Data Communications Company

SEC Modification Proposal

- DCC Impact Assessment (IA)

- **Mod Proposal Ref: SECMP 0015, DCC CR 213**
- **Mod Proposal Title: GPF Timestamp for Reading Instantaneous Gas Values**
- **Mod Path: Path 3 - Self governance**

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Author:	**DCC**
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1 Document History

1.1 Revision History

Revision Date	Revision	Summary of Changes
21/05/2018	0.1	Initial compilation from Service Providers
24/05/2018	0.2	Internal DCC Review
8/6/2018	1.0	Included all review comments
22/6/2018	1.1	Updated RAID based on questions raised by Phillip Twiddy at Gemserv, added Glossary

1.2 Associated Documents

This document is associated with the following documents:

Title and Originator's Reference	Source	Issue Date
SECMP0015 - GPF timestamp - Solution Design Document	https://smartenergycodecompany.co.uk/modifications/sending-commands-via-ppmids//	16/10/2017
SECMP0015_DCC_ PA	As above	23/03/2017

1.3 Reviews and Approvals

This document requires the following DCC internal reviews and approvals:

Name	Title & Company	Issue Date	Revision
Nicola Roteglia	Head of Architecture, DCC		0.2
Ian Marshall	End to End Architect, DCC		0.2
Chalam Neelan	Solution Architect, DCC		0.2
Frederick Wamala	Lead Security Architect, DCC		0.2
Amanda Rooney	Regulation Manager, DCC		0.2

2 Introduction

The purpose of this DCC Impact Assessment (IA) is to provide the relevant Working Group with the information requested in accordance with SEC Section D6.9 and D6.10.

2.1 Previous Information provided by DCC

This IA is provided further to a DCC Preliminary Assessment (PA), which was requested by the Working Group. This document builds on the information previously provided as part of the PA, clarifying and refining the impact of this SEC Modification on DCC.

This DCC Impact Assessment was requested of DCC, and the Service Providers instructed to proceed with their submissions on 7/9/2017.

2.2 DCC Contact Details

Please raise any queries regarding this DCC Impact Assessment using the contact details provided below.

Name	DCC - SEC Modification queries
Contact email	Mods@smartdcc.co.uk

2.3 Context

Instantaneous Gas Smart Metering Equipment (GSME) register values can be read from the Gas Proxy Function (GPF). These will not normally be in-line with the readings on the GSME, since the GSME only provides intermittent updates to the GPF, typically once every 30 minutes.

When reading these attributes from the GPF the date-time field in the response is set to the GPF read time and not the GSME consumption measurement time. Without a timestamp to know when the GSME last updated the GPF, the Supplier cannot know how up to date the information is.

In order to provide accurate information to the suppliers, this change proposes that a GSME shall make the time at which an *instantaneous* register is updated available to the GPF whenever the register values are shared with the GPF. When GPF creates Responses to the corresponding use cases, it shall populate date-time stamp value with the value received from GSME and specify the source (indicates whether the value is from GSME or GPF) of the date-time stamp. The value held by the source field will be used to validate the reliability of the date-time stamp in the Parse and Correlate application.

In summary, this Modification helps inform the gas suppliers of the currency of the instantaneous register values.

2.4 Requirement

The functional requirements for SECMP0015 as stated in the SECAS initial solution design [1] are as follows.

This SEC modification is to allow Remote Parties and Devices reading the instantaneous values from the GPF to know what the time was on the GSME's Clock to which those values relate. Specifically:

- The GSME is to provide to the GPF a date-time stamp value whenever the GSME provides its instantaneous values
- The GPF is to update its copy of this date-time stamp whenever it updates its copy of the GSME's instantaneous values
- The GPF is to make available its copy of the GSME date-time stamp to Devices on the SMHAN
- When the GPF creates a Response to GBCS Use Cases GCS13a, GCS13b, GCS13c, GCS14 or GCS60, the GPF is to use its copy of the GSME date-time stamp to populate the date-time field in the Response it generates, and mark the source of that date-time stamp in the time status of the Response accordingly
- Parse and Correlate is to decode the time status in Responses so that sources date-time stamps are recorded

2.5 Description of Solution

The Communications Hub GSME mirror will be updated to mirror the GSME 'Reading Snapshot Time' and GPF will populate the Use Cases with 'Reading Snapshot Time'. As the change is populating a field that already exists there are no structural changes to the relevant schemas. Backward compatibility is maintained, so there is no impact beyond those listed in the Communications Hub sections below.

