

Export

Peak Incident Management System

| | | | |
|----------------|--------------------------------------------------------|-------------------|---------------------------------|
| Call Reference | PC0145617 | Call Logger | Deleted User -- EDSC |
| Release | Reported In -- T40 | Top Ref | E-0704120541 |
| Call Type | Cloned call | Priority | B -- Progress stopped |
| Contact | Deleted Contact | Call Status | Closed -- Published Known Error |
| Target Date | 03/05/2007 | Effort (Man Days) | 0 |
| Summary | Branch 468519 - System has frozen during a transaction | | |
| All References | Type | Value | |
| | Clone Master | PC0145212 | |
| | Powerhelp | E-0704120541 | |
| | SSCKEL | KEL acha2552T | |

Progress Narrative

Date:30-Apr-2007 14:07:51 User:Chris Hawkes

CALL PC0145617 opened

Details entered are:-

Summary:Branch 468519 - System has frozen during a transaction

Call Type:C

Call Priority:B

Target Release:T40

Routed to:EDSC - Chris Hawkes

Date:12-Apr-2007 12:30:29 User:_Customer Call_

CALL PC0145212 opened

Details entered are:-

Summary:pm states that the system has frozen during a transaction

Call Type:L

Call Priority:B

Target Release:T40

Routed to:EDSC - _Unassigned_

Date/Time Raised: Apr 12 2007 11:58AM

Priority: B

Contact Name: john corry

Contact Phone: GRO

Originator: Phelp

Originator's reference: E-0704120541

Product Type: Riposte

Product Serial No:

Product Site: 468519

12/04/07 11:58 pm states that the system has frozen during a transaction

12/04/07 12:00 UK959395

Information: pm states that the system has frozen and while on line the system has unfroze it self

12/04/07 12:01 UK959395

Information: pm states that this happened on saturday aswell

12/04/07 12:10 UK959395

Information: pm states has happend before aswell

12/04/07 12:10 UK959395

Information: pm states everytime the pm has been advised to reboot the

System

12/04/07 12:11 UK959395

Information: * NULL TEXT SUPPLIED *

12/04/07 12:12 UK959395

Information: pm states that the system freezes during transaction processing and when the system freezes has to turn customers away, and wants to make a complaint

12/04/07 12:13 UK959395

Advice: advised nbsc for complaints and need information as much as the pm can give to send call to EDSC to look into

12/04/07 12:13 UK959395

Information: NODE: 1

USER NAME: MCO001

TIME: 11.50

DATE: 12/04/07

SESSION ID: Unknown

TRANSACTION NUMBERS: unknown

AMOUNT: Unknown

LAST 4 OF CARD NUMBER: 9420

TP: 01

BP:02

STOCK UNIT: AA

12/04/07 12:20 UK959395

Information: other times system has had to be rebooted after freezing during a transaction:

E-0704020356

E-0704020307

E-0703260324

12/04/07 12:21 UK959395

Information: checking events

12/04/07 12:25 UK959395

Information: can you please check why the system freezes during a transaction

12/04/07 12:26 SYSADM

Open OTI: Automatic Open OTI

***Updated by Mohammed Hussain at 12/04/2007 12:26:26

12/04/07 12:26 UK959395

REASSIGN: Call # E-0704120541 was Reassigned from Mohammed Hussain, Group HSH2 to Group EDSC1

Date:12-Apr-2007 12:32:42 User:Jagdeep Bhambra

The call summary has been changed from:-

pm states that the system has frozen during a transaction

The call summary is now:-

Branch 468519 - System has frozen during a transaction

Date:12-Apr-2007 12:33:04 User:Jagdeep Bhambra

Product EPOSS & DeskTop -- Counter Common added.

Date:12-Apr-2007 12:33:14 User:Jagdeep Bhambra

The Call record has been assigned to the Team Member: David Seddon

Progress was delivered to Powerhelp

Date:12-Apr-2007 13:56:53 User:David Seddon

Evidence Added - 468519 - Ctr 1 event logs

Date:12-Apr-2007 14:07:49 User:David Seddon

[Start of Response]

Besides the instance of the screen 'freezing' this morning at 11:50am I've established from previous calls that there were other instances on 2nd April between 10 and 10:30am and also at around 10am on 26th March as well. The counter application event log only covers the April instances and in both cases there are a number of CNIM events written around the time indicating problems with the connection. Checking through the whole log there are in fact a high number of these events. Passing call through to Chris Hawkes so a thorough check can be done on the cause of these events.

