

DCC request for information

Amendments to the Scheduled Read Window
for the CSPN Region

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Classification: DCC Public

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1. Introduction and Context

1. The Data Communications Company (DCC) is Britain's digital energy spine, supporting the transformation of the energy system. DCC is licensed by the Government and regulated by the energy regulator Ofgem to connect smart meters in homes and small businesses across Great Britain to a single secure, digital network. DCC supports the roll-out and operation of second-generation (SMETS2) smart meters, as well as the migration and operation of existing first-generation (SMETS1) meters onto our network.

1.1. Background

2. DCC, Communication Service Provider North (CSPN) and the Department for Energy Security and Net Zero, formed a triparty working group to model the performance of the CSPN Radio Network solution at scale, based on evolved requirements and updated message forecasts to support the development of an optimisation and scaling plan for the CSPN network (if required) to ensure that the network scales efficiently and effectively and providing confidence for its future use. This project is called CSPN Scaling and Optimisation.
3. The CSPN Scaling & Optimisation Phase 1 results identified that there was an opportunity to review the current duration of the Scheduled Read Window. Maintaining the current 6-hour Data Service Provider (DSP) Scheduled Read Window over time will be a significant cost driver for CSPN network scaling and optimisation. DCC is keen to explore this further as it offers an opportunity to significantly reduce the level of scaling and future investment in the CSPN solution (RF Radio Network and wider E2E System components).
4. Scheduled Services delivered via the Scheduled Read Window are those which a User specifies the initial time and date for execution and the frequency at which execution is to recur. The most utilised Scheduled Service is that of the Scheduled Read which has traditionally been executed overnight before the start of the operational day at 06:00 when other operational activity increases.
5. As more Smart Meters are installed over time, and Other Users increasingly utilise DCC Services, the total demand on DCC systems also increases.
6. This is resulting in increased strain on DCC systems to continue to operate as they currently do, and it is therefore necessary to consider changes to the management of these Scheduled Services and the duration of the Scheduled Read Window. Any changes will be designed to ensure that Scheduled Services can continue to be actioned within the SEC defined 24-hour period while utilising available capacity in the most appropriate way. This will help to reduce the level of systems scaling and investment required in the future, while also protecting the stability of DCC Services throughout the day.

1.2. The Challenge

7. The existing configuration of the Scheduled Read Window (SRW) is under pressure due to the increased volumes of Scheduled Reads being processed; this is expected to increase as the installed base grows.
 - Installed Comms Hub (CH) numbers are increasing over time from the current level of ~2.3m up to an estimated ~10.5m by 2033
 - DCC Forecasts suggest that the number of Scheduled Service requested per CH is expected to increase over time from the current level of ~2.8/CH/day
 - Whilst the contracts (and the SEC) allow a 24hr SRW, the working practice has historically been to target completion by 06:00

- Message Sizes have increased, and the number of data packets being processed by CSPN systems exceeds the original design assumptions
- The 'Transaction per Second' rate used during the SRW is nearing the maximum rate that the CSPN solution can currently support

1.3. Purpose of the request for information

8. The purpose of this *Request for Information* is to provide details of DCCs intention to amend the duration of the Scheduled Read Window as an additional option to help optimise the way demand is managed across the day. Changes will more efficiently utilise the available capacity in the most appropriate way and reduce the level of systems scaling and investment required in the future. This Request for Information seeks information from Parties on the potential impact, if any, on their systems and services.
9. DCC is keen to explore the benefits of the proposed changes and plans to run a multi-phase pilot to assess the feasibility of extending the SRW to mitigate scaling risks and reduce future investment.
10. Parties can respond to this consultation by e-mailing consultations@smartdcc.co.uk. This consultation will close on the 7th July 2023 at 1700.

