

SEC Modification Proposal, SECMP0192, DCC CR4443

Extend Scheduled Services for SMETS1 Devices

Preliminary Impact Assessment (PIA)

Version:	0.3
Date:	12th December 2021
Author:	DCC
Classification:	DCC Public

Contents

1	Executive Summary	3
2	Document History	4
2.1	Revision History	4
2.2	Associated Documents	4
2.3	Document Information.....	4
3	Context and Requirements.....	5
3.1	Problem Statement	5
3.2	Proposed Solution	5
3.3	Business Requirement	5
4	Solution Description	6
4.1	Description of DSP Changes	6
4.1.1	Technical Specifications	6
4.1.2	Request Management.....	6
4.1.3	Data Management	6
4.1.4	S1SP Interface	6
4.1.5	Security Impact	6
4.1.6	Infrastructure Impact.....	6
4.2	Description of CGI Instant Energy Changes.....	7
4.3	Description of CapGemini Changes	7
4.4	Critical Software Changes	7
4.5	Description of Secure Software Changes.....	8
4.6	Trilliant.....	8
5	Implementation Timescales and Approach.....	9
5.1	Testing and Acceptance.....	9
5.1.1	System Integration Testing	9
6	Costs and Charges	10
Appendix A: Glossary		11
Appendix B: Risks, Assumptions, Issues, and Dependencies		12
Risks		12
Assumptions		12
Dependencies		12

1 Executive Summary

The Change Board are asked to approve the following:

- Total cost to complete the Full Impact Assessment of £31,099
- The timescales to complete the Full Impact Assessment of 30 days
- ROM costs for SECMP0192, up to the end of Pre-Integration Testing (PIT) of between £350,000 and £550,000

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. It is likely that any purchased infrastructure and capacity would remain unused outside peak hours.

2 Document History

2.1 Revision History

Revision Date	Revision	Summary of Changes
08/12/2021	0.1	Initial DCC Review with Service Providers
13/12/2021	0.3	Internal review

2.2 Associated Documents

This document is associated with the following documents:

Ref	Title and Originator's Reference	Source	Issue Date
1	MP192 Modification Report v0.1	SECAS	23/11/2021
2		SECAS	

References are shown in this format, [1].

2.3 Document Information

The Proposer for this Modification is David Walsh of Smart DCC. The Modification was raised on 23rd November, 2021.

The Preliminary Impact Assessment was requested of DCC on 1st December, 2021.

3 Context and Requirements

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.

3.1 Problem Statement

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.

3.2 Proposed Solution

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.

3.3 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

4 Solution Description

It should be noted that the changes to the SMETS1 cohorts in terms of the distribution of the additional Service Requests across each cohort will be calculated for the Full Impact Assessment (FIA).

4.1 Description of DSP Changes

In addition to the changes to DUIS, DSP will need to amend the 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.

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. A new error code will be introduced in DUIS to notify this validation failure.

4.1.1 Technical Specifications

DUIS and DCC User Gateway Interface Design Specification (DUGIDS) documentation will be updated to describe that DSP 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 will also be made available in the new version of DUIS.

4.1.2 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.

4.1.3 Data Management

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

4.1.4 S1SP Interface

The SMETS1 Service Provider (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 in order for them to maintain details of DSP Schedules for SMETS1 devices.

4.1.5 Security Impact

The implementation will be security assured throughout. This assurance includes reviewing designs, test artefacts and providing consultancy to the implementation and test teams.

A more detailed Security impact will be carried out as part of the Full Impact Assessment.

4.1.6 Infrastructure Impact

There will be no change to the infrastructure design as a result of this change. Additional processing and storage will be required; however, they are not sufficiently large to warrant the procurement of additional compute power or storage.

4.2 Description of CGI Instant Energy Changes

On receipt of a DSP Scheduled Request the CGI Instant Energy (CGI IE) S1SP 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 has up to twenty four (24) hours to carry out Service Requests received with Command Variant 9 to take into account scenarios where communication cannot be established and the request is put into long retry. CGI assumes Service Users will be made aware that Service Request responses for a DSP Scheduled 4.3 could be returned up to twenty four (24) hours after the request is submitted and, therefore, will not be instantaneous at the time the request is received but, rather, accurate at the time the response is sent. Service Request responses for a DSP Scheduled SRV4.4.3 will not be affected to the same degree, as the data set being returned represents a period of time.

