

SEC Modification Proposal, SECMP0122B, DCC CR1418, 4445

Throughput of Alerts (CSP North, DS&A)

Full Impact Assessment (FIA)

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0.31

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DCC

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1 Executive Summary

The Change Board are asked to approve:

- Total cost to implement CR4445 SECMP0122 of £1,010,721 which comprises:
 - £723,653 in Design, Build and PIT costs
 - £287,068 in post-PIT Release costs (SIT, UIT and TTO)
- A timescale to complete the implementation of seven (7) months
- Include CR4445 SECMP0122B in the June 2023 SEC Release

Problem Statement

This change implements changes in CSP North and the DCC Data Science and Analytics (DS&A) solutions to support Alert Throughput reporting. For the CSP South and Central alerts, no changes are required to the data feed as the required timing information is already sent as part of the data feed to the DSP. Changes to the DSP SMWAN Gateway to support sending of the Alert Throughput data to the DS&A team are covered in the other SECMP0122B reporting change numbered CR4392.

Benefit Summary

This will enable DCC to improve the logging and understanding of Alert performance from the Communications Hubs to CSP and thence to the DSP, and give SEC Operations Group enhanced visibility of the same.

2 Document History

2.1 Revision History

Revision Date	Revision	Summary of Changes
01/07/2022	0.1	Initial compilation
11/07/2022	0.25	Initial review complete. Costs being challenged.
29/07/2022	0.31	Added note about Sensus development timing, corrected to WAN timestamp, page 8

2.2 Associated Documents

This document is associated with the following documents:

	Title and Originator's Reference	Source	Issue Date
1	MP122 Business Requirements v1.2 (draft6)	SECAS	24/07/2020
2	MP122 Preliminary Assessment Request	SECAS	14/05/2020
3	OPSG OMR Report Final	OPSG	12/05/2020
4	MP122 DCC Preliminary Assessment v0.5	DCC	25/06/2020
5	SECMP0122 - FIA – Operational Metrics v0.85	DCC	03/09/2020
6	SECMP0122B -PIA - Operational Metrics including CR1418, v1.3	DCC	26/07/2021

References are shown in this format, [1].

2.1 Document Information

The Proposer for this Modification is Gemma Slaney from Western Power Distribution. The original proposal was submitted on 24th March 2020.

The original Preliminary Impact Assessment for SECMP0122B was requested of DCC on 13th July 2020 and completed on 4th September 2020. After a series of reviews and changes, a Full Impact Assessment for CR1418, which was updated to CR4445, was requested on 15th March 2022.

Note that the DCC Technical Operations Centre (TOC) previously identified as the DCC team providing the reporting has been renamed to the Data Science and Analytics (DS&A) team.

3 Solution Requirements and Overview

In this section, the context of the Modification, assumptions, and the requirements are stated.

The problem statement and requirements have been provided by SECAS, the Working Group, and the Proposer.

It should be noted that changes to, and reporting on, SMETS1 Service Providers was removed from the scope of this change by the Working Group.

The changes to CSP North and the Data Science and Analytics (DS&A) reports are included following.

3.1 Problem Statement

The DCC currently does not receive any data from CSP North containing measurements from when the alert reaches the Comms Hub. The DCC also cannot currently identify when an alert enters the Service User's gateway, only when the DSP tried to send it to the gateway. These changes will require further data supply and may require contractual change. To complete this change will require implementation of both CR4392 and CR4445, including changes to the DCC Data Science and Analytics reports. Information from both CRs is not required to implement the Operational Performance Regime (OPR).

3.2 Business Requirements

This section contains the considerations and assumptions for each business requirement as described in document [1] for this part of SECMP0122B.

#	Requirement
[A]	[A] - DSP shall identify the throughput of all Alerts at the following points: Received by Comms Hub/Devices (where this can be logged), Received by CSP, Passed to the DSP, Received by the DSP, Passed to Service User and the Service User handshake received confirming receipt.
[B]	Pursuant to Requirement A, the DSP shall provide data to the TOC at intervals of 15 minutes.