2. Current Management of Scheduled Read

11. Whilst the SEC allows up to 24hrs for Scheduled Reads to be returned, the operational working practice to date has been to attempt to retrieve and return Scheduled Reads to Users by 06:00 each day, but there is no hard cut-off.
 - Currently, the 06:00 time is targeted to complete all first attempts of all reads (~90%, with the remaining ~10% completing throughout the day)
12. DSP systems maintain a set of configuration data for the SRW. This allows each CSP/SMETS1 Service Provider (S1SP) to control and manage the number of Scheduled Read Requests that are sent to each CSP/S1SP and allows for controlling the processing rate through the DCC Systems and the rate of the resulting associated Service Responses being sent to Users. This is referred to as the Transactions per Second (TPS) rate.
13. DCC has historically adjusted the Scheduled Read TPS rate between DSP and CSPN in line with the expected total number of Scheduled Reads expected to be processed each day. This enables the majority of CSPN Scheduled Reads to be returned before the start of the operational day and before the start of daily Smart Meter Installations and other 'within-day' operatorial demand, completing by 06:00.
 - It should be noted that Scheduled Reads returned from each of the SMETS1 cohorts have different configurations and large volumes are often returned within the operational day through till later in the afternoon as part of current working practices.
14. In the CSPN Region, the rate at which the Scheduled Reads are completed is determined by the Transaction per Second (TPS) Rate set by the DSP which is currently set at 250, with the remaining ~10% completing throughout the day.
 - This allows for most scheduled reads to be delivered by 06:00. The remainder of the scheduled reads, such as retries etc., are typically completed at another time point later in the day, completing by 16:30.
 - Note, the run rate is currently set to reduce to 200 TPS at 08:00 to ensure sufficient capacity for the uplift in On-Demand messages sent during the operational 'working day'.
15. As the installed based grows, the time to complete the Scheduled Reads will increase if the TPS Rate remains at 250.
16. 250 TPS is considered the near-maximum that the RNI (Regional Network Interface) can support (tbc by RNI Scale Testing) so increasing above 250 TPS is assumed to require additional RNI Scaling¹.

¹ RNI Scaling is one of the CSPN Scaling & Optimisation Solution Options, initiated to determine the ability of the RNI to scale and where the likely limitations are for the existing solution components.

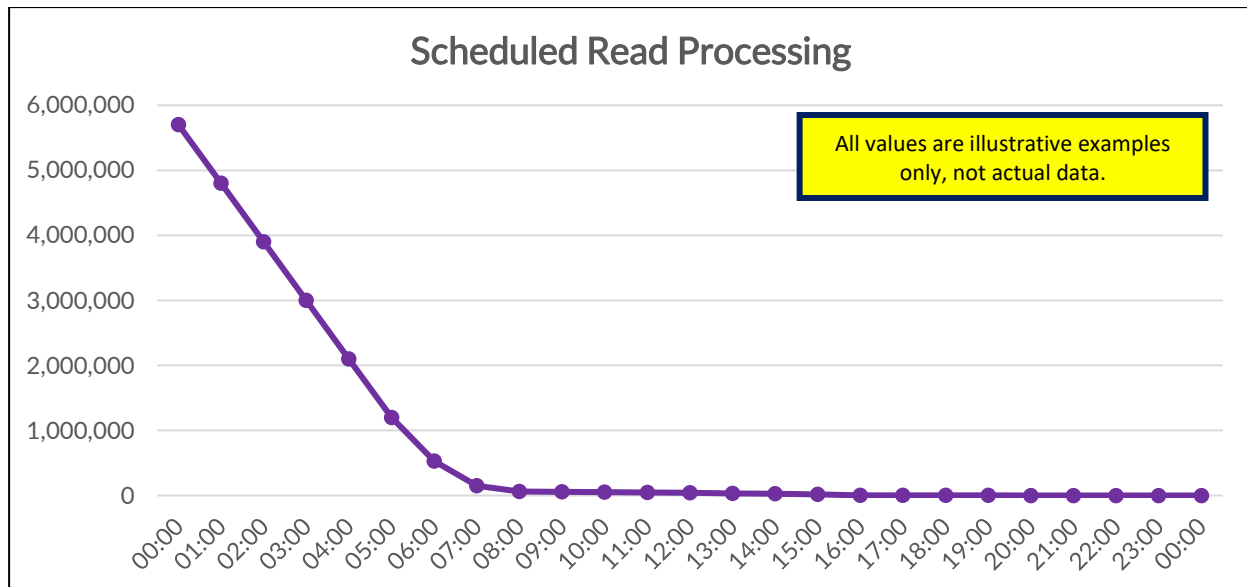


Figure 1 – Illustration of current working practice for Schedule Read Processing

17. DCC intends to conduct a multi-phase pilot to assess the impact of increasing the SRW; Phase 1 is expected to commence in July '23. DCC has engaged with TABASC and OPSG to discuss the detail of the planned pilot.

