

TBDG Design Note

Document Title:	Communications Hub Exchange ('Swap Out')
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Purpose of Paper*	<u>FOR INFORMATION</u>	<u>FOR COMMENT</u>	<u>FOR DECISION</u>	
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Summary of Document Purpose	To provide clarification and guidance on the exchange of an existing commissioned (and populated) communications hub in a premises.			
Submitted By	Peter Morgan, DECC		Meeting Date	December 2015
Document Status*	FIRST DRAFT	FOR REVIEW	TBDG DRAFT	TBDG APPROVED

*Delete as appropriate

Approval				
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1. Introduction

1.1 Summary of action required from TBDG

1. TBDG is invited to note this paper and that no changes are required to existing baseline documents (SMETS, CHTS, GBCS, DUIS) or the drafting of SEC.

1.2 Identification of the issue

2. This Design Note describes the steps that Suppliers will need to take to exchange an existing commissioned and populated (Gas Proxy Function contains data) communications hub and includes :
 - Pre-installation activities and notifications
 - Removing the old communications hub
 - Installing and commissioning the new communications hub
 - Establishing the HAN
 - Re-joining the devices in the premises to the HAN
 - Decommissioning the old communications hub
 - Post exchange activities

2. Background and Context

3. Smart meters are designed to be operated in conjunction with a WAN service which will transfer information between equipment in the home and DCC, for onward communication with DCC Users (Suppliers, network operators and other users).
4. Processes for installing and commissioning devices are central to their ability to be operated within DCC. These processes also establish Smart Metering Inventory relationships between devices and MPxNs (meter points).
5. A previous Design Note ('Install and Commission') has set out the steps required to install and commission devices at first install, and by implication metering devices where there is an existing functioning communications hub.
6. This Design Note provides detail on processes that all Suppliers and Meter Operators may follow when exchanging an installed and commissioned communications hub¹, in situations where the communications hub is non-functioning or functioning. Reasons for replacing the communications hub include: broken device; product recall; exchanging a single band device with a dual band device etc. This Design Note also recognises that there is scope for organisations to develop processes that suit their business requirements and does not seek to unnecessarily constrain innovation.
7. Processes that are not relevant to DCC (e.g. making an appointment with a customer) are not covered in this Design Note.

¹ Please refer to the Communications Hub Re-use Design Note for situations where a communications hub that has not been installed/commissioned is exchanged

8. The relevant section of the SEC for this Design Note is the SEC appendix “Inventory, Enrolment and Withdrawal Procedures”.
9. A communications hub comprises two functions: CHF (communications hub function) which is responsible for establishing the HAN and routing messages between devices on the HAN; and GPF (gas proxy function) that holds copies of data stored on the GSME.
10. The communications hub has two Device Logs – CHF (communications hub function) and GPF (gas proxy function). The CHF Device Log contains Device IDs of devices connected to HAN at the ZigBee level – it is also referred to as the “whitelist”. The GPF Device Log contains Device IDs of devices that request data from it: Type 2 (IHDs and CADs) and PPMIDs. As required by SMETS and CHTS the CHF and GPF Device Logs are automatically backed up to DCC (as per the relevant GBCS alerts and the associated use cases CS14 and GCS62) every time a device is added or removed. This backup contains Device IDs and other credentials relevant to Devices on the HAN. It is held by DCC in its inventory and is not a “viewable” data item, but it can be sent via a service request to a communications hub. The supplier will receive the N24 / N25 DCC alert for success/fail of DCC backup as well as the response to SR 8.11.
11. There are a set of actions that take place to exchange a communications hub, these include:
 - Back up any gas consumption data (subject to consumer consent) from the old communications hub (if possible)
 - Removing the GSME from the CHF Device Log of the old communications hub (if possible) which will clear the consumption data on the GPF
 - Notify DNO of power outage alerts generated when communications hub is removed²
 - Remove the old communications hub
 - Install and commission the new communications hub – this means that the communications hub has end to end communications with the DCC, i.e. is on the WAN and that a HAN has been established
 - Install the stored Han Device Log (from DCC) on the new communications hub Re-join GPF and GSME
 - Decommission the old communications hub