Table 1: Business Requirements for SECMP0122B, CR4445

The changes to CSP North will provide timing information for Device Alerts from SMETS2 Devices. This will enable DCC to improve the logging and understanding of alert performance and give SEC Operations Group enhanced visibility.

This Modification provides additional timing points for Device Alerts from SMETS2 Devices, in two categories:

- those delivered as Device Alerts to the Service User
- Device Alerts where the target is DSP (i.e. the Access Control Broker (ACB) User ID) and DSP generates DCC Alerts to deliver the information to Users, namely N39, N53 and N54¹

The scope of the solution will include DCC Alerts used to carry Device Alert information when it is not feasible for the Device to target a Device Alert at a User directly, such as Device Alerts from PrePayment Meter user Interface Device (PPMID). In some cases there may be more than one DCC Alert triggered by the same Device Alert targeted at the DSP.

The following alert types are out of scope:

- DCC Alerts not used to deliver Device Alert information

¹ In some cases there may be more than one DCC Alert triggered by the same Device Alert targeted at the DSP.

4 Solution Architecture

The solution will require changes to CSP-North and to the DS&A reporting delivered as part of SECMP0122A.

4.1 Overview

CSP North will provide additional data from within the alerts, and support additional timing points which will be communicated to DSP along with the alert.

Two timing points in the log will indicate a time at the Comms Hub and time sent from CSP North. Since additional information is required from the passage of alerts through the CSP North, changes will be required to the DCC components of the SMWAN interface with CSP North; these are covered in CR4392.

The new logs will be delivered from the DSP to the DS&A team at the DCC via the Enterprise Systems Interface (ESI) using the same mechanism as the Service Audit Trail (SAT) data.

Note that a solution option with CSP North sending simple text files showing logging files by Secure File Transfer Protocol (SFTP) to the DSP was considered, but was rejected as the different methods of logging times was likely to cause technical debt and would require two separate methods of processing the data with minimal cost savings.

4.2 CSP North Changes

This change impacts the CSP N solution with a modification to the DCC SMWAN Gateway (Arqiva) Interface Specification described by DCC document SD4.4.1.

The key impacts are on the Regional Network Interface (RNI), a component of the CSP North Network, specifically the sendMessage Application Programming Interface (API) presented by the gateway servers. An extension to the JavaScript Object Notation (JSON) schema is required, to include an additional field for the Great Britain Companion Specification (GBCS) Alert timestamp as recorded by the SDK within the Comms Hub.

The data is encapsulated in a JSON response object conforming to the following schema:

Name	Data Type	Description	Mandatory?
responseld	String	A globally unique identifier that is associated with the Service Response or Device Alert, used for auditing	Yes
commsHubId	Integer	Unique identifier for the Communications Hub,. This will be the Radio End Point ID (REP ID), a 32-bit (10-digit) integer value	Yes
payload	String	The GB Companion Specification formatted Service Response or Device Alert message. Encoded as Base64.	Yes
timestamp	String	The time at which the CSP passes this request to the DSP; Format YYYYMMDDHHMMSS.SSS	Yes
<i>HubTimestamp</i>	<i>String</i>	<i>The timestamp applied by the SDK on the alert Format YYYYMMDDHHMMSS.SSS</i>	<i>No</i>

Note that other fields are included in the JSON response object, but these are not impacted by this Modification.

The new *HubTimestamp* field will not be Mandatory, as the timestamp is not applicable to all types of traffic carried by this interface.