3. Options to Address the Challenge

18. DCC considers that there are three main options available to resolve the challenges identified above.

- Option One - Accept that the Scheduled Read Window will extend as the install base grows. This will require further assessment, but it is likely that increasing the read window in isolation will not support the end-state installed base.
- Option Two - Increase the throughput capacity of the CSPN solution. DCC is working with CSPN to fully impact assess the option of uplifting the CSPN solution to support a higher TPS rate and maintain the current SRW. This is expected to require significant investment.
- Option Three - Combine an extension to the SRW with an increase in the throughput capacity of the CSPN solution. This will minimise the required investment in the CSPN solution, but the implications of extending the Read Window need to be assessed and proven.

19. See Appendix One for further illustrations of option and impacts for DCC and Users.

20. The responses received to this request for information will help inform on which option is the most appropriate and help to determine the most appropriate way to resolve the challenges identified. Confirming the viability of an extension to the current SRW without any material impacts is an important part of this process.

4. Scheduled Read Amendments Pilot

4.1. Rationale

21. Due to the lead times required to increase capacity across both the CSPN solution and the DSP, it is critical that DCC understands the level of scaling required in advance. In addition DCC needs to prove the feasibility of extending the SRW (which will reduce the level of scaling required) before investing in additional systems and running a controlled pilot will provide the insights required and reduce risk to users and performance degradation. For these reasons DCC considers that a pilot of the SRW amendments is necessary to inform future decision making.
22. DCC therefore intends to run a multi-phase pilot to identify and resolve any issues caused by the Scheduled Reads continuing at high volume beyond 06:00, and to inform the level of scaling and investment required in the CSPN solution.
23. The objectives of the SRW Pilot are to:
 - Identify (and resolve) any adverse impacts (on either DCC or User systems or processes) caused by extending the SRW
 - Ensure critical business processes and the performance of On-Demand SRV's are not adversely impacted (e.g., Install & Commission and Prepayment)
 - Provide insights to inform the level of systems scaling (and thus investment) required and support the associated business case

4.2. Approach

24. During each phase of the Pilot, to replicate the high volume of Scheduled Reads at the current TPS rates continuing beyond 06:00, the DSP will delay the start of the Scheduled Reads in CSPN. DCC intend to complete three test phases as follow:
 - Phase One - Delay the start of the Scheduled Read process to 01:00. This will result in a high volume of Scheduled Reads continuing beyond 06:00. These will complete between 06:00 and 08:00. This phase will not impact the On-Demand performance during the operational 'working day'.
 - Phase Two - Delay the start of the Scheduled Read process to 03:00. This will result in a high volume of Scheduled Reads continuing through to completion between 09:00 - 10:00. The completion time is dependent on Northbound Prioritisation being delivered in October to mitigate the risk of impacting On-Demand SRVs.
 - Phase Three - (TBC) Pilot SRW configuration against other Capacity impacting business scenarios e.g. Price Change.
25. Phase One of the Pilot is expected to commence in July with subsequent phases commencing following the implementation of Northbound Prioritisation in October 2023. See Figure 2 below for an indicative view of the timeline associated with the SRW pilot.
26. DCC will monitor system performance during each trial phase and encourage Parties to feedback on any issues that may arise. Where unforeseen, detrimental issues are impacting Parties or DCC Systems it will be possible to quickly move back to the pre-pilot process.