4.3 Description of Capgemini Changes

This Modification proposes 2.7 million SRVs with between five and eleven Device Language Message Specification (DLMS) commands each will be scheduled. If all these SRs are directed at Secure, this will translate to between 13.5million and 29.7million DLMS commands, which represents between 5% and 11% of a day's DLMS commands when under current load with running firmware; and around 7% to 15% of the load with no firmware upgrades. Scaling for firmware upgrades covered an increase of around 60% in the daily load and it is concentrated into the 12:00 to 22:00 period.

Depending on where the load appeared in the day and the duration of the load this volume may require the system to be scaled but this is dependent on the period when the load is scheduled. Capgemini need to know the timing on the scheduled load to make this assessment further, but it is likely that the load will be scheduled outside the Peak demand period, 00:00 to 06:00.

Note that the Capgemini submission assumes all the SRVs are sent to the DCO and processed. This will be investigated as part of the FIA.

If the traffic pattern alters significantly from the current profile then work may be needed on the live environment so that it can handle the peak workloads in near to real time. Any amendments to live might require technical consultancy and additional compute power, leading to an increase in monthly charges for compute and associated licences.

4.4 Critical Software Changes

This change will lead to a new DUIS/MMC schema version, and therefore, a new version of RTDS, GFI, Parse & Correlate and DCC Boxed will need to be released.

Product	DESCRIPTION
RTDS-1	Update MMC and DUIS schema version
GFI-1	Update SMITEn-Lite on GFI containing updated MMC and DUIS schema version
Parse & Correlate (P&C-1)	Update MMC and DUIS schema version
DCCBoxed-1	Internal tools will be Updated to support MMC and DUIS schema version

Additionally, for all products the following tasks will be performed:

- Update of documentation
- Run of regression tests.
- Release of new versions

4.5 Description of Secure Software Changes

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

Request Manager Service	Apply new agreed DUIS Schema to accommodate the changes around SRV 5.1.
Validation Service	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	In SRV 5.1, after the DUIS schema update, the new enumeration will allow these two SRVs to be added in the 5.1 switch case. In SRV 5.3 no change is required. In the SRV 4.3 and 4.4.3, the respective classes should be updated to follow the same pattern already present in SRV's like 4.6.1, 4.8.1, 4.8.2 and 4.8.3. Secure can verify if the scheduling information is present and raise errors if not.
Scheduling Request Service	SRVs 4.3 and 4.4.3 need to be added to the list that checks if an SRV is scheduled so they then can be further processed.
Response Builder Service	Logic needs to be updated so SRV 4.3 and 4.4.3 follow the same pattern defined for on-demand scheduling requests.
Schedule Manager Service:	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:	Additional database storage will be required.

4.6 Trilliant

The SMWAN DUIS schema will need to be updated, along with SRV retry handling configuration. Unit testing to cover new scheduling scenarios will be required.

5 Implementation Timescales and Approach

This change is expected to be included in a future SEC Release. Design, Build, and Pre-Integration Testing (PIT) is expected to take about three months to complete after the CAN is signed.

The CGI IE release would have to occur before, or alongside, the DSP change to allow this functionality to become effective.

Capgemini indicate that two months are required for any infrastructure changes.

Critical Software components would be updated in about one month.

Secure believes two months are required to reach PIT complete, and a further total of two months in Systems Integration Testing (SIT) and User Integration Testing (UIT).

Trilliant expects development to PIT complete to take five weeks.

Details of the implementation will be finalised in the FIA.

5.1 Testing and Acceptance

PIT will be carried out by each Service Provider.

DSP is expected to be limited to functional regression testing as part of a release. DSP will carry out performance testing within its PIT performance test environment.

CGI IE is expected to be limited to functional regression testing as part of a release. CGI will carry out performance testing within its PIT performance test environment.

Secure will:

- Update in the regression suite and test scripts
- Perform targeted testing (includes both positive and negative use cases)
- Perform full regression testing
- Perform one cycle of performance testing (if required)

5.1.1 System Integration Testing

There will be an impact to SIT as a result of this change. SIT activities will include test preparation, execution and reporting as required, as well as Service Request Variant (SRV) testing to verify the use of critical commands on selected devices.