It should be noted that the DSP will map the appropriate API values to two elements relating to the passing of CHF received timestamp and CSP received timestamp for "Receive GBCS Message":

chfReceivedTimestamp	String	YYYYMMDDHHMMSS.SSS	time when alert was received by CHF
cspReceivedTimestamp	String	YYYYMMDDHHMMSS.SSS	time when alert was received by CSP

Table 2: DSP Mapped Values

The Comms Hub comprises two elements, the Sensus SDK and the Comms Hub Function (CHF). The Hubtimestamp field is added by the RNI SDK, and is for the WAN side of the CH, not the HAN side (the DSP field chfReceivedTimestamp "time when alert was received by CHF"). This data is already used to measure the WAN transit time to provide a source for the Performance Measure

(PM) 3.2 data, but CSP N believe that in 99.9% of cases it will be practically identical to the HAN side time. It would **not** identify any delay in the Comms Hub processing of an Alert. CSP N have indicated that capturing the HAN side data would require a Comms Hub change, which would be complex and time consuming. The approach of using the WAN side timestamp was agreed with SECAS.

For the DSP field cspReceivedTimestamp there is a disparity between the requirement quoted for cspReceivedTime and the CSP N timestamp parameters. The CSP N timestamp measures when the Alert leaves CSP N rather than when it arrives at the CSP N. The time difference between the two should be constant, at about 350ms or so, and to remedy this would require a new field and measurement with corresponding complexity and cost concerns. However there is no direct indication of any lags or poor performance by the CSP N processing, and this would be shown as a larger time than usual between the Alert leaving the Comms Hub and the Alert leaving the CSP. Again, this approach was agreed with SECAS.

Adding the extra timestamp information through the API will increase individual messages by a few bytes, but will have no significant impact on message size and will not increase the charges associated with these Alerts.

4.3 DS&A Reporting Changes

The DS&A reporting will use the changed data flows from the DSP as described in CR4392. These changes and additions would then be added to the existing SECMP0122 reporting.

Database changes	Implement changes and secure rules on File Gateway for ingestion of new AST logs (DCC Cloud Team)
	Build new database procedures for Extract, Transform and Load (ETL) of AST logs
	Build new database tables (indexing, partition and optimisation) (Capita Work Package)
Analytics and Reporting changes	Query level monthly retrieval of data to statistical environment
	Build new analytical reporting logic to reflect CSP / DSP Alert timing and integrate to existing SECMP0122 Operational Metrics
	Build new visualisations for 'SECMP0122 Q&A Dashboard' and integrate to existing SECMP0122 Operational Metrics

The reports will be in addition to the existing SECMP0122 reports, and will be provided to the SEC Operations Group using existing methods.

5 Testing Considerations

This Full Impact Assessment includes the cost to develop, fully test and deliver the CSP North components of this SEC Modification.

5.1 Pre-Integration Testing (PIT)

The CSP N PIT testing will consist of:

- Verify Over The Air firmware downloads to Comms Hubs
- Verify request and response from Comms Hub Management interface
- Verify request and response from DSP Simulator
- Verify Comms Hub install alerts
- Verify Billing calendar alerts
- Verify other device alerts sent to DSP which have additional timestamp
- RNI Regression testing

Other negative impact testing against the CSP N support systems will also be carried out to ensure the implementation is correct. There will not be any repeated elements of PIT and SIT testing for this Modification.

Note DCC has challenged the nature of the extent of this testing.

5.2 System Integration Testing (SIT)

The expected integration activities are documented below. All testing will be carried out as part of SEC Release testing on the “B Stream” environments, in accordance with existing practices for SEC releases.

The SIT functional test scope will consist of SMETS2, Single Band Comms Hub (SBCH) only devices. Functional testing will include:

- Selected sample of device alerts generated by each device type delivered to Service User. A minimum of at least two (2) Device Alerts per device are generated. Select sample of alerts to include:
 - AD1s – DCC Alert – Power Outage Event – CSP notification of power outage greater than or equal to three minutes;
 - 8F3F ; 810D; 8F0F; 8F72 (Firmware Update).
- Select sample of DCC Alerts incorporating Device Alert Information sent to Service User namely N39;N53;N54:N62.

There will also be testing of the Alerts changes in SSI (Self Service Interface) and Self Service Management Interface (SSMI) reports and targeted System Regression Testing as part of June 23 SEC Release.

Note that CSP N have identified a far more significant level of SIT. These costs have been included below, but are being challenged by DCC due to the nature of the change, and the lack of a driver to test every single Alert at this stage.

