SEC Modification Proposal, SECMP0192, DCC CR4443

Extend Scheduled Services for SMETS1 Devices

Full Impact Assessment (FIA) \_DRAFT Version

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# Executive Summary

The Change Board are asked to approve:

* Total cost to implement SECMP0192 of £553,907, which comprises:
  + £391,890 in Design, Build and PIT costs
  + £162,017 in release costs (SIT, UIT and TTO)
* A timescale to complete the implementation of **seven (7)** months
* Include SECMP0192 in the November 2022 SEC Release

**Problem Statement and Solution**

Service Request Variant (SRV) 4.3, Read Instantaneous Prepay Values, and SRV 4.4.3, Retrieve Billing Calendar Triggered Billing Data Log, can only be requested on an “On-Demand” service basis or as a “Future Dated” service. Eligible Users must send either SRV to DCC each time the data is required. With a Smart Metering Equipment Technical Specification (SMETS) 2 device in a prepayment scenario, Users have access to the Prepayment Daily Read Log and in a prepayment scenario can schedule daily retrieval of this data. There is no equivalent log in SMETS1 so to get accurate prepayment data on a regular basis, most Energy Suppliers have to send SRVs 4.3 and 4.4.3 as On Demand Service Requests on a frequent, repeated basis.

Running these SRVs using either the “On-Demand” or “Future-Dated” service is not practicable or efficient for both the DCC and many Users. High volumes of up to ~2.7million additional SRVs are expected, at the same time as the highest peak demand is on the DCC Total System, around midnight every night. This will require spending to support as infrastructure to execute the increased demand for these SRVs is not currently forecasted.

If these SRVs are not changed to run as Scheduled Services, then DCC will need to invest in additional infrastructure capacity to fulfil an extra ~2.7m SRVs being sent to the DCC Total System every midnight by Users. Without a change, Users would also have to create their own scheduling mechanism for these SRVs within their own systems.

**Modification Benefit**

Changing the schedule definition of these SRVs to a Scheduled Service would smooth Service Request processing volumes. A Scheduled Service is more appropriate for regular repeat collection activities and will avoid investment in infrastructure to cater for the increased demand during peak demand. Without the Modification, it is likely that any purchased infrastructure and capacity would remain unused outside peak hours.

# Document History

## Revision History

| Revision Date | Revision | Summary of Changes |
| --- | --- | --- |
| 15/02/2022 | 0.1 | Initial compilation |
| 22/02/2022 | 0.2 | Draft version released to SECAS |

## Associated Documents

This document is associated with the following documents:

|  |  |  |  |
| --- | --- | --- | --- |
| # | Title and Originator’s Reference | Source | Issue Date |
| 1 | MP192 Modification Report v0.1 | SECAS | 6/12/2021 |
| 2 | SECMP0192 CR4443 - PIA - Extend Scheduled Services v1.0 | DCC | 09/02/2022 |

## Document Information

This Full Impact Assessment (FIA) contains the design, testing, and costing information for this Modification.

The Proposer for this Modification is David Walsh of Smart DCC. The Modification was raised on 23rd November, 2021. The Preliminary Impact Assessment request was accepted by DCC on 1st December, 2021, and submitted on 14th December, 2021.

A Full Impact Assessment request was accepted from SECAS on 7th January, 2022.

# Solution Requirements and Overview

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

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

## Problem Statement

For pre-payment meters, Energy Suppliers are required to carry out one read per day, essentially on the financial and consumption position of the customers. There isn't any billing associated with this, and the supplier obligation is for a read every; the read can be at any time, so long as there is a read every day. The reading is taken close to the time as the read is requested, and it is an instantaneous read – as there is no PPMID log.

SRV 4.3, Read Instantaneous Prepay Values, and SRV 4.4.3, Retrieve Billing Calendar Triggered Billing Data Log, can only be requested on an “On-Demand” service basis or as a “Future Dated” service. Eligible Users must send either SRV to DCC each time the data is required. These SRVs are not currently defined as eligible for Scheduled Services such that Users cannot use a single request to schedule SRVs 4.3 and 4.4.3 on a repeating frequency using SRV 5.1, Create Schedule.

