

## **Central Network Hub incident – 30 January 2015**

### **1 Executive summary**

On 30 January 2015 building works at the Arup building caused a release of water that subsequently penetrated the University's Central Network Hub. The water caused the failure of equipment hosting a backup service for the joint School of Arts and Humanities and the School of Humanities and Social Sciences. Through luck the incident did not affect the University's central network infrastructure or the Janet network's regional infrastructure also hosted within the same room.

This paper provides a background to the continued siting of equipment in the Arup building, further detail on the incident on 30 January 2015, and subsequent activity taken by UIS to manage risks and plan future remediation.

### **2 Background**

The Central Network Hub (CNH) is the central communications and server room operated by UIS, based in the sub-basement of the Arup building at the New Museums Site. Prior to its current designation it was formerly the University/BT PABX telephony equipment room.

The CNH was built following the need to vacate the server room (A301) as part of the enablement works for the Arup building re-development works for the Cambridge Conservation Initiative. A301, and the Arup building more generally, was the physical hub of the Granta Backbone Network (GBN; the University's fibre optic communications backbone) and the central computer network provisioned over that infrastructure. In addition, A301 also served as a distribution point for the Janet network's east of England point of presence (PoP).

Building of the West Cambridge Data Centre (WCDC) and procurement of the Janet 6 network coincided and it was intended for the Janet network's regional footprint to be operated from the WCDC. Due to construction delays with the WCDC and the cost of moving connections from Arup to the WCDC this did not happen.

The CNH was built to house equipment migrated from A301 as part of the move of the former University Computer Service to West Cambridge. This was considered a sub-optimal solution at the time and the risks of continuing to operate critical infrastructure within the basement of a building undergoing building works were considered, though reviewed as being relatively low-risk at the time.

The CNH houses the University's connection to the Janet network, Janet's regional PoP (network equipment which provides Internet access to local education and research establishments), locally NMS site networking infrastructure and some of the University's infrastructure and telecommunications equipment.

### **3 Background to the incident on 30 January 2015**

On the morning of 30 January 2015 a Kier contractor cut through a water main, leading to the escape of a significant volume of water. Despite their belief that all water mains had been disconnected, the pipe in question was fed from a different source and had not been isolated. This water traversed the fabric of the building, eventually falling into the CNH.

At 11:30am UIS was contacted regarding a fault with a power supply in the room. On arrival, UIS staff discovered water ingress from above and standing water on the floor. One equipment rack (A8) was powered off. By 12:15pm senior staff from UIS had arrived on site and water ingress to the room had ceased, though standing water and live electrics made the environment a significant health and safety risk.

By 12:45pm UIS staff were allowed entry to the room and closer inspection of the equipment was possible. By luck water had not fallen on any of the Janet network distribution equipment. At 1:45pm cleaning and drying of the room had been completed; tripped power distribution strips for rack A8 were replaced but UIS staff visual inspections identified that the equipment had been penetrated by the falling water. Subsequent investigation has resulted in a recommendation from the hardware vendor that the equipment is not safe for use due to both water marks and standing water being visible.

Rack A8 hosted the STaSSH backup service, essentially an off-site backup of the joint School of Arts and Humanities and the School of Humanities and Social Sciences backup service, the primary servers of which are hosted in the Soulsby building at West Cambridge.

A detailed timeline is provided in *appendix a*, which accompanies this paper.

## **4 Consequences and actions taken**

### **4.1 Arup building work**

Kier agreed to provide staff to monitor the CNH for potential further water penetration during the weekend following the incident. They also agreed to drill pilot holes in any further pipes, prior to more invasive cutting being undertaken, to ensure that future water risks were identified.

### **4.2 STaSSH**

The equipment hosted in rack A8 cannot be used and the STaSSH service is currently operating without an off-site backup. While there is an urgent need to return a secondary service to operation, the nature of the service means that this work is not critical. (STaSSH is a backup service and the equipment in the CNH was a backup of that service.)

In parallel with work to purchase replacement equipment and recover losses through the Insurance Office, UIS is working to provision temporary backup storage via its high performance computing infrastructure in the WCDC. A full copy of the primary store is planned in order to restore resilience but given the size of data this is likely to require a full weekend to accomplish.

Replacement equipment will be hosted at the Roger Needham Building.

### **4.3 University of Cambridge network**

If water had penetrated other racks within the CNH it is likely that elements of the CUDN and GBN would have failed, potentially including all off-site connectivity. As such the incident is considered as a near miss and the likelihood of risks considered at the CNH have been reviewed.

The landing site for Janet's regional network presence is in the William Gates Building. An 'in principle' discussion with staff at Janet has been held to agree an emergency plan to directly connect this equipment to the CUDN to reconnect the University in the event of loss of services within the CNH. While loss of services within the CNH would also disrupt connectivity for other Janet-connected organisations in the region, this emergency plan would reconnect the University, to the possible detriment of other organisations in the region.

#### **4.4 Wider network**

If water had penetrated other equipment in the CNH it could have affected the Janet regional distribution network, and as such the Janet network operations centre was contacted at 12:18pm on the day of the incident to alert them to the risk of service disruption.

#### **4.5 Procurement**

Following the incident, discussions already underway to investigate the provision of a second Janet regional PoP based at the WCDC have been accelerated. This second regional presence will also provide the University with a second, resilient, connection onto Janet.

Janet have confirmed that they have already commenced the project to provision a second PoP for the University. The procured carriers (SSC, over Virgin Media infrastructure), have committed to delivering the fibre circuits to the WCDC by mid-July. Discussions have commenced to see if this take can be brought forward. There is also some work to be undertaken by the University Network Division to confirm that the two Janet PoP's are provisioned on genuinely diverse routes.

Whilst the additional fibre circuits will be provided to the University by Janet at zero additional cost, there will be funding requirements for two specific items:

1. Janet Router to be installed in the WCDC. This will be purely for sole use of the UoC, and anticipated costs to the UoC are to be no greater than **£40,000**.
2. CUDN Router to be installed in the WCDC, connecting Janet to the CUDN. This will again be no greater than **£40,000**.

On completion this solution will provide complete resilient Internet connection for the University of Cambridge community. A proposed network topology is appended, appendix *b*.

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18 February 2015