

CSP North Improvement Plan

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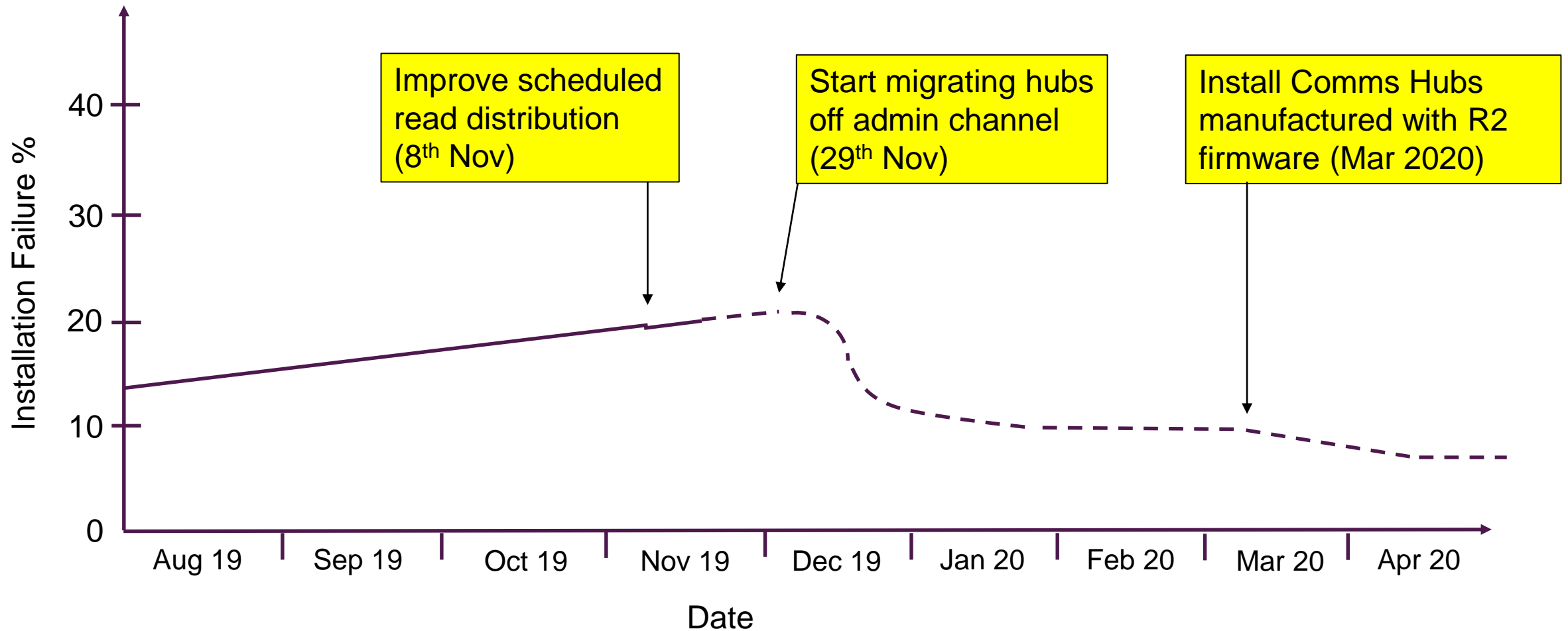
Improvements Summary

Resolution item	Description	Forecasted Reduction in failed installs	Start Date	End Date
1	Migrate Comms Hubs off admin channel to reduce interference during birthing events	- 10%	29-Nov	Benefits by 15 th Dec & ongoing.
2	Deployment of Comms Hubs manufactured on R2 firmware	- 2-2.5%	March 2020 (subject to governance)	Dependent on rollout
3	Improve scheduled read distribution	-1%	8-Nov, now monitoring	

DCC TOC to measure and quantify improvements

The current Install and Commission failure rate in the North region is being reported by customers to be at circa 20%, the above fixes are predicted to bring this rate down to around 5 to 6% which is in line with the Central and South region. The fixes will also have a positive impact on reducing the current Install and Commission time as the fixes are all linked to reducing congestion on the network and improving the service request success rate.

