DCC Boxed

Customer Survey Briefing Pack

DCC Boxed enables true end-to-end testing across the entire DCC ecosystem from DCC User Interface Gateway to the device set. You can prove and optimise your solutions end-to-end enabling earlier identification and more efficient triage of defects, reducing testing costs and "false start" deployments. This enables optimisation of orchestration reducing install failures and times and supports accurate real time simulation of installation events in a training environment. This pack contains further details.

March 2021

DCC Public

Topic

DCC wishes to gauge expressions of interest for DCC Boxed

Proposal

We've been developing an internal test tool which could perform a range of functions for DCC customers. We're proposing to develop it into a tool-kit to be made available for DCC Customers. This briefing pack aims to provide you with the information you need so that we can capture your feedback on this product. We'd really value your help to complete this survey so that we can gauge interest.

Action Requested

Please complete this DCC Survey with your expression of interest
https://forms.office.com/r/7D5RMJfm72

Introduction: Why are we conducting this survey?

DCC Boxed
SURVEY
MARCH

DCC Boxed
ENGAGE
APRIL

DCC Boxed
SHARE
OUTCOMES
MAY

DCC Boxed
NEXT STEPS
JUNE

DCC has a development tool called DCC Boxed. We believe Customers would find this useful. This survey aims to provide briefing information to as many DCC Customers as possible on:

o **Why** we developed DCC Boxed
o **What** DCC Boxed is and how it could be useful for you
o **When** this could be available for you, depending on regulatory approach
o **How** much this could cost - for DCC Users only, proposed pricing models and cost information will be shared for full transparency

Results of this survey will determine next steps for DCC Boxed.
Please respond to the survey through Microsoft forms here https://forms.office.com/r/7D5RMJfm72

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Approach: Engagement to determine your interest in having DCC Boxed

DCC Boxed SURVEY MARCH

DCC Boxed ENGAGE APRIL

DCC Boxed SHARE OUTCOMES MAY

DCC Boxed NEXT STEPS JUNE

DCC will gather survey results via Microsoft Forms online questionnaire.
This is a survey to validate expressions of interest: so we encourage **early responses**.
We will focus on comunicating the usefulness of DCC Boxed to a wide and representative group of customers.

We will engage with you via:
- This Briefing pack
- Online Webinar in April
- Bilateral briefing on request

Consistent information will be made available to all who express interest. DCC will publish updated FAQ's received and provided during the survey period if required.

Outcome – at the highest level, by June

What would constitute "sufficient interest?"

As a minimum, in order to proceed, survey results should demonstrate demand for 35 units per annum for 5 years.

Sufficient Customer interest to proceed?

Insufficient Customer interest to proceed?

- o Proceed to capture DCC Boxed additional requirements;

- o Recommended Regulatory vehicle;

- o Publish Cost Benefit Analysis informed by expressions of interest received & survey results;

- o Project Plan timeline for delivery.

- o Tools already developed to be retained for internal use only.

- o Suspend further activity to make DCC Boxed available for use by DCC Customers or SEC Parties;

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This briefing pack

Slides 7 – 14 provide information on why DCC developed DCC Boxed and what it is at high level in addition to some FAQ. Further technical information (including product specification) is in Appendix 1.

If you are interested in DCC Boxed but NOT currently a DCC User, (e.g. SMIP Device Manufacturer), it would be helpful if you could provide an expression of interest based on a likely indicative cost per unit of circa £5.5K.

Slides 15 – 22 explore different regulatory approaches DCC could take if there are sufficient expressions of interest to make DCC Boxed more widely available. DCC anticipated interest from Customers in having DCC Boxed during 2021. Therefore, three regulatory approaches are considered in terms of how swiftly they could be implemented (with appropriate accompanying transparency of process for DCC Customers). DCC User views on preferred option will shape regulatory approach and the likely 'earliest date' that DCC Boxed could be made available for DCC Users and SEC Parties.

Slides 23-31 onwards are for DCC Users ONLY.   These slides will not be provided to other parties. Three funding models options are summarised, and following slides provide additional detail on the cost model supporting each of these as we are actively seeking responses on this point from those who pay DCC charges.

Why was DCC Boxed developed?

DCC Boxed builds on a current DCC development tool called 'GFI'. This acronym stands for GBCS Integration Testing for Industry, often shortened and referred to by industry as GFI. It is made available by DCC to share its interpretation of the Great Britain Companion Specifications (GBCS) for SMETS 2 (Smart Metering Equipment Technical Specification) electricity and gas meters.

DCC now has an enhanced or expanded GFI to help our DCC Users, SMIP Device Manufacturers, and in future other parties to develop services and products that use existing and newer DCC capabilities such as the new SAPC (Standalone Auxiliary Proportional Controllers) devices and auxiliary load control Service Requests across the Smart Metering ecosystem. This capability plays a key role in Demand Side Response management as part of the wider accelerated agenda to reduce carbon emissions and supports the accelerated rollout of Electric Vehicles with its associated smarter charging infrastructure.

This product is unique to DCC and we believe it is of use to DCC Users, SMIP manufacturers and, in future, other parties.

What is DCC Boxed and why should I be interested in it?

DCC Boxed provides a simulated DCC environment - an informal development or testing environment.

DCC believes this tool could be useful for any party who uses DCC Service Requests or those who manufacture devices for use as part of Smart Metering Systems.

DCC Boxed is a more user friendly and 'complete' design proving tool which can demonstrate:

- How to SMKI (Smart Metering Key Infrastructure – certificate Signing Requests / Device Certificates)
- How to Parse and Correlate (Learn the Language of Smart Metering)
- How to compose DUIS messages that can be successfully sent and received
- How SMETS 2 Devices and the GBCS operate to send and receive Service Requests, and to send and receive alerts from devices.
- How your 'real' devices interact with other simulated devices (Zigbee sticks can be used interchangeably with real devices).

We believe DCC Boxed could provide more flexibility for you, e.g. with:

1. **'Pipe Cleaning' before formal testing**: When there is a new GBCS and DUIS Release, early 'design proving' work could help DCC Users, Adaptor Providers and SMIP Device manufacturers to identify defects in their software, systems or devices, earlier in the development cycle for any particular DUIS Release.

2. **Training / Familiarisation:** If you wish to familiarise yourself, your team, or a Service Provider with a forthcoming DUIS Release or GBCS version as and when it is convenient, rather than needing to align this to scheduled time in DCC testing environments, DCC Boxed offers demonstrations of how the end-to-end process is designed to work.

3. **Firmware Testing:** You could use DCC Boxed to support early firmware testing when you receive new firmware versions or new devices from your device manufacturers, e.g. SAPC capability, live since November 2020

In this way, DCC Boxed (aligned to forthcoming GBCS and DUIS Release) could assist with early 'debug' capability that facilitates 'pipe-cleaning' of your forthcoming business processes and devices.

Over time, how could DCC Boxed evolve?

