Siemens IT Solutions and Services

Service Management

Post Incident Review – Network Radio failure – 5th August 2007

Contents

1. Executive Summary

On Sunday 5th August at 10:34 an air conditioning unit failed at Cable & Wireless' s.24 . At 12:22 BBC National Radio experienced intermittent hits affecting Radio 1 and 5. The increase in temperature at s.24 was causing the intermittent hits to the Radio Path2 tribs that feed s.24 .

Subsequent investigation has identified that the Path1 s.24 tribs were operating on their protection route which also passes through s.24 and not their primary route, which was not known and communicated at the time. As a result, both Path1 and 2 services were experiencing the same environmental conditions explaining the similar nature of degradation. Due to the nature of the degradation experienced Path1 services did not automatically switch back to their prime route away from s.24 and at this point the primary Path1 route was available and error free.

The faulty air conditioning unit was repaired at 13:51 and the BBC/Siemens services were stable from 15:49. There were no problems with the Path1 route throughout this incident. The fact that the Path1 was on its protection route was not identified by the engineer on duty who could have manually failed Path1 back to its primary route.

2. Incident Summary

Impact:	Degradation of National Radio resulting in inaudible services		
Date:	5th August 2007		
Incident Start:	05.08.07 12:20	Services Restored:	05.08.07 15:49
Duration:	3 hours 29 minutes		

Appendix A lists the Radio Tribs impacted by this degradation.

10:34 NMC saw ACU 2 fail at s.24 .

11:04 Mitie on call engr tasked to deal.

11:05 ACU 1 went into alarm also.

12:19 Siemens DTM reported s.24 (Path 2) between s.24 and s.24 as down.

12:25 Mitie engr arrived at s.24 and confirmed ACU 2 was faulty. ACU 1 had a high temp alarm.

12:58 NMC saw some signal degrades on an Optera system at s.24 . When a TN16L mux was investigated at s.24 it was seen to be operating at a high temperature.

13:11 Nortel booked to attend site.

13:51 Mitie reset both units to clear the ACU fault condition to get the ACUs to cool.

14:04 Both ACU alarms cleared as the temperature had dropped.

14:23 Optera signal degrades cleared at 14:23.

14:54 Siemens DTM then reported that they were seeing some Radio services down on both paths and gave an example cct to BBC Sutton Coldfield. NMC investigated to find a 2Mb loss of input from the BBC equipment. C&W was contacted who requested BBC reconnect their equipment. (It was later discovered that the BBC had disconnected the equipment as part of their DR switching process).

15:43 Nortel engr arrived at site and removed the heat sink cover from the TN16L mux and removed the cover to assist in cooling.

15:49 TN16L temp seen to drop and service returned to normal levels.

16:14 Mitie engr advised that the ACUs had struggled to cope with the heat today.

16:27 Siemens DTM advised they are seeing path 2 as alarm free and they will progress switch back of traffic over to C&W.

3. Business Impact

This incident had a massive impact on the BBC's National Radio Services. This forced the invocation of a disaster recovery solution (Re-Broadcast Standby RBS) outside of the Cable and Wireless provided network, initiated by the BBC, without which, a further 2 hours of disruption would have occurred. For a total of 4 hours and 10 minutes listeners suffered degraded audio and data services, causing many to tune away. This event did not occur in a period of lower listener volumes, but on a Sunday afternoon with high listening figures covering such events as the Grand Prix. At no time in the history of the BBC's FM radio services has this disaster recovery solution ever had to be forced into place UK wide. The solution was only ever intended for use where a national emergency could cause communication networks to have failed and a need to get information to the public.

The events on Sunday caused the following UK networks to be disrupted Radio's 1,2,3,4 on FM and Radio 5 Medium Wave and Radio 4 Long Wave. The effect to the listener became gradually worse, starting with "drop-outs" or "mutes" which increased in frequency over a period of 2 hours to the point of being un-usable. As Siemens/Cable and Wireless were unable to resolve the network issues affecting both network paths, the un-usual step of using the RBS service was initiated by the BBC. This is a "get the message out" system, not a quality service. Once this was done, the effect to the listener was: A mono service, without any dynamic RDS data, this would have meant that there was no travel information switching or updates to the radio text for the next two hours. The system radiates initially from one transmitter; the next transmitter will receive that signal and relay that. The process is analogue, so the signal to noise decreases the further you are from the initial transmitter. This means that listeners at the far end would have had a mono hissy service with no travel updates. As the solution is operated in a sequential structure, one failure will cause the rest of the chain to fail. This did happen in the case of Radio 1, which had a silent carrier for 50 minutes for listeners in Birmingham area and further North, East and West in the UK. To make matters worse, the weather conditions over the past few days had caused a VHF "ducting" propagation effect, which was causing reception of broadcasts from the continent not normally possible on VHF/FM. If that effect had reached certain threshold levels it could have shut major parts of the RBS solution down, causing complete loss of service.

