MHHS Programme

Environment Approach & Plan

Document owner	Document number	Version
SI Workstream Lead	**MHHS-DEL618**	**2.2**
Status:	Date	Classification
Draft	**16 January 2023**	**Public**

1. Contents

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1.1   Change Record

Date	Author(s)	Version	Change Detail
08 Aug 2022	Adrian Samlal	0.1	Initial Draft for LDP peer review
30 Aug 2022	Adrian Samlal	0.2	First round review LDP updates
08 Sept 2022	Adrian Samlal	0.3	Minor updates
30 Sept 2022	Adrian Samlal	0.4	SRO review updates
03 Oct 2022	Adrian Samlal	1.0	Document with updates ready for participant distribution
21 Oct 2022	Adrian Samlal	2.0	Participant feedback addressed
07 Nov 2022	Adrian Samlal	2.1	Caveats added to Executive Summary and Section 10
16 Jan 2023	Simon Berry	2.2	New Section 9, Test Phases and Concurrent Environment Requirements added. Section 10. Added Test Environment End to End Overview. Section 11. Added the Environment Details Template.

1.2   Reviewers

Reviewer	Role
Adrian Page	LDP SI Workstream Lead
Kate Goodman	LDP Test Architect
Simon Harrison	LDP Design Assurance Lead
Nigel Hunt	LDP SI Test Team
Dominic Mooney	LDP SI Test Team
Marc Towers	LDP Quality Lead
Adrian Ackroyd	SRO Function Programme Test Manager
Chris Welby	MHHS SRO
Smitha Pichrikat	SRO Function Client Delivery Manager

1.3   References

Ref No.	Document/Link	Publisher	Published	Additional Information
REF-01	MHHS -DEL 315 E2E Testing & Integration Strategy	SI Testing	29th April 2022	
REF-02	MHHS-DEL172 Change Control Approach	PMO	5th May 2022	
REF-03	MHHS -030 Programme Governance Framework	PMO	22nd June 2022	
REF-04	Test Data Overarching Approach & Plan	SI Testing	Jan 2023	
REF-05	MHHS-DEL 466 Defect Management Plan	SI Testing	TBC	
REF-06	MHHS DIP 094 Interface Code of Connection	SI	Jan 2023	
REF-07	Release and Configuration Approach & Plan	SI	TBC	

1.4   Terminology

Term	Description
Various	For terminology, see Programme Glossary on the MHHS portal: Programme Glossary (SharePoint.com)

2 Executive Summary

The Market-wide Half Hourly Settlement programme (MHHS) when completed will contribute to a more cost-effective electricity system, encouraging more flexible use of energy and helping consumers lower their bills. The responsibility for success is shared between all parties and stakeholders, with everyone working together to make sure the programme is delivered and in the highest possible quality.

Robust quality assurance for the necessary changes is required for this complex programme, not least during the industry testing stages where proactive and efficient management of system environments will be crucial to the overall success of the programme objectives. This document provides definition to MHHS Industry Test participants on the approach for testing environments covering planning, scheduling, management, coordination, readiness, and maintenance. The approach and process adopted is intended to be familiar for those industry test participants involved in recent industry programmes.

This document will go through subsequent iterations. It has been agreed with the Environment Working Group (EWG) that version 2.1 is recommended to the Testing Migration Advisory Group (TMAG) as an approved draft with the expectation of future updates on dependent information or where updates are required on artefacts that the document references.

At this stage in the programme information is dependent on artefacts being available at later dates and are listed as follows:

- [REF-04] Test Data and Overarching Approach & Plan – outlines key data requirements which can assist when assessing environment sizes

- [REF-06] DIP 094 Interface Code of Connection – provides technical information including connection and security details

- Technical information provided by the DIP Provider when they are onboarded. This will help to assess solutions for monitoring, functional and non-functional requirements.

Additional work off items are needed to update this document. These will be addressed when relevant information becomes available. Currently these are:

- Outline of participant environments – described in the Section 11 Summary of Environments by Participant Type and Section 14 (I)DNOs' Environments

- Monitoring – reference and summarized when the approach is confirmed by the DIP provider

- Test architecture diagrams in Section 10 – will be based on details contained in the [REF-06] DIP 094 Interface Code of Connection when available

In addition, this document has a dependency on the baselining of the MHHS Programme Plan and the development of the SIT and Qualification approaches and plans being developed in the SITWG and QWG. In addition the Migration and Data approaches and plans are being developed in the MWG and DWG. Until all of these approaches and plans have been fully formed this document has to be considered a living document.

3 Introduction

3.1 Document Purpose

This document intends to set out detailed guidance and requirements for the use and provision of testing environments during the MHHS Programme preparation and test phases. It provides clear guidance in terms of the approach and planning for the intended Test Participants (TPs).

This document should be read by the following groups:

- MHHS Test Participants engaged in MHHS programme design, build and industry testing activities
- SRO Function (SRO)
- Lead Delivery Partner (LDP)
- Core Programme Team (CPT)
- System Integration Team (SI)
- Programme Party Coordinator (PPC)
- Programme Management Office (PMO)
- Testing and Migration Advisory Group (TMAG)
- Environment Working Group (EWG)
- Independent Programme Assurance (IPA)
- DIP Service Provider.

3.2 Reviews and Approvals

The document will be reviewed by the following team members:

- Kate Goodman, LDP Test Architect
- Simon Harrison, LDP Design Assurance Lead
- Nigel Hunt, LDP SI Test Team
- Dominic Mooney, LDP SI Test Team.
- Marc Towers, LDP Quality Lead

Upon completion of LDP/Expleo review, it will then go through a formal SRO team review by:

- Adrian Ackroyd, SRO Function Programme Test Manager
- Smitha Pichrikat, SRO Function Client Delivery Manager
- Chris Welby, MHHS SRO.

Upon completion of the SRO review it will then be distributed to the EWG for review where comments will be incorporated leading to a recommendation of approval by the group.

When comments and feedback have been incorporated, approval will be requested from:

- Testing and Migration Advisory Group (TMAG).

The document will also be reviewed by Programme Participants before submitting to the TMAG and will be made available for information via the programme portal

3.3 Change Forecast

This document will be reviewed and where applicable, updated when the following are available or updated:

- Baselined E2E MHHS Design
- Re-baselined MHHS Programme Plan
- MHHS Overarching Test Data Approach Plan
- DIP Design implementation.

The SI Test Team will own this document and maintain it, with review and approval by MHHS programme governance as appropriate. Each new version supersedes the previous version in its entirety. It will follow the Programme's change control process governed by the PMO [REF 02] MHHS-DEL172 Change Control Approach

Updates to this document will follow the review and approval process outlined in section 3.2.

3.4 Summary of Changes

This is version 2.2 that has had quality checks performed. A new Section 9, Test Phases and Concurrent Environment Requirements has been added. Section 10 has a Test Environment End to End Overview diagram added. Section 11 has the Environment Details template added.

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4 Objectives

4.1 Key Points

The Environment Approach & Plan aims to clarify the following:

- Management and tracking environment builds, and associated reference data.

- Planning and allocation in the use of environments for relevant participants, including user access permissions and control.

- Maintenance, availability, and monitoring of environments, including the specification of back-ups, exports, refreshes, or roll backs.

- Controlling deployments into environments, including data configuration, version control and release notes.

- Tracking and coordination in resolving environment issues using the defect management workflow.

- Considering the environment requirements for the various stages within PIT, SIT and UIT phases.

The process and mechanisms within this document fully support the underlying principles described in [REF-01] MHHS E2E Testing & Integration Strategy.