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Powerhelp

Hours spent since call received: 0 hours

Date:12-Apr-2007 14:08:00 User:David Seddon

The Call record has been assigned to the Team Member: Chris Hawkes

Progress was delivered to Powerhelp

Date:13-Apr-2007 11:33:40 User:Chris Hawkes

[Start of Response]

...There WERE some problems on Saturday 7th, due to a wider issue affecting ALL the ISDN-connected offices. However this cannot explain the problems experienced on 26th March and 2nd and 12th April. Gathering some logs from the gateway counter...

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Powerhelp

Hours spent since call received: 0 hours

Date:13-Apr-2007 13:16:05 User:Chris Hawkes

[Start of Response]

..Ditrace captured for 11:50 this morning does show an unusual (but temporary) condition on the D-Channel of the Eicon card. This will need some deeper investigation (i.e. I have to get the manuals out....!)

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Powerhelp

Hours spent since call received: 0 hours

Date:17-Apr-2007 10:28:26 User:Chris Hawkes

[Start of Response]

...There were two more incidents at 09:06 and 10:24 on the 16th. I will collect the logs for those times and see if they match. The PM MAY notice the line going a bit slow while I upload the data...

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Powerhelp

Hours spent since call received: 0 hours

Date:17-Apr-2007 17:11:35 User:Chris Hawkes

Product General/Other/Misc -- ISDN added.

Date:17-Apr-2007 17:11:37 User:Chris Hawkes

Product General/Other/Misc -- ISDN updated to Subject.

Date:20-Apr-2007 15:11:00 User:Chris Hawkes

[Start of Response]

...Sorry I have not put any updates on this call for a couple of days. (I am afraid I have been helping with some Post Offices that had next to no OLS at all, not just one or two problems per week!) I have been looking at the traces from the 16th, but I have not found anything to match the previous D-channel problems yet. I have also noted that there were some more declined transactions on the 18th and 19th, so I am grabbing the traces for those incidents from the gateway counter before they are "housekept" by the system.

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Powerhelp

Hours spent since call received: 0 hours

Date:24-Apr-2007 13:46:17 User:_Customer Call_

EMPTY 24/04/07 13:43 UK959239 HSH5 Information: PM called in as the system froze again during a transaction on node 1.

E-0704240668

Date:24-Apr-2007 13:49:50 User:_Customer Call_

EMPTY EMPTY EMPTY OTI Astea OTI Success: An add has been sent to PINICL 24/04/07 13:48 uk959331 HSH8 Repeat Call: PM states she has had to reboot the gateway again and has

no OLS 24/04/07 13:49 uk959331 HSH8 Advice: advised pm that as long as she is rebooting the gateway she won't have OLS on node 2 24/04/07 13:49 uk959331 HSH8 Information: pm not happy and hung up

Date:24-Apr-2007 17:58:58 User:Anne Chambers

[Start of Response]

I think there are two interacting problems here:

i) branch appears to have some sort of intermittent comms problem - if this can be resolved it may be the fastest way to help the PM. There have been about 20 of these during working hours in the last 4 weeks. The failures are transient and the connection is normally restored quite quickly.

ii) when a failure does occur, on several occasions CNIM has attempted to update the OnlineStatus object but has got a Riposte lock error. The counter then hangs - the timer which should timeout the NB application after 32 seconds does not kick in. After 6 or 7 minutes CNIM appears to retry the connection. If this is ok the Request is sent (much too late!) and the counter application times out.

Riposte locks have caused problems elsewhere in the past; I will check to see whether other branches are getting similar problems. CNIM code needs to be checked to see if it can behave better in this situation.

If the PM phones in again with the same problem DO NOT ADVISE HER TO REBOOT unless the counter has already been hanging for more than 10 minutes. In most cases it will free itself within this time, and there will be less disruption than a reboot will cause. We are continuing to investigate.