It cannot be under estimated how this event impacted the BBC. It has caused numerous complaints to the BBC over a number of days, and a request for information, under the Freedom of Information Act.

4. Conclusions

The repaired air conditioning unit at s.24 has been confirmed to be operating normally. Further investigation has confirmed that the air conditioning solution is sufficient for the node but due to a problem with the grill direction, the remaining unit was unable to keep the temperature within operating levels. A full audit will be completed on all of the Siemens/BBC nodes to check air conditioning and to ensure that the ACUs are correctly rated and set-up.

The fault investigation carried out by C&W focused on the Path1 route throughout the country and this demonstrated there was no impact. However, the examination did not identify that Path1 services were in fact traversing their protection routes from s.24 to s.24 and consequently were running over the Path2 route through s.24 and therefore subjected to the same degradation issues. An error by an experienced engineer on duty was the cause of this omission.

Siemens and C&W have noted that Analogue Television Distribution did not suffer the same problems due to its dual path topology with no shared prime and protection routing of services. An immediate recommendation from Siemens and C&W is that we should investigate the removal of the auto failover to the protection that currently exists on some of the Path1 Radio Tribs. Further investigation will identify the possibility of providing a protection route that is an alternative route to Path2, potentially utilising today's more extensive C&W network.

Siemens and C&W recognise there were some major gaps in the communications across all parties, use of a 3-way conference bridge facility would have aided problem diagnosis and the decision to invoke RBS. Siemens and C&W acknowledge this as a recommendation in extreme circumstances only.

5. Actions and Recommendations

Summary of Actions and Recommendations

	Description	Owner	Review Date
1	Identify what caused the degradation to the Path1 National Radio Distribution Tribs. It has been identified that the Path1 tribs were operating on their protection routing. This route is also through s.24 and thereby both paths were subjected to the degradation in service. This degradation was not severe enough to trigger the automatic switch of the Path1 tribs away from s.24 back to their primary Path1 routing. The engineer made an error in not detecting that Path1 was on its protection routing. A review of the higher order log files has identified that following a Path 1 incident (FLT1058109) at s.24, Somerset on 12th	John Webb	Completed

	July at 13:40, a faulty power supply card on the Siemens/BBC multiplexer at s.24 was replaced and caused the auto-switch from the Path 1 primary to its protection route through s.24.		
2	An investigation into the current protection of the Path1 National Radio Distribution Tribs is underway to identify any further options or recommendations of preventing a similar incident occurring in the future. To include: 1. Siemens and C&W will investigate the options regarding the necessity to have the auto-failover to protect on these Radio Tribs. The findings from the investigation are as follows – Following an incident in May 2005, path protection was put in place between s.24 and s.24, and also s.24 and s.24. C&W have identified that following the Energis/C&W merger, there is potentially a better method of providing protection in the Radio Distribution Network, by utilising elements of the original C&W network between s.24 and s.24 s.24. In the interim, whilst the work is in progress, Siemens recommend that the auto-failover is removed, maintaining the ability to switch over manually in the event of a path failure. Design to be agreed between Siemens and C&W.	John Webb	24.08.07
	2. Siemens and C&W recommend implementation of the process followed for analogue TV distribution, to re-groom the Radio Tribs on a daily basis. Currently, following significant path switching events, manual switch back to the primary path is reviewed and agreed daily. This will follow standard process through C&W, the Siemens DTM and the relevant BBC Duty Manager. Process now implemented where the 8 Radio circuits are checked for routing on a daily basis. Any switches will be done in-line with the standard authorisation process from C&W, to Siemens DTM and onwards to the relevant BBC Duty Manager.	John Webb	Completed
	3. Check that all other protected circuits are working over their prime route/Path and therefore not running over their protection routes.	Ian Thomas	Completed
	4. Review of all protected services to identify the risks of a protected Path1 service running over a prime Path2 route with a view to utilising a separate route to either current Path. See Action 2.1.	Nick Jupp	31.08.07
3	Recommend to the Raman Programme Team that they ensure	Andy	31.08.07