DCC can see a wealth of applications for DCC Boxed. For this 'first concept' product, we picked core aspects to deliver useful functionality at modest cost. We strongly believe that this product as a 'design proving' tool facilitates understanding by demonstration rather than reading the technical specification documents.

We hope we have communicated the 'swiss army tool' nature of DCC Boxed: it provides a more comprehensive sandpit environment to enhance understanding of how DCC is designed to operate.

DCC Boxed is one 'root' product that could serve or support multiple purposes. If sufficient interest is expressed to proceed to make this available to DCC Users and SEC Parties, additional requirements for DCC Boxed can be identified to support service optimisation, defect triage, as well as enhanced firmware testing for devices.

In addition, DCC Boxed would be a helpful tool as activities to enable the decarbonisation agenda intensify and the electric vehicle market accelerates in the lead up to the ban in production of petrol and diesel cars 2030.

If you would like additional technical information:

o   Please see the Product Specification, Use Cases and further information in Appendix 1

o   We've captured the answers to some frequently asked questions in slides 11 and 12 below.

Frequently Asked Questions

Q: Why has DCC developed this product now?

A: DCC looked into enhancing GFI following the introduction of new **SAPC (Standalone Auxiliary Proportional Controllers) devices in 2020.** Activity was pared back in 2020, as DCC was directed towards immediate delivery priorities. An internal prototype was developed at modest cost with the intention that DCC would share details at the earliest opportunity to gauge expressions of interest with DCC Customers for further development.

Q: How is DCC Boxed different from the existing GFI product?

A: We call this DCC Boxed as it enables true end-to-end testing across the entire DCC ecosystem from the DCC User Interface Gateway to the device set, whereas GFI focuses on GBCS and devices. Details on the incremental enhancements that DCC Boxed provides over GFI are in Appendix 1.

Q: I'm interested but that depends on the price. What is the indicative price?

A: The indicative price depends on DCC User decision. The price will depend on the charging arrangements we'll include in the SEC, but up to a maximum of c£5.5k per unit.

Note: DCC could explore an option whereby DCC Boxed units could be available 'for hire' for eligible organisations interested in using DCC Boxed but unable to afford to purchase.

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Frequently Asked Questions

Q: **What would constitute "sufficient interest" in DCC Boxed from DCC Users, Device Manufacturers and SEC Parties?**

A: We aim for this survey to demonstrate indicative demand for 35 DCC Boxed units per annum for 5 years.

Q: **Will DCC Boxed replace GFI?**

A: That will depend on Customer feedback and expressions of interest; any decision to replace GFI would be signposted well ahead of time.

Q: **I already have processes in place which use GFI and Wired ITCH to meet my development needs. What additional benefit would DCC Boxed provide to me that I don't already have?**

A: SMKI, DUIS (and maybe an Adaptor service) would be missing from that test set up. Joint development of DCC Boxed could capture your prioritised future needs in terms of service and/or device development. DCC believes this will be an important priority for a wide group of DCC Users and SEC Parties as Britain moves forward with the decarbonisation agenda.

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Frequently Asked Questions

Q: Can DCC Boxed work with Test Communications Hubs from both TEF and ARQ?

A: DCC Boxed works with all test comms hubs that are using the ZAZ1 test certificate pack. You can use the comms hub driver (GFI dongle) to connect to the physical communications hub and it will route traffic through to it using a Hand-Held Terminal connection. An integration option for the ARQ and WNC Comms Hubs, similar to that already in place for the Wired ITCH Toshiba Communication Hubs could be costed and explored as a phase 2 development.

Q: Would you consider offering Wired ITCH along with DCC Boxed?

A: DCC Boxed is not yet available, the decision to do so is subject to expressions of interest received from this survey. The Wired ITCH is an established product with a wider scope than DCC Boxed Customers. DCC could review whether there are any efficiencies to be gained by offering DCC Boxed with Wired ITCH.

Q: Would this tool enable debug logs from production Communications Hubs?

A: DCC Boxed will not allow you to see debug logs from production Communication Hubs, all the logging functionality and traffic sniffing capability applies to test (ZAZ1 certificate) devices.

Frequently Asked Questions

Q: Why is the indicative price per unit slightly different to information shared/circulated on 1st March?

A: New information, additional RAM is required which slightly increases the unit cost by approximately £100.

Q: What is driving your timeline DCC ?

A: We believe that Customers would want DCC Boxed asap. If not, we are happy adjust the development pace and take more time.

Q: What if my organisation is just not interested in this kind of design proving tool?

A: DCC believes every DCC User could benefit from DCC Boxed and we'd love to discuss this with you. If you're not interested, then the option of providing DCC boxed through an explicit charge means you'd bear no development or ongoing costs for its provision.

Q: Could DCC Boxed replace SMDA? (Smart Meter Device Assurance Scheme)

A: No, SMDA is a formal assurance process. https://smda-scheme.co.uk/. We think it could support your development and test cycles in readiness for SMDA.

Frequently Asked Questions

Q: Why are we undertaking this survey with you?

A: Following engagement at SEC Operations Group, TABASC, TDEG and a DCC briefing on 1st March, you said you felt it would be prudent for the DCC to survey to gain a wider, representative view of customer interest.

When could DCC Boxed be available?

Potential regulatory options which support delivery, if sufficient expressions of interest are received.
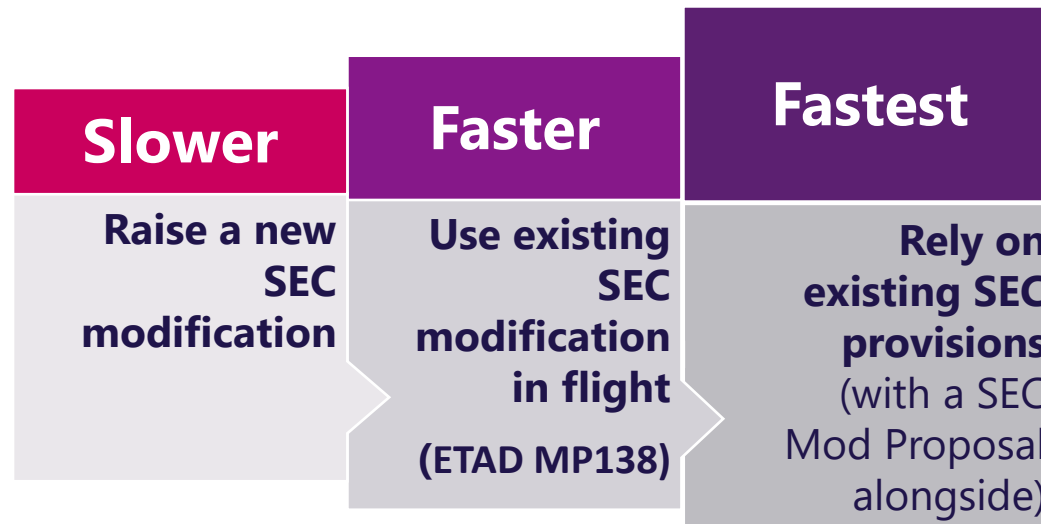
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When?

