

Virtual Computing-Powered Learning Environment



Unified Data Center Architecture helps American University of Sharjah transition to private cloud-based educational applications

EXECUTIVE SUMMARY

Customer Name: American University of Sharjah

Industry: Education

Location: Sharjah, United Arab Emirates

Number of Employees: 5200 students and 350 faculty members

Challenge

- Help enable anytime anyplace access to collaborative e-learning applications
- Offer best in educational technology as a differentiator

Solution

- Move to virtual cloud-based service delivery model using Cisco Unified Data Center Architecture

Results

- Centralized management with improved productivity and easier and faster provisioning of new services
- Greater scalability and enhanced business continuity
- Total cost of ownership reduced by 40 percent

Challenge

Founded in 1997 by His Highness Sheikh Dr. Sultan Bin Mohammad Al Qassimi, the American University of Sharjah (AUS) is a recent addition to the world of global higher education. Nevertheless, it has already earned a reputation throughout the Gulf and beyond for its academic excellence. Its multicultural, coeducational campus life attracts students from across the region and around the world. Although based on the same principles as its older American peers, AUS is thoroughly grounded in Arab culture. However, all educational and administrative functions are conducted in English to reinforce its international flavor.

With around 2500 students living on campus out of a population of 5200 students, and many more independent learners seeking to access the university's facilities remotely, the ability to reliably and securely serve e-learning applications and educational content is crucial. Ashi Sheth, IT director at the American University of Sharjah, says: "Success brings its own rewards, but also its own problems. We have a data center infrastructure designed for the last decade, struggling to keep up with today's demands for dynamic cloud-based services and collaborative learning applications."

AUS uses Cisco® collaborative solutions such as Show and Share, Digital Media Player, and Media Experience Engine, and the growing popularity of those applications contributed to demands upon its data center. The need to store and retrieve vast amounts of content was testing the traditional model of application-specific standalone servers.

Solution

As a result, AUS found a natural fit in a solution based on the [Cisco Unified Data Center](#) Architecture, rather than the old-style enterprise model being offered by the incumbent vendor. "Virtualization of IT assets, service automation, and the attractions of cloud-based computing were right there on our road map," says Sheth, "so we were delighted to see that Cisco was thinking exactly the same way. Its well-considered integration with storage technologies from NetApp and virtualization software from VMware meant we would be able to adopt a phased approach to the introduction of new data center models."



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That latter point was crucial because the existing AUS data center environment is complex and represents a significant investment by the university. A complete equipment upgrade simply could not be contemplated. “The modularity of the Cisco Unified Data Center Architecture means we can incorporate other applications and computing environments as they become due for refreshment,” says Sheth. “Along with much faster server provisioning and lower total cost of ownership, that makes a pretty compelling proposition.”

The initial virtual data center installation consists of two Cisco Unified Computing System™ (UCS®) chassis equipped in total with seven Cisco UCS B200 M2 Blade Servers using Intel Xeon x5670 Series multicore processors with 64GB of RAM. Full connectivity between the chassis and blades is provided by a Cisco UCS 6100 Series Fabric Interconnect Switch with Fiber Channel over Ethernet (FCoE) technology and Cisco UCS Virtual Interface Cards providing 10Gbps backplane speeds.

Running on Cisco Catalyst® 6500 Series Switches with Cisco MDS 9124 Series Multilayer SAN Switches supporting NetApp storage devices, the existing AUS data center is fully integrated with the new and rapidly-expanding Cisco virtual data center. Cisco Fabric Interconnect FCoE technology offers complete interoperability with the existing SAN environment, with optical fiber between the UCS 6100 and the MDS 9124 switches, saving the need for separate siloed storage.

“As well as the close fit with our technology road map, we were impressed by the Cisco UCS Stateless Computing concept,” says Naji Nujumi, a systems engineer at the American University of Sharjah. “It means that the kind of environment needed by an operating system or application can be quickly and easily recreated in a new server, making us much more responsive to users’ needs.”

This rapid provisioning capability is accomplished with service profiles, which are effectively server definitions realized in software. Stateless Computing makes for much greater scalability and can be used in conjunction with virtualization to achieve optimum data center utilization.

Results

The UCS platform will support several application sets. It will provide virtual desktop infrastructure (VDI) services based on Citrix XenServer Enterprise Edition to academic and administrative users, including hosting a full Microsoft Office suite. Also served by this private cloud model will be educational applications such as MATLAB (a programming environment for algorithm development, data analysis, visualization, and numerical computation) and Maple 16 (helping students analyze, explore, visualize, and solve mathematical problems).

