

WebCampus Semester Report Fall 2009

Last Updated: September 23, 2009

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Summary

From August 13-17, 2009 WebCampus was unavailable for a scheduled hardware upgrade. This upgrade was performed to increase the stability of an aging hardware, which was soon to be unsupported by the vendor. The new hardware environment provides: increased redundancy, increased performance, a 5-year support contract with the vendor, and much more as described in the hardware improvements section. Although the migration to the new hardware was completed in less time than anticipated and initial problems were minimal, more problems were encountered during the 4th week of the semester (September 13-21, 2009). However, as of September 21, 2009 the WebCampus environment is once again stable after upgrades, patches and bug fixes were applied to the database and other supporting software.

Timeline

August 13-17, 2009

Time: 8/13/09 5:00 PM – 8/17/2009 8:00 AM

Details: WebCampus was unavailable for a scheduled hardware upgrade. The upgrade was completed early and services were enabled on the evening of 8/16/2009. One of the 3 database servers did not go live due to hardware issue requiring a replacement part (expected to arrive 8/18/09)

August 22, 2009

Time: 0:00 (Midnight) – 6:00 AM

Details: WebCampus was unavailable for scheduled hardware maintenance to replace failed hardware component on database server #3.

September 13, 2009

Time: 1:26 – 4:50 PM & 7:45 – 9:20 PM

Details: WebCampus became unresponsive at 1:26 PM when both disk controllers for the storage array (storage for all WebCampus data/content) rebooted simultaneously. The use of 2 disk controllers is to ensure that if one controller should become unresponsive the other disk controller would continue to function allowing WebCampus to remain available. This is not a known issue and has been escalated within IBM and a resolution has not yet been provided.

Time: 7:45 – 9:20 PM

Details: The WebCampus application began generating connection time-out errors when database server #2 could no longer communicate with the other two database servers¹. It was later determined that the application tier may have recovered automatically. However, due to the earlier outage the application tier was restarted to proactively clear the environment.

September 14, 2009

Time: 1:30 – 1:45 AM

Details: Database server #2 could no longer communicate with the other two databases and it shut down. The other two database servers continued to respond and the system recovered with no intervention. Delays may have been encountered between 1:38 and 1:45 AM.

September 15, 2009

Time: 7:15 – 8:40 AM

Details: WebCampus became unavailable from 7:15 – 8:40 AM when all databases stopped responding. WebCampus service was restored with only one database running. Oracle support identified a bug in the current version of Oracle Automatic Storage Management (ASM) and provided a patch. It was also recommended that the version of Oracle Clusterware also be upgraded to be meet Oracle recommended standards. Emergency maintenance was scheduled for Thursday, September 17th from 12:01 – 4:00 a.m. to install these patches. This maintenance was later moved to noon on Wednesday, September 16th after two more service interruptions during the morning hours of September 16th.

September 16, 2009

Time: 1:30 – 3:00 AM

¹ It was determined after working with Oracle and Blackboard that the versions and configuration of our Oracle database, ASM, and Clusterware were producing memory leak issues resulting in extensive page swapping which in return resulted in the databases being unable to communicate with each other.

Details: WebCampus was unavailable from 1:30 – 3:00 AM due to the recently identified bug within Oracle.

Time: 7:45 – 8:04 AM

Details: WebCampus was again unavailable from 7:45 – 8:04 AM due to the recently identified bug within Oracle. Due to the continued interruptions, the emergency maintenance scheduled for September 17th from 12:01-4:00 a.m. was moved to noon on September 16th.

Time: 12:00 (Noon) – 3:20 PM

Details: WebCampus was unavailable from noon until 3:20 PM for emergency maintenance to install the Oracle patches for ASM and Clusterware. Database administrators continue to work with Oracle and Blackboard (WebCampus vendor).

September 17, 2009

Time: Unknown – 11 AM

Details: Student tracking was not updated and email sent within WebCampus was not delivered. The issue was reported around 11:00 AM and the background jobs server was restarted. All messages were then delivered and the tracking was updated and viewable by instructors.

Time: 11:35 AM – 1:00 PM

Details: Several application servers were not responding and so a “rolling restart” of these servers was performed. WebCampus remained available during this restart, but some users experienced session time-out messages. Workaround provided to help desks and users was to close their browser session and try again and this resolved the issue for most users.

Time: 3:00 – 4:30 PM

Details: WebCampus became unavailable to all users when all databases stopped responding and a full cluster restart was performed. Continuing to work with Blackboard and Oracle an issue was found with several WebCampus indexes, which utilize an uncommon Oracle feature known as Oracle Text. While this new error was being investigated, the use of the Saturday 0:00 – 6:00 a.m. maintenance period is planned.