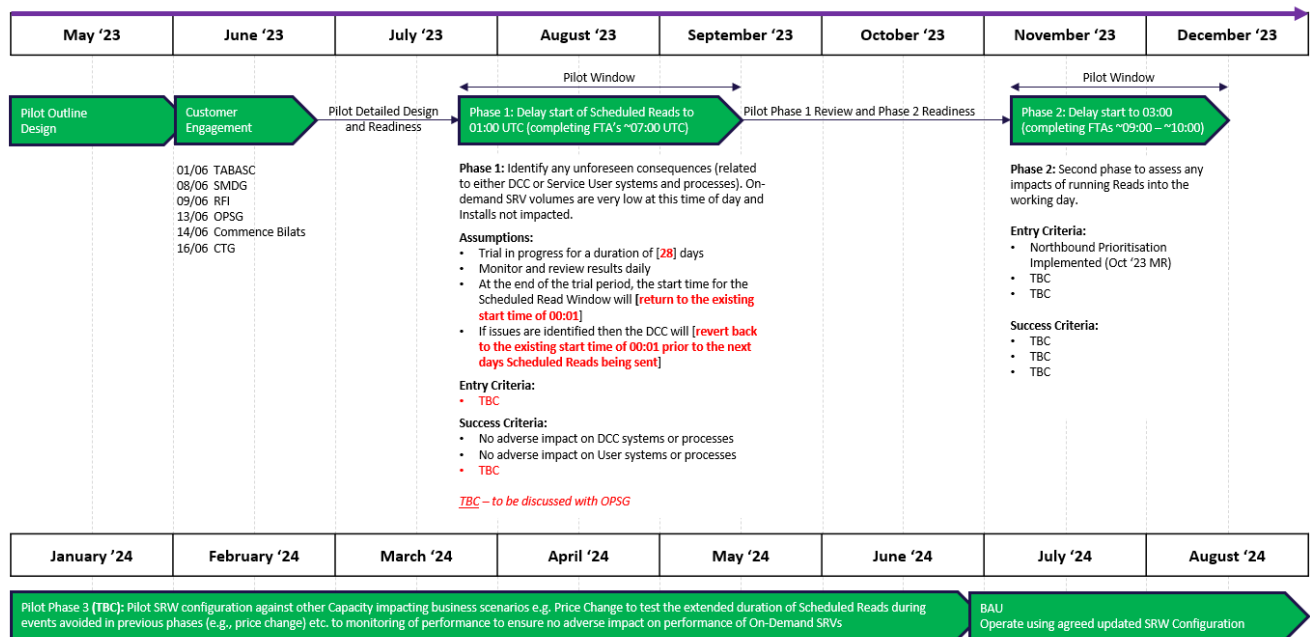


Figure 2 – Illustration of SRW Pilot Activity Timeline

27. DCC will ensure that Parties are provided with advanced notification of the beginning of any test phase.

5. Risk Mitigation

28. DCC recognise that the proposed changes may present a challenge to Parties and this request for information aims to gather additional information regarding any risk. Additionally, DCC is also progressing activities to help mitigate any risks and inform ongoing discussion.

29. **RNI Scale testing** – DCC is currently working with CSPN to test the throughput capacity of the RNI to understand the maximum TPS and Packets per Second (PPS) rate. This analysis will help inform on when the number of installed CHs will significantly impact on completing the majority of Scheduled Reads by 06:00.

30. In addition, DCC is Working with CSPN to understand the investment required in the RNI to uplift throughput capacity to enable the majority of Scheduled Reads to continue to complete by 06:00 as the number of installed CHs increases.

- To minimise the likely investment required in the CSPN network, DCC is keen to assess the impact of Scheduled Reads completing in an amended timeframe.
- DCC considers that there will be no adverse impact on On-Demand message performance (in particular Install & Commission) if the majority of Scheduled Reads do not complete until 08:00.
- DCC is also assuming that the introduction of DSP Change Northbound Prioritisation (targeting implementation in October 2023) will mitigate any risk to On-Demand message performance if the Scheduled Reads (at 200 TPS or even higher rates) extend further into the day beyond 08:00.

31. It has been identified as part of Phase 2 Scaling & Optimisation analysis that the CSPN solution has an end to end capacity risk, within the RNI component, as the volumes of Scheduled Reads increases over time and the installed base grows.

- CSPN have advised DCC that any further increases to the current 250 TPS must be carefully considered and requires additional testing

- This TPS value is therefore assumed to be a maximum value (tbc via 'in progress' RNI Scale Testing activity).