4.2 Assumptions and Caveats

This document is written to aid strategy and planning for test environments. However, there are certain caveats which will hinder early versions of this document due to the unavailability of key information. Therefore, the intention is to add more detailed information as when this information becomes available. This should not impact approval of the initial publication of this document where the assumption is that approval is based on the intended content.

Key information include:

- Scheduling of tranches based on Test Plans.

- Technical requirements on the DIP design (including monitoring).

- Baseline dates and guidance of the programme.

- Static Data requirements for each testing phase.

4.3 Environment Working Group (EWG)

- The MHHS Environment Manager will work with the EWG to initially shape the Environment Approach & Plan. The MHHS Environment Manager is responsible for tracking initial plans for building each environment, identifying environment owners of each participant, the method for environment deployment and usage, and strategy for maintenance and issue resolution. Where appropriate, the MHHS Environment manager will report these activities back to the EWG, Programme Participants and Stakeholders.

- The EWG will report their output to the TMAG for approval. This will occur on an ongoing basis and may require engagement with other programme participants. Where the EWG is unable to reach a consensus on a decision delegated to them by TMAG the matter will be escalated to the TMAG.

5 Scope

5.1 Out of Scope

- Configuration – This will briefly be outlined in this document where it relates to infrastructure such as internal and external DNS service names. A separate in-depth document will be created, entitled [REF-07] Release and Configuration Approach & Plan, which will hold more detailed info on release processes and technical configuration.
- PIT – responsibility of TPs to perform their own tests on their own environments before SIT. The SI Test Team will provide the simulator to be used by TPs during their PIT.

5.2 Environment Managers

Environment managers play a key role in ensuring test environments operate successfully. The scope of this document will try to address the expectations for members of the Environment Working Group (EWG) and that of environment managers.

These will be covered comprehensively in the Roles and Responsibilities section.

5.3 Participants

All Test Participants involved in MHHS testing will be expected to comply with the Environment Approach & Plan and these will be outlined under the Summary of Environments by Participant Type section.

These are:

- Suppliers
- Service providers
- (I)DNOs
- Data Integration Platform service provider (responsible for the DIP)
- DCC (responsible for both Smart Metering and Central Switching Service)
- Elexon (responsible for Elexon Central Systems, which comprise Load Shaping Service, Market Data Service, Volume Allocation Service, Industry Standing Data Service and BSC Settlement Operations)
- Electralink (responsible for the Data Transfer Network – DTN)
- St Clements and C&C, together with the (I)DNOs (responsible for SMRS)
- UMSOs (responsible for the UMSO services)
- RECCo (responsible for EES).

Each of the parties above is referred to as a Test Participant (TP) throughout this document.

5.4 Test Phases

There are various test phases which determine how and when TPs use environments. These test phases will be referred to throughout the document and can be referenced in the [REF-01] MHHS-DEL315 - E2E - Testing & Integration Strategy document. The SI Test Team will schedule the test phases and work with the MHHS Environment Manager for environment coordination and planning.

5.5 Coordination and Planning

Planning and scheduling of testing for each TP will be outlined in the Programmes central test plans. This will align with the scheduling for using the test environments.

5.6   Maintenance, Availability and Monitoring

Specific areas that cover maintenance, environment availability and monitoring are covered. Maintenance will describe reasons where environment maintenance may occur with the intention of referencing a log where this information is held. Environment availability will have the same intention covering where intended and non-intended reasons for times when environments are not available. Monitoring will cover the type of intended tooling that will be used to ensure environment availability and alert when environments become unavailable.

6 Management and Coordination

6.1 Planning

SI Test Team will advise TPs when SIT and UIT environments can be accessed, to avoid any clashes. For example, there may be different types of tests that need to be performed or conflicts with data and configuration or ensuring only approved code versions are on environments. There may be instances where re-tests will have to be scheduled. The schedules will be defined by the SI Test Workstream Leads and based on the timeframes; slots will be embedded into the environment usage schedules. This section aims to clarify the process around planning. Also, note that TPs will need to have their own environments ready according to the schedules.

The programme is intending to allow the placing of reliance on testing performed by third parties as it is pragmatic, helpful to TPs and their service providers and entails little risk.

In further drafts, this section will contain a high-level plan of the testing schedule which will be based on the re-plan.

6.1.1 Tracking and Coordination

- The MHHS Environment Manager is central to all coordination, communication, and escalation.

- EWG will have a regular meeting scheduled on the first Tuesday of every month. This will be chaired by the MHHS Environment Manager. TP environment managers or representatives are encouraged to attend as this will be particularly important during both prep and execution of SIT and UIT phases. Programme test leads and representatives from the design groups are also invited to attend.

- As the project progresses, there may be a need for more frequent meetings covering issues or testing progress. Only interested parties need attend these meetings or 'catch-ups'.

- The MHHS Environment Manager will produce a high-level testing and readiness report at regular intervals. Most likely, these will be weekly, but could increase in frequency based on activity.

- Any scheduling of test phases will be shared via a centralized Gantt chart (or similar) which will be visible to the EWG, and other interested parties published via the MHHS collaboration base.

- ADO Dashboards will be utilized to track versions of components in environments. This will be part of the release management process which will be referenced here when it is defined. Dashboards will allow visuals of release versions currently in environments and the ability to drilldown into historical versions. Owners of Central and other components critical to the end-to-end settlement processes are expected to communicate their current application versions via release notes as this will avoid confusion when testing on correct versions of various system components. Critical areas will be identified by the Programme and listed here. Programme will decide if this is required for non-critical systems.

- A release management plan and schedule will be published to inform when fix versions will be applied to environments. This will be published on the MHHS collaboration base.

- Subject to the design, it is assumed the status of the programme environments will be implemented via a dashboard on a chosen tool, to ensure environment statuses (i.e., where components are available or unavailable) are fully tracked. It is currently assumed this will also cover services to and from the central systems.

- Azure Dev Ops (ADO) will be utilized to capture testing issues. Environment issues will have its own category and will be triaged as part of the defect workflow. Environment issues will be coordinated by the MHHS Environment Manager. For clarification, the defect workflow is captured in the [REF-05] MHHS-DEL46 Defect Management Plan.

6.1.2 SIT

- Environment managers/representatives involved in SIT will be expected to attend regular meetings related to environments and the EWG. Frequency dependent on the criticality of project deliverables and issues. This could involve daily stand ups and weekly meetings based on testing schedules. Any ad-hoc meetings outside of the regular EWG meetings are likely to be relevant to TPs involved in test execution or where issues may occur that impacts testing. In these circumstances, only those involved in testing need to attend. Meetings will currently cover requirements from now until SIT and subsequently, planning and execution.

- Environment Issues 'defects' will also be captured and reviewed so that they do not occur in UIT. Environment downtime will also be logged for historical review and future mitigation.

- TPs will be given timed slots to perform their testing. The SI Test Team and MHHS Test Environment Manager will be responsible for coordination and provision of the test environments which will be communicated to TPs. TPs will be responsible for provision of their own test environments and will need to coordinate with the MHHS Environment manager to connect to central systems.

6.1.3 UIT

- All participants involved in UIT (Qualification and E2E Sandbox testing if applicable) should attend regular meetings related to environments and the EWG. Frequency dependent on the criticality of project deliverables and issues. This could involve daily stand ups and weekly meetings based on testing schedules. Meetings will cover planning and execution for UIT.