What are the regulatory routes to delivery?

DCC believes there will be expressions of interest for DCC Boxed in 2021 and so there is merit in exploring regulatory options which support making DCC Boxed available this year.

All options require a change to the charging statement which carries a three-month lead time.

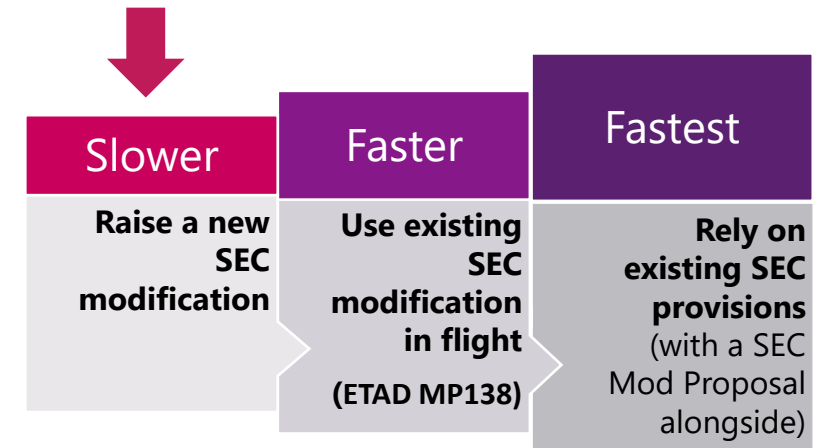Each option requires a SEC Modification at some stage. At summary level:

Slower	Faster	Fastest
Raise a new SEC modification	**Use existing SEC modification in flight** **(ETAD MP138)**	**Rely on existing SEC provisions** (with a SEC Mod Proposal alongside)

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Option 1 – DCC to raise new SEC MP

DCC to raise a new SEC modification for DCC Boxed as a new service; to update K7.5 and ETAD/Section H14 of the SEC.

Timeline for SEC modification approval is dependent on SEC governance process.

If the modification is approved, a further three-month lead time would be required before any Explicit Charge in the Charging Statement could come into effect.

Slower	Faster	Fastest
Raise a new SEC modification	**Use existing SEC modification in flight** (ETAD MP138)	**Rely on existing SEC provisions** (with a SEC Mod Proposal alongside)

Pros:

o Simplicity – fresh SEC modification following the established route to approval and delivery.

Cons:

o We expect the mod process controls the critical path – DCC Boxed could be ready for use much sooner.

o Opening the charging statement would commence after SEC modification approval.
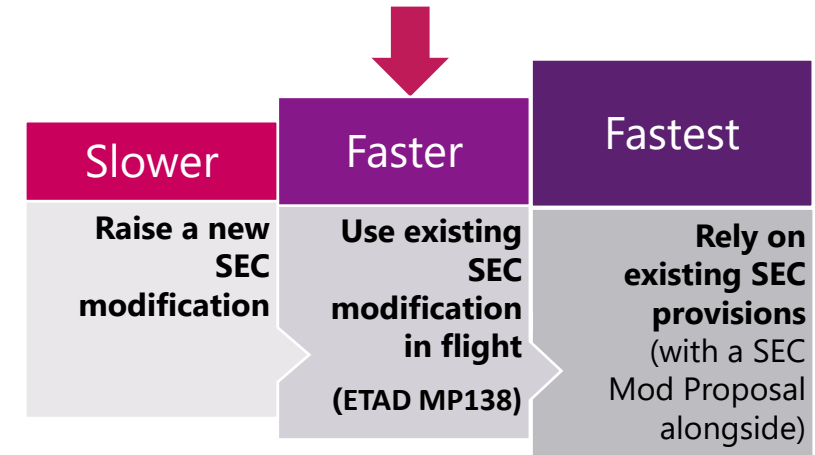
Option 2 – DCC requests amendment to SEC MP 138 scope

Slower	Faster	Fastest
Raise a new SEC modification	**Use existing SEC modification in flight** (ETAD MP138)	**Rely on existing SEC provisions** (with a SEC Mod Proposal alongside)

DCC could request to amend SEC Modification "DCC Service Testing in ETAD" MP138.

This SEC Modification Proposal aims to update SEC testing approach documentation to include Device Manufacturer-related testing services, and to validate with this documentation industry to ensure these services are fit for purpose.

DCC is proposing that four Testing Services are added to the Enduring Testing Approach Document (ETAD) and that the appropriate charging arrangements are added to the SEC. The four Testing Services under consideration are:

1. Interoperability and Innovation Events

2. GBCS for Industry (GFI)

3. Radio Frequency (RF) Noise

4. Wired Instrumented Test Communications Hub (ITCH)

DCC would update the ETAD and Section H14 of the SEC to classify DCC Boxed service as a type of GFI testing tool.

DCC would reopen the Charging Statement for the Regulatory year ending 31 March 2022 and introduce a new Section K7.5(m) 'GFI Testing' Explicit Charge.

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Option 2 – DCC requests amendment to SEC MP 138 scope

Slower	Faster	Fastest
Raise a new SEC modification	**Use existing SEC modification in flight** (ETAD MP138)	**Rely on existing SEC provisions** (with a SEC Mod Proposal alongside)

This option is dependent on the progress of the MP138 mod and associated timings and approval of the proposed amendment.

Expected approval date of the modification is currently uncertain.   There would be an additional three-month lead time before any Explicit Charge in the Charging Statement would come into effect.

Pros:

- Amending a SEC Modification already in flight *could* speed up delivery, if DCC Users agree DCC Boxed could be added as an acceptable addition to scope to achieve the wider SEC Modification purpose.

Cons:

- Potential for delay if the SEC modification amendment is not supported for any wider reason.

- This could adversely affect SEC MP 138 delivery

- We expect the mod process controls the critical path – DCC Boxed could be ready for use much sooner.

