Myplace Unscheduled Interruption in January 2014: Investigation report and follow up action

The Myplace service experienced four unscheduled interruptions to service between the 21st and the 28th January 2014. These outages coincided with a minor maintenance upgrade and with the first teaching week of the second semester and occurred at peak usage times causing problems for classes scheduled at those times and for a number of assessment sessions taking place overseas at the time..

Actions Taken to Mitigate the Risk in Future

- Significant new investment made into the Myplace IT Infrastructure.
- The timing of maintenance and upgrades reviewed.
- Improved communications and coordination established.
- Plans for system growth and benchmarking revised.

Background

Myplace is a 'mission-critical' system for Learning and Teaching, which now forms a key part of the student experience across all Faculties and student facing Professional Services.

The Myplace service experienced a number of unscheduled outages during January 2014 listed below. These coincided with a minor maintenance upgrade to the underlying Moodle code and with the first teaching week of the second semester. The system was returned to stable operation following each outage and although no single root cause was identified, a number of remedial measures were implemented with no resulting interruptions to the service.

Dates of Incidents

- Tuesday 21st January 2014, unavailable for 5 hours
- Friday 24th January 2014, unavailable for 4 hours and 42 minutes
- Monday 27th January 2014, 1 hour of intermittent performance
- Tuesday 28th January 2014, 45 minutes of intermittent interruptions to service

The outages occurred at peak usage times – shortly after 10am and 11am on Tuesdays and Fridays. These outages caused significant problems for classes which were scheduled at those times, and in particular for a number of assessment sessions taking place overseas.

When the system became unavailable, the focus for the Information Services Infrastructure team, was to "restore it safely" rather than "restore it quickly". As the database size has grown dramatically over recent years, the "safe restore" time has been extended, and is now becoming unacceptably long.

Myplace is in general a very robust and reliable service, with an uptime of 99.4% last year (2013/14), and 99.1% and 99.3% in the previous 2 years, even including scheduled maintenance outages.

Analysis

While there are a number of possible causes for these outages, it has not been possible to establish with 100% certainty a single root cause. It is likely that the fundamental cause of this disruption was a combination of a number of contributory factors.

The likely primary contributory factor was core Moodle code resulting in a, previously asymptomatic, inefficient database operation. This section was replaced by more efficient code; since then the problem has not recurred.

Other potential factors were identified:

- Shortly before the outages, a minor maintenance upgrade had been applied to the Moodle code. This did not affect the specific code that was identified above as being “inefficient”. The minor upgrade was fully tested prior to application and there is no evidence that it contributed to the service interruption.
- While it was not possible to identify any one change that would cause such a great impact, minor changes when aggregated over large numbers of users, may have had an unexpected database performance impact.
- These outages took place during the first week of the teaching semester. Historical evidence shows that the first two weeks of any term are the peak load periods for Myplace.
- The “Myplace” environment has grown substantially over time, both in terms of the volume and the complexity of usage and the amount of data stored within the database.

Long term increased usage of Myplace

The graph below shows how the use of Myplace has grown over the past three years, since the current infrastructure was originally deployed. The data being plotted is “Number of pages retrieved during November”, which is representative of the database load at these peak teaching periods. The 2014 figure is extrapolated based on previous year’s growth.

It is clear from the graph below that the current utilisation of the system is approximately six times higher than when it was originally deployed.