- **Qualification** will most likely have a tranche system where TPs will be given timed slots to perform their testing. The SI Test Team and MHHS Test Environment Manager will be responsible for coordination and provision of the test environments which will be communicated to TPs. Qualification TPs will be responsible for provision of their own test environments and will need to coordinate with the MHHS Environment manager to connect to central systems.

- **E2E Sandbox** is optional but may need a level of coordination which will be confirmed at a later date. The SI Test Team and MHHS Test Environment Manager will be accountable for coordination of the central test environments which will be communicated to TPs. TPs will be responsible for provision of their own test environments and will need to coordinate with the MHHS Environment manager to connect to central systems.

6.2 Environment Allocation

6.2.1 Scheduling

TPs must ensure they have relevant testing requirements confirmed with the SI Test Team. This will drive the scheduling for use of the testing environments. TPs must have an allocated environment manager or nominate a similar representative to ensure scheduling is performed smoothly. Failure to do this can create conflicts in testing requirements and ensures approved code versions are used when testing is performed on test environments.

The following table is the assumed usage strategy for each central system environment required for test phases. The actual timelines will be agreed with the Programme and a reference will be added here when that is available:

Environment	Phase	Testing Stage	Comments
SIT Staging			Readiness for SIT such as regression for changes, defect re-testing, etc. This will ensure that the actual SIT environments are not broken when new code is deployed.
SIT A	SIT	SIT Component Integration SIT Functional	Component integration tests will be conducted as individual components are integrated. Then full end-to-end testing can start.
SIT B	SIT	SIT Migration SIT Non-Functional* SIT Operational	It is assumed these three stages can be executed on one environment, but not in parallel to avoid conflicts. TP's can decide to have their own environment for each stage or re-purpose their environments for each stage. *Note new systems, such as the DIP, may be required to run tests on Pre-Prod and Prod.
UIT	UIT	Qualification E2E Sandbox	Central systems and some (I)DNOs' environments will be provided as a testing service to allow TPs to conduct Qualification Testing and E2ESandbox Testing. Each TP will need to complete either SIT or Qualification Testing before starting E2E Sandbox Testing.

Table 1 Environments per Test Stage

Note: Section 11.1 contains an overview of participants.

6.2.2 SIT

- SI will specify the necessary environments for the central systems and monitoring progress on their delivery.

- Environment coordination will be managed by the MHHS Environment Manager.

- TPs involved in SIT will have timeframes planned into testing schedules with advanced notice being given. This is to avoid clashes in testing requirements and ensures approved code versions are used.

- Parties taking part in SIT will need to provide their own system test environments for:

  o SIT Functional

  o SIT Non-Functional and Migration

  o UIT.

- To plan appropriately, the following information may be needed

  o Reference Data requirements will be coordinated with the Test Data Manager with advanced notice in line with testing schedules. TPs will also be expected to attend regular planning meetings. This will give the Test Data Manager enough time to prep data requirements.

  o Application version, including the applications and services version that will be used.

  o Configuration requirements.

  o Test User Access i.e., specific test users that need to be set up in the environment for specific testing.

  o The SI Test Team will schedule the usage of the test environments (which will be shared across the programme) according to the testing plan. The MHHS Environment Manager will hold a centralized version of the plan which will be reviewed on a regular basis.

- Environment coordination will be managed by the MHHS Environment Manager.

- TPs not involved in SIT will need to participate in the UIT Qualification test phase and will need appropriate slots on the associated environment to be planned in by the SI Test Team and MHHS Environment Manager.

- Number of SIT environments required (Table 1) will be determined by the SI Test Team and feasibility will be discussed with the EWG. Currently three SIT environments are envisaged.

  o SIT Staging environment to prove SIT readiness.

  o One environment for component integration, functional testing.

  o One environment for non-functional, migration and operational testing. Assumed these won't run in parallel and will be repurposed for each.

- Approval will be needed from the Programme if more SIT environments are required.

6.2.3 UIT

- SI Test Team will specify the necessary environments for the central systems and monitoring progress on their delivery.

- Environment coordination will be managed by the MHHS Environment Manager.

- Qualification

    o SI Test Team will most likely allocate tranches for TPs to perform testing.

    o TPs must provide their own environment and connection details to connect to central systems.

    o SI Test Team will make available configuration details of central systems for connection.

    o TPs not involved in SIT will need to pass Qualification testing and hence will need to use the Qualification Environment.

- E2E Sandbox

    o SI Test Team will most likely allocate tranches for TPs to perform testing.

    o TPs must provide their own environment and connection details to connect to central systems.

    o SI Test Team will make available configuration details of central systems for connection.

    o TPs that qualify by passing SIT may perform testing on the E2E Sandbox environment if they require.

6.2.4 Pre-Prod and Production

- The SI Test Team will coordinate the roadmap to production readiness. However, it is expected that participants will have their own Pre-Prod and Production environments in line with their own strategies

- Programme Participants are also expected to have their own Service Management model in place.

6.3 Code of Connection

For both SIT and UIT, TPs will be responsible for connecting their own systems to the DIP. Guidance for this will be available on the [REF-06] MHHS DIP 094 Interface Code of Connection Guide via the design documentation. As an outline, the guidance will cover the following topics:

- DIP Messaging Interfaces

    o Detailed description of the interface including the landscape, API details, webhooks, configurable parameters and communication channels.

    o Security requirements and standards including JSON message signing, transport layer security.

    o Internet access.

- Public Key Infrastructure including standards for digital certificates.

- DIP Certificate Authority including references to DIP certificate authority, PKI, usage, and general governance.

- Key Management – description of secure procedures needed for the handling of cryptographic keys including firewalls, authentication, etc.

- Security such as user access and authentication. Of note will be the need for different security credentials between test environments and the eventual production environment.

6.3.1 DIP Interface overview

The diagram below is a high-level view of the connection interface. The Code of Connection document will contain a more detailed description:
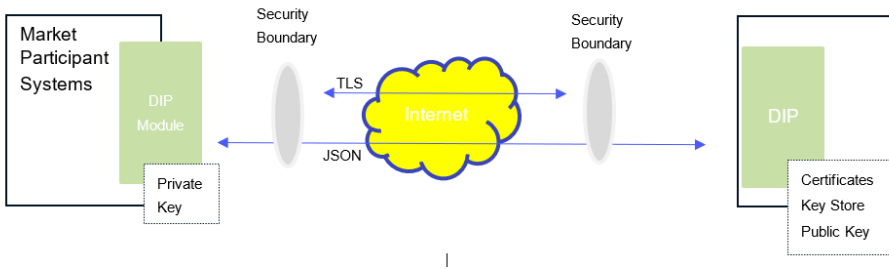
Figure 1 DIP Interface Overview

6.3.2 Enduring Design Hub

TPs will have access to the Enduring Design Hub which will allow visibility of components of the TOM and environments. TPs can discuss with relevant technical SMEs team the underlying components of the environments. This will be coordinated by the MHHS Environment Manager.

6.3.3 Registration Responsibilities

The [REF-06] MHHS DIP 094 Interface Code of Connection Guide specifies the requirements for the appointment of individuals responsible for certificate registration. These roles are outlined below:

- Senior Responsible Officer (SRO) – senior executive with the authority to make decisions on behalf of the organization. Responsible for appointing ARO and TC.
- Appointed Responsible Officer (ARO) – key responsibilities of requesting certificates.
- Technical Contact (TC) – responsible for managing certificates and related processes.

