

[Outage Report]

Problem Description

Data Centre Affected	ALL
Severity	Urgent

This outage reports concerns connectivity issues experienced across the C4L Network on 27th October between 16:34 and 16:41

Update 1

Date	October 27th
Time	16:00

As part of our continuing improvements to the C4L VPS platform, we were performing reconfigurations to physical servers within the platform to change their host networking from using STP-enabled bridges to using the Linux bonding driver, as a means to increase stability.

The work was taking place from 16:00 BST onwards, and was not expected to affect users of the VPS platform, as their virtual servers were hot migrated off each physical server as it was reconfigured. Even in the event of an unanticipated problem that may affect VPS platform users, there was no scenario envisaged at the time that could affect other C4L services.

Update 2

Date	October 27th
Time	16:34

At 16:34 BST, following the second host's reconfiguration, and subsequent reconfiguration of the attached switch ports not to send or receive spanning tree messages, we lost connection to both the servers and the switches, which first alerted us to a problem.

It became immediately apparent, due to other connectivity problems observed, that the scope of the problem was affecting more than just the VPS platform. As we were unable to connect to the management interface of the switch, we went to the location of the switch to undo the change.



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Update 3

Date	October 27th
Time	16:41

At 16:41 BST, the cables from the four switch ports attaching the server that had just been reconfigured were physically unplugged. At this time, services began to recover.

We are aware that a number of customer ports errdisabled on the customer side during this outage. Once the situation had stabilised we began to contact all customers we believed to be affected, informing them to clear the errors on their ports.

Resolution/Workaround

Our storage VLAN spans many sites that exist between our two main hubs from which we deliver our virtual server services, and the spanning tree processes on all switches in all paths where this VLAN is present became overloaded, causing a knock-on effect that disrupted all layer 2 services traversing those devices.

In turn, this flapping in spanning tree topology changes across the network caused high processor utilisation on our smaller devices, thereby also affecting layer 3 services in those cases. Our larger devices in the core network did not appear to experience problems in delivering services other than layer 2 services.

A small number of virtual server customers reported problems within their guest operating systems due to storage inaccessibility having lasted more than a few seconds, but these small numbers of cases were quickly resolved through restarts of those virtual servers.

Additionally, some edge devices had placed ports in a disabled state due to flapping thresholds being exceeded. Manual intervention was required by us to re-enable these ports. These were also quickly resolved on a case-by-case basis.

In order to prevent further far-reaching disruption in the future, the C4L VPS platform storage access has been reconfigured to use VLANs that are specific to each location. In the unlikely event of a similar problem in future, only the site local to the problem would observe the traffic. In addition, a two-person check of host networking configuration changes has been added to the change control process, to further reduce the likelihood of any mistake occurring.

C4L fully understands that this outage, along with the previous two outages of a similar nature this week, may have shaken confidence in the services C4L provide to you. C4L are fully committed to offering customers diverse pathing for all interconnects to protect against fibre or hardware failure, unfortunately this does open us up to problems such as the ones mentioned above when devices getting their CPU's overloaded and cause the topology to loop.

Rest assured, we are working tirelessly to learn from these events and put in protections to mitigate against such incidents in the future. The three events this week have all been caused by separate issues, and each issue has been separately mitigated against. However, given the events of this week, we are now in the early planning stages of expanding our MPLS portfolio to cover all devices and sites within our



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network which will eliminate these layer2 VLAN problems that have caused this week's disruptions. This work will take us into next year and we will keep customers informed as we make changes around the network. This, combined with our continued hardware upgrades across all sites will further protect us against third parties looping our network.

C4L sincerely apologises for any disruption to services caused by this outage. If you have any further questions with regards to the outage report or the events surrounding it, please don't hesitate to contact us on +44 (0)1202 299 799 option. 3

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