2 Predicted Performance Trajectory



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Resolution #1 – Network congestion on single channel (PBI117413)

Description:

- After the deployment of a new version of the network management system (NMS), an activity was undertaken to balance the network by moving comms hubs away from the 'admin' channel to one of another 12 channels. The aim of the activity is to reduce the traffic on the admin channel, which is the default channel by which the comms hub communicate with the RNI during the birthing and installation process, in order to reduce RF interference. However, this balancing activity exposed a defect within the TK software which caused the TK's to enter into a disconnect / re-connect cycle, which resulted in an incident, and has delayed the activity.

Impact:

- The impact of the RF interference is an increase in retries required to communicate with a comms hub due to lost transmissions, negatively impacting I&C success rates. The impact of the TK entering this disconnect / reconnect cycle was that communication from comms hubs associated with that TK were lost, both during the I&C process and during PCO (Post commissioning obligations).

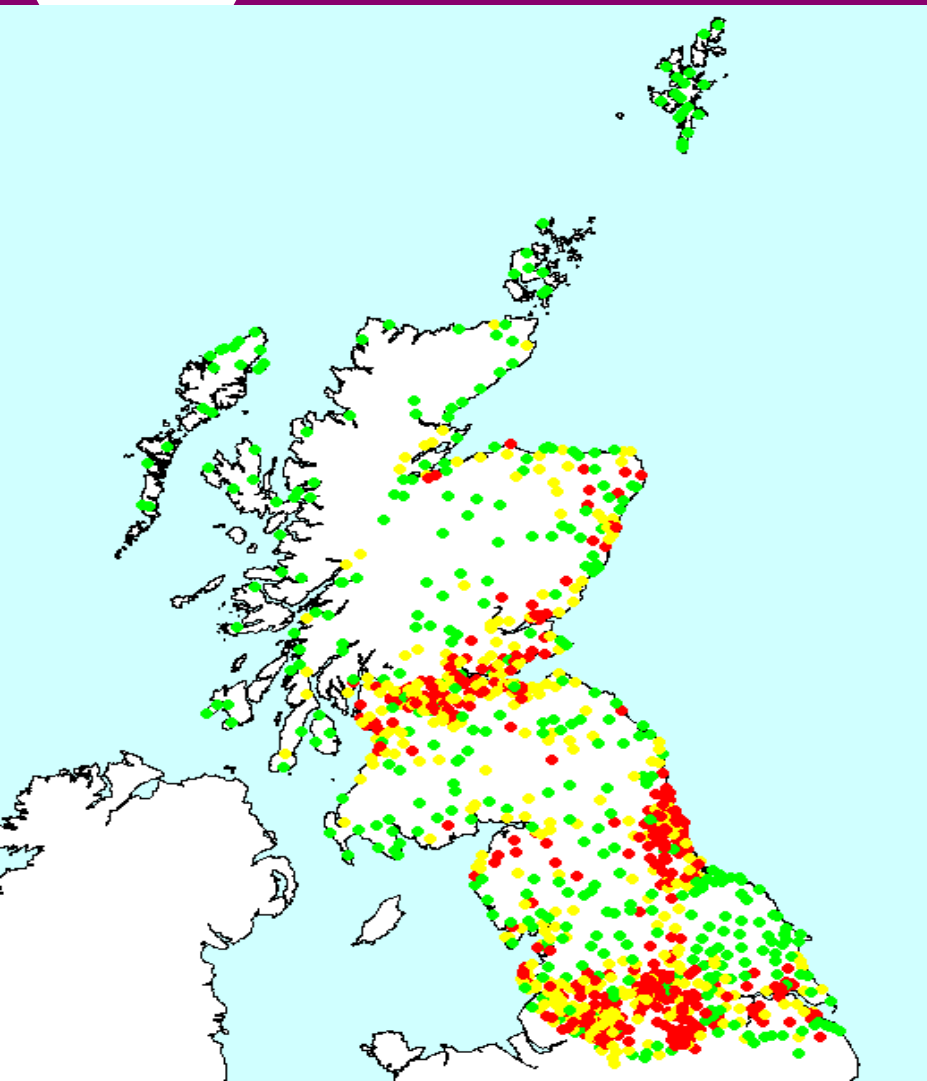
Resolution:

- 2 patches, one to the NMS and one to the TK software were delivered by Sensus, the NMS patch has already been successfully deployed into production, the second is undergoing testing and results so far have been very good. The main risk here is that we are unable to replicate having hundreds of thousands of comms hubs on the network in our test environments, meaning that while we have tested that all 12 channels will communicate with the TK successfully, the numbers of comms hubs on those channels is limited.
- Once we have satisfied both the DCC and ourselves that as much testing as we can carry out has been done, we will roll this patch out to the estate of TK's, which will take approximately 12 days (subject to a 10 working day DCC notice period prior to starting, submitted in anticipation, roll out due to start on the 14th November)
- After this roll out has completed, we will start the comms hub balancing activities, on small numbers of hubs at first (in the hundreds), before increasing to the thousands and tens of thousands once we are confident that no further issues are seen.

Dates (forecast based on current information):

- NMS Patch in production: 7th November – complete.
- TK patch roll out completion: 28th November – in progress.
- Balancing activities commence: 29th November

3 TK load by traffic volume (including alerts)



TK = Transceiver Kit, i.e. radio hardware within the base station.

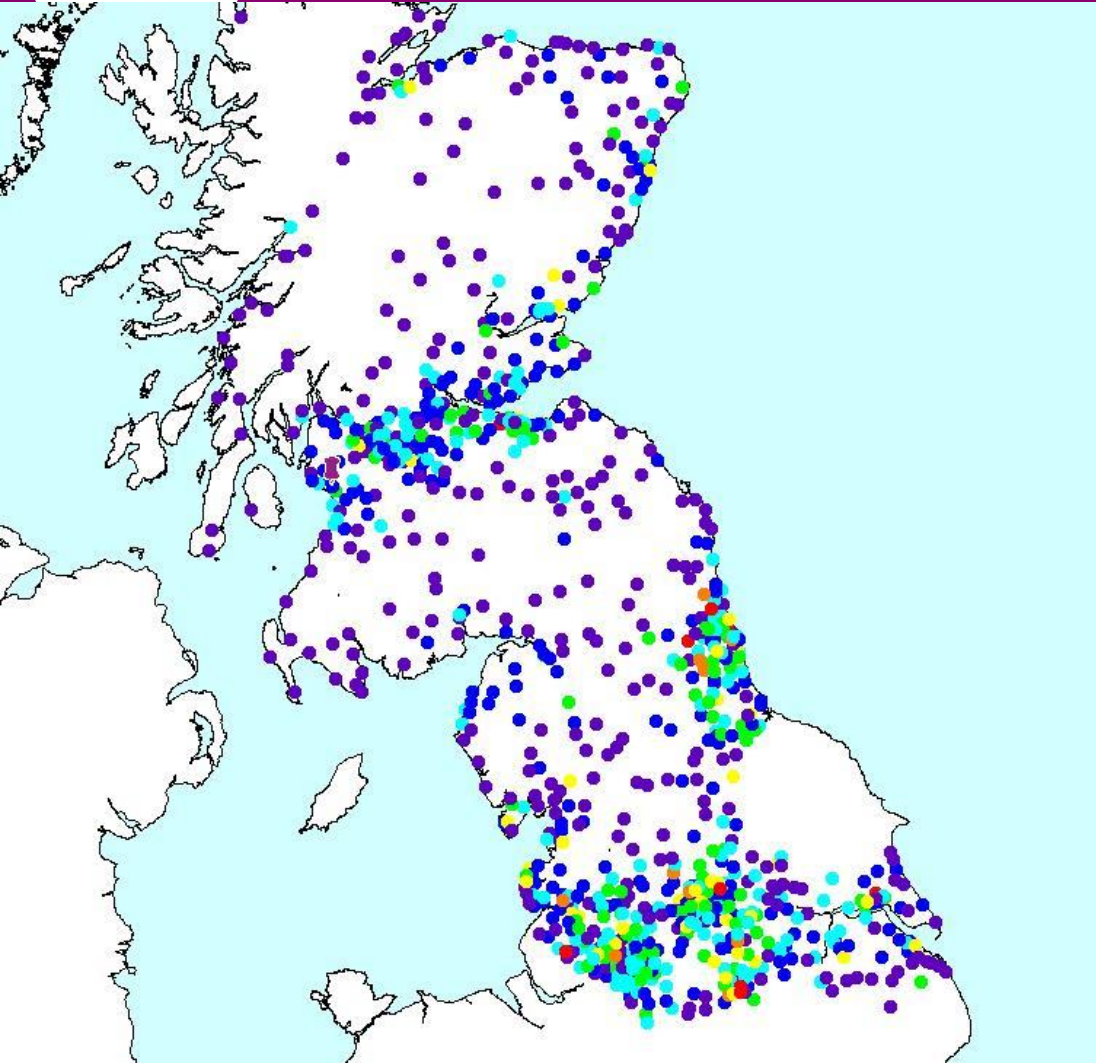
This image shows load on each TK in terms of traffic volume from the hubs, this will take into account such things as alert volumes, message traffic etc.