3. Communications hub exchange process

12. The DCC notifies the Installing Supplier (the Supplier exchanging the communications hub) that a communications hub needs exchanging (via Incident reporting, subsidiary document S8 Inventory Enrolment and Withdrawal Procedures).
13. Communications hubs are provisioned by the DCC and Suppliers (or their meter operators) will need to order (from stock) the replacement communications hub following DCC Order Management processes.
14. Using SR 4.8.1 (Read Active Import Profile Data³) and SR 6.13 (Read Event or Security Log) the Gas Supplier may retrieve consumer data and event logs from the old communications hub. The

² This can be achieved via the normal DNO power outage reporting telephone number.

Gas Supplier may back up the consumer data on the GPF in the old communications hub (if it is working and they have adequate opportunity and subject to consumer consent). There is no service request to transfer consumer data from the old communications hub to the new one.

15. If the old communications hub is functioning the Installing Supplier may use SR 8.8.1 Unjoin service to GSME to remove old GPF from GSME device log, which will also clear consumption data from the GPF (as per the “Remove CHF Device Security Credentials” command detailed in CHTS).
16. The Installing Supplier removes old communications hub.
17. The Installing Supplier physically replaces the old communications hub with the new communications hub.
18. The Installing Supplier installs new communications hub. Current communications hub designs visibly indicate that there is WAN connection. Should the communications hub fail to connect to the WAN, the Installer should follow instructions in DCC’s Communications Hub Support Materials. In the event of inability to connect to the WAN the installer will need to decide whether to abort the installation or follow the Install and Leave process (see No WAN Design Note). In all cases of WAN failure the Supplier should report an incident to the DCC in order for it to be resolved. If there is no WAN then restoring the Device Logs on the new communications hub will require an alternative solution (eg hand-held terminal).
19. The CSP checks that the communications hub is the communications hub it purports to be and if satisfied enables a WAN connection for the communications hub, at which point the DCC updates its smart meter inventory status to “Commissioned”
20. The Installing Supplier sends SR 8.12.1 Restore HAN Device Log to re-establish the HAN and subsequently SR 8.12.2 Restore GPF Device Log to restore the GPF Device Log, in each case stating the Device ID of the old and new communications hubs (see DUIS for further detail). Electricity and Gas Suppliers are allowed to send both commands. The resulting alert (N30/31) is sent to the Supplier that did not send the initial Service Request.
21. The DCC responds to the “Restore” service requests and sends the Device Logs (from the old communications hub) stored in its inventory to the new communications hub.
22. Devices on the HAN then re-establish HAN connectivity automatically through the ZigBee Trust Center Swap-out (TCS) feature (implemented in SMETS2 devices and communications hubs). This feature (described in ZigBee Smart Energy 1.2a) allows meters and other devices connected to the HAN to re-establish HAN connectivity automatically on communications hub exchange without the need for any manual intervention. The Installing Supplier is required to check this and in some cases may need to use the SMETS Interface Commands: Find Smart Metering HAN and Re-establish Communications Links (SMETS refs: ESME – 5.6.2.6, GSME – 4.5.2.8) to force meters to re-establish communication with the HAN. As per SMETS (“Physical requirements”) a device alert (GBCS alert 0x8183) is sent to suppliers when devices establish HAN connectivity.

³ This service request also retrieves gas data, despite its name.

23. If not done so already, the Installing Supplier sends SR 8.8.1 Unjoin service to GSME to remove old GPF from GSME device log.
24. The Installing Supplier is responsible for updating the Device Log on the gas meter with the new GPF Device ID. The Installing Supplier sends SR 8.7.1 Join Service to GSME to join GSME and GPF by writing GPF credentials into GSME device log. The Join and Unjoin Service Request for the GPF / GSME is supported by the Service Request for the electricity Supplier as well as the gas Supplier. As per SMETS 1.58 section 4.5.1 GSME shall be capable, immediately upon establishment of a Communications Link with a GPF of providing data to the GPF. The electricity Supplier is able to submit the unjoin/join commands to the GSME for the GPF.
25. Installing Supplier sends SR 8.3 to decommission the old communications hub using the old communications hub Device ID (for the old communications hub to be marked as 'decommissioned').

