University of East Anglia

ISC14D002

Title:	**Research Storage issues**
Author:	Iain Reeman
Date:	5 September 2014
Circulation:	
Agenda:	
Version:	Final
Status:	Open

Issue

The paper outlines the issues experienced with the Research storage service and the plan for resolution. Considerable disruption has been caused to researchers who have been migrated to this service.

Recommendation

The recipients are asked to note the report.

Resource Implications

With the exceptions that are noted in the paper the proposed actions can be delivered within existing ISD resources and those of our support companies.

Risk Implications

All changes will be robustly managed and agreed with our support companies and within ISD before implementation, to reduce the risk of service disruption.

Equality and Diversity

We do not believe that the issues with Research Storage has an impact on specific groups with protected characteristics.

Timing of decisions

Work on problem resolution is continuing. This report provides an update of the current position. Consultation will be sought where necessary.

Further Information

Iain Reeman, extn 2926, email i.reeman@uea.ac.uk

Background

The Research Storage service was developed in response to a growing demands for:

- Lower cost, secure, scalable, high density data storage
- A tiered storage architecture
- High performance and shared access

Working with our data storage partners, IBM/Tectrade a service was developed using a number of tried and tested storage components. The exception to this was the back-end disk storage which was a new product, however this risk was mitigated by purchasing advanced support services from a specialist company, who have implemented this product elsewhere.

The development of this service reduced the cost of secure backed up Research Data storage to an aggregated cost of £100 per TByte per year, which compares favourably to insecure commodity storage widely used at UEA.

A migration plan was developed and signed off to move researchers to the new solution, with the initial step being to migrate Researchers personal filestore data.

Issue

The migration was progressing as planned until the system failed on 19th June 2014, when approximately 1500 of the 2500 users had been migrated. This initial failure was caused by a number of compromised PC's at UEA attacking the service in the guise of a Denial of Service attack. A number of other failures followed over the next two weeks whilst the technical teams at UEA and within our support companies investigated.

The investigation highlighted that the critical problem was with the file servers (Samba) and occurred when a file is renamed from one directory to another where the source directory has a different case to the destination directory. In theory this is not possible, and this led to the conclusion that the problem is associated with a bug within the server operating system. This was escalated to the developers of the software (Redhat). It should be noted that this part of the system is commonly used within all business sectors (and also at UEA) without issue and is regarded as a low risk component of the service.

The live servers were configured with the last known good configuration on 18th July, with snapshots (self-service file recovery) and clustering removed, and user migrations have stopped. So far it has not been possible to replicate the problem on our test servers. We have not experienced any unplanned downtime since the reconfiguration and our confidence in the current live configuration continues to grow.

The investigation also highlighted a number of other issues requiring resolution. These were probably existing background issues that were unreported and could only ever have been uncovered by the detailed forensic investigation:

Issue	Resolution
Increasing number of compromised PC's on the UEA network.	A project will be included within the 2014/15 POW to review the IT security.

Issue	Resolution
Storage fibre infrastructure issues. These were not previously noticed because a dedicated resource was not available to monitor the infrastructure to the detailed level required to identify these issues.	For the duration of this problem our supplier has provided the resource to provide detailed monitoring of the infrastructure. Issues that have been highlighted have been resolved and the benefits are being seen.
Off-line file synchronisation was not configured correctly on some user's PC's, which meant that in the event of a service failure users were unable to access data.	The IT support team have resolved all the issues flagged to the IT Helpdesk
A small number files were identified that would have been problematic to accessed and would have had unexpected names.	User scripts have been created to resolve this problem and is being progressed.

Next actions

Working with our suppliers we will continue to try to replicate the problem on our test servers, however the likelihood of being able to do so is low. Our specialist support company has since observed this problem within a different organisation and have resolved it by upgrading to the latest supported versions of the operating system and Samba software.

A plan for service restoration has been created, discussed and agreed within ISD. This involves reinstating the snapshots and resilience on the live service followed by updating the operating system and Samba software. The work will be undertaken in incremental steps with each step being robustly tested before being implemented. In addition, a minimum of two weeks service stability will be observed between each change.

Before implementation of the plan, discussions will be held with representatives of the researcher community to determine the best time to commence to minimise any disruption to research activity.