- Opening the charging statement would commence after the SEC modification approval.
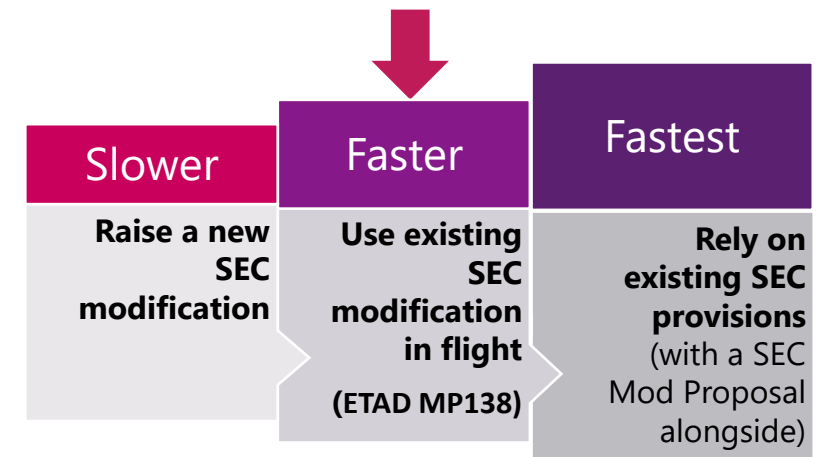
Option 3 – Rely initially on existing SEC Provisions, amend Charging Statement to show explicit charge

Slower	Faster	Fastest
Raise a new SEC modification	**Use existing SEC modification in flight** (ETAD MP138)	**Rely on existing SEC provisions** (with a SEC Mod Proposal alongside)

DCC Boxed classified as an 'Additional Testing Tool' under K7.5(i) of the SEC and as an Explicit Charge:

K7.5(i)

('additional testing support') an obligation to pay arising during that Charging Period from the acceptance by that Party of the charges offered by the DCC to provide additional testing support to that Party pursuant to Section H14.33 (Device and User System Testing

DCC would reopen the Charging Statement for Regulatory year ending 31 March 2022. The Charging Statement currently sets out the charge as a line item as follows:

SEC ref	Service	Indicative explicit charge	unit
K7.5 (i)	Additional testing support	£700 - £1,350	Per consultant, per day

DCC would introduce an additional line to sit alongside the existing offer of consultant support as follows (in italics):

| SEC ref	Service	Indicative explicit charge	unit
K7.5 (i)	Additional testing support	£700 - £1,350	Per consultant, per day
K7.5 (i)	*Additional testing support*	*£xxxx (depending on financial model chosen)*	*Per DCC testing software unit provided*
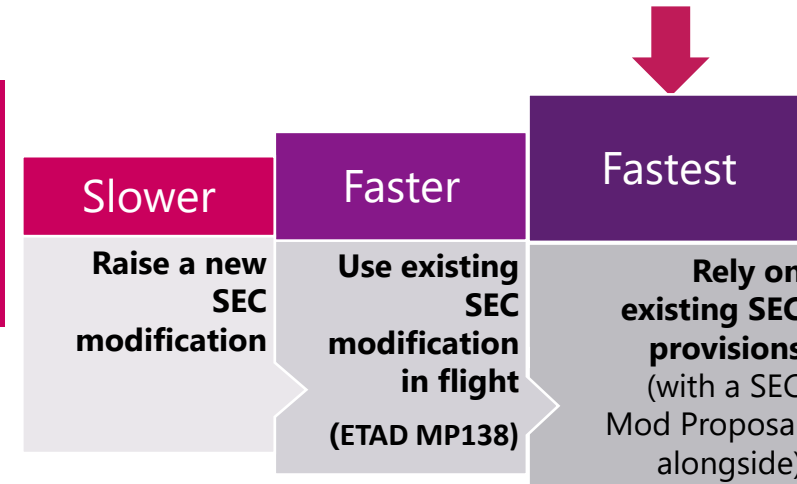
Option 3 – Rely initially on existing SEC Provisions, amend Charging Statement to show explicit charge

Slower	Faster	Fastest
Raise a new SEC modification	**Use existing SEC modification in flight** (ETAD MP138)	**Rely on existing SEC provisions** (with a SEC Mod Proposal alongside)

Paragraph 129 of Section 15.7 of the Charging Statement would be amended as follows:

129 Testing Participants may request, pursuant to Section H14.33 of the SEC, reasonable additional support to that Testing Participant associated with;

o *the DCC Total System and the results of such Testing Participant's Device and User System Tests*

o *the Systems of the Testing Participant that are (or are intended to be) User Systems*

o *communications between the DCC and any Device or between Devices which comprise (or which the Testing Participant intends will comprise) a Smart Metering System. This could be in the form of consultant support, provided on a day-rate basis, or per instance of DCC testing software provided.*
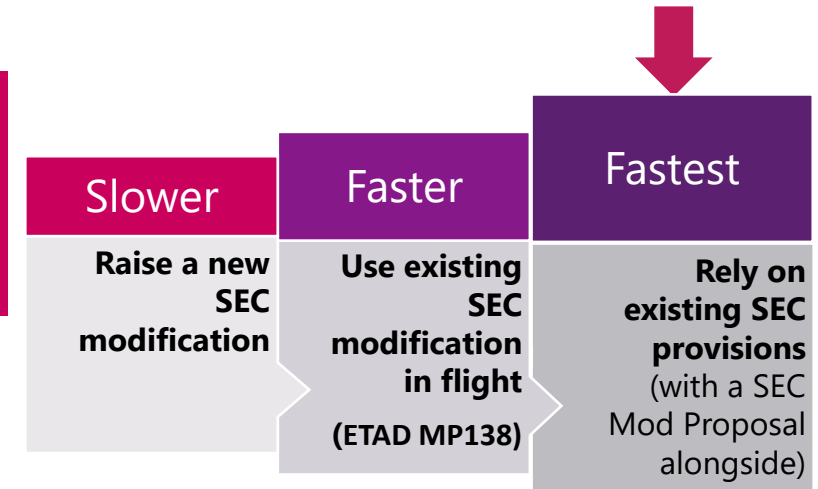
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Option 3 – Rely initially on existing SEC Provisions, amend Charging Statement to show explicit charge

Slower	Faster	Fastest
Raise a new SEC modification	**Use existing SEC modification in flight** (ETAD MP138)	**Rely on existing SEC provisions** (with a SEC Mod Proposal alongside)

This option would not require a SEC modification but would have a three-month lead time before the change in the Charging Statement would come into effect.

While this option provides the quickest way to make the product available (and in particular ahead of the SEC November 2021 release), we will only proceed down this regulatory route if there is strong customer support and would look to follow it up in due course with a SEC modification so that DCC Boxed is explicitly referred to in the SEC.

Pros:

- A SEC Modification proposal could run alongside this vehicle and therefore would not control the critical path – but this could only be acceptable if there is significant DCC User support.

- Opening the charging statement could commence as soon as possible after survey results demonstrating significant DCC User support have been received.