The mechanism using which the Timestamp values are populated in the Device Responses corresponding to the following Service Request Variants (SRVs) will undergo modifications due to this change.

- 4.1.1 Read Instantaneous Import Registers
- 4.1.2 Read Instantaneous Import TOU Matrices
- 4.1.4 Read Instantaneous Import Block Counters
- 4.3 Read Instantaneous Prepay Values
- 4.18 Read Meter Balance

3 Impact on DCC Systems, Processes, and People

This section describes the impact of SECMP 0015 on DCC's Services and Interfaces that impact Users and/or Parties.

Note that any associated Risks, Assumptions, Issues, and Dependencies are held in section 8 following.

3.1 Services

The major impact of SECMP0015 to services is on the Communications Hub, The Communications Hub (CH) will require changes to the GSME mirror and GPF functions. This will also impact the Parse component.

The following GBCS use case and message responses shall be updated:

- GCS13a Read GSME Consumption Register
- GCS13b Read GSME Block Counters
- GCS13c Read GSME Register (TOU)
- GCS14 Read GSME Prepayment Register(s)
- GCS60 Read Meter Balance for GSME

3.1.1 Mirror Reading Snapshot Time

The Reading Snapshot Time attribute is optional, and represents the last time all of the Current Summation Delivered, Current Summation Received, Current Max Demand Delivered, and Current Max Demand Received attributes supported by the device were updated.

It is expected this will be updated by the GSME every time the GSME data is mirrored from GSMEs that support this SEC Modification. The CH will support GSMEs that both implement and do not implement this SEC Modification. Test cases shall be added that cover meters that both support and do not support this optional attribute.

The GSME mirror shall make this attribute available to devices on the HAN. If the attribute is read when it has not been populated the response status 'unsupported attribute' shall be returned.

Note: the SEC solution design document [1] proposed the attribute shall be set to 'invalidTime' as opposed to 'unsupported attribute' as defined by ZigBee.

3.1.2 Populate Identified Use Cases Timestamp Field

When the GPF creates a Response to Use Cases GCS13a, GCS13b, GCS13c, GCS14 or GCS60, the GPF shall use its copy of the GSME date-time stamp to populate the date-time field in the Response it generates if available. If the GSME date-time stamp is null or not available, the current time shall be used. The source of the timestamp shall be used to indicate the GSME consumption time or the CH current time.

The Time Stamp ‘bit 2’ element will be set to 1 for data from the GSME and 0 for the CH. The GBCS section 7.2.7, "Message construction – Grouping Header", specifies the message construction for the above mentioned GBCS messages.

All the affected messages will require the ‘Date-time stamp in response’ as specified in the column Z of tab ‘Use Case Reference’ of GBCS section 20 mapping table.

3.2 Parse and Correlate Application

Parse and Correlate will provide a solution to read the Grouping Header date-time field from the responses and decode bit 2 of that field, which corresponds to the ‘time status’, to flag where date-times came from the GSME rather than the CH. Parse and Correlate would also decode bits 0 and 1, in line with GBCS Table 9.1.4.2b and flag that date-time as (1) reliable, (2) unreliable or (3) invalid.

The solution implies that a new Message Mapping Catalogue (MMC) schema with all the relevant changes for this solution needs to be previously supplied and applied to Parse and Correlate.

The Service User Simulator (SUS) will need to integrate the new MMC schema to ensure that the implementation is consistent with that of the Parse and Correlate software.