32. A schematic of the CSPN system design is provided in Appendix Two.

6. The ask from Customers

33. It is recognised that amending the time by which Scheduled Reads complete could impact Parties. DCC has engaged with Industry through relevant SEC Committees in June 2023, the Technical Architecture and Business Architecture Sub-Committee (TABASC) and Operations Group (OPSG) to provide details of the risk and proposals for the pilot presented above. The Operations Group was supportive of the DCC approach, including this request for information.
34. DCC are keen to be fully informed throughout the pilot phase to ensure the most appropriate options are considered and decisions made. DCC ask that Parties respond to the questions below and provide any other relevant information for consideration.

Question One

Are there any potential impacts on your organisation where the majority of scheduled reads are not completed by 06:00 and what are those impacts? If impacts exist, over what time period can your organisation resolve them? Please provide a rationale for your response.

Question Two

Are there any reasons you would not support you support a pilot to confirm that there would be no adverse impact for Parties or the DCC on critical business processes (e.g., Install & Commission and Prepayment) and/or On-Demand SRV performance if Scheduled Reads were processed throughout the day? Please provide a rationale for your response.

Question Three

Is there any additional information or points for consideration that DCC should be aware of that will help inform the implementation of the planned SRW pilot phases?

35. DCC is keen to speak to customers on a bilateral basis if there are areas for discussion with the planned SRW Pilot. If you have any queries, please do reach out and contact DCC via consultations@smartdcc.co.uk

7. How to Respond

36. Please provide responses by 1700 on 07th July 2023 to DCC at consultations@smartdcc.co.uk
37. Consultation responses may be published on our website www.smartdcc.co.uk. Please state clearly in writing whether you want all or any part, of your consultation to be treated as confidential. It would be helpful if you could explain to us why you regard the information you have provided as confidential. Please note that responses in their entirety (including any text marked confidential) may be made available to the Department for Energy Security and Net Zero (DESNZ) and the Gas and Electricity Markets Authority (the Authority). Information provided to DESNZ or the Authority, including personal information, may be subject to publication or disclosure in accordance with the access to information legislation (primarily the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004). If DESNZ or the Authority receive a request for disclosure of the information we/they will take full account of your explanation (to the extent provided to them), but we/they cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded by us as a confidentiality request.
38. If you have any questions about the consultation documents, please contact DCC via consultations@smartdcc.co.uk

8. Attachments

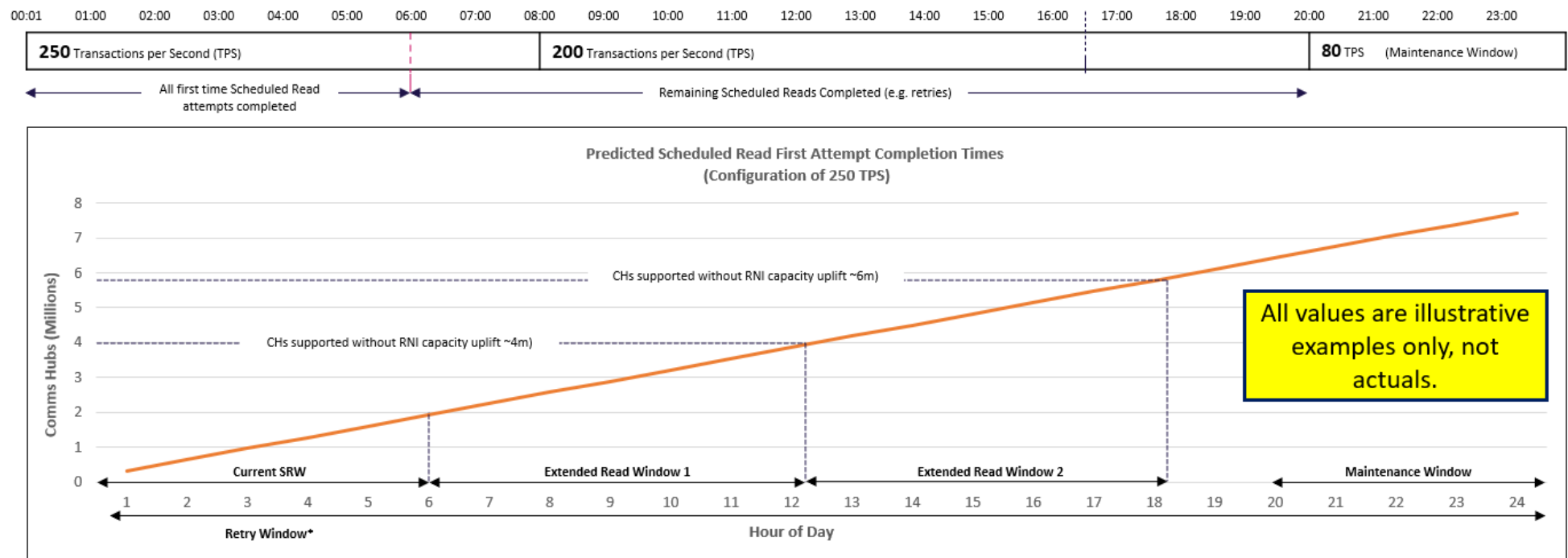
- Attachment 1: Request for Information Response Template – Scheduled Reads

