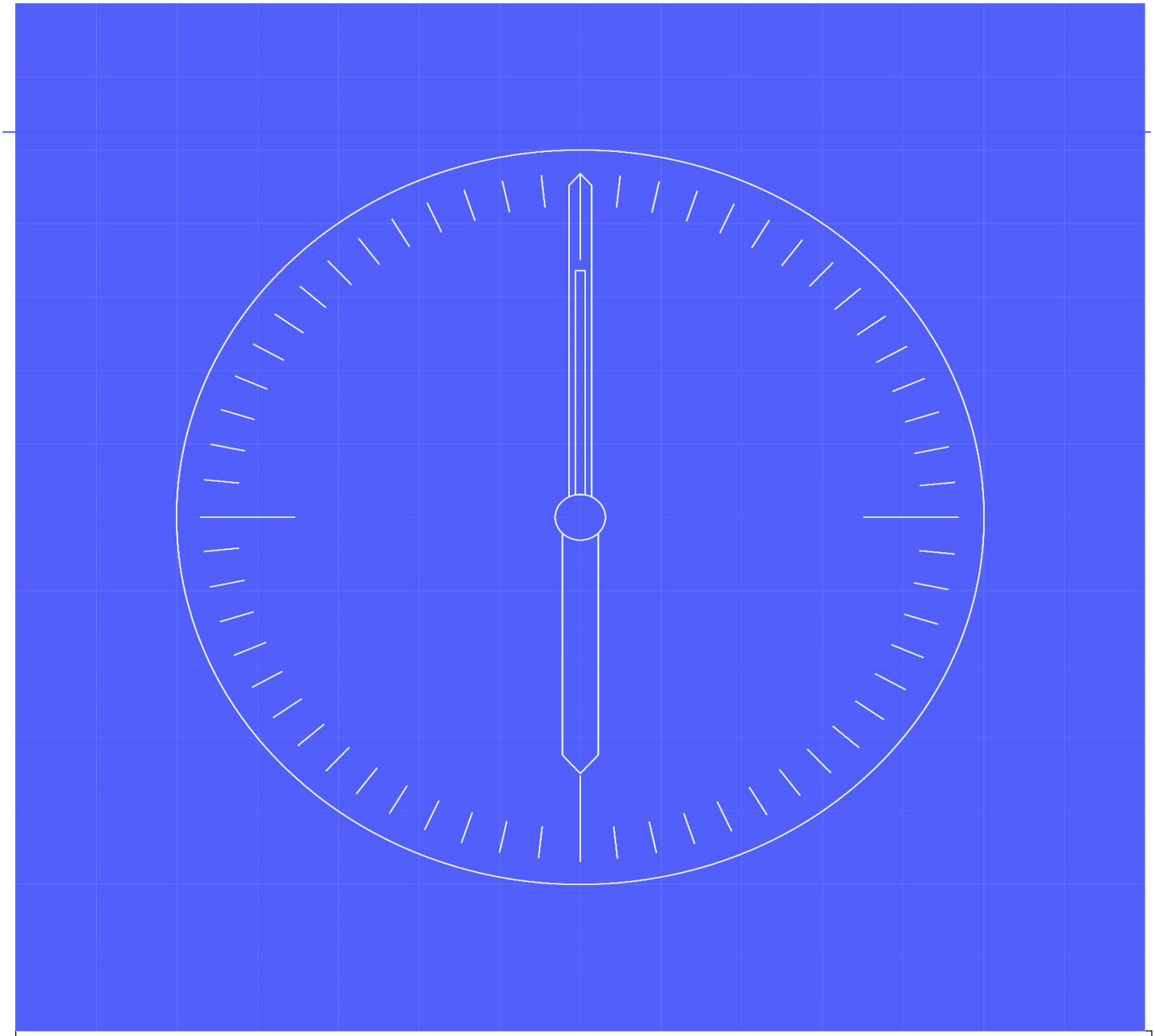
MHHS PROGRAMME
Industry-led, Elexon facilitated

SIT Operational Test Data Approach & Plan



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Cesar Lopes	**MHHS-DEL2432**	**1.0**
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1.1 Change Record

