitenant community cloud model.

> "We were very keen to look at community cloud solutions that could unify servers and storage with a single fabric, while significantly reducing our cable stack.""

Jonathan Burt
Corporate Infrastructure Architect
Salford City Council

## Solution

Salford has worked with Cisco for around 15 years and closely tracks technology developments. When Cisco launched its Unified Computing System™ (UCS®), Salford was interested in exploring the potential advantages but it had to wait until its existing server estate had reached end of life.

"We were very keen to look at community cloud solutions to unify servers and storage within a single fabric, while significantly reducing our cable stack," says Burt. "The Cisco and NetApp FlexPod architecture provided an unrivalled, pre-integrated design that fitted that requirement very well."

Initially, a small FlexPod stack was procured for The Landing, a seven-floor Council and ERDF funded facility. Designed to host small and medium-sized businesses (SMBs) in the media industry, this has a screening room, usability labs, and digital workflow center. The solution features a NetApp FAS3270 storage system with 80TB of storage plus a Cisco UCS chassis with seven B200 M2 Blades running VMware. It also has a number of UCS C210 M2 rack-mounted servers for media transcoding, and two Cisco Nexus® 5548 Series Switches.

Following this project, the Council deployed a second FlexPod at its primary data center. Operational within just three months, it features 60TB of storage, two Nexus 5548 Series Switches, and two UCS chassis, one of which has seven B200 M3 Blades, each equipped with 192GB of memory. The second chassis, configured to provide a remote desktop services environment, also has seven B200 M3 Blades, each equipped with 32GB of memory.

This virtualized data center is managed via Cisco Prime Data Center Network Manager, a feature-rich, customizable dashboard providing visibility and control through a single screen.

The implementation was carried out by Manchester-based ANS Group, a former Cisco Data Center and Virtualization Partner of the Year and FlexPod Premium Partner, and was helped by the fact that the modular FlexPod design reduces deployment times from months to weeks. "It's to the credit of both ANS Group and the modular nature of the Cisco kit that installation ran very smoothly and surprisingly quickly," says Burt.

Finally, Salford plans to install a third FlexPod at its secondary data center, which is located in a building owned by the neighboring Manchester City Council. This facility will have a smaller NetApp FAS3240 storage system, with 30TB of storage, two 5548 Series Switches, and a single UCS chassis with a mixture of B200 M3 Blades for server virtualization and VDI.

## Results

Thanks to FlexPod, Salford now has a solid foundation for the delivery of community cloud services. Features that make the architecture especially suited to cloud delivery include:

- UCS XML API that takes administration to the next level and helps automate UCS operations, taking advantage of the fact that the UCS brought together the ability to manage all components in one management interface.

- Wide range of programmability options, from resource pooling and perception of infinite capacity to continuous availability and drive predictability.

- Unified Fabric for 'wire-once' logically-defined network and storage connectivity with northbound programmability

- Virtualized Multiservice Data Center reference architecture for cloud environments using flexible, validated designs in an integrated model that adapts easily to public sector needs.

> "Multitenancy was embedded within FlexPod from day one. Using this as a blueprint, you can change different elements without breaking it. The modular design also means you can build on top very easily."

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- Cisco Data Center Interconnect technologies that transparently extend LAN and SAN connectivity and provide accelerated, highly-secure data replication, server clustering, and workload mobility between geographically dispersed data centers.

Although FlexPod is set up to support VDI, the Council for the time being is more concerned with using the data center platform to deliver session virtualization, with terminal services providing remote applications to traditional desktops.

Salford is working on a proof-of-concept in which applications will be separated from operating systems and devices. Users will then be able to choose which applications they want, and these will be presented with a standard user interface irrespective of device. To make this transition, Salford will most likely use Citrix and Microsoft hypervisors to virtualize the applications, combined with Citrix presentation technologies to stream them to multiple device types. Says Burt: "We believe session virtualization is the biggest enabler of what we want to do moving forward. You can achieve far greater economies of scale with this approach."

Virtualization rates are currently at 95 percent and are targeted to increase to 99 percent by the second half of 2013. In total, 450 virtual machines run Exchange, SQL, SAP, Active Directory, and line-of-business applications. The Council is in the process of migrating SAP applications from Solaris and Oracle to Linux86 with an Oracle back-end as part of the move from physical to virtual infrastructures. Microsoft System Center is used for VM management and orchestration.