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Powerhelp

Hours spent since call received: 0 hours

Date:26-Apr-2007 09:14:36 User:Anne Chambers

Reference Added: SSCKEL_acha2552T

Date:30-Apr-2007 12:16:26 User:Chris Hawkes

[Start of Response]

...Again, sorry to leave this one so long between updates (there are a lot of "A" priorities around at the moment). I have now analysed the first incident from the 19th and this shows that the R1 was written at 09:08:48, I can see 4 x 250 byte encrypted messages going out of the diehl driver between 09:08:47.903 and 09:08:48.023, (to the 4 cor servers) but no sign of a response from the datacentre. The ISDN call, which was first established at 09:06:48.982 was hung up at 09:09:41.029 with no errors. The A3 was written to the messagestore at 08:09:03 (datacentre time), but I need to try and find out how far the clocks between the branch and the Datacentre are before being able to decide whether this was within the 32 second timeout period...

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Consumer

Date:30-Apr-2007 12:22:14 User:Chris Hawkes

[Start of Response]

...Sorry, I should have also said that the fact that the A3 was written for this transaction proves that at least ONE of the 4 copies of the R1 arrived at the datacentre, and got processed.

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Consumer

Date:30-Apr-2007 12:53:26 User:Chris Hawkes

[Start of Response]

...For the SECOND incident on the 19th, at 14:59, I canNOT see any A3 written in the messagestore. This implies that either NONE of the 4 R1s arrived at the datacentre, or, if they did, it was already too late to process them. In this case the R1 was written at 14:58:45, but the call, which was initiated within 500mS, did not establish a good working connection to the Datacentre (that would carry user data) until 14:59:00 - i.e. 15 seconds later. All 4 of the R1 copies were transmitted within 1 second. The delay in call initiation was due to slow response from the LNS router in the datacentre in setting up the IP layer. I cannot tell what caused that though...

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Consumer

Date:30-Apr-2007 13:09:11 User:Chris Hawkes

[Start of Response]

...That ISDN call also ended without error at 15:00:00 after transmitting and receiving LOTS more frames.

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Consumer

Date:30-Apr-2007 13:18:12 User:Chris Hawkes

[Start of Response]

...There was an interesting bunch of incidents on the 23rd at around 10:16-22: What makes them interesting is that there were 4 declined transactions logged (R1s) at 10:16:11 (Node 1), 10:17:22 (Node 1), 10:18:29 (node 2) and 10:21:19 (NODE 1), but in the middle at 10:10:13, there was a completely SUCCESSFUL transaction (also node 1). This indicates just how intermittent the problem is.

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Consumer

Date:**30-Apr-2007 14:06:08** User:**Chris Hawkes**

[Start of Response]

...Again, for this series of calls, I can see (encrypted) frames that look like the 4 copies of the (1242byte) R1 leaving the counter within a second or so of the time it was written in the message store, so it looks as though the R1s did NOT reach the datacentre. However there are smaller packets (150-250bytes) going in both directions before and after the critical messages. This is beginning to look to me like a congestion issue further up the network (probably UPSTREAM of the DLE).

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Consumer

Date:**30-Apr-2007 14:07:43** User:**Chris Hawkes**

[Start of Response]

...Because there are 2 separate issues here - the basic congestion issue with the comms (somewhere) AND the way that the counter code can lock up in certain circumstances, I am going to CLONE this call so that we can work on the two problems in parallel.

[End of Response]

Response code to call type L as Category 40 -- Pending -- Incident Under Investigation

Response was delivered to Consumer

Date:**30-Apr-2007 14:07:51** User:**Chris Hawkes**

Call cloned from original call:PC0145212 by User:Chris Hawkes

Date:**30-Apr-2007 14:08:47** User:**Chris Hawkes**

...Anne, please can you explore the lock-up issue associated with this problem.