3.3 GBCS Integration Testing For Industry (GFI)

The GFI Testing Tool and GFI Comms Hub will be impacted by this Modification.

The GFI Testing Tool will require the following changes to its GPF data structures:

- Add the attribute ReadingSnapshotTime to the GPF data structures
- Initialize ReadingSnapshotTime on the GPF with 0xFFFFFFFF (invalid value)
- Support mirroring of ReadingSnapshotTime by a GSME sending a Report Attributes command
- Expose ReadingSnapshotTime to devices on the HAN

GPF response construction will also need to be updated for the use cases GCS13a, GCS13b, GCS13c, GCS14 and GCS60 in order to correctly set the Grouping Header date-time:

- If the GPF ReadingSnapshotTime is invalid, date-time will be set to the GFI CommsHub system time, and the status field will indicate the value as unreliable and as having the same source as the response
- If the GPF ReadingSnapshotTime is invalid, date-time will be set to the value of that attribute, and the status field will indicate the value as reliable and as having a source different from the source of the response

The test reports produced by GFI will also be enhanced in order to display the Grouping Header date-time status information.

The GFI GSME emulator will require improvements to validate the changes required by this Modification. These improvements will include the ability for the GSME emulator to act both as a device that mirrors ReadingSnapshotTime and a device that does not mirror that attribute.

The solution described above will allow the GFI GPF to work with Gas Meters capable of mirroring ReadingSnapshotTime as well as GSMEs that do not mirror this attribute.

A change in the GBCS mapping table that sets the grouping header date-time field as mandatory for use case GCS60 will be required.

Is also assumed that a given GSME will have a consistent behaviour regarding the mirroring of ReadingSnapshotTime when mirroring Instantaneous GSME register values. It will either always report ReadingSnapshotTime or never report it. Although an inconsistent behaviour will not prevent the use of GFI it may cause the GFI GPF to provide misleading information both to remote parties and to devices on the HAN.

3.4 DUIS, DUGIDS and MMC

The DCC User Interface Specification (DUIS) is expected to remain unchanged. The DCC User Gateway Interface Design Specification (DUGIDS) and Message Mapping Catalogue (MMC) will require changes; as described following.

3.4.1 DUIS and DUGIDS Changes

The description of the following SRVs in DUGIDS shall be updated to reflect the behaviour of the timestamp field.

- 4.1.1 Read Instantaneous Import Registers
- 4.1.2 Read Instantaneous Import TOU Matrices
- 4.1.4 Read Instantaneous Import Block Counters
- 4.3 Read Instantaneous Prepay Values
- 4.18 Read Meter Balance

The structures of these SRVs are not expected to change and hence there will not be any changes to the DUIS XML Schema Definition.

3.4.2 MMC Changes

The MMC XML Schema Definition shall be modified to add two new optional attributes to the existing timestamp field within the Response Header:

IsFromGSME	If the IsFromGSME attribute of the Timestamp in the Response is set to Tue, then this indicates that the value of Timestamp is set by the GSME, not the GPF.

ClockStatus	Indicates if this time is RELIABLE, UNRELIABLE or INVALID.

The attached DUGIDS extract describes the changes to DUGIDS documentation.

SECMOD0015 DUGIDS Documenta

3.5 Motorway and Transform Libraries

No Impact.

3.6 Solution Infrastructure

No additional infrastructure will be required.

3.7 Impact on Safety

This change does not affect the processing, storage or transmission of data within DCC Data Systems. No new types of hardware infrastructure are required to be procured or installed as a result of this change and, therefore, there is no foreseeable HSE impact. The proposed functionality will be accommodated within existing infrastructure which have already been subject to assessment.

3.8 Impact on Consumers

Consumers will not be impacted, but there will be benefits to the addition of this metadata, including considerations around Pre-payment and emergency credit calculations.

3.9 Modification Deliverables

The changed documents and deliverables for SECMOD0015 are as described in the table below.

