

SEC Modification Proposal, SECMP0122B, DCC CR1418, 4392

Throughput of Alerts (DSP)

Full Impact Assessment (FIA)

Version:

0.2

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DCC

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1 Executive Summary

The Change Board are asked to approve:

- Total cost to implement CR4392 SECMP0122 of £161,245 which comprises:
 - £88,123 in Design, Build and PIT costs
 - £73,123 in post-PIT Release costs (SIT, UIT and TTO)
- A timescale to complete the implementation of seven (7) months
- Include SECMP0122B, CR4392 in the June 2023 SEC Release

Problem Statement

This change implements changes to the DSP SMWAN Gateway to support sending of the Alert Throughput data to the DCC Data Science and Analytics team. For the CSP South and Central alerts, no changes are required to the data feed. Changes to the CSP North and the Data Science and Analytics production of the reports are covered in the other SECMP0122B reporting change numbered CR4445.

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
03/05/2022	0.1	Initial compilation
06/05/2022	0.2	Internal review completed

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 February 2021 Release	DCC	03/09/2020
6	SECMP0122B Operational Metrics Preliminary Impact Assessment (PIA) 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 CR4392, 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 both this change and the accompanying changes to CSP North and the Data Science and Analytics (DS&A) reports. The latter changes will be included in CR4445.

3.1 Problem Statement

The DCC currently does not receive any data from the CSPs 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, as well as changes to the DCC Data Science and Analytics reports. Delivery of CR4392 and the DS&A changes would give reporting for CSP South and Central (CSP S&C). 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].

#	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/S1SP, 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, CR4392

The changes to the DSP 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

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

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
- SMETS1 Service Provider (S1SP) Alerts
- SMETS1 Alerts, which are based on alerts from SMETS1 Devices²

² SMETS1 Alerts do not always correspond to alerts originated by devices, i.e. they can originate from within a S1SP. These alerts were in scope for the PIA.

4 Solution Architecture

The solution will require changes to external interfaces and to motorway processing in the DSP.

4.1 Overview

DSP will deliver a logging facility in addition to the Service Audit Trail (SAT). The log will provide additional data from within the alerts, and support additional timing points from CSP North communicated to DSP along with the alert. This data will show the lifespan of the alerts, including alert generation time (where available), time of arrival at DSP, time of leaving, and time of acknowledgement by the Service User.

Two other timing points in the log will indicate time received at the Comms Hub and time received at CSP North. Since additional information is required from the passage of alerts through the CSP North, changes will be required to the SMWAN interface with CSP North.

The UDP packets sent by CSP S&C already contain the Comms Hub received time which will be used in the log.

For DCC Alerts that are used to carry Device Alerts where they cannot be targeted directly at the User by the Device (e.g. from PPMIDs), timing information of the Device Alerts will also be recorded in the SMWAN Gateway, and will be added to logging information from the generation of the DCC Alert.

The new logs will be delivered to the DS&A team at the DCC via the ESI using the same mechanism as the SAT data.

Note that a solution option with CSP North sending simple text files showing logging files by SFTP to the DSP was considered, but was rejected as both 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 Component Changes

The following table summarises the components to be updated in the DSP.

Component	Changes
SMWAN Interface	Inclusion of additional timing points for alerts received from CSP N
SMWAN Gateways	Extraction of timestamps: <ul style="list-style-type: none"> CH received <ul style="list-style-type: none"> Use timestamp from UDP header for CSP S&C alerts From alerts received from CSP N CSP received <ul style="list-style-type: none"> For alerts received from CSP N
Request Manager Gateway	Pass timestamps to Request Manager
Request Manager	Propagation of alert timestamps into DCC Alerts where these are used to deliver the device alert
Request Manager to Message Gateway	Pass timing information received from SMWAN gateway to Message gateway
Message Gateway	<p>Receipt of timestamps from Request Manager</p> <p>Capture of timing points within DSP:</p> <ul style="list-style-type: none"> DSP current redelivery attempt SU stack received <p>Logging of the timing points:</p> <ul style="list-style-type: none"> Creation (extracted from GBCS header) CH received CSP received (from CSP N) DSP received (captured in SMWAN gateway) first delivery attempt (captured in Message Gateway), redelivery attempt(captured in Message Gateway), SU ack received(captured in Message Gateway) <p>On each attempt to deliver for:</p> <ul style="list-style-type: none"> device alerts to Service User DCC Alerts to Service User where the device alert is delivered as a DCC Alert (N39, N53, N54, N62)
ESI Interface	New (log) report format for AST Logs
Reporting	Add header, trailer, signature; compress
ESI Gateway	Delivery of log files to DCC

4.2.1 Changes to CSP North SMWAN External Interface

Two additional elements will be added to allow 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

4.2.2 Alert Supplementary Timing (AST) Log

The Alert Supplementary Timing (AST) Log will be configured as follows:

- Logs will be issued periodically at intervals of 15 minutes (or 50MB if reached before 15 minutes)
- Where no Device Alerts are sent in a reporting period, no logs shall be issued
- A new row will be created for each alert, containing information about the end-to-end timing of the delivery of that alert
 - A row shall be written to the log for the original attempt to deliver an alert, and a separate new row for any redelivery attempts that may be required (note that redelivery attempts may be reported in different files from earlier attempts)
- Logs will include data from DSP inspecting alert payload data and lookups in the Smart Metering Inventory

Note that the Working Group inquired why this log is sent at a 15-minute period, and whether changing that period would reduce costs. DCC notes that this is a standard period used for transmission of data to DCC, and that changing the period by small amounts would have little or no impact, while changing the period significantly would markedly increase costs.