Date	Author(s)	Version	Change Detail
13/03/2024	Cesar Lopes	0.1	Initial Draft
27/03/2024	Cesar Lopes	0.2	Updates following SRO and Code Body review
12/04/2024	Cesar Lopes	0.3	Updated following Industry Consultation
15/05/2024	Cesar Lopes	1.0	Baselined at v1.0 following May SITAG approval

1.2 Reviewers

Reviewer	Role
Lee Cox	SI Test Manager
Richard Puddephatt	SI Test Data Manager
Iain Smith	SI Non-Functional Test Lead
Julia Ledden	SI Operational Test Lead
Kevin Davis	SI Test Architect
Simon Berry	SI Environments and Release Manager
John Wiggins	SI Data Migration Manager
Adrian Ackroyd	SRO Function Programme Test Manager
Smitha Pichrikat	SRO Function Client Delivery Manager
Phil Heiton	SRO SIT NFT/Operational Test Manager
Code Bodies (BSC and REC)	Various

1.3 References

Ref No.	Document	Publisher	Published	Additional Information
REF-01	MHHS-DEL-315E2E Testing & Integration Strategy	SI Testing	29th April 2022	
REF-02	MHHS-DEL-2417 SIT Operational Test Approach & Plan	SI Testing	26th March 2024	
REF-03	MHHS-DEL 300 Test Data Strategy	SI Testing	18th May 2023	
REF-04	MHHS-DEL813 Overarching Test Data Approach & Plan	SI Testing	24th May 2023	
REF-05	MHHS-DEL618 - Environment Approach & Plan	SI Testing	28th February 2023	
REF-06	MHHS-DEL2376 - SIT Non-Functional Test Data Approach & Plan	SI Testing	14th March 2024	
REF-07	MHHS-DEL1470-CIT Data Loading High-Level Guidance	SI Testing	19th July 2023	
REF-08	MHHS-DEL1367 - SIT Functional Test Data Approach & Plan	SI Testing	16th August 2023	

1.4 Terminology

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

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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.

[REF-01] 'MHHS-DEL315 - E2E Testing & Integration Strategy' describes the overall, end-to-end (E2E) approach to testing - the manner in which all parties involved in the MHHS programme will conduct testing.

One of the major test phases is the **Systems Integration Testing (SIT).** The purpose of SIT phase is to prove that the component Services are implemented in a way consistent with the MHHS E2E Design and interact coherently and consistently.

The SIT comprises sub-test stages: (1) **Component Integration Testing (CIT)**, (2) **Functional Test**, (3) **Migration Test,** (4) **Non-Functional Test** and (5) **Operational Test**.

This document, associated with the **[REF-02] MHHS-DEL-2117 SIT Non-Functional Test Approach & Plan**, provides the data preparation guidance for the **SIT Operational Tests**.

This document is a child document of a series of documents progressively detailing the data approach for testing. Therefore it is recommended the following documents be read in conjunction:

- [REF-03] MHHS-DEL 300 Test Data Strategy: covers the data required to be coordinated across the systems for testing purposes.
- [REF-04] MHHS-DEL813 Overarching Test Data Approach & Plan: establishes a common and fully aligned set of test data for use in the industry-wide test phases of MHHS.

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3 Introduction

3.1 Document Purpose

This document aims to define a Test Data Approach specifically for the SIT Operational Tests. It provides a detailed view of specific data required per participant role.

This document is intended to be read by the following groups:

- Senior Responsible Owner Function (SRO)
- Lead Delivery Partner (LDP)
- Testing and Migration Advisory Group (TMAG)
- Data Working Group (DWG)
- Programme Participant Test Managers
- All Programme party teams and resources involved in SIT execution or support.

3.2 Reviews and Approvals

The SIT Operational Test Data Approach and Plan will go through an initial LDP review by the following team members:

- Lee Cox, SI Test Manager
- Richard Puddephatt, SI Test Data Manager
- Kevin Davis, SI Test Architect
- Iain Smith, SI NFT Test Lead
- Julia Ledden, SI Operational Test Lead
- Simon Berry, SI Environments and Release Manager
- John Wiggins, LDP Enterprise Architect

Upon completion of the LDP review, any comments and feedback would be incorporated before going to the SRO team for formal review by:

- Adrian Ackroyd, SRO Function Programme Test Manager
- Smitha Pichrikat, SRO Function Client Delivery Manager
- Phil Heiton, SRO SIT NFT/Operations Test Manager
- Balancing and Settlement Code (BSC) and Retail Energy Code (REC)

Upon completion of the SRO and Code Body review it will then be distributed to the DWG for consultation where comments will be incorporated leading to a recommendation of approval by the group.