With the cloud-based VDI architecture currently running as a proof-of-concept pilot, the benefits are eagerly anticipated. “People will enjoy the same desktop view whether working on campus, on a mobile device, or at home,” says Sheth. “Their learning environments will no longer be shackled to a physical location, and they’ll be able to access educational applications anytime, anyplace.”

That VDI platform will also enable full bring-your-own-device functionality for the 5200 AUS students. As a participant in the VDI proof-of-concept pilot, Sheth says: “The boot-up speed is impressive, while remote HD video runs just as if the content’s sitting there on the local machine.”

Meanwhile management will be centralized and simplified, offering major productivity improvements. The university’s Windows 7 upgrade, for example, is taking nearly a year and involving many individuals both from the central IT team and the academic computing group supporting the four colleges within AUS. “Such labor-intensive projects will be a thing of the past,” says Nujumi, “because we’ll be able to upgrade all software once from a single point.”



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Furthermore, with the UCS platform, AUS is seeing a twofold improvement in performing routine administrative tasks. “For example, operations that once took a minute are now taking just under 30 seconds,” says Nujumi. “Multiply that by the thousands of such minor tasks we do, and it translates into the team spending much more time on service improvement and strategic issues.”

Soon a VMware vSphere Hypervisor software platform will be introduced across the UCS servers. “It’s simply amazing how quickly we can bring virtual servers into service on the UCS system,” says Sheth. “Whereas the procurement cycle may once have run to 12 weeks or more, bringing new server capacity on stream is now down to just one day or less.”

In fact, if adding server capacity is simply a matter of replicating a service profile, with Cisco Stateless Computing a new server can be provisioned in a few hours. “If I’m faced with a performance problem on any application, I can quickly bring more computing resources to bear, greatly improving responsiveness to our customers’ needs,” says Nujumi.

The adoption of Cisco Unified Data Center Architecture also confers lower total cost of ownership (TCO), because individual server utilization is optimized; meaning that far less hardware is required. Also energy consumption is much reduced and space requirements are lower, while FCoE technology results in less copper cabling. “We have calculated an up to 50 percent energy saving, with commensurate reductions in cooling requirements. Overall our business case shows TCO falling by more than 40 percent,” says Sheth.

The enthusiasm with which AUS has embraced the Cisco Unified Data Center Architecture reinforces the university’s reputation for innovation, making it a great place to come for tomorrow’s workforce, not only Middle East youth (in many countries 50 percent of the population is aged 18 and below) but also students from abroad who want to experience other cultures and ways of thinking. Sheth says: “Knowing they will have access to the best in educational technology is a significant differentiator and encourages young people to come and study with us.”

Next Steps

As the server consolidation program proceeds, an additional UCS chassis and nine additional blades will be installed at AUS, with the intent of moving more standalone server applications into the virtualized environment. These applications will include Oracle databases, access to which will in future be offered as part of the VDI cloud-based model. Ultimately, AUS will move from around 20 traditional server racks to just three UCS chassis.

The adoption of Cisco Unified Data Center Architecture also provides business continuity benefits to AUS. Sheth says: “We’re planning a co-located facility for disaster recovery and, with a virtualized UCS environment, creating that will be faster and less expensive.” Not only will AUS save greatly on real estate rental and energy costs, but also connectivity will be fiber-based. The high-speed backplane inherent in the Cisco architecture makes real-time data mirroring between the local SAN and the remote SAN realistically achievable, while failover to the co-located facility will be virtually instantaneous.

What could be an 18-month project using traditional technology speeds up with a Cisco Unified Data Center Architecture. “With UCS service profiles, we have server resources that are truly portable—seamless to implement, seamless to migrate, and seamless to activate,” Sheth says. “Furthermore we’ll be able to manage our onsite and co-located data centers as a single entity.”

For More Information

For further information on the Cisco architectures and solutions featured within this case study, go to www.cisco.com/go/datacenter

Product List

Data Center Solutions

- Cisco Unified Computing System (UCS)
- Cisco UCS B200 M2 Blade Servers (providing 64GB of RAM with Intel® Xeon® x5670 Series processors)
- Cisco Virtual Interface Cards

Routing and Switching

- Cisco MDS 9124 Series Multilayer SAN Switches
- Cisco Catalyst 6500 Series Switches

Fabric Interconnects

- Cisco UCS 6100 Series Fabric Interconnect Switches

Applications

- Microsoft Office (full suite)
- Microsoft Windows 7
- Citrix XenServer Enterprise Edition
- VMware vSphere Hypervisor
- MATLAB, Maple 16, and other mathematic and scientific educational software
- Oracle-based databases



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