Date:**30-Apr-2007 14:08:55** User:**Chris Hawkes**

The Call record has been assigned to the Team Member: Anne Chambers

Date:**01-May-2007 17:10:13** User:**Anne Chambers**

[Start of Response]

There is a problem which is causing system freezes during banking transactions at many Bronze branches if the comms are intermittent. The system hangs for several minutes, and the clerk may decide to reboot, or be advised to by the helpdesk. The problem just affects the gateway counters.

The R1 request priority message is written. The counter tries to connect to the data centre but the connection fails. The event logs show several CNIM events, followed by a Riposte 'timeout waiting for lock' event. Then C_HV_POSCH reports that it couldn't update the WANStatus object.

The counter becomes unresponsive. The banking timer, which should time out the request after 32 seconds, doesn't kick in. If the clerk doesn't reboot, the counter usually wakes up again after 5-8 minutes. At this point the banking transaction is timed out.

The comms problems at some Bronze branches are being investigated on call PC0145212. This call has been raised to find out why the Riposte lock is being held and why the counter then hangs - and eventually recovers.

Very hard to tell when this problem started, but I think it goes back to at least Sept 2006. While it is very inconvenient for the affected branches, few of them are continually badly affected by it.

One thing I've noticed: ETopUp requests don't hit this problem, but NB and Debit Card do, whenever CNIM Failure mode is set to lost connection when trying to send the request.

Not quite sure where this call should go. The banking EMV code may be implicated. CNIM manages the connection or failure to connect. C_HV_POSCH (a counter agent) reports the failure to update the object. Riposte is holding the lock (but I suggest we only raise this with Escher as a last resort).

[End of Response]

Response code to call type C as Category 40 -- Pending -- Incident Under Investigation

Date:**01-May-2007 17:11:26** User:**Anne Chambers**
Evidence Deleted - 468519 - Ctr 1 event logs

Date:**01-May-2007 17:12:09** User:**Anne Chambers**
Evidence **Added** - Messagestore and 111111111 group

Date:**01-May-2007 17:12:34** User:**Anne Chambers**
Evidence **Added** - c1 application event log

Date:**01-May-2007 17:12:57** User:**Anne Chambers**
Evidence **Added** - tuneable trace 12 th Apr

Date:**01-May-2007 17:13:40** User:**Anne Chambers**
Evidence **Added** - Extract of messages and events for problem March/April

Date:**01-May-2007 17:14:32** User:**Anne Chambers**
The Call record has been transferred to the team: QFP

Date:**01-May-2007 17:14:59** User:**Anne Chambers**
Product Network Banking -- NB Counter added.

Date:**01-May-2007 17:15:07** User:**Anne Chambers**
Product Network Banking -- NB Counter updated to Subject.

Date:**02-May-2007 08:03:16** User:**Lionel Higman**
The Call record has been assigned to the Team Member: Mark Scardifield

Date:**02-May-2007 11:26:34** User:**Mark Scardifield**
The Call record has been transferred to the team: EPOSS-Dev
The Call record has been assigned to the Team Member: Mark Scardifield

Date:**02-May-2007 16:48:58** User:**Kath Greenwood**
I have discussed this with Gareth and we are unsure what is triggering the counter to wake up again after 5-8 minutes. As the 30 second timer in the Counter Code is not triggered, the Counter development team is unable to shed any light on the matter.

An example of the problem can be seen in the application event log at 11:51:27 on 12/04/07, where Riposte logs:
"An unexpected error occurred while attempting to modify an entry in the run map. Timeout occurred waiting for lock. (0xC1090003)"

At the same time, Counter Call Scheduler logs:
"Timeout occurred waiting for lock."
while attempting to write the NetworkState message to the message store.

We have seen the Riposte Timeout message before but are not aware of an explanation from Escher as to the root cause. I'll check with Mike Coon on his return next week.

Perhaps CNIM could have a quick look at the problem to see if they are able to shed any light on what is waking up after 5-8 minutes and advise if this time is configurable.

On Gareth's suggestion, I am returning this Peak for onward routing to CNIM.