With a SMETS2 device in a prepayment scenario, Users have access to the Prepayment Daily Read Log and in a prepayment scenario can schedule daily retrieval of this data. There is no equivalent log in SMETS1 so to get accurate prepayment data on a regular basis, most Energy Suppliers have to send SRVs 4.3 and 4.4.3 as On Demand Service Requests on a frequent, repeat basis.

Running these SRVs using either the “On-Demand” or “Future-Dated” service is not practicable or most efficient for both the DCC and many Users. High volumes of up to ~2.7million additional SRVs are expected, at the same time as the highest peak demand is on the DCC Total System, around midnight every night. This will create inefficiencies within DCC Total System processing and require spending to support as infrastructure to execute the increased demand for these SRVs is not currently forecasted.

If these SRVs are not changed to run as Scheduled Services, then DCC will need to invest in additional infrastructure capacity to fulfil an extra ~2.7m SRVs being sent to the DCC Total System every midnight by Users. Without a change, Users would also have to create their own scheduling mechanism for these SRVs within their own systems.

## Solution Options

To enable DCC to schedule these additional SRVs, a SEC change is required to the Service Request Matrix in the DCC User Interface Specification (DUIS) section 3.1 to define the SRVs as being able to be DCC Scheduled as an applicable Mode of Operation for SMETS1 Devices only:

* SRV 4.3 - Read Instantaneous Prepay Values
* SRV 4.4.3 - Retrieve Billing Calendar Triggered Billing Data Log

Changing the Service definition of these SRVs would smooth Service Request processing volumes significantly if these SRVs could be requested by Users and processed by the DCC as a Scheduled Service. A Scheduled Service is more appropriate for regular repeat collection activities and will avoid investment in infrastructure to cater for the increased demand.

## Business Requirement

There is one Requirement for this Modification.

**Requirement 1:** The DCC shall add DSP scheduling support for SRV 4.3 and SRV 4.4.3 for SMETS1 devices

# Solution Overview

Changes to the DSP and the SMETS1 Service Providers (S1SPs) are required for this Modification solution.

## The "Do Nothing" Approach

The alternative of a "Do Nothing" Option was briefly investigated. If the Service Requests remained On Demand, it is possible Energy Suppliers would want to schedule them all at midnight, and certainly within the current Peak demand window. This would translate to about 750 extra Transactions per Second (TPS), which equates to two extra DSP motorway lanes to carry the extra traffic. Those lanes would then sit unused for the rest of the day. The most recent ROM for implementing a new motorway from the DSP is £350,000 per lane, giving a total of £700,000.

The costs for the downstream S1SPs are more difficult to calculate. The impacts would be greatest on the Middle Operating Capability (MOC) and Final Operating Capability (FOC) cohorts – which at the time of writing, both of which have a long way to go on their migrations. The expected increase would send both of them a long way over their contracted TPS rates, with significant changes required in processing capacity and infrastructure. There would also be a requirement for a DCO uplift and potentially a functional change which would be difficult to achieve especially while the migrations are ongoing, and very costly. As a ROM, that figure would start at £1.5million with a high tolerance and risk associated. This would probably even impact the SIM operators, Vodafone and VMO2, as well, requiring SIM changes and additional network capacity.

## DSP Changes

Scheduling of Service Requests is carried out by using SRV 5.1. In order for SRV 4.3 and SRV 4.4.3 to be able to be scheduled, the structure of SRV 5.1 will need to be changed to include SRV 4.3 and SRV 4.4.3. This requires changes to the DUIS schema.

In addition to the changes to DUIS, the Contractor will need to amend the DCC Data System processing to enable creation of SRV 4.3 and SRV 4.4.3 for delivery to S1SPs after they have been scheduled using SRV 5.1. A new S1SP XML Schema that references the DUIS schema will need to be created.

The scheduling capability for SRV 4.3 and SRV 4.4.3 will be applicable only for SMETS1. If DCC Data Systems receives a request to schedule SRV 4.3 or SRV 4.4.3 for SMETS2, the request will be rejected using the new error code E050111.