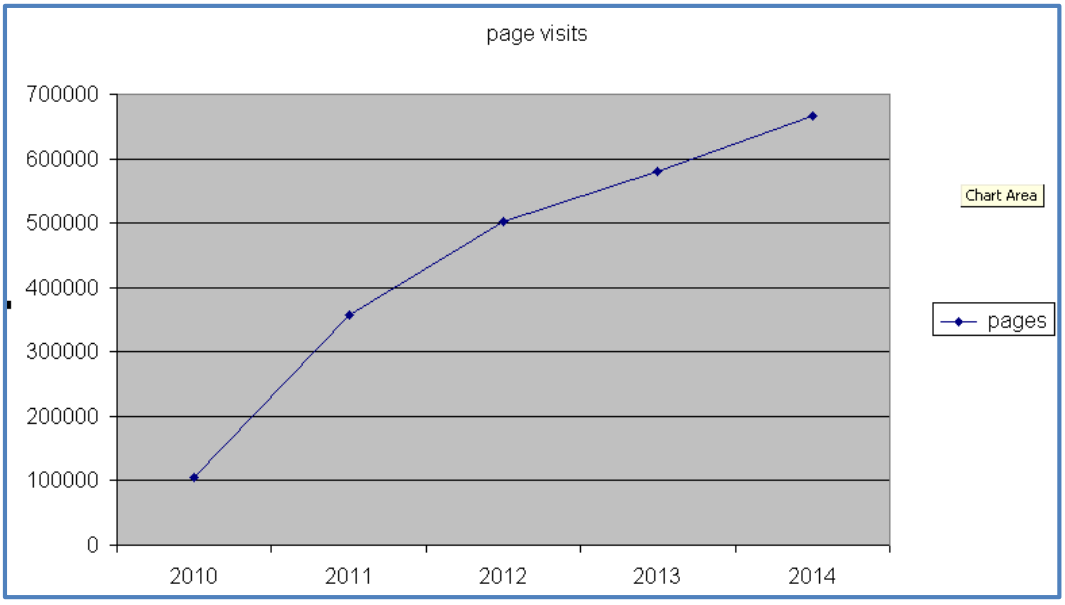

Figure 1 – Annual increase of Myplace peak load

Actions Taken

Infrastructure upgrade

The database servers supporting Myplace are now three years old. By August 2014, they, and their storage infrastructure, will be migrated to new hardware to provide additional capacity. This is a significant investment in the underlying hardware and software infrastructure on which Myplace and its associated databases run. The resultant upgrade providing a more responsive, reliable, resilient, flexible and scalable infrastructure underpinning the Myplace service. In addition the services of a Moodle Partner with corporate/enterprise experience was engaged to review and advise on infrastructure changes.

Timing of maintenance and upgrades

Following extensive consultation with the user community, an upgrade/maintenance schedule for the Myplace service was agreed in 2012/13. This allowed for a “major” upgrade each summer, and a minor “maintenance” update mid-year. The summer upgrade is where any significant functionality changes are deployed, with the mid-year refresh being minor upgrades and essential maintenance.

Dates, times and impact of these maintenance works are published to the Myplace community three months in advance, following extensive consultation.

With an institution the size of ours, and with Myplace being used for such a diverse range of activities, it is virtually impossible to obtain complete consensus on dates. It is acknowledged that the current choices of dates are perhaps skewed towards the needs of undergraduate teaching term and corresponding exam/study dates; this is by far our largest client group.

Communications and Coordination.

In general, the communications plan between the staff working on these problems and the end users worked well. The Information Services incident management processes handled the technical communications and coordination, while the Education Enhancement Myplace team handled the end-user communications. In learning from this experience, a formal Myplace communications protocol has been established between the two groups to ensure that the messages which are being distributed remain consistent.

Growth and Benchmarking

When the Myplace service was launched in 2010, system sizing was determined by using data from reference sites of a similar size to ours, adding in a large overhead for growth and expansion.

This was sufficient for the level of use and predicted growth. The graph presented previously show the load on the system has now increased by an order of magnitude since initially deployed.

The goal of future Myplace/Moodle releases and infrastructure changes will be to ensure that components that comprise the system are fully scalable to meet any unexpected increases in growth/usage.

Future releases of Myplace (from summer 2014) will include facilities for simple load testing, but it is likely that the most practical approach will be to scale the Moodle environment with adequate capacity to accommodate growth of 20% each year. This growth will, of course, be reviewed regularly by the Myplace and Infrastructure teams.

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