In the image here the highly loaded TKs are coloured red, medium yellow and low green.

This gives you a real world view of where the heavily loaded areas are, as per expectation, they are the more urban areas.

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TK load by volume of Comms Hubs



This image shows load on each TK in terms of numbers of comms hubs joined to each TK.

The highly loaded TKs are in the lighter colours.

The fix plan is to focus the migration of the CH's that are impacted by the chatty devices away from these highly loaded TK's first, in order to lighten the load by bringing some balance to the network in turn improving performance.

As you can see the urban areas are more heavily loaded.

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Resolution #2 – SDK in Comms hub (PBI116516)

Description:

- The current version of SDK within the 1.38.6 (or earlier) comms hub code contains a defect where during the installation process the comms hub could report incorrect routing information back to the RNI.

Impact:

- The potential use of a sub optimal route by the RNI may cause a delay in messages on uplink and downlink to the comms hub, meaning that the I&C process may take longer than expected. This increases the risk of I&L installations as customer systems may time out. In the worst circumstance comms may fail entirely to the CH.

Resolution:

- The fix for this issue is contained within the R2 comms hub code, which is currently undergoing UIT testing at both the Manchester test lab and within customer's RTL's.
- The improvement delivered by the new SDK will only be apparent when used in a comms hub manufactured with R2 code, as the issues is only apparent during I&C, once birthed the hub will settle its routes and the issue is not present. Current plans are for this FW to be made available for manufacture at the end of the year, however, owing to the lab move from Winchester to Manchester and other configuration issues specific to the new lab, testing is behind schedule, with a number of open issues still undergoing triage.
- On the current build of SDK, once the hub is successfully installed, it will, along with the RNI, re-establish it's routes based on self-learning, which can take up to 5 days, after which the routing tables will have optimised.

Dates (forecast based on current information):

- R2 code ready for manufacture: March 2020 for CH units out of the box

Description:

- DSP scheduled reads take place between the early hours of the morning and 6am each day, this mechanism currently sends 40 messages per second to Arqiva with a 40 second retry mechanism in place, should the DSP get a 'too busy' response, this retry is attempted 3 times before moving to a retry every 2 hours. Currently, due to the short window in which the DSP want to run these reads, we get a lot of messages going into the retry process, this has seen to be more prevalent in the mornings when retries are more likely to happening

Impact:

- The primary impact is there may be an increase in the number of E20 alerts seen by the customers in the mornings, this could cause in an increase to installation times.

Resolution:

- Change the number of reads per second from 40 to a lower number, reducing load, initially this will be changed to 30 reads per second, but may go lower.
- Another option to be investigated is to spread the scheduled reads over a 24hr period, rather than a 4-6 hour window in the mornings.

Dates (forecast based on current information):

- DSP change from 40 messages per second to 30: Completed on 8th November (now being monitored).