Following the move to FlexPod, processor utilization has dropped from 90 percent to between 40 and 50 percent, leading to a noticeable improvement in the speed and response of applications. Also, improved deduplication rates contributed towards an estimated 30 percent reduction in storage requirements.

Improvements to the computing architecture and cooling systems have helped the Council reduce its energy bill by more than 50 percent over the last four years. "We're hoping to drive energy costs down even further," Burt says. "We've gone from 32 hosts controlling 400 VMs down to 10 Cisco UCS blades that run the entire environment. We're on track to achieve a 40-to-one consolidation ratio with potential scope to go up to 50-to-one."

A further benefit is a significant reduction in cabling and switch port count across all three data centers. Previously Salford had been connecting fixed form factor switches to fully populated modular Cisco Catalyst® 6500 Series Switches to overcome switch port density challenges in its primary data center. With the UCS and Nexus integration in FlexPod, however, the Council is able to use 10Gbps Ethernet Cisco Unified Fabric (including Fibre Channel over Ethernet and Data Center Bridging) and Fabric Extender Technology. These technologies reduced cabling, network interface cards, access and aggregation network layer switch port requirements, and power consumption while also allowing for future scalability which adheres to data center fabric design best practices.

The number of racks in the data center has been cut from five to two, releasing valuable space that Salford can rent out to other organizations. Manchester City Council, for example, has taken six racks, and other partners are looking to move in. "One of the key aspects of this project is that, while we see Salford City Council as a customer, we are also delivering services to other partner organizations and driving income," Burt says.

Providing IT services that support the growth of SMBs in The Landing, for example, could help Council finances through improved employment rates. "Multitenancy was embedded within FlexPod from day one," says Burt. "Using this as a blueprint, you can change different elements without breaking it. The modular design also means you can build on top very easily."
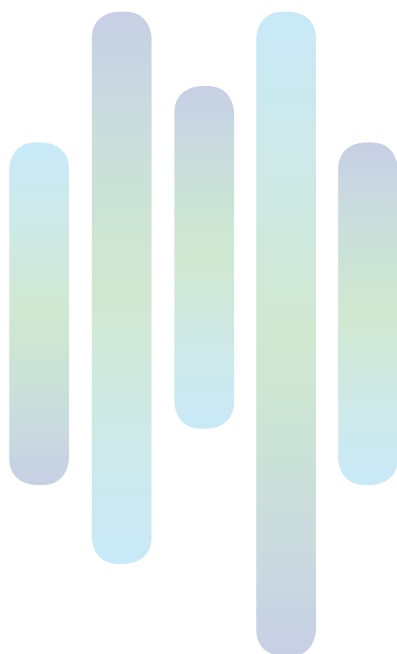
## Next Steps

Going forward, Salford is planning to improve business continuity by changing its primary and secondary data center configurations from active-standby to active-active. Cisco technologies designed to enable and complement an active-active data center configuration include the advanced virtual workload mobility functionality found in Salford's existing Cisco Nexus 1000V Series Virtual Software Switch deployment, accompanying virtual security products, Cisco Overlay Transport Virtualization (OTV) and Cisco Locator/ID Separation Protocol (LISP). Together, these technologies will remove the need to reconfigure IP addresses or network design when services and applications are moved between or clustered across Salford's active-active data centers. This will be achieved in a safe and optimized manner by isolating fault domains at each data center and by directing users to their most locally hosted resource when determined by service policy.

## For More Information

To learn more about the Cisco Services, architectures, and solutions featured in this case study please go to:

www.cisco.com/go/flexpod

## Product List

### FlexPod Components
- Cisco Unified Computing System (UCS)
  - Cisco UCS B200 M2 Blade Servers
  - Cisco UCS B200 M3 Blade Servers
  - Cisco UCS C210 M2 Rack-Mount Servers
- NetApp FAS3270 and FAS3240 storage systems
- Cisco Nexus 5548 Series Switches
- Cisco Nexus 1000V Series Virtual Software Switches
- Cisco Nexus 1010 Virtual Services Appliances

### Network Management
- Cisco Prime Data Center Network Manager

### Applications
- VMware
- SAP
- Microsoft Exchange, Active Directory, SQL Server, and System Center
- SQL
- Citrix