### Technical Specifications, DUIS and DUGIDS

DUIS and DUGIDS documentation will be updated to describe that DCC Data System scheduling will be supported for SRV 4.3 and SRV 4.4.3 for SMETS1. The DUIS schema will need to be modified to add SRV 4.3 and SRV 4.4.3 to the list of Service Requests accepted by SRV 5.1 for scheduling. The new error code E050111 will also be made available in the new version of DUIS.

A DUIS extract provided by the DSP is embedded in Appendix C: DUIS Changes below.

Design documentation updates for the DSP will be carried out during the Detailed Design phase.

### Request Management

Request Management will be amended to add support for creation of Service Requests on schedule activation of SRV 4.3 and SRV 4.4.3. The processing of SRV 5.1 will be modified to include a validation check to ensure that the scheduling of SRV 4.3 and SRV 4.4.3 is not supported for SMETS2.

### Data Management

Data Management will be updated to allow SRV 4.3 and SRV 4.4.3 to be scheduled

### S1SP Interface

The S1SP XML schema used by the S1SP Interface will require uplifting as a result of the changes to SRV 5.1 within the main DUIS schema, since this Service Request is passed to the S1SPs for them to maintain details of DCC Data System Schedules for SMETS1 devices.

### Security Impact

The DSP Security Assurance team has reviewed this change. There is no material impact on the DSP security implementation. The Security Assurance team will provide general security oversight of the implementation throughout, in accordance with DSP’s contractual requirements:

No additional Penetration Testing will take place as a result of this change as:

* there are no material changes to DSP interfaces
* there are no material changes to the security implementation
* there is no new infrastructure being introduced

There is no requirement to update the Protective Monitoring implementation.

### Infrastructure Components

New infrastructure components are not required for this CR. There will be a need for deployment of a new version of DUIS XML Schema to the Data Power appliance. Network configuration updates will be required at the S1SP Gateways and the incoming F5 controller will need to point to the appropriate DUIS version at the Datapower.

### Non-Functional impacts

There are no Non Functional Impacts associated with this Modification, including Performance, Resilience and Disaster Recovery.

## Critical Software

The SRVs are currently on-demand only Service Request and will be changed so they can also be scheduled. This change will lead to a new DUIS/MMC schema version, and therefore, a new version of RTDS, GFI, Parse and Correlate (P&C) and DCC Boxed will need to be released. These products are often updated as part of a release, and any update costs are shared across the SEC Release. Note that DCC Boxed costs are already budgeted, and will not be charged as part of this Modification.

## CGI Instant Energy (CGI IE)

On receipt of a DSP Scheduled Service Request, CGI IE carries out a validation check to ensure the Service Request Variant is applicable to Command Variant 9 and returns an S1SP Alert S1VE12 to the Service User if the combination is invalid.

CGI IE will develop and test a database update script to add standing data to its “Security Module” component database, to allow SRV 4.3 and SRV 4.4.3 to be processed as DSP Scheduled Requests.

CGI IE will also create a database table backup script in order to ensure any changes can be rolled back in the event of issues during implementation. The standing data will be added to the database using a SQL script and no restart of the environment(s) will be required as the relevant database data is not cached.

No other impact on documentation, services, or functionality is anticipated.

## Capgemini

Any capacity increase will require upgrades to the Production and User Integration Testing (UIT) environments.

## Secure

The proposed implementation is to schedule these two SRVs via SRV 5.1, which impacts the following components of the IP5b solution:

* Request Manager Service: apply new agreed DUIS Schema to accommodate the changes around SRV 5.1.
* Validation Service: to populate the Schedule Id by adding the SRV 4.3 and 4.4.3 to the already existing list that’s part of that logic, and changes in the existing validations.
* Scheduling Transform Service:
  1. In SRV 5.1, after the DUIS schema update, the new enumeration will allow the two SRVs to be added in the 5.1 switch case, and they will be correlated with the following schedule data type:

|  |  |  |
| --- | --- | --- |
| **SRV** | **Snapshot Type** | **Schedule Data Type** |
| 4.3 | Current | Last Midnight Snapshot |
| 4.4.3 | Billing | Billing Snapshot |

