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Lee Chye Seng  
Deputy Director,  
Emerging Technologies

## Enriching e-learning with effective Application Traffic Management tools

### Industry:

Education

### Challenges:

- Enough speed to cope with edveNTUre's high utilisation rate
- Ease of installation and maintenance

### Solution:

F5's BIG-IP® web load balancer

### Benefits:

- Drastic reduction in error messages and incidents related to server speed
- Easy to use and configure to suit any customised policy
- Highly stable and robust performance

### Overview

Long recognised as an established tertiary institution in Singapore, the Nanyang Technological University (NTU) has a fine tradition of providing facilities to meet the needs of its large student population of 23,000 and more than 1,000 professors.

In response to the growing maturity of Internet technology and its expansion into the e-learning arena, NTU created its own e-learning programme — edveNTUre — in order to facilitate information exchange as well as position itself as a leader in the world of learning.

Today, edveNTUre can be regarded as a real-time mission-critical service of the University. Students depend on it for courseware content material, forum discussion and so on, while professors use it as a means to communicate with their students. EdveNTUre has also become an indispensable productivity tool for online assessment.

### Challenges

Within a short span of 3 years, the number of online courses in NTU has witnessed a quantum growth from zero in May 2000 to 5,740 in May 2003, which accounts for approximately 90 percent of NTU course curriculum. The Centre for Educational Development (CED) finds it increasingly difficult to

provide for and manage the flow of traffic to and from the system.

When edveNTUre e-learning services first started in May 2000, NTU received an average Web page view of 30,000 daily. When the e-learning application was upgraded a year later, the daily average Web page view experienced a tenfold increase to 300,000. During the first three weeks of the semester, page views can hit as high as 1 million per week.

During the peak season (the first three weeks of a semester), it was common for students to experience delays in accessing information due to busy web servers. Although much effort was made to improve the servers' performance, the issue of speed still haunted them. At times, messages like “internal server error” occurred when there are too many concurrent users.

“As a result of the high utilisation rate in our e-learning services, we foresee the pressing need to set up a multiple server platform to cope with the growing demand,” said Lee Chye Seng, Deputy Director, Emerging Technologies, NTU. “We decided to configure multiple e-learning application servers to cope with the growing demand,” he added.





### Solution

Since April 2002, NTU has been looking for a web load balancing solution and reviewed solutions from various leading players.

“Some of them took too much time and hassle to configure, some required major changes in network settings just to plug it onto our network and one unfortunate vendor ‘broke’ our network connectivity in the midst of the setup,” Lee lamented.

Finally, NTU selected F5 Networks because firstly, it only took the engineer a short while to configure the box and demonstrate a working solution. Lee and his team were impressed by how easy it was to use the web based administration tool, and most importantly, when the solution was plugged into the

production server network, it worked as promised. Furthermore, the transition was seamless.

F5 Networks’ BIG-IP web load balancer is designed with comprehensive features that are easy to learn and simple to configure to suit any customised policy. “The load balanced setup has been running for more than five months now, and we have begun to forget its existence — that is a piece of good news to us,” Lee said with a chuckle.

With the load balancer setup and additional e-learning application servers, the number of incidents related to server speed and error messages was reduced drastically by 50 per cent. The e-learning technical team also saw the reduction (approximately 40

percent) in the number of email/phone/walk-in complaints during the peak season. Employee productivity was also increased as they could spend more time administering servers instead of tending to complaints.

### Conclusion

Having developed from a small engineering institute into a premier university for industries and businesses over the past 20 years, NTU is now repositioning itself for the knowledge-based economy and to surmount the challenges of new knowledge revolutions. New initiatives are being adopted to provide the necessary impetus to propel NTU forward, so that it becomes a University of Global Significance and Excellence in the 21st Century.

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