Cons:

- This vehicle was not specifically designed for tools (rather consultancy services) and DCC Boxed is not limited to purely addressing testing issues (which was the initially intended purpose of H14.33)
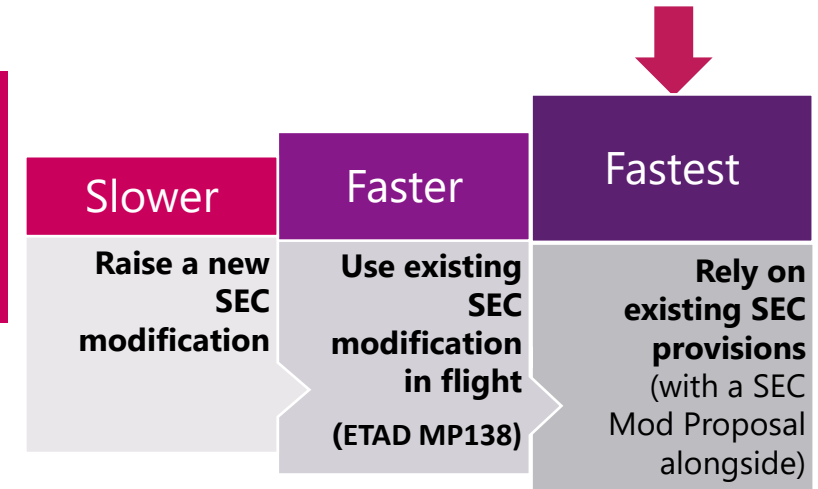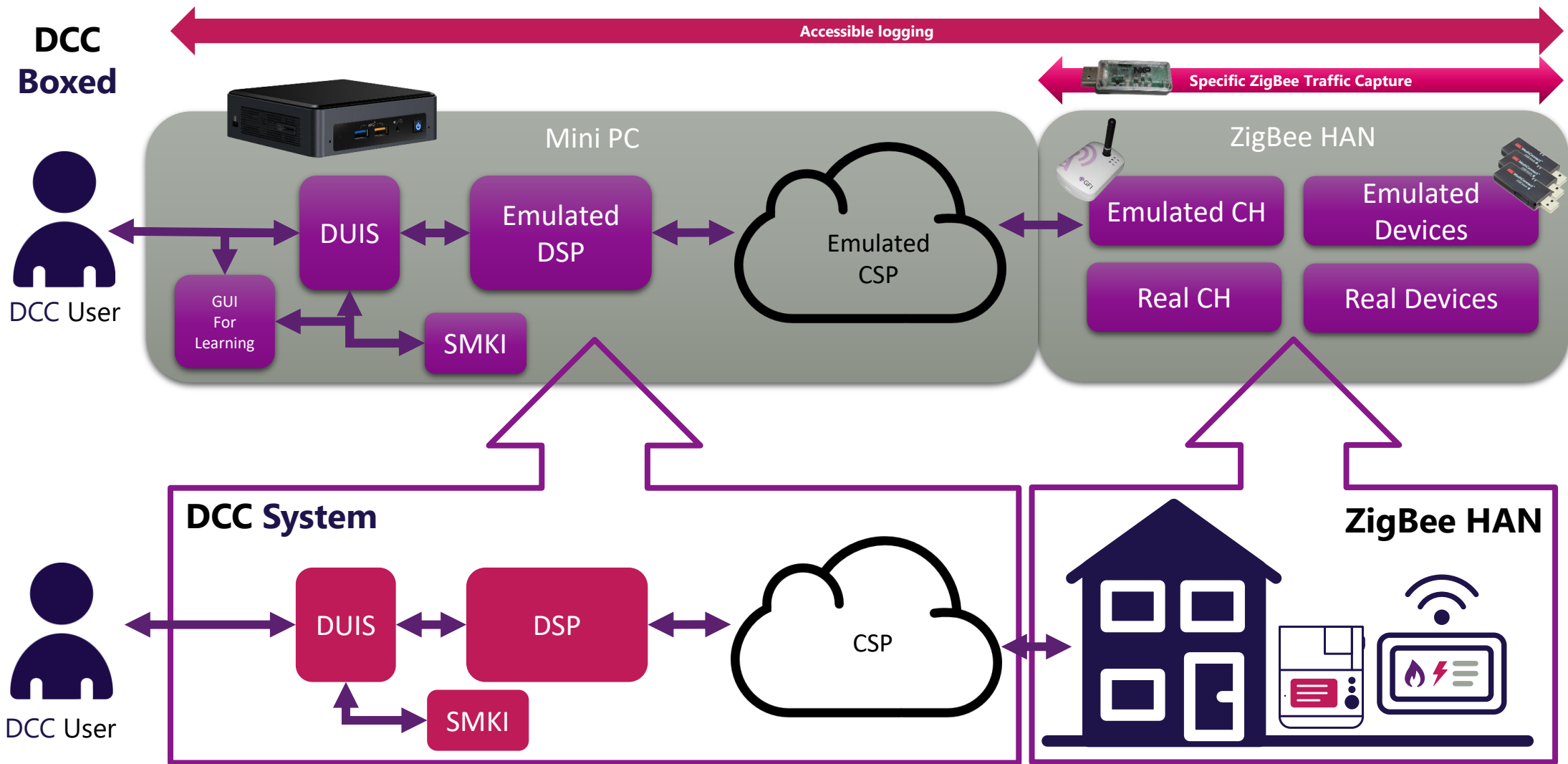
Thank you

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APPENDIX 1

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DCC Boxed and how it represents the end-to-end DCC system

DCC Boxed

Accessible logging

Specific ZigBee Traffic Capture

Mini PC

DCC User

DUIS
GUI For Learning
Emulated DSP
SMKI
Emulated CSP

ZigBee HAN

Emulated CH
Emulated Devices
Real CH
Real Devices

DCC System

DCC User

DUIS
DSP
SMKI
CSP

ZigBee HAN

What's in the Box

Additional

Standard Kit Included

Images are for illustration only. Actual product may vary.

The kit includes:

- A mini-PC – To run DCC Gateway and SMKI interface
- ZigBee Traffic Sniffer
- A USB hub with 8 ports
  (*This is all Pre-configured Kit*)

Additional items:
Zigbee USB Sticks – These are available to emulated devices. The following functions are currently scoped:
- o ESME
- o GSME
- o HCALCS
- o CAD
- o IHD
- o PPMID

A GFI Comms Hub

DCC Boxed Use Cases for all DCC Users

DCC Boxed can enable testing of new versions of GBCS and DUIS for every DCC Boxed customer
So that DCC Boxed customers are informed about the changes, can get some time interacting with them and understand impact on their systems / processes – it also offers the possibility of early bug identification.

DCC Boxed can enable development and testing of DCC adapters
So that Adaptor providers can create changes to support upcoming releases before go live, prototype new functionality and generally be more informed.

DCC Boxed can train newcomers to the SMIP programme
So that new staff can quickly be brought up to speed and understand the ecosystem

DCC Boxed can demonstrate end-to-end communication with the SMIP
So that stakeholders understand the full ecosystem and its component parts

DCC Boxed Use Cases for all DCC Users

DCC Boxed can facilitate the testing of new scenarios
So that more eventualities can be prepared for and managed/mitigated in advance

DCC Boxed can support analysis when assessing impact of changes on the end-to-end system
So that when changes do occur they are better prepared for and managed

DCC Boxed can facilitate understanding of how the SMIP HAN works
So that stakeholders are more informed and can make better decisions

Other Use Cases

DCC Boxed can facilitate training for suppliers and device manufacturers
So that supply chains and partnering firms can use representative systems in the production of their products and services e.g. training can be performed against a system that is representative of DCC rather than an approximation.