6.4 Availability

To meet tight testing deadlines, effective environment management needs to be in place to ensure environments are ready and functioning appropriately before and during the testing phase. The aim is to minimize downtime so that environments are available. Environments may not be available for either planned or unplanned periods. In addition, certain assurances and readiness criteria can mitigate against any environment downtime (covered in detail under the Assurance and Readiness Criteria section).

6.4.1 Central Systems Unavailability

Although the aim is to minimize downtime, environments may not be available for either planned or unplanned periods. Central Systems will provide details of planned or regular schedules when environments are not available. Where appropriate, SLAs will be collated. When this information is available, it will be documented in a central log and referenced here.

- Reasons for unplanned environment unavailability:
  - o Infrastructure failures – these can be (but not limited to) servers being down, memory bottlenecks, connection failures, network errors.
  - o Software failures – severe defects, deployment failures, security failures.

If an unplanned issue occurs a defect should be raised as per the defect management process where they will be triaged and tracked. If the incident is critical i.e., a blocker, then this should be escalated to the MHHS Defect and Environment managers. Environment defects will try to be resolved as soon as possible and regular updates will be communicated.

- Reasons for planned environment unavailability:
  - o Data refreshes
  - o Data Loads
  - o Infrastructure maintenance
  - o Infrastructure patching
  - o Code deployments.

Where planned environment outages may occur on central systems, the MHHS Environment Manager will communicate this to the EWG and other TPs in advance and will be added to the testing schedule. There may be situations where an adhoc outage occurs and hence maintenance may need to be planned. This can usually happen when a serious issue on the environment needs to be fixed.

6.4.2 TP Systems Unavailability

TP systems will need to be connected to central systems during relevant phases for SIT and UIT. During the testing phase, TPs will need to advise the SI Test Team of any outages. Early communication is important as testing could be impacted, not only to the applications being tested, but also where there is a dependency on the application(s). Planned non-availability will be captured on logs. However, unplanned incidents should be raised initially as defects by the individual/team encountering the problem and will follow the defect triage process as specified on [REF-05] MHHS-DEL46 Defect Management Plan. The incident should also be communicated via email and Teams channels, as soon as possible, quoting the defect number.

It will not be SI responsibility to ensure availability of TP systems, however, if an incident occurs, the MHHS Environment Manager will be the central point to ensure the correct parties are involved in resolving the issues.

6.4.3 Unavailability and mitigation

When an unplanned environment outage occurs, it may have an impact on original testing timelines. In such circumstances, TPs will need to liaise with the SI Test Team on the impact and discuss any re-plans. The SI Test Team will then need to work with the TMAG to negotiate and mitigate any impact on test completion and sign offs.

Tracking environment downtime will help pinpoint root causes. Tracking is expected to be captured automatically via relevant environment monitoring tools.

6.5   Monitoring

This section is a placeholder until more detailed requirements on monitoring are available. All TPs are encouraged to provide monitoring for their own systems.

There are two ways to monitor environments; regular checks, and live automated checking. Manual checking can be time consuming and requires people resources to perform checks regularly. Live automated checks are more robust and real-time as tooling can help pinpoint problems and alert support immediately when there is an issue. Alerts may be in the form of emails or integrated into a support channel. If the right tool is used, dashboards can be set up to show states of components on the environment allowing support to drill down into problem areas.

- Monitoring is part of the DIP requirements and is expected as part of the delivery. Therefore, it is assumed each environment instance of the DIP will have a fully packaged monitoring system that has been fully tested. Environment readiness tests can also be monitored. Monitoring of feeds into and out of the DIP is also recommended *(Requirement tbc)*.

- As part of the DIP Solutions for monitoring it is expected that *"Azure Monitor will be leveraged to collect operational telemetry such as availability, performance, and usage of the DIP in a centralised store. Azure App and Container Insights will be used to deliver further analysis of DIP microservices which will collect detailed metrics and logs related to their performance and operation. "*

- Ideally monitoring should be set up for central systems and is an item for discussion. Feeds into and out of central systems would be monitored.

- Recommended other TPs have their own monitoring set-up for their own systems.

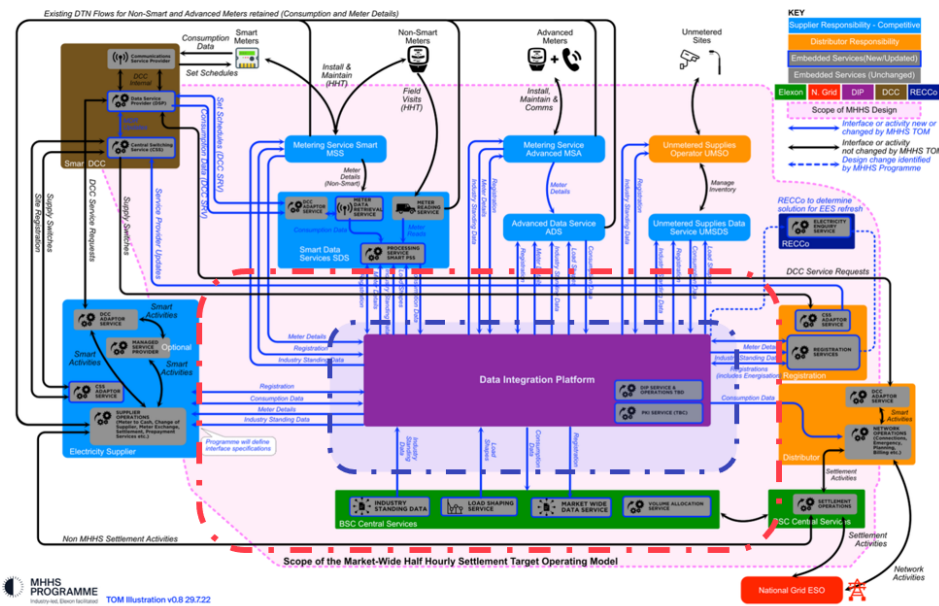- Diagram below demonstrates the intention for monitoring:

Figure 2 Monitoring Scope

6.6 Maintenance

Test environments will most likely need periods of maintenance and hence there could be specific times when an environment is not available. These periods will be scheduled into the planning and testing timeframes will work around them or vice versa. Maintenance may be scheduled for the following reasons:

- Data refreshes – test data in environments can become messy. There will not be any regular data refresh slots. However, in some cases data refreshes may be needed to avoid bad data and data conflicts. TPs should advise in advance when data refreshes will happen to avoid data going out of sync with other testing activities. Ideally, this will fall into line with planned environment unavailability.

- Data loads – certain types of data may need to be loaded or reloaded for different parties or types of testing. Method of a data load may affect the maintenance period. For example, a data injection may not be a huge effort, but sometimes data may need to flow through the system as there may be data dependencies.

- General Maintenance – Infrastructure may need general maintenance such as server reboots, replacement of hardware, routine upgrades, infrastructure patches, etc. Occasionally, there may be unforeseen circumstances where general maintenance is required.

- Rollbacks – time may be required to perform system rollbacks. Circumstances where this may occur could be to rollback code versions or return a system to its prior state before an outage.

6.7 Communications and Meetings

6.7.1 Mail and mail groups

- EWG members will be part of the EWG mailing list for the monthly meetings.
- A separate mailbox will be available for environment queries and mailings.
- An MS Teams channel will be setup to service immediate queries.

6.7.2 Meetings

Regular meetings will take place and will focus on members of the EWG and those with specific interests in the preparation and status of the test environments. Meetings will take the form of the following:

- Monthly EWG catch up will occur on the first Tuesday of every month. This is an open forum which EWG members and interested parties are encouraged to attend. It will cover open topics, key points over the past and upcoming monthly period, and any general queries that the group may have.