Date:**02-May-2007 16:49:24** User:**Kath Greenwood**
The Call record has been transferred to the team: QFP

Date:**03-May-2007 14:53:01** User:**Lionel Higman**
The Call record has been transferred to the team: Nwks-&-VPN-Dev

Date:**08-May-2007 15:24:07** User:**Peter Ambrose**
The Call record has been assigned to the Team Member: Nick Johnson

Date:**14-May-2007 07:45:01** User:**Chris Hawkes**
...*** Note for anyone INVESTIGATING this incident: The Branch (468519) for which the original, pre-clone, incident was logged, has NOT reported any further problems since I switched the Service type from Bronze (ST4 - Dial on demand) to Silver FRIACO (ST7 - "always" on).

Date:**14-May-2007 07:48:55** User:**Chris Hawkes**
...*** Notes for anyone considering the relative PRIORITY of this incident (RMF etc): (1) There is a VERY STRONG financial incentive to switch as many as possible of the remaining SILVER FRIACO branches AWAY from this service (ST7) and on to a Dial-on-demand service (ST4) NOW and during the next few months. (2) The Silver FRIACO service will be withdrawn altogether by September. Therefore a FIX is required by then to address the problem at any remaining ISDN DOD branches (could be as many as 200 potentially affected).

Date:**14-May-2007 07:50:19** User:**Chris Hawkes**
...*** Further note for anyone INVESTIGATING the problem. If you need any more evidence, please ask SOON, as there are plans to bring forward the migration of THIS branch (468519) to ADSL within the next 2 weeks.

Date:**18-May-2007 15:10:49** User:**Nick Johnson**
I can see that comms fail between 10:38 and 10:51.

CNIM has set a test timer of 787 (13 mins 7 seconds) and will not test the line during that time. Something else causes the line to come up during that time (10:57) CNIM tests the line and the ping works.

One thing of note is the very long ping reply times which indicate poor comms.

I suspect CNIM is working as planned where it is required initially to wait 5-15 minutes before testing the line.

Date:**29-May-2007 11:03:43** User:**Peter Ambrose**
Forwarding to EPOSS Dev for further investigation on the behaviour of Riposte.

Date:**29-May-2007 11:03:59** User:**Peter Ambrose**
The Call record has been transferred to the team: EPOSS-Dev

Date:30-May-2007 16:56:28 User:Mike Coon

I think that Kath Greenwood forgot to "check with Mike Coon on his return next week", not that I can shed any deep light on the problem.

Except on the matter of timeouts.

(1) The primary timeout of 32 seconds that Anne Chambers mentions is unfortunately not independent of the Riposte "Notify" (of the arrival of the [A3]) process. The timeout period is a parameter to that call, so if Riposte hangs, possibly "waiting for lock", then maybe the 32-second timeout is also suppressed, leading to the counter freeze. (I happen to be looking into this area for the HNG-x/Horizon hybrid with PCI per CP4305. That version won't use Notify and will therefore have an independent timer.)

(2) In addition to the 32 second timeout there is a "600" (probably seconds) timeout for NBRequestReply.dll which is policed by NBFramework.dll. This has long thought to be dodgy and though it attempts a recovery process to tidy up the transaction it may be faulty. The ten-minute timeout is set so long to ensure that it is hardly ever allowed to expire. Steve Evans has been studying this, or related problems under long-standing PEAK 96719 and also 128872 and 134587. However it may be the reason why the counter can wake up several minutes after the initial freeze.

Date:04-Jun-2007 17:23:04 User:Mark Scardifield

I am concerned that this problem is not readily reproducible and any potential (speculative) fix is likely to be fairly invasive. The most obvious change would be to introduce a timer that is separate from Notify as suggested by Mike Coon above. This will change the way that every single on-line transaction is handled so significant testing would be required. Any change to the NB Framework has to be considered as risky.

I would like to get a view "pre-RMF" whether we would be happy to contemplate this scale of change before we invest more time and formally propose a change via RMF.

Date:05-Jun-2007 10:38:38 User:Mike Coon

A possible alternative to the one suggested above by Mark Scardifield (replacing the Notify timer with an independent one) would be to tidy up (one-line code change) NBFramework so that it does not loop when it times out a component. Then we could be justified in reducing the configured timeout period for NBRequestReply from the present ten minutes to say one minute.