DCC Boxed can facilitate field force training such as for meter installers
So that installers can be more informed and effective in day-to-day roles by honing procedures and understanding the importance of sequencing in commissioning flows

DCC Boxed can enable the study and development of GBCS devices
So that devices can be more efficient and smartly developed, with fewer issues and higher quality.

Other Use Cases

DCC Boxed can enable the study and development of DUIS/ MMC protocol stacks and tools with hardware in the loop

So that there is a joined-up view between our user interface DUIS and devices, currently we focus on either DUIS or Device and then see the result of integration in our regulated environments, having an end-to-end system would help all parties understand.

DCC Boxed can enable the study and development of Zigbee SEP devices, compatible with SMIP

So that devices can be more efficient and smartly developed, with fewer issues and higher quality. We will be able to see effects (in real time) of devices within the HAN e.g. message flows, issues etc.

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Expansion from GFI

What can GFI do	How can DCC Boxed do this better	What new functionality DCC Boxed offers
Software emulated ESME,GSME, IHD, PPMID, CAD and HCALCS messages	ZigBee hardware enabled Device Emulators	Other Emulated Device emulation (e.g. SAPC, CAD with MQTT)
GBCS only	GBCS, SMKI & DUIS	GBCS Inspector SMKI Service DUIS API and GUI
CH Emulation	Emulation & Real Devices (ZAZ1)	Real Devices (ZAZ1) & Emulated Mix and Match i.e. Toshiba Wired ITCH
Graphical User Interface	Enhanced Graphical User Interface	New Graphical Interface with built-in help functionality
HAN is independent of the test tool	HAN is part of the test tool	Multiple HAN support

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DCC Boxed

Product Specification

Version:	**V1**
Date:	**26/03/2021**
Author:	**DCC**
Classification:	**DCC Public**

Table of Contents

1. Introduction

DCC has worked with Critical Software to expand GFI into a new internal product called DCC Boxed. This product aims to emulate the full end-to-end SMIP ecosystem for SMETS2 DCC Boxed.

From a DCC User perspective, this system provides similar interfaces and react the same way as when connected to DCC itself.

DCC Boxed emulates the DCC components, the consumer Communications Hubs and all the HAN devices such as Smart Meters, IHDs and other devices, as independent physical modules communicating through real ZigBee HANs as shown in the picture below (emulated components in orange).
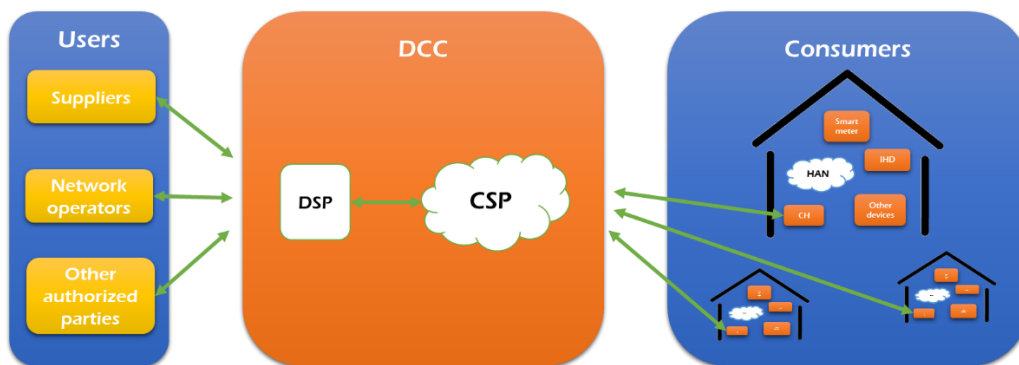

Furthermore, any emulated component in the HAN is interchangeable with its correspondent real device/component allowing to create numerous test scenarios when all required real devices may not be available.

This system allows DCC Users to test specific scenarios without having to connect to the real DCC DUIS Interface but still being able to communicate end-to-end with devices on a HAN using real or emulated devices.

2. DCC Boxed compared to current GFI

Currently, GFI is a tool that is mainly oriented towards HAN device manufacturers while DCC Boxed is an end-to-end tool supporting wider device testing including DCC customers.

The simplified diagram below illustrates the full end-to-end SMIP ecosystem:
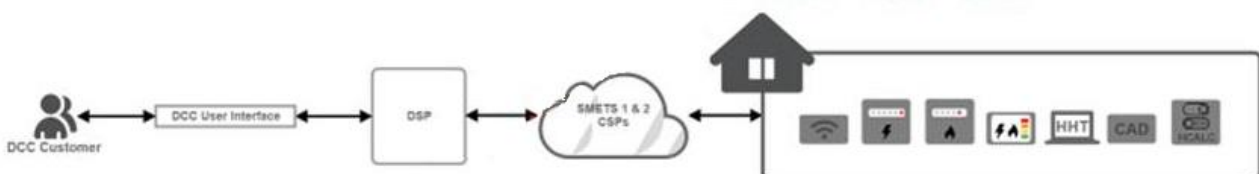
2.1. Current GFI

The current GFI gives the user the possibility to create **one single** SMIP ZigBee HAN, emulating a consumer ZigBee environment, that would have been created by a real Communications Hub, where they can connect their developing devices.

GFI allows the user to generate GBCS payloads and send them through the ZigBee HAN to the developing devices. Instead of using DUIS messages to specify the commands to be sent to the device, the user generates GBCS payloads directly from specification files allowing them to fine tune the commands controlling the GBCS payload fields.

GFI also validates the responses from the device against the GBCS specification presenting to the user a detailed report.

Currently, Device Manufacturers use GFI through its emulated Communications Hub to communicate with real devices for testing and development purposes:

2.2. DCC Boxed

DCC Boxed is a mixed software-hardware set of components to assemble end-to-end scenarios of the SMIP infrastructure for SMETS2.

Contrary to current GFI, DCC Boxed can control multiple ZigBee HANs and the user can specify the commands using DUIS Request XML messages and the usual DCC DUIS Interface specification.

It provides the experience of the entire SMIP ecosystem with the use of real devices or emulated ones interchangeably:

2.2.1. DUIS Interface

The DUIS Interface offers services compliant with the DUIS specification, allowing users to submit Service Requests following the required pattern.

The DUIS Interface is responsible for translating the DUIS Requests to GBCS commands that can then be sent to the HAN. It is responsible as well for routing back the device responses and alerts to the user.

2.2.2. SMKI Interface

DCC Boxed includes a SMKI Interface allowing consultation of active organisational and device certificates and where users can submit Certificate Signing Requests for their own usage, or for Device usage. This naturally includes a CSR validating phase that applies some of the technical verifications required by the official SMKI.