- Testing cycle – as participants enter SIT and UIT phases, more focused meetings may be necessary to cover the state of the environments in relation to the testing. The meeting may be in the form of a sole environment meeting or embedded into a main testing catch-up.

- Issues – issues will be raised via the defect management workflow process. When issues are triaged and identified as environment issues, they will then be tracked by the MHHS Environment Manager. Separate meetings may be needed to track and resolve issues. These meetings are likely to be short 'stand-ups' via Microsoft Teams where parties involved in testing and resolution will be invited. Defects identified as environment issues will be filtered and shared via an ADO dashboard with action points captured and shared via minutes. Subsequent meetings will follow up the action points.

6.8   Test Environment Support

In addition to automated monitoring, environment support is available during testing times (8am – 6pm UK time). Any testing outside these hours is unlikely to have environment support available. This will be determined with the DIP Provider with details added to this document when the agreed SLAs are in place.

- The MHHS Environment Manager will be the central coordination point.

- Support will be expected to respond to email alerts and general issues reflected on monitoring tools.

- Support will also be expected to be part of defect and environment issue triage meetings.

7 Test Data and Configuration

7.1 Reference and Business Data

Data in environments comes under two categories:

- Reference – static data that is part of the environment set up.
- Business – specific data used in user testing scenarios to sign off functionality.

The EWG will work closely with the Data Working Group (DWG) to ensure correct data is set up in the environments. This will be in line with the [REF-04] Test Data Strategy and Test Data Overarching Approach & Plan. TPs are also recommended to join the DWG for specific questions around data.

The SI will undertake coordination for all data set-up.

7.2 SIT

- The Data Working Group (DWG) will coordinate data requirements. Participant infrastructure build teams will load data with the SI Test Data Manager coordinating.
- TPs will be informed of the Reference Data being provided and will need to liaise with the EWG that data requirements are set correctly in the environments.
- TPs need to ensure the correct data requirements are confirmed prior to testing in relation to the testing schedule.
- TPs will need to ensure their own data migration or ETL processes are in place to load their own business data.
- Business data integrity tests will be specified for SIT by the SI Test Data Manager, which TPs will need to execute.

7.3 UIT

- Data is set up and deployed in the same way as SIT.
- Participants should not need any additional data to that used in SIT, but if any is required then sufficient notice should be given to the SI Test Data Manager.

7.4 Configuration

Configuration (including Release Management) will be covered in detail in the [REF-07] Release and Configuration Approach & Plan. However, as this is closely connected to this document an outline below will highlight the areas of coverage:

- Environment Builds – plan of the test environments including services, components, and their versions.

- Deployments – detail for deploying a version of software into an environment and how that will be communicated.

- Release Roadmap – plan demonstrating the central system timelines for software releases.

- Configuration – connection details for TPs to connect their own systems to central systems.

- Version Control – details on how the versions of the DIP are kept up to date for each release.

- Backups – detailing process and frequency of backing up the environment including copies of data and configs.

- Exports - detailing process and frequency of backing up the environment including copies of data and configs.

- Refreshes - detailing process and plan for data refreshes.

- Rollbacks – documenting the process to roll back the environment to a previous version.

- Release Notes and testing impact assessment – structure of the release notes including the process for assessing any impacts on the current environment functionality.

- Business data loading – documenting the process to load business data.

8 Roles and Responsibilities

This section will highlight the involved actors associated with the approach. It mainly consists of EWG members formed from the SI, SRO, TPs, and PPC/PMO functions.

8.1 Environment Managers

- The MHHS Environment Manager is the central point for coordination
  - Chair EWG meetings and any other ongoing meetings relating to test environments.
  - Act as the central contact or liaison point for environment issues, readiness, planning, communication.
  - Point of escalation for matters relating to test environments.
- TPs are expected to have their own Environment Manager or representative
  - Environment managers or representatives will be identified by relevant parties and captured centrally in the programme database as a point of contact.
  - Attend EWG meetings. For certain areas, there may be one representative for multiple systems.
  - Act as the central contact or liaison point for their own systems.
  - Point of escalation for matters relating to their own test environments.
  - Participate in any additional functions or meetings relating to environments.

8.2 Programme Responsibilities

Error! Reference source not found.describes the roles of those participating in the MHHS Programme environment duties:

Role	Description
MHHS Environment Manager (SI)	• Coordination for planning and maintaining schedule for test environment usage. • Documenting the environment provision plan with the SI Test Team when available. • Raising and/or coordinating any environment Defect in ADO and liaising with relevant environment teams. • Assuring environments are stable during the Test window in conjunction with the relevant environment managers. • Managing & Tracking change in general across all environments. • Involved in Defect Triage meetings on a regular basis. • Assuring that all required systems are connected & working as expected in the test environment prior to test execution.
TPs Environment Managers	• Point of contact for their own test environments. • Timely provision of their own test environments. • Participating in environment meetings. • Raising environment defects for their own systems (if they impact the MHHS Programme in ADO and liaising with relevant environment teams. • Responsible for environment defects that their own systems have an impact on.
SI Defect Manager	• Leadership & communication of Defect management process. • Point of Escalation for defect issues and defect SLAs. • Regular Defect Status Reporting. • Running Defect Triage Panel and managing the audience.

	• Analysis of Defects to assist in project decision-making activities.
	• Liaising upstream with senior stakeholders and downstream with Test Participants Test and Programme teams.
	• Single point of contact for any user level access management towards Defect Management Tool (ADO).
	• Involved in Defect status calls / Triage meetings.
SI Triage Team	• Representation from SI Design, Test and Programme teams.
	• Review and analyse the newly raised Defects (along with Severity and Priority of the Defect) by different Test Participants' Test team and drive relevant actions.
	• Change the assigned Priority and Severity if required as a part of triage assessment.
	• Involved in regular Defect Triage Meetings.
	• Involved in changing the status from 'New' to 'Open' if a newly raised Defect is accepted by SI Triage Team.
Test Defect Manager (per Test Participant)	• Reviewing & managing the quality of the Defect Submitted by Tester (along with Severity and Priority of the Defect).
	• Involved in Defect Triage meetings on a regular basis.
	• Point of contact for the SI Defect Manager and Test Execution Team.
	• Driving Retest of Defects that have been delivered into the test environment.
	• Reviewing, accepting, and closing Defects that have been successfully retested in the test environment.
SI Release Manager	• Responsible for release management plan.
	• Checking Release Notes when patch is delivered to determine which Defects can be set to retest.
	• Coordinating with the SI Defect & environment managers when required.
Tester (Test Participant)	• Submitting new Defects.
	• Defect retest.
	• Involved in Defect Triage meetings on a regular basis wherever necessary.
	• Retesting fixed Defects as per the release notes/info in Defect Management Tool (ADO).
SI Design Authority	• Provides Design concurrence for the design activities under the MHHS solution for environments.
SRO TMAG Chair	• Point of escalation for System Integrator.
	• Oversight of Environment Management process.
BSC and/or RECCO	• Point of escalation for System Integrator during Qualification.
PMO	• Set up and highlight agenda for monthly EWG meetings.
	• General communication and escalation point.
	• Administering documentation.
Security Points of Contact	• Responsible as central points of contact for obtaining certificates and any other information related certificates
	• Roles are defined in [REF-06] MHHS DIP 094 Interface Code of Connection Guide include DIP Service Providers
DIP Representatives	• Responsible for certificate registration

| | | • Roles are defined in [REF-06] MHHS DIP 094 Interface Code of Connection Guide include Senior Responsible Officer (SRO), Appointed Responsible Officer (ARO) and Technical Contact (TC) |

Table 2 Roles and Responsibilities

9 Test Phases and Concurrent Environment Requirements

This section will highlight the high-level MHHS Programme SIT and UIT Test Plan and the concurrent test environments required for participants for the different test phases.