	similar events from the last two years are tested 'war-gamed' across the new Raman network to prove that these scenarios will not result in similar disruption. Ongoing	Fletcher	
4	Confirm that the Raman Network is able to identify protection switching has taken place and which route (prime or protection) any protected path service is traversing. Confirmed, the Raman network has the capability to identify which route a protected service is on. Follow up work through the Raman programme team will demonstrate this capability to Siemens/BBC Ongoing	Andy Fletcher	31.08.07
5	Further investigation will be completed to re-check that the air conditioning is sufficient for s.24 and is operating correctly with particular focus on why the remaining unit was unable to keep the temperature within operating levels.		
	The equipment loading at s.24 is 5kW and each ACU is rated at 8kW. It has been discovered that the 2nd ACU that remained in service had had its grills set incorrectly and this resulted in a reduction in the effectiveness of the airflow through the equipment racks. The grills have been adjusted to their optimal setting to remove the hot spots.	Ian Thomas	Completed
	Further investigation to identify when the last maintenance visit was and why the quality assurance procedures were not followed by the 3rd Party. The last site visit at s.24 was completed on the 2nd of May 07 by Norland and no defects were recorded. Since this visit Norland have been replaced with Mitie.	Ian Thomas	Completed
	Does the change in C&Ws maintenance supplier have any bearing on this? Mitie have been engaged to deliver a single methodology across the whole estate, this includes a common approach to maintenance frequency and standards. For the EAMs they will now means be visited 4 times a year (as opposed to 2 visits by Norland) Management reporting will now be fully computerised, this will be a significant improvement on what was previously a 'paperwork' based system done on a regional basis.	Ian Thomas	Completed
6	An audit will be completed on the other Siemens/BBC nodes to check air conditioning and to ensure that the current change procedures that are in place are being adhered to, confirming that the preventative maintenance has been carried out, including the major annual ACU service conducted in May as well as the	Ian Thomas	31.08.07

	quarterly check of the ACU equipment. Following on from the grill discovery in point 5 the audit will also double check the grill direction settings. Mitie have been tasked with completing an audit of all EAMs / SNAPs which house Siemens/BBC equipment. The output of this is expected to be delivered by 29.08.07	Ian Thomas	31.08.07
	Clarification of SLA response for an ACU engineer to site is also required. The contracted response time for an engineer to attend site is 2 hours.	Ian Thomas	Completed
	Confirmation of the process for when a portable air conditioning unit is dispatched to an incident. Mitie have formal agreements with a number of large Air Conditioning suppliers to deploy portable units on demand. A new process is being negotiated where Mitie engineers will initiate the deployment of portable units in parallel to an engineer proceeding to site, when an AC unit failure is reported which reduces capability to N or less with a high temperature alarm. In all other instances, for example when capability exceeds N+1, they are to liaise with the C&W Network Management Centre who will ensure that if there is any change in state, they can then initiate the deployment of back up units. Negotiations are targeted for completion for the end of August.	Ian Thomas	31.08.07
7	C&W will investigate the bit error rate level to invoke auto-failover. Ongoing	Nick Jupp	24.08.07
8	C&W to confirm when they informed Siemens DTMs of the ACU failure at [redacted]. C&W did not inform the Siemens DTM of the ACU failure at [redacted]. A new procedure is now in place whereby notification will be made upon a second ACU failure, or when a high temperature alarm is detected. A service impact analysis will be generated and forwarded to the Siemens DTM advising of the risk.	John Webb	Completed
9	Communication to be reviewed between C&W, Siemens and onwards. Siemens and C&W recommend that a communication bridge (recorded and time coded) be set up for major incidents. Conference line and phone have been established, further work to be completed on recording/time coding capability.	Hilary Faul	31.08.07

10	Siemens to conduct a review of DTM training and familiarisation of the NICAM Distribution. DTMs have made contact with BDMs to set these sessions up – ongoing..	Hilary Faul	31.08.07

5. Appendix A

National Radio Circuits

s 24

6.Document Control Page

6.1Document Identification

Title: Incident Report – Network Radio – 5th August 2007

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Version : V1.1

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6.2Authorisation

Name :
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6.3History

Version	Date	Author	Description
Draft	07/08/07	John Webb	Incident Report
0.1	08/08/07	Hilary Faul	Updated following review.
1.0	08/08/07	Hilary Faul	Issue 1
1.1	20/08/07	Hilary Faul /Navin Sathi	Progress Update.