4. Post exchange activities

26. The Installing Supplier ensures that the old communications hub is returned using the relevant DCC process and sends a SR8.14 Communications Hub Status Update (where applicable for the old and new communications hubs).
27. DCC is responsible (via Incident reporting, subsidiary document S8 Inventory Enrolment and Withdrawal Procedures) for notifying the Gas Supplier that the communications hub has been exchanged. The Gas Supplier may infer that the GPF has been replaced.
28. The Gas Supplier sends two SR6.21 Request DCC device handover requests, one for the Supplier credentials (Key Agreement and Digital Signature) and one for the Network Operator credentials (Key Agreement and Digital Signature)⁴. These commands have anti-replay protection and therefore one may fail if they are sent at the same time (one after the other) but arrive out of sequence. DUIS does permit more than one type of credential per SR 6.21 request, so both the Key Agreement credential and the Digital Signature credential can be updated within a single SR 6.21. The Gas Supplier will not do this while the Installing Supplier is on site (unless they are the same but that is only a subset of scenarios).
29. The Gas Supplier undertakes post commissioning obligations⁵ (PCO) on the GPF for re-issuing the device credentials using two SR 6.17 Issue Security Credential commands, one for the Key Agreement credential and one for the Digital Signature credential. These commands have anti-replay protection and therefore one may fail if they are sent at the same time (one after the other) but arrive out of sequence. The order of execution is not important. Once the SR 6.17 commands have been executed, the certification signing request is signed by SMKI and then updated on the device using SR 6.15.2 Update Security Credentials (Device). The Gas Supplier

⁴ This is because both the Supplier (KA + DS) and Network Operator (KA + DS) credentials need to be updated from DCC ACB credentials which are on the CH GPF as installed. Therefore, the Supplier cannot update the NO credentials to be the NO (as they are DCC ACB credentials) without doing a SR 6.21 for Supplier and a SR 6.21 for Network Operator. The first SR 6.21 would replace the DCC ACB credentials for the two Supplier credentials (KA and DS) and the second SR 6.21 would replace the DCC ACB credentials for the two Network Operator credentials (KA and DS) with Supplier credentials

⁵ These can be found in the SEC appendix "Inventory, Enrolment and Withdrawal Procedures"

will not be doing this while the installing Supplier is on site (unless they are the same but that is only a subset of scenarios).

30. The Gas Supplier sends SR6.15.1 to update Network Operator credentials on GPF.
31. The DCC will then validate the recovery key on the GPF as part of its PCO as well on the new GPF.
32. The Gas Supplier re-applies the tap off mechanism (TOM) commands below to the GSME for the new GPF to update. Sending a TOM command to re-apply the current values on GSME will cancel any future-dated commands of the same type on the GSME. Hence any future dated commands will then also need to be re-applied:
 - Set Tariff on GSME (SR 1.1)
 - Update Prepayment Configurations on GSME (SR 2.1)
 - Send Message to GSME (SR 3.1)Set CV and Conversion Factor Value(s) on the GSME (SR 6.6);
 - Set Billing Calendar on the GSME (SR 6.8);
 - Write Contact Details on GSME (SR 3.4)
 - Set Price on GSME) (SR 1.2)
33. The following TOM command does not need to be sent on communications hub exchange:
 - Clear ZigBee Device Event Log where the Command is addressed to the GSME (SR 3.3)
34. SR 3.2 Restrict Access For Change Of Tenancy is not a TOM command but consideration needs to be given if it needs to be applied to the data that is transferred from the GSME to the GPF on communications hub exchange.