9.1 SIT and UIT Test Timelines

Figure 3, below states the timelines of the different test phases of the Programme and readers are able to derive when environments will be required. The POAP is included in this document to aid the reader and provide a ready reference point for the Environment Timeline. The POAP reflects the Programme Test Planning assumptions at the point of Round 3 Consultation.

Figure 3 MHHS Test Phase Timeline

9.1.1 Connectivity Proving

Environment Connectivity Proving is essentially establishing Environment Readiness and will include Programme Parties;

- requesting and installing PKI (TLS & JWS) certificates,
- registering Webhooks,
- demonstrating the use of the APIs, and
- connecting to each end point for each organisation by Market Role.

Lessons learned from previous large-scale industry programmes have identified that establishing and proving connectivity prior to the start of testing for Programme Participants has been problematic. These problems have tended to impact the commencement of test execution. A dedicated Environment Connectivity Proving stage will enable connectivity activities to be more closely monitored and supported and will act as a Quality Gate for subsequent test activities.

9.2   Environment Availability Requirements

Table 3, below states when each environment is required. It should be noted that these dates do not include the environment set-up times for Programme Participants. Programme Participants should ensure that all of the activities that they require to source, configure and test their environments are completed prior to the dates stated below.

Environment	Required from	Required to	Sandbox end
SIT-A	23-Jul-23	07-Apr-25	
SIT Staging	13-Nov-23	19-Jan-26	
SIT-B	26-Feb-24	19-Jan-26	
UIT	09-Jul-24	19-Jan-26	31-Dec-26

Table 3 Environment Utilisation

9.3 Concurrent Environment Requirements

9.3.1 Concurrent Environments for SIT & UIT participants

Some Programme Participants, the Core Systems Providers and those Programme Participants that opt to participate in SIT and UIT will be required to maintain environments for the duration of the Programme Test phases. Table 4, below states the number of concurrent environments that will be required at any time to support SIT and UIT throughout the different Programme Test Phases.

# concurrent environments	From	To	SIT-A	SIT Staging	SIT-B	UIT	Notes
1	23-Jul-23	13-Nov-23	Y	N	N	N	SIT-A is the first environment to be stood up to support SIT Testing.
2	13-Nov-23	26-Feb-24	Y	Y	N	N	SIT Staging Environment from 13th November, 2023.
3	26-Feb-24	09-Jul-24	Y	Y	Y	N	SIT-B environment from 26th February, 2024.
4	09-Jul-24	07-Apr-25	Y	Y	Y	Y	UIT environment added. At peak all 4 environments operating in parallel.
2	07-Apr-25	19-Jan-26	N	Y	N	Y	SIT-A and SIT-B environments no longer required as SIT Functional, Non-Functional and Migration Testing have completed.
1	19-Jan-26	31-Dec-26	N	N	N	Y	Qualification Testing completed in the UIT Environment. No requirement for additional code releases, therefore no need for the SIT Staging Environment. UIT only used for Sandbox Testing.
0	31-Dec-26		N	N	N	N	Sandbox Testing complete at the end of 2026. No ongoing requirements for environments.

Table 4 Number of concurrent environments required by time period to support SIT and UIT Testing Phases

9.3.2 Concurrent Environments for SIT only participants

Some Programme Participants may opt to participate in the SIT phase only, recognising that participating in SIT will negate the requirement to complete Qualification Testing in the UIT Test Phase. Table 5 below states the number of concurrent environments that will be required at any time to support SIT throughout the different Programme Test Phases.

# concurrent environments	From	To	SIT-A	SIT Staging	SIT-B	Notes
1	23-Jul-23	13-Nov-23	Y	N	N	SIT-A is the first environment to be stood up to support SIT Functional Testing.
2	13-Nov-23	26-Feb-24	Y	Y	N	SIT Staging environment from 13th November, 2023.
3	26-Feb-24	07-Apr-25	Y	Y	Y	SIT-B environment from 26th February, 2024.
0	07-Apr-25		N	N	N	End of SIT Functional, Non-Functional and Migration Testing. Programme Participant has participated in SIT Testing, therefore no need to undertake Qualification Testing, therefore no requirement for UIT environment. All SIT environments stood down.

Table 5 Number of concurrent environments required to support SIT Testing phases

9.3.3 Concurrent Environments for UIT participants

Some Programme Participants will elect not to participate in the SIT Test Phase. These Programme Participants will be required to complete Qualification Testing within the UIT Test Phase. Table 6 below states the number of concurrent environments that will be required at any time to support UIT throughout the different Programme Test Phases.

# concurrent environments	From	To	SIT Staging	UIT	Notes
1	13-Nov-23	19-Jan-26	Y	N	SIT Staging Environment required.
2	09-Jul-24	19-Jan-26	Y	Y	UIT Environment required.
1	19-Jan-26	31-Dec-26	N	Y	No more code releases planned. SIT Staging environment no longer required
0	31-Dec-26		N	N	End of UIT Sandbox testing. No ongoing requirement for environments.

Table 6 Number of concurrent environments required to support UIT Testing Phase

10 Overall Test Architecture by Test Phase/Stage

10.1 Overall system diagram

Below is a diagram of the target operating model as expected. This section will aim to show the test environment structure based on the main system design. This section is a placeholder for when the SI is able to provide specific info on each test environment within the programme. Test system architecture will be provided under each test phase sub-section when available. Central systems are denoted within the scope of the MHHS design:
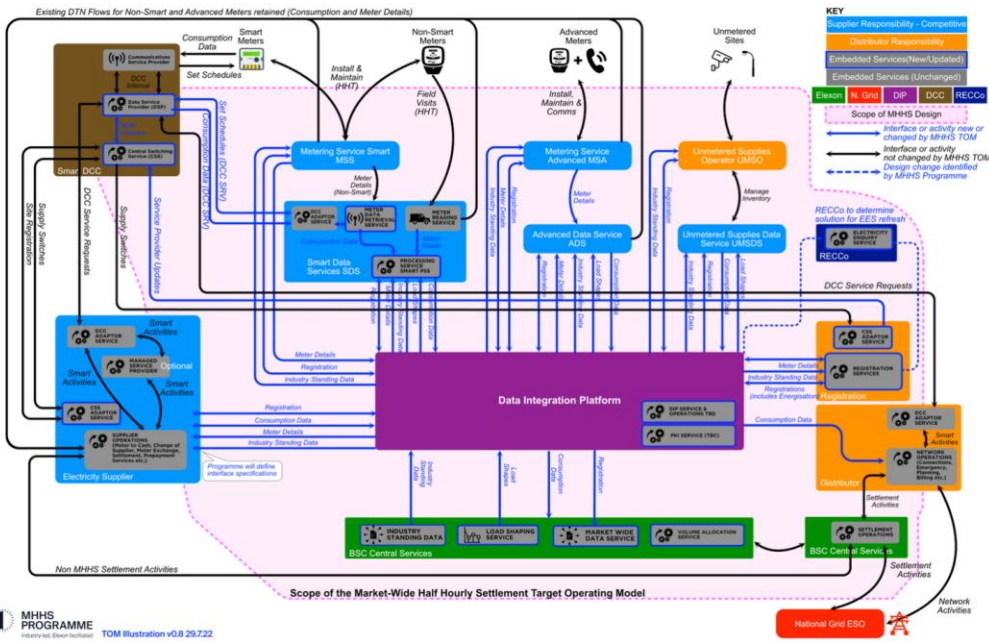
Figure 4 Target Operating Model

10.2 Test Environment End to End Overview

Figure 5, below provides an overview of the Test Environment End to End architecture. This diagram provides a logical view of the environment set-up.