9. Appendix One

These have been provided to help illustrate the current Scheduled Read management process linked to the potential options to resolve.

SRW Option 1: The time to complete Scheduled Reads is largely dictated by the Transaction per Second (TPS) rate set by the DSP. The TPS rate is set to attempt the majority of Reads by 06:00 each day. To maintain the 06:00 'target' as installs increase the TPS rate needs to be increased. At some point, the rate will exceed the RNI throughput capacity (**RNI Scale Testing** activity will inform what the threshold is).

Based on ~2.3m Comms hubs



Note 1: This is the 'do nothing' option which would result in the SRW naturally being extended over time as the installed base grows

Note 2: Retries actually happen throughout the day, the 'Retry Window' is assumed to be dedicated time to allow the 'tail' to complete*

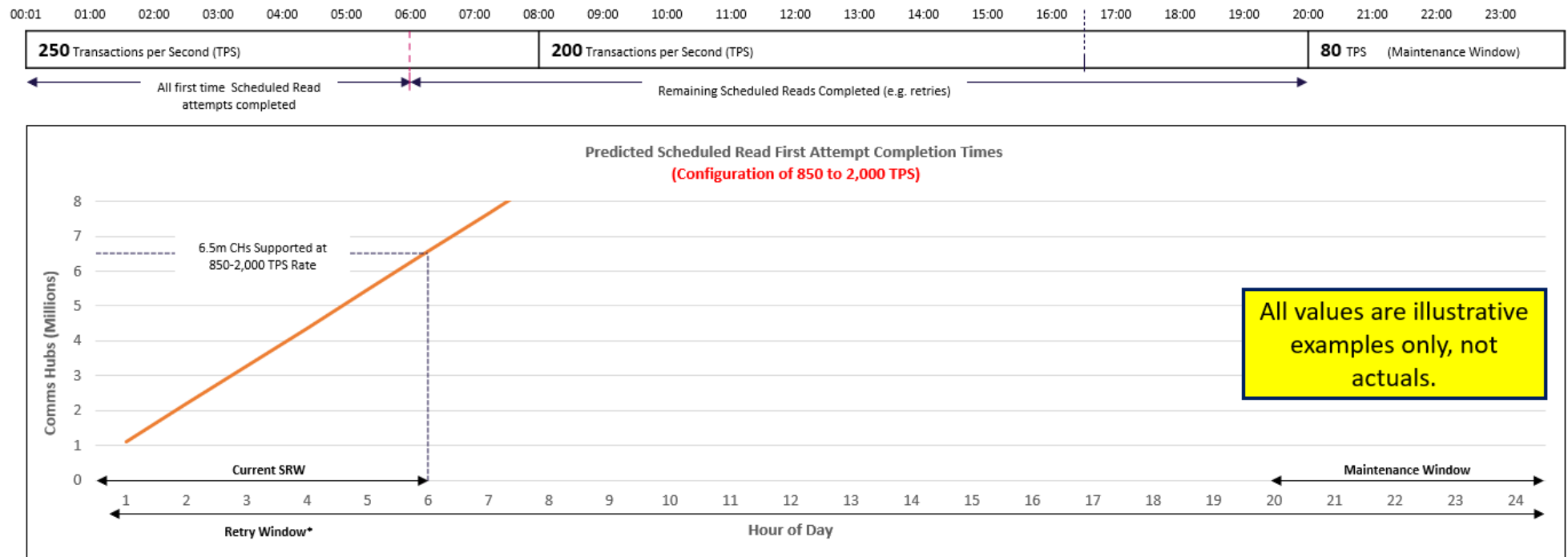
Note 3: Introduction of 4FSK potentially offers an alternative to RNI Capacity uplift but completely unqualified at this point and currently considered complimentary