Deliverable	Changes Required
SD4.1 DCC User Gateway Interface Design Specification	DUGIDS Updates required to Annex 4.
SD4.1.19 MMC XML schema	MMC Changes to support the new functionality
Communications Hub Detailed Specification (CHDS)	CHDS will be uplifted to include new commands with PIT Test Approach
Communications Hub Technical Specification (CHTS)	CHTS will be uplifted to include new commands with PIT Test Approach

Deliverable	Changes Required
Parse and Correlate Application	CRITICAL Software Changes: Use Case Specifications Test Approach Test Case Specifications Test Reports Installation Document Software Architecture Specification API Release Notes Traceability Matrix Release Notes
GFI Software	CRITICAL Software Changes: Installation Document, and Release Notes

4 Impact on Security

This section describes the impact the DCC considers SECMP 0015 will have on the Security of the DCC's Total System.

DCC has carried out a security risk assessment for SECMP 0015 and determined that there is no change to the security model as a result of the planned Modification.

5 Testing Considerations

This Impact Assessment includes the cost to develop and deliver this SEC Modification up to and including Pre-Integration Testing (PIT). This is subject to a PIT environment being available for this testing to be carried out. The Communications Hub change testing will be limited to PIT testing of the new functionality outlined in this Change Request as well as PIT regression testing. PIT System testing will consist of 2 cycles of testing of the new functionality delivered by this Change Request, plus 2 cycles of regression testing. A repeat of a subset of PIT System test cases will be conducted for DCC Test Assurance witnessing.

The cost for Systems Integration Testing (SIT) and User Integration Testing (UIT) will be determined once the full scope of the release that this SEC Mod is allocated to is finalised; the cost will apply to the release and not to an individual SEC Modification.

5.1 Framework and Testing Tools

This Modification will require the following changes to support CH testing:

- Update to testing framework to verify and validate the backward compatibility use cases
- Update to test support tools to support upstream and downstream mechanism limits / no limits

- Update the PIT meter Test Stub capability to assure the Modification Communication Hub software uplift

5.2 Reference Test Data Set (RTDS)

The RTDS data set will be updated with the following changes:

- New GBCS payloads for the use cases GCS13a, GCS13b, GCS13c, GCS14 and GCS60 run on a GPF. These payloads will include a mix of examples where the GPF returns the GSME timestamp (reliable date-time) and its own timestamp (unreliable date-time).
- Update of existing GCS60 payloads to include the Grouping Header date-time.
- New and updated DUIS and MMC examples for the service reference variants 4.1.1, 4.1.4, 4.1.2, 4.3, and 4.18 matching the payloads mentioned above.

Is assumed a change in the GBCS mapping table that sets the grouping header date-time field as mandatory for use case GCS60.

6 Implementation Timescales and Releases

This Modification is expected to be included in a SEC release. Implementation timescales will be agreed as part of the relevant SEC release Change Request.

6.1 Change Lead Times

From the date of approval (in accordance with Section D9 of the SEC), to implement the changes proposed DCC requires a lead time of: **13 months**.

6.2 Consideration against Other Changes

None currently identified.

7 DCC Costs and Charges

This section indicates the total quote for this modification.

Implementation Phases	Included in Quote?	Purpose
Design	Yes	The production of detailed System and Service designs to deliver all new requirements.
Build	Yes	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)	Yes	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)	No, not included	All Service Providers PIT complete solutions are brought together and tested as an integrated solution, ensuring all Service Provider solutions align and operate as an end-to-end solution.
User Integration Testing (UIT)	No	Users are provided with an opportunity to run a range of pre-specified tests in relation to the relevant change.
Implementation to Live	No	The solution is implemented into production environments and ready for use by Users as part of a live service. This service is subject to implementation costs.

The total quote for this work is **£569,530**.

7.1 Impact on Contracts and Schedules

It is not expected that there will be material changes to the contract as a result of this change. The actual changes will be assessed as part of the CAN.

There are modifications in the contract schedules required to support the changes in this Modification:

Schedule 2.1: For update to DSP Functional Requirements;

Schedule 2.3: he GBCS version in schedule 2.3 is to be updated

Schedule 6.1: Consideration for updates to DSP Milestones if this change is to be implemented outside of the standard release cycle;

Schedule 7.1: For updates to payments linked to milestones and Operational charges.

