Web Application Delivery for Education Learning System

> **"**We researched the major Application Delivery Controller solutions on the market and were impressed to learn we could deploy A10 ADCs for the most superior performance at the best price. The A10 ADC is particularly useful as it can load balance the application server clusters within the two Blackboard applications. I recommend A10 ADC as a key component for online learning infrastructures.**"**
>
> **Herman Poon**
> Systems Administrator,
> McMaster University

McMaster University is a leading university in Canada, committed to creativity, innovation, and excellence. McMaster has excelled in inspiring critical thinking, personal growth, and a passion for learning to its 23,000 plus student population. As a result, the "McMaster Model" – a student-centered, problem-based, interdisciplinary approach to learning – has been adopted by universities around the world.

Using the latest technology is a key element to McMaster's success. In 2008, McMaster began a selection process to replace the incumbent WebCT 4.1 Learning Management System (LMS), choosing the Blackboard Academic Suite 8 and Blackboard Vista 8. The new system allows comprehensive e-Learning, course and student management, while also adding Web 2.0 collaborative features for community and content.

To ensure the Blackboard platform is highly available and to power the new features, McMaster also required an upgrade of the underlying system architecture, including both physical and virtual servers. The applications are web-based, so an Application Delivery Controller was also needed, principally to provide application acceleration, load balancing and Layer 7 scripting with rewrite functionality.

After researching the options, McMaster narrowed the choice to Citrix NetScaler, F5 Networks BIG-IP, Cisco ACE and A10 Networks® Application Delivery Controllers (ADC).

Simplifying Blackboard Deployment

The A10 ADC was chosen by McMaster in a high availability configuration for maximum redundancy. In addition to delivering twice the performance at half the price of the competitors, the A10 ADC satisfied the functional requirements as well as solving some key implementation issues.

- **Web Server Load Balancing:** Load balances Web server traffic across the Blackboard application servers. Multiple Web applications are provided from the A10 ADC, ensuring the fastest user response and optimal use of server resources. Web servers are also cloaked by the A10 ADC, with users connecting via an external IP, providing a full proxy and routing for added security to the web servers.

- **Blackboard CORBA/IIOP Internal Load Balancing:** Common Object Requesting Broker Architecture/Internet Inter-ORB Protocol is used between the Blackboard Academic Suite and Vista application server clusters for internal communication, for example authorization and LMS data. The A10 ADC successfully load balanced the traffic, eliminating a hard coded, single point of failure.

- **Layer 7 Deep Packet Inspection and Rewrite:** Enables the URL rewrite capability for any URL within the McMaster LMS. The Layer 7 inspection "finds and replaces" references to unencrypted URLs, converting from HTTP to HTTPS automatically, before they ever reach the browser. Due to A10 ADCs' Advanced Core Operation System (ACOS®) with Scalable Symmetrical Multi-processing (SSMP), the Layer 7 deep packet inspection and replacement process does not impact performance.

- **ASIC SSL Acceleration:** Off-loads compute intensive functions from the LMS to the A10 ADCs' dedicated ASIC processor, freeing resources on the load balanced Web servers. SSL certificates are consolidated on the A10 ADC to further reduce management and administration time.

The CORBA/IIOP internal load balancing solution was particularly useful as the A10 ADC was able to effectively solve the issue in the Blackboard environment.

Flexible Platform, Excellent Support and Compliance

Throughout the A10 ADC deployment, McMaster was pleased to find the A10 Networks support team was responsive and quickly cleared any hurdles that were presented. The guarantee of encrypted URLs also helped satisfy both Provincial and Federal security regulations for privacy, Freedom of Information and Protection of Privacy Act (FIPPA) and Personal Information Protection and Electronic Documents Act (PIPEDA) respectively.

The A10 ADC provided all the required features for the new Blackboard system at a significantly lower price than competitors. The price point combined with extra performance headroom, platform flexibility and all-inclusive licensing model remove the need to request additional funds at a later date, further satisfying both technical and management goals.
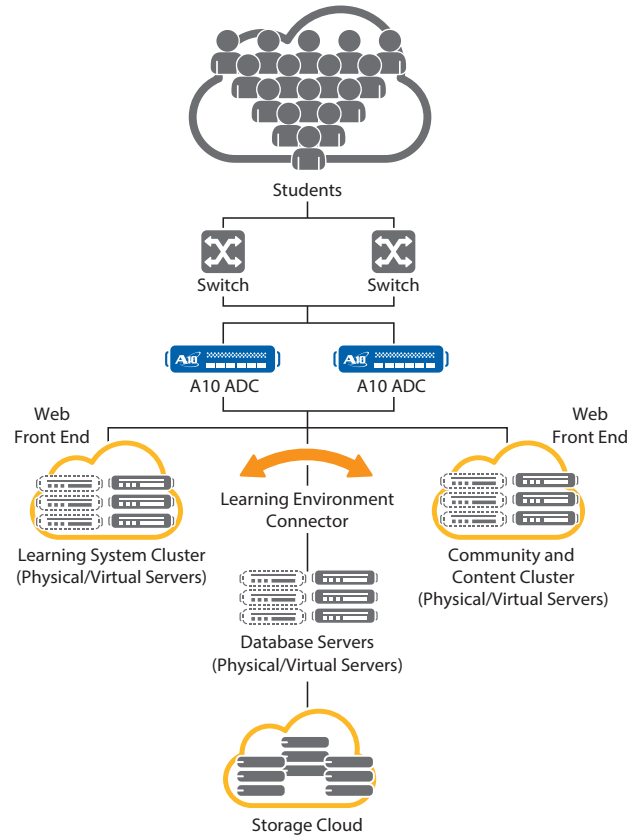

Figure 1: McMaster Blackboard LMS Network

About McMaster University

McMaster University, one of four Canadian universities listed among the Top 100 universities in the world, is renowned for its innovation in both learning and discovery. It has a student population of 23,000, and more than 145,000 alumni in 128 countries. For more information, visit www.mcmaster.ca

About A10 Networks

A10 Networks is a leader in application networking, providing a range of high-performance application networking solutions that help organizations ensure that their data center applications and networks remain highly available, accelerated and secure. Founded in 2004, A10 Networks is based in San Jose, California, and serves customers globally with offices worldwide. For more information, visit: **www.a10networks.com**

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