However this timeout is still rather "brutal" and does not provide for any recovery actions such as resetting the PIN pad or suggesting that the Clerk tells the customer to retrieve their ICC card. This clumsiness may be acceptable for a rare occurrence; it can easily be worked around and the PIN pad can be reset by subsequent actions.

However it is not clear whether the transaction recovery is really adequate in this circumstance. This could be investigated under the umbrella of PCI but would have wider relevance than PCI in that it could apply to ETU transactions as well as NBS and DCS.

BTW it is not understood in EPOSS Dev why this whole problem appears only with Banking transactions. Surely the whole Riposte and comms path is identical for ETU? Could it be that ETU transactions are equally implicated but are just not as apparent for some reason?

Date:06-Jun-2007 09:34:48 User:Mark Scardifield

Routing to RMF - not for authorisation because we (Dev) haven't proposed a fix yet - but to discuss the cost/benefit and likely timing of making a NB Framework change before committing more effort to investigating potential fixes.

Date:06-Jun-2007 09:35:01 User:Mark Scardifield

The Call record has been transferred to the team: RelMngmntForum

Date:07-Jun-2007 11:46:04 User:John Budworth

Extracts from two mails from Mik Peach of SSC read;

1/ From Mik Peach of SSC to Release Management (for RMF)

For 145617 I accept that we are unlikely to get a fix from Escher, and even if we got one, we are unlikely to implement it. I also agree that the "brutal" changing of timers is more likely to cause problems than to solve them - so I am in agreement with development that they should not attempt to fix the problem. However, even though we know that we can resolve the underlying network problems by switching the site to "always on", there is a cost associated with doing this, and we are trying to migrate sites to dial-on-demand. I think that the easiest way to handle this is to agree not to produce a fix, but to flag to Graham Welsh and Alex Kemp that there may be an ongoing requirement to "juggle" the networks with problem sites as a result of this decision.

2/ From Mik Peach of SSC to Graham Welsh (Head of Service Transition) and Alex Kemp (Network Service Manager).

Investigation into Peak 145212 and a clone of same (145617) has identified a problem which can cause counters to suffer an approximate 8 minute "hang" during online transactions. The underlying root causes of this are intermittent network issues on a dial-on-demand circuit, coupled with a Riposte timer issue. Given that we are unlikely to get a fix from Escher, and even less likely to implement one even if we got one, and given that the only alternative in the counter code would require a counter release of a fix described as "brutal", with possible side effects; the SSC recommendation to RMF is that we do not attempt to fix this problem. We have a work-round, which is currently to switch any such problem-site out of dial-on-demand to always-on; actually in the case of the specific PO raising the call, we switched them to ADSL. Initial investigation has shown that the problem is affecting 10-12 Post Offices, who are getting the symptoms 2-3 times per week.

For the sites which have this problem, and which remain on ISDN, we will have the alternative of switching to Silver FRIACO (service type 7) or metered FRIACO (service type 9).

I appreciate that BT and POL have been slower than anticipated in the ADSL roll-out, and I understand the pressure to switch to dial-on-demand. However, I believe that, although there will be a cost to CS in using this workaround, it would be more cost-effective than the alternatives.

Routing back to EPOSS-Dev for a final response that will route call back to SSC for closure.

Date:07-Jun-2007 11:46:41 User:John Budworth

The Call record has been transferred to the team: EPOSS-Dev

Date:07-Jun-2007 14:19:43 User:Mark Scardifield

[Start of Response]

Returning for closure as discussed above.

[End of Response]

Response code to call type C as Category 64 -- Final -- Published Known Error

Routing to Call Logger following Final Progress update.

Date:16-Mar-2010 14:24:39 User:Chris Hawkes

Defect cause updated to 7 : Design - High Level Design

Date:16-Mar-2010 14:24:42 User:Chris Hawkes

CALL PC0145617 closed: Category 64 Type C

| | |
|-----------------|-----------------------------------------------------|
| Root Cause | Design - High Level Design |
| Logger | Deleted User -- EDSC |
| Subject Product | Network Banking -- NB Counter (version unspecified) |
| Assignee | Deleted User -- EDSC |
| Last Progress | 16-Mar-2010 14:24 -- Chris Hawkes |