

Post Incident Review

Issue 1 Date: 7th June 2013

***IMT23989/13 21CN MULTI SERVICE: NATIONWIDE: LOSS OF SERVICE
(31/05/2013)***

Contents:

- 1. Report Aims**
- 2. Customer Impact, Experience & Affected Infrastructure**
- 3. Incident Summary**
- 4. Root Cause**
- 5. Risk Mitigation**
- 6. Actions**

1. Report Aims

This report has been produced by BT to provide further detail and clarification of the failure which impacted service on 31st May 2013

2. Customer Impact, Experience & Affected Infrastructure

Loss of service for 45,000 WBMC Shared customers for 2 minutes and 30,000 customers for 2 hours 21 minutes and for 400 VoFTTP customers for 10 hours 10 minutes (TBC)

3. Incident Summary

At 16:20 on the 31st May, Loss of management alarms were presented against the core router at Stepney and IMT23970/13 was raised. Several automated incidents were also generated against connected equipment, but no service impact was identified at this stage. A technical bridge was established to try and identify the reason for the loss of management to the core router. Whilst investigations were ongoing, the core router experienced a non-graceful route processor failover at 18:39 causing a Loss of Service to 45,000 customers for a few minutes.

The vendor was engaged and it was found that card 2 was stuck in a boot cycle. The card was reseated, but this failed to restore service. Simultaneously, customer reports were passed into the Operations team and IMT23989/13 was raised to confirm a loss of service. Investigations continued and a spare card was ordered to site. The fault was then localised to two out of the three routes between the core router and the FER (Front Edge Router), which would be impacting 30,000 customers. The routes between the core and FER routers were shut down, which forced traffic to the standby core router. Full service was confirmed to be restored from 21:02 IMT23999/13 was then raised to record the loss of resilience.

The spare card arrived on site at 22:26, card 2 was removed but the spare card was not inserted as it did not contain enough RAM. 512Mb was required, but the card only had 256Mb. A new task was raised for a card to be delivered with the correct RAM. The card arrived on site at 01:07, but it was a newer version than all other cards in the router. The vendor was engaged to check the compatibility and after a delay of 1 hour 20 mins, they advised the cards were not compatible. Diagnostics continued with the vendor and in the meantime, at 02:50, a suitable spare card was identified at Colombo House so the engineer travelled from Stepney to collect the card.

The new card was inserted, but the memory did not appear against the core router. At this point, further errors were also identified against card 4 so this card was removed. Card 2 was reseated and a routing engine switchover was performed and the card then showed to be working as expected. The vendor advised to keep the routes shut down until card 4 could be changed, but they were unable to provide an advanced replacement for this card.

Spares holdings were checked to try and locate an FPC card with 512Mb RAM and a card was identified in the test labs that could be used. An order was issued to collect the card and transport it to Stepney. At 12:34 on the 01/06, further errors were seen against the core router and at 12:50, another reload commenced which caused additional automated incidents. It was confirmed that there was no service loss experienced, but it was agreed to divert traffic away from the entire node to prevent any further risk to service. The vendor then agreed to provide an advanced replacement card.

At 17:06, reports were received regarding a Loss of Management across 846 FTTC circuits. This was as a result of the core router being by-passed by traffic and IMT24042/13 was raised. At 22:30, further fault reports were received against the future voice platform for 400 of the voice over FTTP customers being out of service. The services would have been down since the node had been by-passed by traffic. IMT24117/13 was raised against this service.

Once the spares from the test lab and from the vendor were on site at Stepney, a technical bridge was set up to restore the core router. At 23:18, a new card was inserted and a routing engine switchover was performed. The routes to the FER were brought back into live service and full checks were completed to ensure the core router was stable. Monitoring is still in force even though service has remained stable due to the issues experienced.

4. Root Cause

On the 11th May, non-service affecting errors were identified against card 4 in a core router and a ticket was raised with the vendor to investigate. The vendor recommended reseating the card, which was carried out on the 24th May. Initially, this appeared to resolve the problems but further issues were identified from the 29th May. A new card was ordered and was replaced at 03:45 on the 31st May. It is now understood that the replacement of this card was the root cause of this failure as it did not contain enough RAM (256Mb instead of 512Mb).

5. Risk Mitigation

Cards replaced and vendor investigations taking place to determine root cause analysis of the failure. A review required to establish why resilient routing didn't take effect. Review of alarm capabilities to take place to establish whether the failure could have been identified proactively. Review of spares availability and cleansing of spares holdings required to ensure no further 256Mb cards are used and that FPC spares are readily available

6. Actions

- a) To establish the exact root cause of the loss of service experience by WBMC customers. Waiting vendor analysis on cards.
- b) To establish why vendor resilience or network resilience wasn't available for this type of failure. For the initial route processor failover, the lack of memory resulted in a chain of failures within the core router that meant the vendor resilience didn't take effect. The cards did not go hard down. Due to the nature of the second fault, the BGP peer was up between the FER and the core router but nothing was coming out of the ports. The peer had to be shut down manually for the resilience to take effect

c) Spares Review

All 256Mb cards will be upgraded to 512Mb. The vendor has visited Magna Park and all 256Mb identified will be upgraded by the vendor and returned to site on the 6th June. There are also two 256Mb cards in the live network that will need to be replaced. Additional cards exist in other spares stocks across the UK, so these will also be checked.

A full review will be carried out into the spares as records indicate that 9 cards exist in the returns process. Daily updates will be provided.

- d) FTTC resilience – Management for 846 FTTC circuits was lost when the core router was by-passed by traffic. A review required to establish how to avoid this from occurring again.
- e) Alarm capability –No QoS alarms were seen against this device. The device is available in Net Health 21 so further investigations are ongoing. A separate piece of work will be looked at to see if an alarm can be provided for a drop in traffic against routers as the current capability only highlights erroring cards.

An update on all actions is expected on or after 12th June

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