* 1. – For SRV 5.3 no change is required.
  2. - For SRV 4.3 and 4.4.3, the respective classes should be updated to follow the same pattern already present in SRVs including 4.6.1, 4.8.1, 4.8.2 and 4.8.3. In this way the system can verify if the scheduling information is present and raise errors if not.
* Scheduling Request SCM Service: SRVs 4.3 and 4.4.3 will be added to the list that checks if an SRV is scheduled so they then can be further processed.
* Response Builder Service: logic will be updated so SRV 4.3 and 4.4.3 follow the same pattern defined for on-demand scheduling requests in the same way as the Scheduling Transform Service. On-demand scheduling SRVs (4.6.1, 4.8.1, 4.8.2 and 4.8.3) have scheduling logic applied.
* Schedule Manager Service: new logic will be amended to add the new schedule data types.
* Database Component: changes in the database columns and tables to store the new set of scheduled data being received from the devices.
* Infrastructure Updates; additional database disk space
* Update design documentation

## Trilliant

Trilliant will implement a change to update the dcc-smwan-server DUIS schema to support the new scheduled SRV. A new retry config will be introduced on dcc-sref-context to handle the specific scheduled srv retry process.

Documentation updates will be included in this work.

# Testing Considerations

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

There are no requirements to performance test the functional changes in this Modification.

## Pre-Integration Testing

The DSP PIT team will design and implement the functional updates required to the DSP for the change.

DSP PIT will prove the functionality specified in the Design has been implemented against the agreed acceptance criteria. PIT testing will include testing both existing updated DSP Use Cases, and new Use Cases development for the Modification. A series of regression tests will also be run.

Secure PIT Testing will consist of:

* Update the regression suite and test scripts
* Perform targeted and full regression testing
* Perform one or more cycle of performance testing (subject to results and implementation).

Trilliant will add testing to cover SRV4.3 and SRV4.4.3 schedule SRV scenarios as well as SRV5.1/SRV5.3 scenarios with schedules for SRV4.3 and SRV4.4.3. Costs associated with the Trilliant PIT environment will be shared with other CRs and other Modifications in the same SEC Release.

## System Integration Testing (SIT)

All testing is expected to be carried out as part of November 2022 SEC Release testing on the DSP “B Stream” environments, in accordance with existing practices for SEC Releases. The full scope of Solution Testing for CR4443 will consist of SIT Functional Testing only. As such, the functional test scope includes a test using a single Device Model Combination from each of the three S1SPs.

To test the new DUIS (SMETS2) error code a new negative test scenario will be developed and executed against a single Comms Hub variant from each of the two SMETS2 CSPs.

SIT Functional Testing will consist of:

**SMETS1 devices**

* SRV5.1 Create Schedule for SRV4.3 and SRV4.4.3;
* SRV5.2 Read Schedule for SRV4.3 and SRV4.4.3;
* SRV5.3 Delete Schedule created as above;
* Meter Reading Business Scenario;
* Change of Supplier Business Scenario;
* Change of Mode Business Scenario;

**SMETS2 devices**

* SRV5.1 Create Schedule for SRV4.3 and SRV4.4.3 (Negative Scenario)

## User Integration Testing (UIT)

Test execution for UIT will test the DSP scheduling of SRV4.3 and SRV4.4.3 via SRV5.1 and SRV5.3 by setting up schedules against one previously migrated SMETS1 meter set (a positive test) and one SMETS2 meter set (a negative test).

SMETS1 testing will ensure that SRV4.3 and SRV4.4.3 can be successfully set up and deleted from a DSP schedule and that the Service Requests are successfully executed.

The SMETS2 testing will ensure that the new error code is returned to notify the validation failure. The testing will be conducted in the UIT-B test environment. Once all testing is complete the SMETS2 meter set will be decommissioned.

All User Integration Testing will take place in the UIT-B test environment only.

## CGI System Integrator

Activities for the CGI System Integrator have already been defined for the November 2022 SEC Release. This Modification is not expected to significantly increase the level of system integration to be carried out, although the involvement of the S1SPs will be included in the change.

# Implementation Timescales and Releases

This Modification is expected to be included in a SEC Release in November 2022. Implementation timescales will be finalised as part of the relevant SEC Release Change Request.

