



Department for
Energy Security
& Net Zero

Smart Metering Implementation Programme

Communications Hub Exchange

Orchestration Guidance for TCSO only and
mixed TCSO/ new installations scenarios

V4.0 – 2 December 2024



Change Control Table

Version number	Revision date	Description
V1.0	14.06.2023	Draft reviewed by TSIRS and TCSO SG
V2.0	17.07.2023	Draft reviewed by TBDG
V3.0	21.08.2023	Final draft submitted to SECAS
V4.0	02.12.2024	'Orchestrations' and 'Annex A: Orchestration Sequence' sections updated



1. Aim

This Guidance Document aims to provide orchestrations developed for Trust Centre Swap Out (TCSO) Comms Hubs (CH) exchange scenarios covering:

- “Happy path” - all CH and non CH equipment working prior to CH exchange
- “non Happy path” – CH or non CH equipment not working due to non CH Device fault prior to CH exchange and therefore “install and commission” (I&C) would be used rather than TCSO for that equipment

The operational status of the old CH (the one that is being replaced) has no bearing on the majority of orchestrations in Appendix B, and where it does this is clearly highlighted.

2. Context

TCSO allows the Comms Hub (CH) to be exchanged whilst leaving existing devices operational and on the HAN without the need for re-joining/commissioning them (where they were operational to begin with). TCSO is native to all ZigBee Smart Energy devices (meters, IHDs, PPMIDs etc) and is enabled via GBCS allowing energy suppliers to send a series of service requests (SRs) to the DCC.

Orchestrations describe the sequence of Service Requests (SR) to achieve a given outcome. For the cases provided in the table, there are three main orchestration blocks of SRs: TCSO, I&C and decommission.

3. Prerequisites

Prior to installation it is important to check that all devices on the HAN are functioning as expected and on an appropriate latest firmware version. In addition, the check should ensure that the expected devices are in the CHF device log (e.g. there are not multiple GSMEs or PPMIDs which could be an indicator of a fault condition). There may be limited functionality in devices on site to check whether HAN devices are operable (e.g. the meter display may not indicate whether the meter is off the HAN). Installers are advised to check the status of all devices (noting that there may be consumer owned devices such as CADs etc too) in the CHF device log before going to site e.g. by remotely ascertaining which devices are working or not working, or by the installer having the ability to do so on-site, for example by:

- Checking CHF device log
- Reading FW version
- Other routine reads etc



There should be consumer engagement scripts/dialogue setting out the CH exchange process covering topics such as:

- confirming whether the consumer has any consumer devices on the HAN (e.g. CADs) that they are aware of and actively use¹ and ensuring they are on the HAN if possible
- the need for a consumer to be present/ not present

An Outage Alert will be generated when a CH is de-energised for more than three minutes and this may need to be managed by Suppliers and DNOs prior to de-energising the old CH to avoid unnecessary follow up actions.

The installer should check for the correct WAN LED sequence (as per CHSI, Useful References below) to indicate the new CH has birthed before sending any SRs. It may be helpful to send an SR to read CH FW version as a check (as suggested in Appendix B Orchestrations). Where the new CH does not birth the relevant exception process (e.g. SR 8.14.2 No WAN Install and Leave) should be followed.

There will likely be other operational aspects to consider, beyond the scope of this document, for example it may be necessary for the installer to have GSME seals to hand where there is an expectation that the battery cover on the GSME will be opened (e.g. to activate any GSME mode of operation to speed up receipt of GSME SRs post CH exchange).

4. Orchestrations

The table in Annex A sets out the sequence of orchestration blocks for different scenarios. The numbers in the table indicate sequence e.g. “1” denotes that the given orchestration block should be performed first. Under the ‘happy path’ scenario no I&C is required.

Where I&C of one or more non CH devices is required because the existing non CH device is not working, the non CH device that is not working should be Decommissioned first, including SR 8.11 “Update HAN Device Log (Remove)”, before any TCSO (so as to avoid loading a device log containing details of a non working device into the new CH). In addition, the install codes for any device added through SR8.11 will be required.