End to End Overview
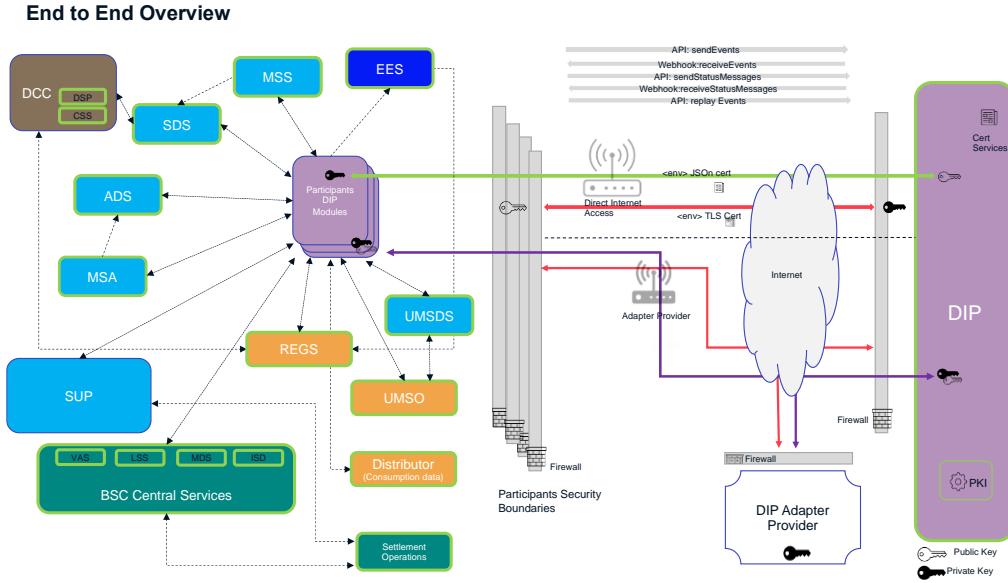
Figure 5 End to End Test Environment Architecture

Abbreviation	Long Description	Abbreviation	Long Description
ADS	Advanced Data Services	MSA	Advanced Metering Service
CSS	Central Switching Service	MSS	Metering Service Smart
DIP	Data Integration Provider	REGS	Registration Service
DSP	Data Service Provider	SDS	Smart Data Services
EES	Electricity Enquiry Service	SUP	Supplier
ISD	Industry Standing Data	UMSDS	Unmetered Supplies Data Service
LDOS	LDSO Ops	UMSO	Unmetered Supplies Operator
LSS	Load Shaping Service	VAS	Volume Allocation Service
MDS	Market Wide Data Service		

Table 7 End to End Test Environment Architecture – abbreviations key

10.3 SIT

This section will contain a more detailed version on the SIT environment in future versions of this document. Therefore, this section is a placeholder until that information becomes available.

Items likely to be included are:

- Explanation of SIT environment.
- Method for connection.
- Method for loading of data.
- Outline of readiness tests.
- Environment configuration.
- Network connectivity checks.
- Certificate and webhook registration.
- Data and message exchange.

10.4 UIT Qualification

This section will contain a more detailed version on the UIT Qualification environment in future versions of this document. Therefore, this section is a placeholder until that information becomes available.

Items likely to be included are:

- Explanation of UIT environment.
- Method for connection.
- Method for loading of data.
- Outline of readiness tests.
- Environment configuration.
- Network connectivity checks.
- Certificate and webhook registration.
- Data and message exchange.

10.5 UIT E2E Sandbox

This section will contain a more detailed version on the UIT Sandbox environment in future versions of this document. Therefore, this section is a placeholder until that information becomes available.

Items likely to be included are:

- Explanation of UIT environment.
- Method for connection.
- Method for loading of data.
- Outline of readiness tests.
- Environment configuration.
- Network connectivity checks.
- Certificate and webhook registration.
- Data and message exchange.

11 Summary of Environments by Participant Type

The tables in this section shows each participant type and the environments needed for testing for each testing phase. The tables will be updated in later versions of this document when re-planning is complete, and TPs have confirmed their testing approach.

11.1 High Level View of participants

The Table 3 is based on the [REF-01] MHHS DEL 315 E2E Testing & Integration Strategy demonstrating the environments required for the phases of testing. Where testing is performed, an environment is required. In conjunction with Section 6.2, the SI Test Team will follow a process of engagement with Test Participants to obtain further information for the table. This will entail the following:

- Provide a template for participant engagement to capture environment details.
- Set up initial and regular meetings with participants to identify and document environment needs.
- Create a catalogue of information to hold all environmental information.

The template will hold a minimum of the following information:

- Participant details.
- Test Lead name.
- Environment contact(s).
- SIT Staging Environment – confirmation of environment provision.
- SIT A Environment - confirmation of environment provision.
- SIT B Environment - confirmation of environment provision.
- UIT Environment - confirmation of environment provision.
- Platform – e.g., infrastructure such as cloud, on prem, etc.
- Scheduled Downtime – any regular environment downtime.
- Support – confirm support mechanism if the environment goes down.
- Deployment Process – code deployment mechanism.
- Environment Alert Mechanism – alert process for environment issues.
- Monitoring Tool – how is the environment monitored for availability.

Category	Description	Details
Participant Name		It is important we know who you are and who to reach out to. This information will be stored centrally on the Programme's CRM
Test Lead name		
Environment contact name(s)		
System/Application name		Fill in a template for each system that will be involved in MHHS testing
SIT Staging Environment	Name of environment that will connect to SIT staging	• Early thoughts and ideas to help us in planning
SIT A Environment	Name of environment connecting to SIT Component and Functional test	• Let us know initial thinking for each environment • Will an environment be provided?
SIT B Environment	Name of environment connecting to SIT NFT, Migration and Operational testing	• If not provided will an environment be re-purposed? • What are your thoughts and constraints in making these
UIT Environment	Name of environment connecting to UIT Qualification and E2E sandbox testing	decisions
Platform	Infrastructure e.g. cloud, on prem, operating system, etc	This info will help when building environments are built and aids connectivity tests
Interfaces	Protocol used connect to integrated systems	
Sizing, Configuration and Connectivity details	High level understanding of network interfaces e.g how does the environment connect?	
Readiness	What are the set of smoke checks/tests in place?	Despite being early in the process to confirm this level of information, it would be helpful to understand what is envisaged.
☐ Readiness Time	How long do readiness checks take to execute	
Scheduled Downtime	Planned environment downtime e.g.. maintenance, data refreshes, etc	
Support	Support mechanism for environment issues	
Environment Alert Mechanism	Alert process for environment issues e.g. email subscriptions, Teams alert channels, etc	
Monitoring Tool	Tool used to ensure environment is running	
Environment Set up time	Timeframe to prepare environment	
Data Checks	Are there checks in place to ensure data readiness	
Release Mechanism	Release process description including tool	It is important to understand the release process and the time taken as it ensures sufficient time is given to release code
☐ Deployment Time	Time taken to deploy code	
Shared Usage	Is the environment used by other functions apart from MHHS testing?	Confirm that the environments being provisioned are solely used for MHHS testing

Figure 6 Environment Details Template

The template in Figure 6 was discussed at the December Environment Working Group and Market Participants requested to provide feedback on the template. At the January Environment Working Group there was a further discussion where Programme Participants were encouraged to provide early feedback on the template in order that the MHHS Programme can start to build an environments fact base, with SIT participants the priority.