The data within in the AST Log will include the following where available, though some will not be populated in some cases, as above:

- Device Alert Code;
- response ID (i.e. message ID of the Device Alert);
- where the information from the Device Alert is being conveyed to the Service User by a DCC Alert:
 - the DCC Alert Code of the DCC Alert
 - response ID (i.e. message ID) of the DCC Alert
- Device ID of the Device which originated the Device Alert
- Service User SEC User ID (i.e. EUI-64 ID) which is the target of the Device / DCC Alert
- additional timing points to be extracted from the CSP interface:
 - CSP received time (for CSP N)
 - data obtained by inspecting the GBCS payload of the Device Alert:
 - timestamp of when the alert was generated;
 - data enriched by DSP using lookups within the Smart Metering Inventory:
 - CSP
 - corresponding CHF ID
- additional timing points added by DSP:
 - timestamp when DSP received the Device Alert from the CSP
 - timestamp of DSP's first attempt to send the corresponding Device Alert/DCC Alert to the Service User
 - timestamp of DSP's latest attempt to send the Device Alert/ DCC Alert (only for a redelivery)
 - timestamp when the User acknowledged receipt of Device Alert/ DCC Alert (where successful)

4.2.3 Motorway Processing

The motorway processing will be amended to extract timing data from alert messages received from CSPs. For each delivery attempt of the alert (or corresponding DCC Alert), log the timing information as extracted along with DSP timing data.

4.2.4 Other Impacted Components

This Modification has the following additional impacts:

- The Enterprise Systems Interface (ESI) specification will be updated to include the AST Log outlined in section 4.2.2.
- Logging will need to support recording of additional data items for use in the new report.
- Reporting Application Server will be updated to process the new AST logs that are delivered to DCC via Enterprise Systems Gateway.
- Self Service Management Interface (SSMI) File Transfer interface will be updated to feature AST logs to allow request for redelivery. This is a configuration change only.

Note there are no changes to Technical Specifications, such as DUIS or GBCS.

4.2.5 Infrastructure Components

There is expected to be an increase processing resource and storage capacity in order to support this change. It has been estimated at this stage that sufficient capacity exists within the current infrastructure to support this.

Other changes to the infrastructure will relate to network connectivity requirements as identified in the Section 3.3 Functional/Technical Solution above.

5 Testing Considerations

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

5.1 Pre-Integration Testing

The DSP PIT team will design and implement the functional updates required to the DSP for the change. PIT Testing will be carried out to prove that the functionality specified in the Design has been implemented against agreed acceptance criteria. Both manual and automated testing is in scope. The DSP PIT System Test team create manual tests (and data). Test execution covers manual testing and automated regression test packs.

Once PIT Complete status is achieved, the PIT team will support post PIT activities in the form of technical support and defect fixes to allow DSP to achieve its test exit obligations.

The updates to the DSP system and the timing of the PIT exit will be agreed with the DCC through updates, submission and review of the Solution Design documents.

5.2 System Integration Testing (SIT)

The expected integration activities are documented below. All testing is expected to be carried out as part of June 2023 SEC Release testing on the DSP “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 proposed 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.

5.3 User Integration Testing (UIT)

The DSP UIT Projects team 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.

6 Implementation Timescales and Releases

This Modification is 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 testing regime 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

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 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 is not 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".

It should also be noted that changes to, and reporting on, SMETS1 Service Providers was removed from the scope of both this change and the accompanying changes to CSP North and the DS&A reports.

£	Design, Build and PIT	SIT, UIT and TTO	Total
SECMP0122B, CR4392	£88,123	£73,122	£161,245

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.

6.3.1 Application Support Costs

Application Support costs have been calculated for a period of 16 months after the solution is implemented, additional eight Low Complexity calls per month on average relating to additional functionality. The service will run from July 2023 for a period of 16 months.

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£1,994 per month

6.3.2 Changes to the DSP Contract

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

- Schedule 2.1 (DCC Requirements): update to reflect the addition of new Requirements to enable achievement of the activities and / or deliverables under this Modification
- Schedule 3 (DCC Responsibilities): update to reflect the addition of new DCC Responsibilities to enable achievement of the activities and / or deliverables under this Modification
- Schedule 4.1: Solution Design documents will need to be updated
- Schedule 6.1 (Implementation Planning): addition of new milestones
- Schedule 7.1 (Charges and Payment): revisions to incorporate the charges and payment applicable for Modification

Appendix: Glossary

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

Acronym	Definition
ACB	Access Control Broker
AST	Alert Supplementary Timing log
CH, Comms Hub	Communication Hub
CHF	Communications Hub Function
CR	(DCC) Change Request
CSP	Communications Service Provider
CSP S&C	CSP South and Central
CSP N	CSP North
DCC	Data Communications Company
DS&A	Data Science and Analytics team
DSP	Data Service Provider
ESI	Enterprise Systems Interface, a file format
FIA	Full Impact Assessment
GBCS	Great Britain Companion Specification
OPR	Operational Performance Regime
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
PPMID	PrePayment Meter user Interface Device
SAT	Service Audit Trail
SBCH	Single Band Comms Hub
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
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	Technical Operations Centre
TTO	Transition to Operations
UIT	User Integration Testing