Approval will then be requested from:

- Systems Integration Testing Advisory Group (SITAG).

The document will be made available for information via the programme portal.

3.3 Change Forecast

The SI team will own this document and keep it up to date, with review and approval by MHHS programme governance as appropriate. Each new version supersedes the previous version in its entirety.

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

3.4 Summary of Changes

Initial release.

3.5 Assumptions and Caveats

3.5.1 Assumptions

- The Programme Participants taking part in SIT have already identified their systems that will be deployed in the Test Environments and will be used during SIT Tests.
- The Programme Participants, as part of the PIT Testing, are being able to create and load test data to their systems in their PIT test environment.
    - Whenever possible, the tools developed by the participants during the PIT stage can be reused to load test data for SIT.
- As described in the document [REF-05] MHHS-DEL618 - Environment Approach & Plan, the Programme Participants will execute Operational Tests on the SIT-B Environment, segregated from the SIT-A used during the Functional Tests.
    - It is assumed the SIT Non-Functional and SIT Operational can be executed in one environment but not in parallel to avoid conflicts.
    - Programme Participants can decide to have their own environment for each stage or re-purpose their environments for each stage.
- Relevant Programme Participants will populate non-core service management, Operational, BCDR Processes, and Workflow systems with any supporting set up data required for running operational tests.

3.5.2 Caveats

N/A.

4 Objectives

4.1 Objectives

The objective of the SIT Operational Test stage is to:

1. Validate through a variety of Test techniques that Operational processes are in place that support the MHHS Design, including Service Management and Business Continuity/Disaster Recovery.
2. Prove that the solution can be operated and supported using supporting processes in a production like Test environment.

Operational Testing is primarily a type of Non-Functional Testing where the Non-Functional Requirements along with Operations processes are tested and validated, however this does not where applicable exclude the inclusion of Functional requirements.

The objective of this document is to establish the approach to obtain the test data required to execute and pass all test scenarios / cases in the scope of the Test Stage without exception.

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5 Scope

5.1 In Scope

As described in [REF-02] MHHS-DEL-2417 SIT Operational Test Approach & Plan, the scope of SIT Operational involves the following roles:

- Operational Processes
- Business Continuity / Disaster Recovery
- Service Management – processes/workflows
- Operational Choreography
- SIT LDSO with MPRS (in own target infrastructure)
- Functional Business Requirements (limited)
- Security
- CR044 – implementation of Data 'Refresh' message IF-051

This document provides the Test Data Approach to be used for the different types of Operational Tests.

5.2 Out of Scope

This document does not cover the details of the provisioning of data for:

- All the other SIT Stages – these will be the subject of separate Test Data Approach and Plan documents:
  - Migration Test
  - Non-Functional Test
- UIT Test Stages:
  - Qualification Test
  - E2E Sandbox

6 Test Architecture & Coverage

6.1 SIT Operational – Planned Tests and Data Requirements

The Table 1 lists the test types planned to be carried out during SIT Operational Testing. The document [REF-02] MHHS-DEL-2417 SIT Operational Test Approach & Plan contains the details for each group.

Table 1: SIT Operations Test and Data Requirements

Test Group	Tests	Test Data Requirement
Operational Process	Maintenance	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test.
Operational Process	Fault Management/Error Handling	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test.
Operational Process	Reporting	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test.

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Test Group	Tests	Test Data Requirement
Operational Process	**DIP Onboarding / Offboarding**	**Test Data preparation required to execute E2E tests involving multiple programme participants.**
Business Continuity and Disaster Recovery	Business Continuity	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test. • If the test execution against identified scenarios is not viable, practical and achievable, the processes may be verified through assurance processes (static testing)
Business Continuity and Disaster Recovery	Disaster Recovery	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test. • If the test execution against identified scenarios is not viable, practical and achievable, the processes may be verified through assurance processes (static testing)
Service Management	• Service Desk Support • Incident Management • Change Management • Problem Management • Capacity Management • Knowledge Management	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test.
Operational Choreography	• **Interfaces where manual work may be required e.g. IF-031/IF-032** • **Assurance of procedures, processes involving manual work**	**Test Data preparation required to execute E2E tests involving multiple programme participants.**
SIT LDSO with MPRS (in own target infrastructure)	**MPRS integrated with LDSO's (DNO, iDNO's)**	**Test Data preparation required to execute E2E tests involving multiple programme participants.**
Security	System Access	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test.
CR044	**Data 'Refresh' message IF-051**	**Test Data preparation required to execute E2E tests involving multiple programme participants.**