2.2.3. Device Emulators

DCC Boxed provides device emulators for the user to experiment the full end-to-end communications. The emulators are able to join the ZigBee HAN and interact with all devices and remote parties according to their roles.

The emulators are components connected through USB that are ZigBee enabled, powered by Silabs ZigBee stack SEP 1.4 (version >= 6.3.3) operating in 2.4GHz and have data-stores to persist their states.

Optionally, in a case-by-case basis, the emulators can be provided with SubGHz band support or running a specific Silabs ZigBee stack version allowing to reproduce specific behaviour for issue analysis by the users.

The device emulators available are:

- ESME;
- GSME;
- SAPC;
- HHT;
- IHD;
- CAD;
- HCALCS; and
- PPMID.

2.2.4. CH / CH Interfaces

The HAN in DCC Boxed kit has as its backbone the Comms Hub developed as part of the GFI programme (**GFI-CH**). The Comms Hub is able to create a persistent HAN to be established allowing for message exchange between emulated/real devices exactly like in a consumer home.

If the user has access to a real CH and wants to use it instead, DCC Boxed is able to communicate with the real CH device through one of the following interfaces:

- Wired Toshiba ITCH:
- CH Driver; and
- Generic CH Interface.

The **Toshiba ITCH** provides an interface that is able to communicate with a wired Toshiba ITCH containing ZigBee test certificates.

The **CH Driver** (provided as a ZigBee enabled component connected through USB, like the device emulators) makes it possible to integrate with a real CH via its HHT interface. It is able to join the CH using the regular HHT procedures. Since, from the CH perspective, it will be seen as an HHT, it will allow commands to flow from the remote party, through the DCC emulator directly to the real DCC-CH, as well as responses and alerts from the HAN back to the remote party through the same path.

The **Generic CH Interface** allows the user to communicate with a real CH through a TCP interface implemented according to the GFI Segmented Processing Specification using SCPI syntax.

2.2.5. Analysis Tools

DCC Boxed includes a set of analysis tools for debug and study purposes:

- ZigBee sniffer
    - A ZigBee NXP sniffer to capture the ZigBee traffic in 2.4 GHz for debug and study purposes.

- Wireshark plugin

    - A plugin to Wireshark to allow the visualization of GBCS payload meaningfully along with the ZigBee traffic

- GBCS decoder

    - A module that is able to decode the GBCS payload present at each DUIS Service Response and displays it to the user in a meaningful format.

3. Hardware Kit

The kit consists of a mini-PC (server unit), a USB ZigBee sniffer, and a USB hub with enough ports to support a typical HAN configuration. USB ZigBee powered device emulators are available as additional devices.
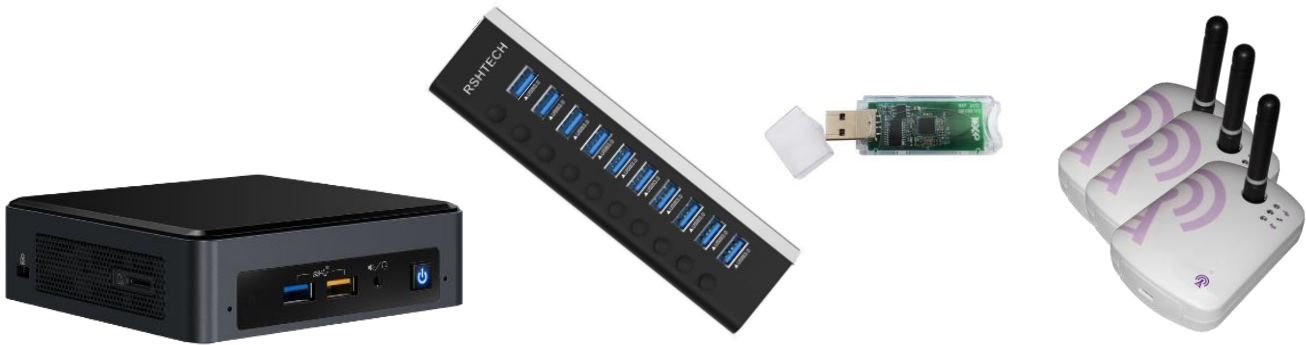
Images are for illustration only. Actual product may vary.

Hardware specification:

- Emulators powered by Silabs dual-band ZigBee Stack: EFR32MG SoC family;

- 2.4 GHz ZigBee Sniffer powered by NXP;

- Server unit powered by Intel Core i5, 16GB RAM, 128GB SSD;

- 4 USB ports + 10 port USB hub;

- One ethernet port; and

- One HDMI port.

4. Deployment Scenario

The solution is designed to be usable out of the box, with minimum set-up effort from the users.

The pre-configured kit is the most adequate solution for users who are just starting to learn SMETS2 and its numerous protocols. No technical knowledge is needed beyond that required to connect the hardware devices to the ports according to the manual.

Expert users can take advantage of more advanced capabilities as the system exposes all the familiar low-level interfaces (e.g., DUIS Interface, SMKI) found on the real DCC system.

Upon powering up the kit, users can connect their computer to the mini-PC using an ethernet cable and browse to a friendly user interface (dashboard) from which the overall system status can be monitored and common operations (e.g., sending Service Requests) can be executed. All the interactions with the system's components, including the device emulators, are executed through the user interface.

5. Usage Examples

DCC Boxed can be used to exercise the use of Service Requests as any Service User would using an UIT environment, while having access to the real devices on their home or lab. A manufacturer/innovator can use this kit to develop and test their devices. A Service User can use it to test their implementation of the interaction with the DUIS Interface or DCC adaptor. DCC and other organisations could use this kit to test new scenarios or analyse impact of changes.

Trainees can use this kit to get acquainted with the SMIP HAN and all the other components in the end-to-end communication.

HAN analysis/simulation scenarios may be built with this kit, as it includes an easy to install HAN on premises.
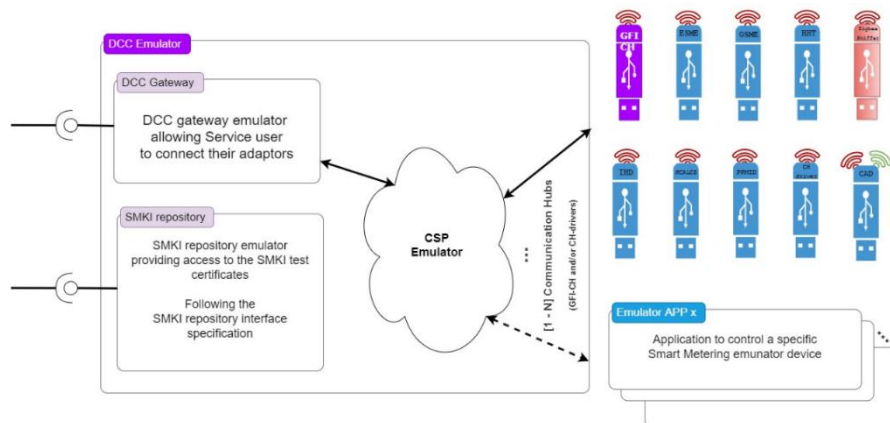
Some examples of use for this kit are:

-   Testing the version 4.0 of GBCS (and DUIS), part of the November 2020 SEC Release;
-   Development and testing of DCC adaptors with hardware in the loop;
-   Internal training to suppliers and device manufacturers;
-   Field force training (e.g., for meter installation);
-   Study and development of GBCS compliant devices;
-   Study and development of DUIS/MMC protocol stacks and tools with hardware in the loop;
-   Study and development of ZigBee SEP devices, compliant with SMETS2;
-   Train newcomers to the SMIP program, particularly SMETS2; and
-   Demonstration of the end-to-end communication in the SMIP.