5.3 User Integration Testing (UIT)

CGI System Integrator will conduct a limited amount of testing to confirm that the timing information for Device Alerts from SMETS2 Devices is working in each UIT test environment. This will comprise checking the new logs for a few days post deployment and cross-referencing any alert timing log entries to the corresponding SSI SAT entries.

Note that CSP N have identified a far more significant level of UIT. These costs have been included below, but are being challenged by DCC due to the nature of the change, and the lack of a driver to test every single Alert in UIT.

5.4 DS&A Testing

As part of the development cycle, DS&A will generate reports and check their accuracy against the sample data produced by both CSP North and CSP South and Central. The implementation of the reporting alongside the existing SECMP0122 Operational Metrics reporting will take the same formatting and annotation styles and apply them to the reports.

6 Implementation Timescales and Releases

This Modification was expected to be included in a SEC Release in June 2023. Implementation timescales will be finalised as part of the relevant SEC Release Change Request.

6.1 Change Lead Times and Timelines

From the date of approval (in accordance with Section D9 of the SEC), to implement the changes proposed DCC requires a lead time of approximately **seven** months.

The broad breakdown of the development and testing regime for the DSP (from CR4392) is shown in the following table in months after an approval decision date (D).

Phase	Duration
SECAS agreement on scope of release	
CAN signature	D + 1 Month
Design, Build and PIT Phase	3 Months
SIT and UIT Phase, aligned with Release Dates	3 Months
Transition to Operations and Go Live	D + 7 Months

It should be noted that the CSP N proposed testing periods are longer, with an intended duration of nine months. The testing requirements are being challenged by DCC, with the expectation that the full programme duration will match that described above.

Important; Changes required to the Sensus SDK component cannot be implemented for the period August 2022 – 2023, due to other Change Requests being processed. This means that work could not start on this change until August 2023 with a subsequent impact on completion of the work.

The DS&A reporting development and testing is expected to take three months, and will run in parallel to DSP and CSP N testing.

6.2 SEC Release Allocation and Other Code Impacts

This Modification is expected to be implemented as part of the June 2023 SEC Release, however the allocation to a release may be dependent on other Modification timings and the suitability of a release. No functionality overlap with other Modifications has been identified at the time of undertaking this Full Impact Assessment.

6.3 Costs and Charges

This section indicates the quote for all phases of application development stage for this Modification. Note these costs assume a release of just this SEC Modification without any other Modifications or Change Requests in the release, which might not be truly reflective of what the post-PIT test costs or programme duration will look like. A calculation of those costs will be carried out when the contents of the future Release are finalised, and the post-PIT costs determined through a "Grouping CR" also referred to as a "Release CR".

Costs are broken down by Application Phase and Service Provider in the associated Code Red document.

£	Design, Build and PIT	SIT, UIT and TTO	Total
SECMP0122B, CR4445	£723,653	£287,068	£ 1,010,721

Design	The production of detailed System and Service designs to deliver all new requirements.
Build	The development of the designed Systems and Services to create a solution (e.g. code, systems, or products) that can be tested and implemented.
Pre-Integration Testing (PIT)	Each Service Provider tests its own solution to agreed standards in isolation of other Service Providers. This is assured by DCC.
Systems Integration Testing (SIT)	All the Service Provider's PIT-complete solutions are brought together and tested as an integrated solution, ensuring all SP solutions align and operate as an end-to-end solution.
User Integration Testing (UIT)	Users are provided with an opportunity to run a range of pre-specified tests in relation to the relevant change.
Implementation to Live (TTO)	The solution is implemented into production environments and made ready for use by Users as part of a live service.

As part of the Release CR charges for June 2023, it is expected that the SIT and Implementation costs will be shared amongst other Modifications and CR in the same release, and consequently are expected to be lower.

As noted above the CSP N costs are being challenged by DCC.

6.3.1 Application Support Costs

No Application Support charges have been identified for this Modification.