Time(s): 6:54 – 7:14 PM, 9:35 – 10:40 PM

Details: Continued stability issues encountered due to the use of Oracle Text in WebCampus. To minimize possible problems from external forces the background jobs server was shut down at 11:00 PM. With background jobs disabled users could utilize WebCampus but up-to-date student tracking was not visible to instructors and mail through WebCampus was being queued but not sent.

September 18,2009

Time: 4:00 AM

Details: Oracle provided resolution specific to Blackboard clients utilizing the Oracle Text functionality. This resolution requires an upgrade of the database that will be performed during the regular maintenance period of 0:00 – 6:00 on Saturday, September 19th. During this time, WebCampus background jobs were kept on hold and the section backup functionality for faculty was disabled. In addition, the resolution was implemented on the WebCampus test environment.

September 19, 2009

Time: 0:00 – 3:55 AM

Details: During the scheduled maintenance period the Oracle database was updated to 10.2.0.4 to be on the same release level as Oracle ASM and Clusterware. In addition, patch 5883585 was applied to the system. Background jobs, and section back-ups are still disabled at this time

while the system is monitored.

September 20, 2009

Time: 0:00 (Midnight)

Details: After stability was confirmed the WebCampus background jobs were enabled and WebCampus mail was delivered and student tracking was updated.

September 21, 2009

Time: 3:00 – 5:00 AM

Details: Unrelated to the previous Oracle issues during the week. Some monitoring systems were disabled to eliminate outside contention on the database resulting in the log files running out of allocated disk space. This issue was quickly resolved and the monitoring services have been enabled once again. Background jobs (student tracking and email) were delayed until 9:40 AM.

Note: The WebCampus staff has a strict policy of installing all patches and upgrades to the WebCampus test environment before they are applied to production to minimize problems that can potentially be caused by these changes.

WebCampus Outage Impacts

When WebCampus is unavailable users are not able to access the system. This can result in the disruptions for both faculty and students. Faculty members are unable to upload content, view or post discussion and email messages, grade assignments and assessments and more. Students are unable to submit assignments, take and complete assessments, read or post discussions and emails and more. Regular maintenance is scheduled for every Saturday from 0:00 (Midnight) – 6:00 a.m. and although this time is not always used it is recommended that assignments and assessments not be due during this time so that if maintenance is needed students are not impacted. Unfortunately, when unexpected outages occur, it is often difficult to anticipate when WebCampus will be available again. This results in students and faculty needing to check back regularly and often interrupts the time set aside to complete work in WebCampus.

The Nevada Learning Network and the Office of Information Technology work to eliminate unexpected WebCampus outages. However, with a system as complex as WebCampus, issues will sometimes occur. During these times, faculty are encouraged to work with their campus support staff to minimize the impact unexpected outages have on the education of students. This may involve extending access to an assessment or assignment and updating other time sensitive materials. Support is available and staff are ready to assist in making these adjustments.

Hardware Improvements

In August 2009, the WebCampus hardware was replaced with new, more efficient hardware. The new hardware replaced equipment that was no longer supported under maintenance agreements as of September 2009 and to renew service contracts it would have been more expensive over the next 5 years then to purchase new equipment providing a more robust system with a five year service contract.

Hardware Comparison

Original Hardware (2005 – 2009)

Production:

- (3) Sun Fire V440
- (2) Sun Fire e2900
- (3) Sun StorEdge 3510

Test:

- (2) Sun Fire V240
- (1) Sun StorEdge 3511

Shared

- (3) Firewall – Sun Fire V210
- (2) Load Balancer – Big IP

New Hardware (2009 - Present)

Production:

- (13) IBM x3350
- (3) IBM x3650
- (1) IBM x3650

Test:

- (5) IBM x3350
- (2) IBM x3650

Shared

- (1) IBM DS4700
- (1) IBM TS3200
- (2) Firewall – Cisco
- (2) Load Balancer – Big IP (from original purchase)

Still to Come (Fall 2009)

Tremendous improvements have already been made to the WebCampus hardware for Fall 2009 but more improvements are planned for the semester. At this time, dates have not been set for the following improvements. As the staging and testing for these improvements are underway, dates will be set and posted in the WebCampus announcements.

- Incorporation of second failover load balancer*
- Incorporation of a Dataguard server for another level of database redundancy*
- Upgrade of WebCampus software
- Update to disk array firmware

* Currently being underway.