8 RAID and Clarifications

The detail below provides a summary of the risks, assumptions, issues, dependencies and clarifications observed during the production of a DCC Impact Assessment. DCC requests that the Working Group considers this section and considers any material matters that have been identified during this Impact Assessment phase. Any changes may impact the proposed solution, implementation costs and/or implementation timescales**.**

8.1 Risks

Ref	Risk Description
R-001	The revised CHTS and GBCS specifications will not be available to support this programme.
R-002	There will be a DCC delivery programme in place across Service Providers to support the development, testing and release of further change. If this assumption is not true, then this IA must be extended to include the aspects of the delivery programme necessary to oversee the delivery of changes to the solution. If this dependency is not met, there may be the following issues: • No programme support beyond PIT delivery; • Inability to run SIT on the updated CSP solution • Inability to promote into live service

8.2 Assumptions

DCC would like to confirm the validity of assumptions listed below with the Working Group. These assumptions have been used in the creation of this DCC Impact Assessment. Any changes to the assumptions may require DCC to undertake further assessment, prior to the contracting and implementation of this change**.**

Ref	Assumption Description	Assumption Accepted
A-001	This change is assumed to be delivered as part of a formal release (i.e. not expected to have a dedicated release for this change alone)	The quoted costs are for a standalone release, which means that some testing costs will be blended with the other testing costs for the release. Yes
A-002	The release in which this SECMOD would be implemented is assumed to be post Release 2.0. As such it is likely to be later than November 2018	Yes

Ref	Assumption Description	Assumption Accepted
A-003	To date Service User Simulator (SUS) changes in the PIT phase has not been subject to any formal testing; it includes unit testing only. The solution and the estimates presented here assume no changes to this approach.	Yes
A-004	No formal testing of SUS, including Factory Acceptance Testing (FAT) and System Integration Testing.	Yes
A-005	There will be no Liquidated Damages or Cross Liabilities incurred under this CR	Yes. No damages / liabilities other than those already part of the SEC
A-006	It is assumed that the costs of ZigBee and Commercial Product Assurance (CPA) certification will be covered in the SEC release CR. As such no certification costs have been included in this response.	Yes
A-007	This Modification will be supported on all Single and Dual Band Communications Hub variants including Debug and ITCH builds.	Yes
A-008	This Modification will also apply to RHCH.	Yes
A-009	It is assumed that there are no release management costs as these are not requirements of the CR. Any such activities will require reassessment.	Yes. Understand that release management costs are separate from individual Modifications.
A-010	It is assumed that when the test approach is finalised it will confirm which variants are expected to be tested and not each SKU. For example, 1 SBCH & 1 DBCH SIT would be tested rather than 1 SBCH SIT, 1 PIT, 1 UIT, 1 ITCH etc. If this assumption is not valid, then additional costs will need to be considered for the samples to be produced for each SKU. Costs beyond PIT are been included in this Modification.	Yes, anticipating that Comms Hub variant is subject to SIT, with possible exclusion that one of the three Toshiba SKU1 / SKU2 / SKU3 variants may be tested as a proxy for all three.
A-011	PIT System testing will be performed against stubbed ESME and GSME devices, and based on a subset of meter test cases.	Yes. Stubbing each of GSME that does & does not support this change
A-012	GCS60 does not currently require the date-time stamp' in the response. A change in the GBCS mapping table that sets the grouping header date-time field as mandatory will be required.	Yes
A-013	The MMC change is expected to impact only those use cases referred above	Yes