6.3.2 Changes to Contracts

The contract updates will be detailed within the CAN and will impact the following schedules:

- Schedule 6.1 (Implementation Planning): addition of new milestones and update document 4.4.1
- Schedule 7.1 (Charges and Payment): revisions to incorporate the charges and payment applicable for Modification

Appendix A: Glossary

The table below provides definitions of the terms used in this document.

Acronym	Definition
ACB	Access Control Broker
API	Application Programming Interface
AST	Alert Supplementary Timing log
CH, Comms Hub	Communication Hub
CHF	Communications Hub Function
CR	(DCC) Change Request
CSP	Communications Service Provider
CSP N	CSP North
DCC	Data Communications Company
DS&A	Data Science and Analytics team
DSP	Data Service Provider
ESI	Enterprise Systems Interface
FIA	Full Impact Assessment
GBCS	Great Britain Companion Specification
JSON	JavaScript Object Notation
OPSG	(SEC) Operations Group
OPR	Operational Performance Regime
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
PPMID	PrePayment Meter user Interface Device
RAID	Risks, Assumptions, Issues, and Dependencies
RNI	Regional Network Interface
SAT	Service Audit Trail
SBCH	Single Band Comms Hub
SDK	Sensus SDK component, part of the RNI
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SFTP	Secure File Transfer Protocol
SIT	Systems Integration Testing
SLA	Service Level Agreement
SMETS	Smart Metering Equipment Technical Specification
SM WAN, SMWAN	Smart Metering Wide Area Network
SU	Service User
SSI	Self Service Interface
SSMI	Self Service Management Interface
TOC	(DCC) Technical Operations Centre
TTO	Transition to Operations
UIT	User Integration Testing

Appendix B: Risks, Assumptions, Issues, and Dependencies

The tables below provide a summary of the Risks, Assumptions, Issues, and Dependencies (RAID) observed during the production of the Full Impact Assessment. DCC requests that the Working Group considers this section and considers any material matters that have been identified. Changes may impact the proposed solution, implementation costs and/or implementation timescales.

Risks

Ref	Description	Status/Mitigation
MP122B-AR1	PIT costs as quoted are for all Alerts and potential scenarios. This increases costs significantly.	Open. Have challenged CSP-N to reduce volume of testing.

Assumptions

Ref	Description	Status/Mitigation
MP122B-AA1	Delivering this change as a standalone release will incur significantly higher charges due to the Sensus RNI components not sharing costs across a release. In particular, the build component and PIT costs will not be shared, and are significant.	Open. Planning for the SEC Release may identify shared costs.

Issues

Ref	Description	Status/Mitigation
MP122B-DC1	The Hubtimestamp field is added by the RNI SDK, and is for the WAN side of the CH, not the HAN side (the DSP field chfReceivedTimestamp "time when alert was received by CHF"). This data is already used to measure the WAN transit time to provide a source for the Performance Measure (PM) 3.2 data. It would not identify any delay in the Comms Hub processing of an Alert. CSP N have indicated that capturing the HAN side data would require a Comms Hub change, which would be complex and time consuming. The approach of using the HAN side timestamp was agreed with SECAS.	Open
MP122-DC2	There is a disparity between the DSP field cspReceivedTimestamp and the CSP N timestamp parameters. The CSP N timestamp measures when the Alert leaves CSP N rather than when it arrives. The time difference between the two should be constant, at about 350ms or so, and to remedy this would require a new field and measurement with corresponding complexity and cost concerns. There is no direct indication of any lags or poor performance by the CSP N processing, and this would be shown as a larger time than usual	Open

	between the Alert leaving the Comms Hub and the Alert leaving the CSP. Again, this approach was agreed with SECAS.	
MP122-CN1	Changes required to the Sensus SDK component cannot be implemented for the period August 2022 – 2023, due to other Change Requests being processed. This means that work could not start on this change until August 2023 with a subsequent impact on completion of the work.	Open

Dependencies

None identified at this time.

Ref	Description	Status/Mitigation