Assumption 1: 250 TPS is current assumed maximum (tbc)

Assumption 2: Radio Network uplift not required

Assumption 3: RNI Phase 0+1 required to support all scenarios

SRW Option 2: To maintain the current 'Scheduled Read Window' at 6.5m Comms Hubs the TPS would need to be increased to between **850 to 2000** over time which would require a significant RNI throughput capacity increase and would likely require additional investment in the DSP to support the increased TPS rate. This is the most costly option but would not require a change to any user processes or systems.



Note 1: This option requires significant investment in the RNI (and likely the DSP) and due to the timescales to deliver the RNI uplift, the SRW would need to be extended in the short term (likely to ~10:00)

Note 2: Retries actually happen throughout the day, the 'Retry Window' is assumed to be dedicated time to allow the 'tail' to complete*

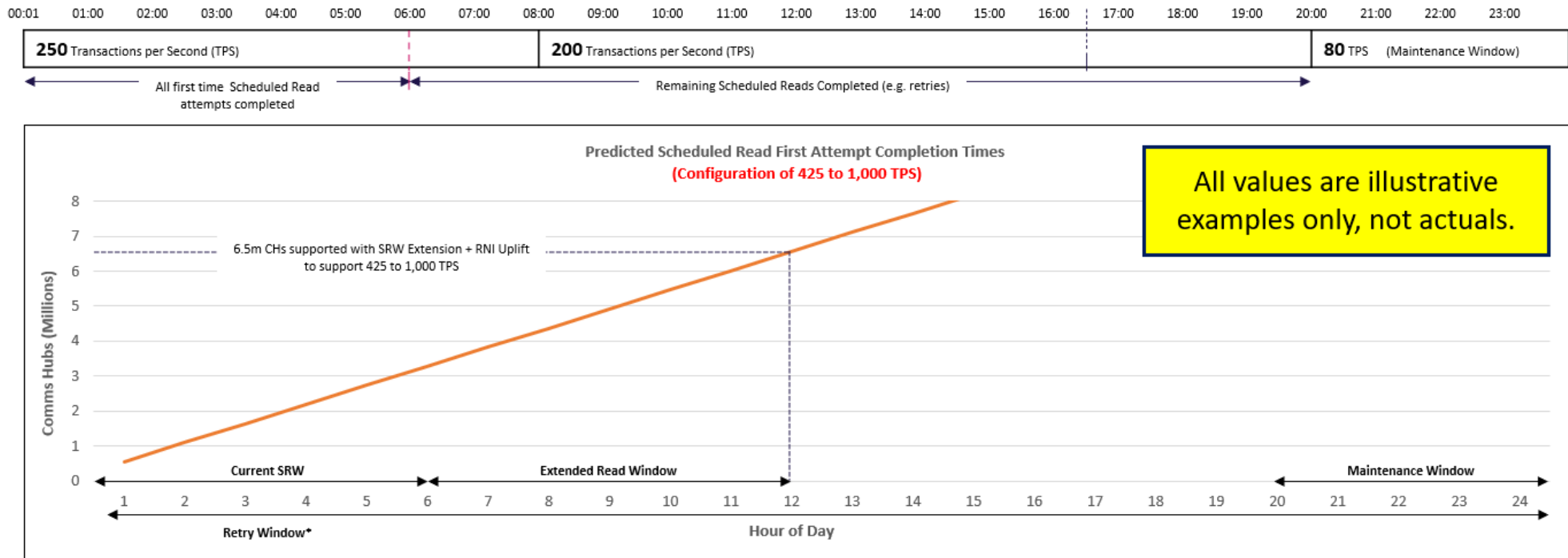
Note 3: Introduction of 4FSK potentially offers an alternative to RNI Capacity uplift but completely unqualified at this point and currently considered complimentary

Assumption 1: 250 TPS is current assumed maximum (tbc)

Assumption 2: Radio network would require further uplift

Assumption 3: RNI Phase 0+1 required to support all scenarios

SRW Option 3: By uplifting the RNI (and potentially the DSP) to support between **425 to 800** TPS whilst extending the Scheduled Read Window to mid-day, up to ~6.5m CHs can be supported. This combination is expected to significantly reduce the level of investment in systems development. This assumes no material adverse impact on users which needs to be validated.