APPENDIX 2

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Questions in the survey

DCC Boxed Survey

Welcome to our DCC Survey on DCC Boxed.

You should have a copy of the DCC Boxed Survey Briefing Pack to give you additional information to aid completion.

If you have not received your copy of the pack. If you are a DCC User, so need the additional funding model information, please contact: Chris.Barlow@smartdcc.co.uk or Helen.Metcalfe@smartdcc.co.uk and we will be happy to send you a copy.

DCC has developed a new end-to-end test tool called "DCC Boxed".

DCC Boxed enables true end-to-end testing across the entire DCC ecosystem from DCC User Interface Gateway to the device set. You can prove and optimise your solutions end-to-end enabling earlier identification and more efficient triage of defects, reducing testing costs and "false start" deployments, enables optimisation of orchestration reducing install failures and times, and support accurate real time simulation of installation events in a training environment

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Questions in the survey

We believe DCC Boxed could be useful to DCC Users, SEC Parties and in future other organisations, as a 'design proving' development tool. This is where we really need your help! DCC wishes to gauge expressions of interest from you for DCC Boxed.

The DCC Boxed Survey Briefing Pack explains:

- Why we developed DCC Boxed

- What DCC Boxed is and how it could be useful for you

- When this could be available for you, depending on regulatory approach.

- How much this could cost

If the briefing pack isn't giving you all the information you would like, don't worry! We are happy to provide briefing on request, and there will be an online Webinar on 15th April.

This online survey will run until 7th May. Results will be made available in summary form by 31st May and next steps shared in June.

We want to do all that we can to collect as many views as possible.

Thank you for completing this survey - we really appreciate your time!

Questions in the survey

ON THE SURVEY:

Details of questions are available in DCC Boxed Survey Briefing Pack slides (Appendix 2).

DCC will provide you with a copy of your survey submission for your records, usually within a day of submission.

We encourage early submission throughout the Survey period.

If you decide you would like to amend survey results after submission, you can submit a 'new' survey response. Alternatively, you can contact us and we'll amend your answer and provide an updated copy of your submission.

It is perfectly acceptable for separate parts of the same organisation to provide a survey response, as we believe DCC Boxed has multiple uses.

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Questions in the survey

1. Welcome to the DCC Boxed Survey which is open to all interested parties to respond to! Please enter your name below

2. Please tell us which organisation you are from

3. Please provide your email address (PS: we'll use this to provide you with a copy of your submission response.)

4. What is your relationship to DCC?

- ❑ DCC User - Energy Supplier
- ❑ DCC User - Other User
- ❑ DCC User - Network Operator
- ❑ SEC Party - Device Manufacturer
- ❑ SEC Party - other
- ❑ Adapter Provider
- ❑ Non SEC Party interested in DCC Boxed
- ❑ Other

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Questions in the survey

5. DCC Boxed enables true end-to-end testing across the entire DCC ecosystem from DSP Gateway to the device set. This means you can prove and optimise your solutions end-to-end enabling:

- Earlier identification and more efficient triage of defects
- Reducing testing costs and "false start" deployments
- Optimisation of orchestration reducing install failures and times
- Supporting accurate real time simulation of installation events in a training environment

Can you indicate below which of these is of interest to your organisation? (please select all that apply)

Earlier identification and more efficient triage of defects

❑ Reducing testing costs and "false start" deployments

❑ Optimisation of orchestration reducing install failures and times

❑ Supporting accurate real time simulation of installation events in a training environment

❑ Not interested

6. Please provide a rationale for your response

7. DCC Boxed provides a 'design proving' sandpit you own, have access to and control over. We see it as a 'root' product like a 'swiss army tool' that could be used to support different purposes. If you are interested in using DCC Boxed for purposes other than those described in question 5 above, that is great news! Please could you describe any other purposes you have in mind below:

8. DCC Boxed could be used to enhance support and understanding for organisations looking to use auxiliary load controls and/or new Standalone Auxiliary Proportional Controllers (SAPC) devices to meet accelerated decarbonisation priorities. Do you agree?

❑ Yes

❑ No

❑ Maybe

9. Please provide a rationale for your response

Questions in the survey

10. In the Frequently Asked Questions (FAQ) section slide 11 to 15, we give an indication of a price point of £5.5k. Based on this price point how interested would you or your organisation be on obtaining a copy of DCC Boxed?

❑ Extremely interested

❑ Somewhat interested

❑ Neutral

❑ Somewhat disinterested

❑ Extremely disinterested

11. Please provide a rationale for your response.

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Questions in the survey

12. If you are interested in obtaining DCC Boxed, could you give us an indicative number of units that you would require?

❑ 1

❑ 2 to 3

❑ 4 to 6

❑ 7 to 10

❑ 10+

❑ Not Interested

13. DCC could explore an option whereby DCC Boxed Units could be available 'for hire' for eligible organisations interested in using DCC Boxed but unable to afford to purchase.

❑ Yes I would be interested in a 'for hire' option for DCC Boxed

❑ No I have no interest in a 'for hire' option for DCC Boxed

❑ Other

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Questions in the survey

14. FOR DCC USERS ONLY: REGULATORY OPTIONS. Regulatory Options have been described in slides 16 to 23. Please could you give an indication below on which option would be preferable to your organisation? Please note each option includes a SEC Modification at some stage. All options require a change to the Charging Statement which carries a three month lead time.

❑ Option 1: New SEC Modification Proposal

❑ Option 2: Request amendment to existing SEC Modification Proposal

❑ Option 3: Raise SEC Modification Proposal, rely on existing SEC provisions for initial development

15. Please provide a rationale for your response.

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Questions in the survey

16. FOR DCC USERS ONLY - PRICING OPTIONS. Funding Model details have been made available to you in slides 24 to 32. Please could you give an indication below which funding/pricing option would be preferable to your organisation? Please note: this would provide an early, indicative view: we will revisit and revalidate your preference formally once this survey has completed.

❑ Fixed Charge

❑ Explicit Charge

❑ Hybrid Fixed/Explicit Charge

❑ Suspend

17. Please provide a rationale for your response.

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