¹ where I&C of an existing consumer device is required then it should first be Decommissioned. Energy Suppliers and Other Users can Decommission CADs. The consumer should also have details of how to reset and install the device (e.g. install codes) to hand



There are a number of caveats:

- The table does not cover instances where “Leave HAN” (Security Sub-Committee Guidance on Device Security Assurance and Triage Use Case 3²) functionality is used as part of GSME I&C – changes to existing GSME I&C orchestrations may be needed in these cases. Performing CH exchange in a premises is a maintenance activity along with any relevant associated activity involving meters to support this. Maintenance is an energy supplier responsibility, and if they have any questions regarding maintenance and SSC triage use cases, they should raise them through SSC.
- Consumer devices such as CADs etc are assumed to be treated in the same way as IHD/ PPMIDs.
- Alt HAN devices (Bridges) are assumed to be treated in the same way as IHD/ PPMIDs.

5. Useful References

Other background documents detailing mainly “happy path” TCSO CH exchange:

- Business Architecture Document (<https://smartenergycodecompany.co.uk/design-notes/>)
- DCC Business Process Documents (<https://smartenergycodecompany.co.uk/design-notes/>)
- DCC Use of DUIS GN (<https://smartenergycodecompany.co.uk/design-notes/>)
- DUGIDS (<https://smartenergycodecompany.co.uk/design-notes/>)
- CHSI (<https://www.smartdcc.co.uk/media/1096/ch-supporting-information-v17-final.pdf>)

² <https://smartenergycodecompany.co.uk/device-security-assurance-and-triage/>



6. Annex A: Orchestration Sequences

Scenario			Orchestration Block							
			TCSO SRs		I&C SRs			Unjoin and Decommission SRs		
ESME	GSME	IHD/PPMID/CAD	New CH	GSME TOM	GSME	ESME	IHD/PPMID	GSME	ESME	IHD/PPMID
TCSO	TCSO	TCSO	1	2	-	-	-	-	-	-
NA	TCSO	TCSO								
TCSO	I&C	TCSO	2	-	3	-	-	1	-	-
I&C	TCSO	TCSO	2	3	-	4	-	-	1	-
TCSO	NA	TCSO	1	-	-	-	-	-	-	-
TCSO	TCSO	I&C	2	3	-	-	4	-	-	1
NA	TCSO	I&C								
TCSO	I&C	I&C	3	-	4	-	5	1	-	2
I&C	TCSO	I&C	3	4	-	5	6	-	2	1
TCSO	NA	I&C	2	-	-	-	3	-	-	1

Notes:

- Numbers in the table indicates sequencing of the three possible orchestration blocks (annex B includes details of SRs for each of the three orchestration blocks). Decommissioning of the existing CH has been omitted for clarity but is still required.
- NA indicates no SMETS2 meter present for that scenario
- Green shading indicates “happy path” TCSO only scenarios
- “-” denotes no orchestration SRs required
- For split fuel “happy path” TCSO only scenarios, the gas supplier will need to send the GSME TOM SRs once they receive the relevant alerts as set out e.g. in the DCC Process Document (see Useful References above), noting reliance of receipt of alerts
- For split fuel “happy path” TCSO scenarios where a meter stops working post TCSO, a follow up visit by the other energy supplier may be required. This may be evidenced by receipt of expected alerts such as N30 and N31 (e.g. those associated with the CH device log back ups) and lack of subsequent expected alerts (e.g. HAN rejoin alerts such as 8183 for ESME and 8F69 for GSME). Absence of a correct sequence of alerts may indicate error condition and measures outlined in Appendix C should be considered
- For split fuel scenarios with I&C for electricity or gas multiple visits may be required
- For scenarios where there is a Sub GHz GSME, the TCSO SR for Sub GHz GSME should be performed before other Sub GHz devices.



7. Annex B: SRs for Orchestration Blocks in Annex A

TCSO Happy Path Orchestration (uSmart orchestration based on BAD and DCC BPDs – other orchestrations may exist. Please consult BAD and DCC BPD for detailed sequence diagrams).