The System Integrator will be required to manage the testing. It should be noted that the additional costs for SIT are likely to be similar to Design, Build, and PIT costs. These costs will be included in the FIA.

UIT Test preparation for this Modification will include the allocation of a previously migrated SMETS1 meter set and the allocation and Installation and Commissioning of a SMETS2 meter set.

A full assessment of SIT and UIT testing will be provided in the FIA.

6 Costs and Charges

The table below details the cost of delivering the changes and Services required to implement this Modification Proposal.

The Rough Order of Magnitude cost (ROM) shown below describes indicative costs to implement the functional requirements. The price is not an offer open to acceptance. It should be noted that the change has not been subject to the same level of analysis that would be performed as part of a Full Impact Assessment and as such there may be elements missing from the solution or the solution may be subject to a material change during discussions with the DCC. As a result the final offer price may result in a variation.

The table below details the cost of delivering the changes and Services required to implement this Modification. For a PIA, only the Design, Build and PIT indicative costs are supplied.

	Design, Build and PIT	Days to Create FIA	Cost to Create FIA
All Service Providers	£350,000 to £550,000	30	£31,099

Table 2: SECMP0192 Standalone Cost

The phases included are as follows.

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. It includes Unit Testing (also referred to as System Testing), Performance Testing and Factory Acceptance Testing by the Service Provider or supplier.
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.

Based on the existing requirements, the fixed price cost for a Full Impact Assessment is **£31,099** and would be expected to be completed in 30 days.

Appendix A: Glossary

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

Acronym	Definition
CAN	Contract Amendment Note
CGI IE	CGI Instant Energy
CR	DCC Change Request
DCC	Data Communications Company
DCO	Dual Control Organization
DLMS	Device Language Message Specification
DSP	Data Service Provider
DUGIDS	DCC User Gateway Interface Design Specification
DUIS	DCC User Interface Specification
FIA	Full Impact Assessment
PIA	Preliminary Impact Assessment
PIT	Pre-Integration Testing
ROM	Rough Order of Magnitude (cost)
SEC	Smart Energy Code
SECAS	Smart Energy Code Administrator and Secretariat
SIT	Systems Integration Testing
SMETS	Smart Metering Equipment Technical Specification
SRV	Service Request Variant
S1SP	SMETS1 Service Provider
UIT	User Integration Testing

Appendix B: Risks, Assumptions, Issues, and Dependencies

The tables below provide a summary of any Risks, Assumptions, Issues, and Dependencies (RAID) observed during the production of this PIA.

Risks

Ref	Description	Status/Mitigation
MP192-SA1	The new MMC and DUIS schemas shall be available before the implementation starts	Open
MP192-SA2	Aligning DUIS changes across all the DCC ecosystem partners' and DCC Service Users	Accepted

Assumptions

Ref	Description	Status/Mitigation
MP192-SA1	The new MMC and DUIS schemas shall be available before the implementation starts	Open
MP192-SA2	Assume the scheduling of SRV 4.4.3 (billing data) is aligned in terms of the billing calendar set on the device otherwise it carries the risk that when Schedule SRV 4.4.3 is being executed, it will send the response "Data Not Available"	Accepted
MP192-SA3	The TRT of these scheduled SRVs will be 24 hours	Accepted
MP192-SA4	No additional validation against the corresponding SRV 5.1 in the Secure system is expected to check the frequencies align, i.e., if the supplier sets up a schedule that does not align with the billing frequency, it will not be rejected, but missing or partial data will be returned during the corresponding on-demand requests. Similarly, if different users set up schedules for SRV 4.4.3 on the same device with different frequencies, these would not be rejected, just that again any schedules that do not align with the billing period on the device may see missing or partial data returned.	Accepted
MP192-SA5	Secure will continue to support the existing 450 TPS (transaction per second), where $TPS = (Request + Response + Alert) / \text{second}$. Hence, capacity is not required to be increased in terms of TPS	Accepted

Dependencies

Ref	Description	Status/Mitigation
MP192-CD1	RTDS and SMITEn-Lite require an updated version of Parse and Correlate	Open
MP192-CD2	GFI depends on an updated version of SMITEn-Lite	Open
MP192-CD3	DCC Boxed depends on an updated Parse and Correlate	Open