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Test Group	Tests	Test Data Requirement
Business Requirements	• Maintenance of records • Supporting of Investigation and resolution of issues • Escalation processes • Managing a proving Test process in line with Half Hourly collection process • Implementation Data validation • Implementation of Monitoring processes / tools	No pre-load of test data required. • Tests can be executed with any data present in the PP system, or a new MPAN business process can be executed to run the operational test.

This document describes the Test Data Approach to support all Operational Tests requiring Test Data preparation.

7 Test Data Approach

7.1 Operational Test Data Approach - Overview

SIT Operational Tests and SIT Non-Functional Tests will take place in the same SIT-B Environment. So, it is logical to re-use test data between those two SIT test stages. The Table 2 contains a summary of the Test Data Types produced for SIT Non-Functional Tests and its applicability for the Operational Tests.

As non-functional and operational tests progress, the MPAN data will change as per the business process executed during tests. While running operational test scenarios, it is the responsibility of the Programme Participants initiating a test to select, when needed, one MPAN currently available in their systems with the required state specified by the Test Case data conditions.

Table 2: Non-Functional Test Data Types and Operational Tests applicability

#	Test Data Type	Test Data Approach	SIT Operational Test Applicability
#1	**E2E Choreography**	• Re-use of SIT Functional Test Data, cohorts pairing and SIT Migration Test Data. • Re-load the Test Data into SIT-B Environment systems. Total MPANs available: approximately 10,000.	• Operational Process (DIP Onboarding / Offboarding) • Operational Choreography • SIT LDSO with MPRS (single platform) • CR044 (Data Refresh)

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#	Test Data Type	Test Data Approach	SIT Operational Test Applicability
#2	**PP and DIP Bilateral**	• Re-use of CIT Test Data. • Re-load the CIT Test Data into SIT-B Environment systems. Total MPANs available: approximately 40,000.	Any test where the SI End-point, the pseudo company MHHS, is used to assess the Programme Participant operational capability in a bilateral test involving DIP and a single Programme Participant.

The Test Data Types are fully described in the [REF-06] MHHS-DEL2376 - SIT Non-Functional Test Data Approach & Plan.

7.2 Test Data Loading

The loading of the Test Data for SIT Operational Tests will use the same tools, file types and SFTP environment used for SIT Component Integration Tests, SIT Functional Tests, SIT Migration Tests and Programme Participant PIT. Details available on:

- [REF-07]: MHHS-DEL1470-CIT Data Loading High-Level Guidance
- [REF-08]: MHHS-DEL1367 - SIT Functional Test Data Approach & Plan

7.3 Test Data Generators

Similar to the approach executed for SIT Component Integration Tests and SIT Functional Tests, **data generators shall be used for electricity consumption data instead of historical consumption data.**

The Data Generator tool, which launched on 24 May 2023, provides realistic test data for the following types of data to use during Pre-Integration Testing (PIT) and Systems Integration Testing (SIT):

- IF-021 – Directly consumable data, consumed by Elexon Central Systems (ECS) among others
- IF-041 – Directly consumable data, consumed by the Data Services

The Data Generator tool fully simulates the above-mentioned types of Meter and Settlement data and produces valid data for testing.

Information on the Data Generator is available on the Simulators & Emulators page of the Collaboration Base. Participants will need their own tool to transform and inject the data into the relevant Service, where appropriate.

Notes:

1. Participants shall **NOT use real domestic customer consumption data** associated with the real MPANs in the Test Environment.
2. If, during the Data Cut, real domestic consumption data is extracted as part of the production data backup and loaded to the participant test environment, the participant shall apply a transformation script to modify and randomise the domestic consumption data.
3. Participants **may use real consumption data for non-domestic** MPANs. It is the responsibility of the participant to analyse the risks and impact of using real consumption data in the test environment. The real consumption data may expose participants' business-sensitive information.
4. Participants may use their own data generation tools.