SRs to new CH	
11.2 [optional]	Read Firmware Version [to confirm new CH is birthed]
8.12.1	Restore HAN Device Log
8.12.2	Restore GPF Device Log
8.8.2	Unjoin Service (GSME to old GPF)
8.7.2	Join Service (GSME to new GPF)
If Gas Supplier:	
6.24.1	Retrieve Device Security Credentials (GPF)
6.21	Request Handover of DCC Controlled Device (GPF)
6.24.1	Retrieve Device Security Credentials (GPF – GNO)
6.21	Request Handover of DCC Controlled Device (GPF - GNO)



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8.7.2 [optional]	Join Service (GPF to PPMID) [may not work if PPMID still associated with old GPF, e.g. if SR 8.8.2 above failed]
8.7.2 [optional]	Join Service (Type 2 to GPF)
TOM Commands to GSME:	
1.1.1	Update Import Tariff (GSME)
(if prepay) 4.13	Read Prepayment Configuration
(if prepay) 2.1	Update Prepay Configuration
6.2.8	Read Device Configuration (Gas)
6.6	Update Device Configuration (Gas Conversion)
6.8	Update Device Configuration (Billing Calendar)
3.4	Update Supplier Name
8.3	Decommission Device [Old CH]
8.14.4 or 8.14.3	Communications Hub Status Update - No Fault Return or



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	Communications Hub Status Update - Fault Return [Old CH]
8.14.1	Communications Hub Status Update - Install Success [New CH]
5.1	Create Schedule

ESME I&C Orchestration

8.11	Update HAN Device Log
6.21	Request Handover of Device from DCC
8.1.1	Commission Device
8.14.1	Comms Hub Install Update (Success)
8.2	Read Inventory
6.24.1	Retrieve Device Security Credentials (DNO)
6.21	Request Handover of DCC Controlled Device (DNO)
8.7.2/8.7.1	Joins (based on Inventory response)
(if prepay) 2.1	Update Prepay Configuration



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1.6	Update Payment Mode
1.1.1	Update Import Tariff
4.4.2	Retrieve COM/T Billing Data Log
6.17	Issue Security Credentials
6.15.2	Update Security Credentials (Device)

GSME I&C Orchestration

*** existing: Ensure old GSME is removed, ensure leave HAN button is used**

New: Ensure old GSME is removed

8.11	Update HAN Device Log (Add)
6.21	Request Handover of Device from DCC (GSME)
8.1.1	Commission Device
6.24.1	Retrieve Device Security Credentials (GPF)
6.21	Request Handover of Device from DCC (GPF)
8.14.1	Comms Hub Install Update (Success)
8.2	Read Inventory



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6.24.1	Retrieve Security Credentials (GPF – GNO)
6.21	Request Handover of DCC Controlled Device (GNO)
8.7.2/8.7.1	Joins (based on Inventory response)
(if prepay) 2.1	Update Prepay Configuration
1.6	Update Payment Mode
1.1.1	Update Import Tariff
4.4.2	Retrieve COM/T Billing Data Log
6.17	Issue Security Credentials (GSME and GPF)
6.15.2	Update Security Credentials (Device) (GSME and GPF)

PPMID / IHD I&C Orchestration

8.11	Update HAN Device Log
8.2	Read Inventory
8.7.2/8.7.1	Join Device (based on inventory response)

Non CH Device Unjoin and Decommission – general sequencing prior to TCSO



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8.8.1/8.8.2	Unjoin Device (depending on other devices on site)
8.11	Update HAN Device Log (Remove)
8.3	Decommission Device



8. Annex C: SRs to aid debugging production incident.

After sending SR 8.12.1 if the ESME/ GSME has not sent Alerts 8183 (Device joined SMHAN) or 8F69 (Tunnel Established), it would be helpful sending SR 6.13 to CHF to read CHF event logs and SR 8.14.1 and attach the outcome of SR to any production incident raised.

If GSME is not responding SR 6.13 to GPF to read GPF event logs may be useful for debugging.

If the ESME, GSME joined successfully but any of the post commissioning steps fail, SR 6.13 to GSME or ESME to read the event logs may be useful for debugging.