## 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 **nine 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 | 4 – 6 Months |
| Transition to Operations and Go Live | D + 7 Months |

Note that the CGI IE changes could be aligned to the SEC Release, or implemented either at an earlier or later date in a maintenance release.

## SEC Release Allocation and Other Code Impacts

This Modification is expected to be implemented as part of the November 2022 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.

## 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 the Post-PIT costs include the effort involved in the Installation & Commissioning (I&C) of test Devices (SMETS2+) and Migration of SMETS1 test Devices required to generate the Service Audit Trail records necessary to validate the solution. If the SEC Release in which this Modification is deployed contains other changes that require I&C/ Migration during Post-PIT testing, then costs for that activity will be shared across the Release.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| £ | Design | Build | PIT | Integration Testing, SIT and UIT | TTO | Total |
| Service Provider Totals | 63,591 | 152,908 | 175,031 | 136,726 | 25,291 | **£553,907** |

|  |  |
| --- | --- |
| 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. |

Note that any DUIS uplift charges is included in this Modification as a standalone change. When the contents of a SEC release become finalised, and if there is more than one change in the release with DUIS charges, only **one** set of charges will be payable, since the DUIS changes required for the individual CRs will be done only **once** for the release.

### Application Support Costs

No additional Application Support costs are anticipated associated with this Modification.

### Changes to the DSP Contract

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

* Schedule 2.1: Updated DCC Data System Requirements;
* Schedule 3: DCC Obligations will require new obligations for the DCC to achieve the deliverables under this CR;
* Schedule 4.1: Solution Design documents will need to be updated as per section 4.1;
* Schedule 6.1: New Milestones as proposed in section 6.2 of this FIA;
* Schedule 7.1: Values against the milestones.

There will be no updates to SLAs as a result of this change.

# Appendix A: 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, but any such changes will be progressed as a Change Request.

## Risks

|  |  |  |
| --- | --- | --- |
| Ref | Description | Status/Mitigation |
| MP192-DR1 | There is no time contingency in the high-level plan and therefore, although reasonable efforts will be made to adhere to the plan, there is a risk to the planned dates. | Open |
|  |  |  |
|  |  |  |

## Assumptions

These assumptions have been used in the creation of this Full Impact Assessment. Any changes to the assumptions may require DCC to undertake further assessment, prior to the contracting and implementation of this change.

|  |  |  |
| --- | --- | --- |
| Ref | Description | Status/Mitigation |
| MP192-AD1 | SECMP0192 will be included in the November 2022 SEC Release. The price breakdown, and work start-date is based on the November 2022 Release. | Open |
| MP192-AS2 | No additional validation against the corresponding SRV 5.1 in the Secure IP5B system is expected to check the frequencies align | Accepted |
| MP192-AS3 | There is no requirement to increase capacity in the Service Provider systems, beyond database storage. |  |

## Issues

None at this time.

## Dependencies

None at this time.

|  |  |  |
| --- | --- | --- |
| Ref | Description | Status/Mitigation |
| MP192-DC1 | RTDS and SMITEn-Lite depends on an updated version of Parse and correlate .GFI depends on an updated version of SMITEn-Lite. DCC Boxed depends on an updated P&C. | Open |
|  |  |  |

# Appendix B: Glossary

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

|  |  |
| --- | --- |
| **Acronym** | **Definition** |
| CR | DCC Change Request |
| DCC | Data Communications Company |
| DSP | Data Service Provider |
| DUIS | DCC User Interface Specification |
| FIA | Full Impact Assessment |
| F5 | DSP device for functions such as load balancing of network traffic |
| PIA | Preliminary Impact Assessment |
| PIT | Pre-Integration Testing |
| ROM | Rough Order of Magnitude (cost) |
| RSA | Registered Supplier Agent |
| SAT | Service Audit Trail |
| SEC | Smart Energy Code |
| SECAS | Smart Energy Code Administrator and Secretariat |
| SI | Systems Integrator |
| SIT | Systems Integration Testing |
| SMETS | Smart Metering Equipment Technical Specification |
| SRV | Service Request Variant |
| SSI | Self Service Interface |
| UIT | User Integration Testing |

# Appendix C: DUIS Changes