Note 1: This option likely provides the best value for money but the impact on users needs to be assessed.

Note 2: Retries actually happen throughout the day, the 'Retry Window' is assumed to be dedicated time to allow the 'tail' to complete*

Note 3: Introduction of 4FSK potentially offers an alternative to RNI Capacity uplift but completely unqualified at this point and currently considered complimentary

Assumption 1: 250 TPS is current assumed maximum (tbc)

Assumption 2: Radio Network uplift not required

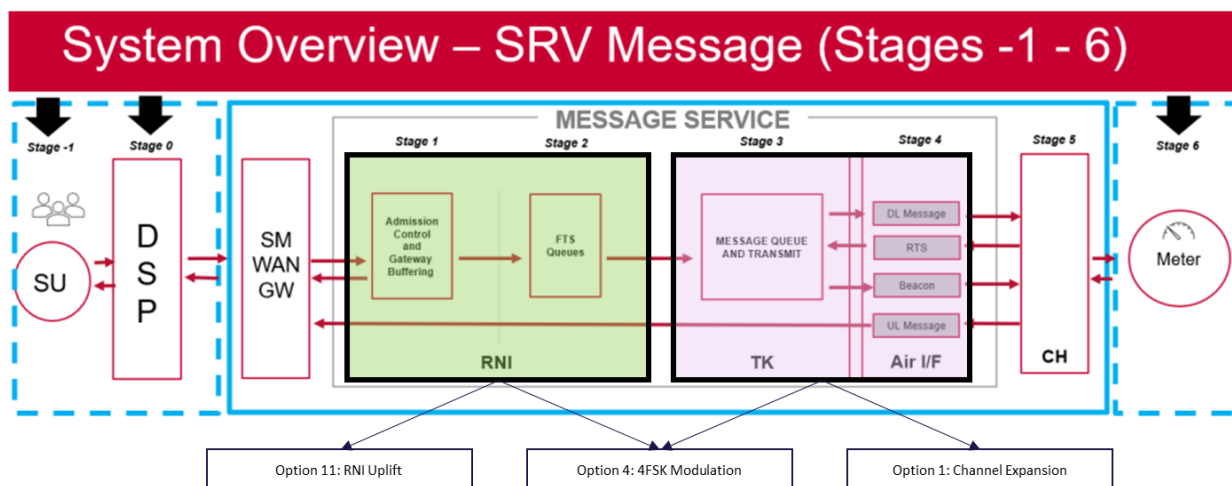
Assumption 3: RNI Phase 0+1 required to support all scenarios

10. Appendix Two

System overview for SRV processing.

The CSPN solution can be split into two key groups of components, the RNI (the green box below) and the Radio Network (the purple box below). Whilst the Channel Expansion (Option 1) will increase the throughput capacity of the Radio Network, the components within the RNI also need to be uplifted (Option 11) to align E2E Solution Capacity.

Note, the Options relate to CSPN Scaling and Optimisation project technical options being considered to help support the development of an optimisation and scaling solution options for the CSPN network.



Enhancements to the Radio Network creates additional capacity at a localised level and mitigates the risk of dense cells, whereas enhancements to the RNI increase the overall capacity at a centralised level and mitigates the risk of total system overload/failure.

Note – Options 1, 4 and 11 are the **CSPN Scaling & Optimisation Solution options** that are actively being progressed as part of Phase 2

CSPN proposed a number of solution options as an output from Phase 1 with a Preliminary Assessment being created for each option. All options were reviewed and were then either progressed to Impact Assessment as a Phase 2 deliverable or put in a bucket of solutions for future consideration if required.