Table 8 provides a view of environments that will be provided by participants and currently demonstrates assumptions:

BSC Role	Responsible Organisation(s)	Environments			
		SIT-Staging	SIT A	SIT B	UIT
MSS (Metering Service Smart)	service provider	TBD	Y (selected)	Y (selected)	Y
SDS (Smart/Non-Smart Data Service)	service provider	TBD	Y (selected)	Y (selected)	Y
MSA (Metering Service Advanced)	service provider	TBD	Y (selected)	Y (selected)	Y
ADS (Advanced Data Service)	service provider	TBD	Y (selected)	Y (selected)	Y
UMSDS (UMS Data Service)	service provider	TBD	Y (selected)	Y (selected)	Y
DC (Data Collector)	agent	TBD	-	Y (selected)	tba
DA (Data Aggregator)	agent	TBD	-	Y (selected)	tba
MOP (Meter Operator)	agent	TBD	-	Y (selected)	tba
domestic supplier	supplier	TBD	Y (selected)	Y (selected)	Y
non-domestic supplier	supplier	TBD	Y (selected)	Y (selected)	Y
DSP	DCC	TBD	Y	Y	Y (service)
CSS	RECCo	TBD	Y	Y	Y (service)
EES	RECCo	TBD	Y	Y	Y (service)
ISDS (Industry Standing Data Service)	Elexon	TBD	Y	Y	Y (service)
LSS (Load Shaping Service)	Elexon	TBD	Y	Y	Y (service)
MDS (Market-wide Data Service)	Elexon	TBD	Y	Y	Y (service)
VAS (Volume Allocation Service)	Elexon	TBD	Y	Y	Y (service)
Settlement Operations	Elexon	TBD	Y	Y	Y (service)
Existing Settlement Operation (Non-MHHS)	Elexon	TBD	TBD	TBD	TBD
UMSO	(I)DNOs	TBD	Y (selected)	Y (selected)	Y
Network Operations	(I)DNOs	TBD	Y (selected)	Y (selected)	Y
Registration Services	(I)DNOs	TBD	Y (selected)	Y (selected)	Y
DIP	MHHS	TBD	Y	Y	Y (service)
PKI	MHHS	TBD	Y (test certs?)	Y (test certs?)	Y (service)
DTN	Electralink	TBD	Y	Y	Y (service)

Table 8 High Level Participant view

12 Assurance and Readiness Criteria

Various techniques and processes will be put in place to ensure central system environments are ready for use. As system design progresses more detailed information will be added to this section. Assurance and readiness can be separated into two different methods: Pre-testing cycle readiness and Testing cycle readiness.

- Pre-testing – before a testing phase commences, environments need to be functional from day one. The SI Test Team will ensure that environments are prepped and ready for testing. Therefore, certain assurances need to be given to ensure environment readiness:

    o TPs will be expected to fulfil SIT and UIT entry criteria. Entry criteria relating to environment requirements will be specified in relevant test planning documentation when available.

    o The programme will inform TPs when testing starts. Information will be communicated by the SI Test Team.

    o Necessary user access arranged by the SI Test Team to connect and log into systems. The process to do this is documented on the [REF-06] MHHS DIP 094 Interface Code of Connection.

    o Environment Readiness tests to be executed by relevant parties where systems are directly or indirectly part of the test cycle. For example, if an application or system is being tested then that is considered as direct involvement. If a system isn't under test, but is need for endpoint checks, then that is considered as indirect involvement. These tests will be specified by the SI Test Team and will confirm the following:

        - Network connectivity tests – simple ping (subject to security requirements) and DNS tests to ensure the network is up and running and endpoints are available.

        - Certificates check – ensuring correct certificates are setup. Different test environments will need different certificates e.g., SIT A will have its own, UIT its own, etc. Hence, each environment will need its own certificate check. Certificates are issued via the DIP Service Provider where Public/Private key pairs will need to be created. For each environment communication between the DIP and DIP Service Users will need to be verified. Firstly, secure communications by the TLS will need to be established and then secure authentication between individual JSON messages through digital signatures. This will be outlined in [REF-06] MHHS DIP 094 Interface Code of Connection. However, later versions of this document will outline the requirements for each environment.

        - Test data verification – simple checks to verify correct data is available in the system.

        - End-to-end check – executing a test from the starting point to the end point. This is not to be confused with a full system test. Instead, a check from the starting point(s) to the end point(s) of the system to ensure any subsequent testing will flow through the system.

        - Environment monitoring and alerts in place (covered in the Monitoring section).

        - SI Test Team will confirm readiness through formal procedures (format tbc).

        - Testing Cycles – during daily testing cycles, a level of confidence should be given to ensure the test environments are fit for purpose. To mitigate this, the following will be put into place (depending on system design):

            o Daily morning status health check reports for central systems. Depending on system design, these can be manual or automated.

            o Automated end-to-end check – executing a test from the starting point to the end point.

            o Live environment monitoring and alerts in place (covered in the Monitoring section)

- TPs are also encouraged to give updates on their own environment readiness and health status.

- Different tests phases will not be run on the same environment and will help to ensure approved release versions are being tested.

13 Central Systems' Environments

13.1 Central Parties Overview

This section lists central TPs together with the name of their system(s) that will be connected to the DIP.

Participant Name	System(s)
Data Integrations Service Provider	DIP
Data Communications Company (DCC)	Smart DCC - Data Service Provider (DSP), Central Switching Service (CSS)
Electralink (DTS)	DTN
Elexon Central Systems (Helix)	Industry Standard Data Service (ISDS), Load Shaping Service (LSS), Market-wide Data Service (MDS), Volume Allocation Service (VAS), Settlement Operations
Retail Energy Code Company (RECCo)	EES

Table 9 Central Systems

13.2 Data Integrations Service Provider

Building the Data Integration Platform (DIP) as the data exchange solution for the MHHS Programme

13.3 Elexon Central Systems

The Elexon central systems comprises of the Balancing and Settlement Code (BSC) services. The DIP consumes industry standard data and load shapes (daily average consumption or export data for each settlement period). Consumption data and registration will flow from the DIP to the BSC central services. This will be a critical part of the central systems in the test environments.

13.4 Data Communications Company (DCC)

The DCC manages data and communications to and from smart meters. The Programme will decide if it is feasible to have more than one instance of test environments due to the complexity in setting up multiple systems.

13.4.1 DCC – DSP

The DSP manages communications with Smart Meters.

13.4.2 DCC – CSS

The CSS is responsible for the change of supplier activity i.e., when a consumer is changing their supplier. Switching requests, objections and any updates in registration is managed when a change of supplier is secured. As this service has only come into play in 2022, it will be an important component of test environments to ensure it works with any MHSS system changes.

13.5 Retail Energy Code Company

Company established to oversee the development of the Retail Energy Code (REC).

13.6 Electralink – Data Transfer Network (DTN)

The DTN is an exchange system allowing participants in the industry to exchange customer information (particularly important for settlements and changing suppliers). This is particularly important in SIT where E2E scenarios will need to be covered.

14 (I)DNOs' Environments

(I)DNOs are responsible for their own environments, but connection to the DIP will need to be monitored for availability and readiness (as per other TP environments).