Ref	Assumption Description	Assumption Accepted
A-014	Modification delivery is assumed to take place at a point after Go Live of DCC R2.0. Note that this Modification cannot be part of R2.0 because this change is not incorporated within the DCC R2.0 technical specifications, and it would not be CPA-compliant.	Yes
A-015	It is assumed the implementation of this modification will be based on the firmware delivered by CR194 for single band devices and by CR184 for dual band devices	These are internal DCC CRs.covered in the November 2018 release. Yes. Understood from discussion with DCC to be the CRs forming the baseline upon which these changes are applied.
A-016	It is assumed that this Modification includes the development of functionality for all production and test variants available at R2.0 go live.	Yes
A-017	During PIT the following devices combinations will be tested: • Modification compliant test stub and complaint CH • Non- compliant test stub and complaint CH	Yes
A-018	If appropriate real world meters become available in the time window for this work that the DCC may incorporate them into the testing (minimising the risk of using emulators) via a change.	Yes
A-019	The GPF implementation will be backward compatible with non-compliant GSME by filling up missing time-stamp attributes with Communications Hub's own time-stamp.	Yes

8.3 Issues

None at this time.

8.4 Dependencies

There are some internal dependencies for this response.

Ref	Dependency	Dependency Accepted
D-001	The SUS integration requires the proposed changes to MMC changes to be made available as part of a published MMC schema version.	Yes

Ref	Dependency	Dependency Accepted
D-002	System Integration Testing (SIT) is dependent on Critical Software providing an updated version of the Parse and Correlate software	Yes
D-003	There is a dependency on the relevant changes being made to SMETS, CHTS and GBCS, (referred to as the Technical Specifications Group (TSG) specification documentation,	Yes
D-004	The changes required by this Modification are dependent on the changes being currently implemented in the scope of CR194 and CR234. Therefore implementation should be after the conclusion of the work on those two change requests. At this time, CR194 and CR234 are expected to be concluded in December 2018.	These are internal DCC CRs covered in the November 2018 release. Yes. Understood from discussion with DCC to be the CRs forming the baseline upon which these changes are applied.
D-005	Delivery of all the changes in the scope of CR194 and CR184. If the implementation of these CRs are delayed, there will be an impact on the delivery of this CR (213).	Yes
		Removed following discussion between DCC and SECAS (integrated with D-003)
D-007	There is a dependency on CPA security characteristics to be updated to align with the TSG specifications. If CPA is not updated to align with the new TSG specifications, then the change can't be delivered	Yes
D-008	There is dependency on having in place a delivery programme to deliver this CR up until PIT. Without a delivery programme coverage, this change can't be delivered	Yes

Ref	Dependency	Dependency Accepted
D-009	There is a dependency on DCC Live (DCC-L) to raise a release CR to CSPs for a yet to be defined maintenance release which includes at a minimum the following scope: • Defect management support; • SIT support including entry and exit criteria; • UIT support including entry and exit criteria • Appropriate certification to promote code into live; • Support hours during SIT / UIT phases; • Delivery governance and assurance; • DCC-L design and test governance Note this is identified as R-002 above.	Yes

8.5 Clarifications Required

None at this time.

Appendix: Glossary

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

Acronym	Definition
CH	Communications Hub, Comms Hub
CHDS	Communications Hub Detailed Specification
CHTS	Communications Hub Technical Specification
CR	Change Request
DCC, DCC-L	Data Communications Company, DCC Live
DSP	Data Service Provider
DUIS	DCC User Interface Specification
DUGIDS	DCC User Gateway Interface Design Specification
GBCS	Great Britain Companion Specification
GFI	GBCS Integration Testing For Industry
GPF	Gas Proxy Function
GSME	Gas Smart Metering Equipment
HAN	Home Area Network
IA	Impact Assessment
MMC	Message Mapping Catalogue
PA	Preliminary Assessment
PIT	Pre-Integration Testing
PPMID	Pre Payment Meter Interface Device
RTDS	Reference Test Data Set
SEC	Smart Energy Code
SIT	Systems Integration Testing
SMETS	Smart Metering Equipment Technical Specifications
SMHAN	Smart Meter Home Area Network
SR	Service Request
SRV	Service Request Variant
SUS	Service User Simulator
TOU	Time of Use (Tariff)
UIT	User Integration Testing