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8 Test Data and SIT Operational Environment Reset

Due to the nature of the execution and scale of Non-Functional Tests in the same environment as the Operational tests, the data in the Programme Participant's systems may become inconsistent and unusable over time, making it impossible to continue the Test phase.

The Programme will monitor the data position of all participants and only, as a last resort, will ask, with a two-week notice, the participants to reset their systems to the state before the start of the execution of the non-functional and operational tests.

It is highly recommended that all Programme Participants take a full backup or re-storing point of their system under tests after the initial Non-Functional Test Data Loading and just before the start of the test execution.

9 Test Data Anonymisation

All MPANs records used in testing will be allocated unique reference ID that will be used in all communications, including test results and defect logging in ADO.

Due to the MPAN being considered Personal Identifiable Information (PII), it cannot be shared outside of the System Test Environment. I.e., While the Real MPAN can be used in the IF/PUB or DTS messages transferred and processed in the test environment, it cannot be shared in communication means like email, test reports, bug triage, etc.

The programme will provide a table to all participants with a Unique Ref ID for the allocated MPANs to be used in communication. For example:

- MPAN Core: 20 1234 1234 123

- Ref ID (For communications and reports): ABCD_10001234

Note:

- The same anonymisation/obfuscation approach shall be used for Domestic and Non-Domestic participants.
- **NO real domestic consumption data shall ever be used for tests linked to its original MPAN or Meter.**
- Participants may use real non-domestic consumption/generation to check their processes.
    - It is the responsibility of the participant to analyse the risks and impact of using real non-domestic consumption data in the test environment. The real consumption data may expose participants' business-sensitive information.

9.1 Test Data Anonymisation for Testing Reports and Test Evidence

As the MPAN is considered Personal Identifiable Information (PII) and cannot be shared in Test Reports and any evidence, logs or images attached to Azure DevOps. The participant needs to obfuscate the MPAN while keeping the ability of assurance teams to verify the content.

For Reports and Test evidences:

1. The participant shall remove or obfuscate the unique identifier digits of the MPAN – Digits 11 to 18 of the full MPAN (see Figure 1).
2. For image files, the participants can blur or overlay the unique identifier with any colour graphic shape (e.g.: a white rectangle covering the unique identifier digits).
3. The same obfuscation approach shall be applied for Domestic and Non-Domestic MPANs

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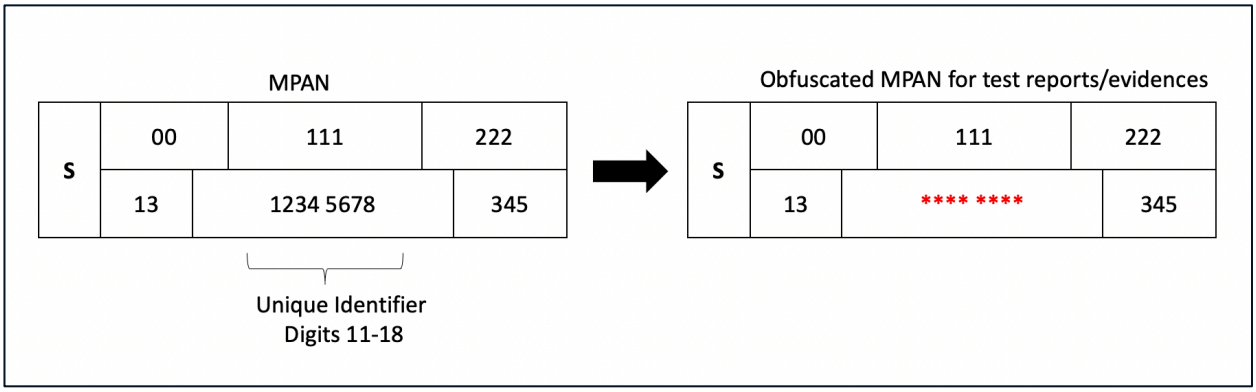

Figure 1: MPAN obfuscation for Test Reports and evidence

10 Test Data Schedule

Please, refer to [REF-02] MHHS-DEL2417 SIT Operational Testing Approach & Plan for the SIT Operational Test Schedule.

Table 3: SIT Operational Test Data Milestones

Milestone	Milestone Date
Operational Test Data – Shared	09 Aug 2024
Operational Test Data – Ready	06 September 2024 Four weeks before SIT Operational Start

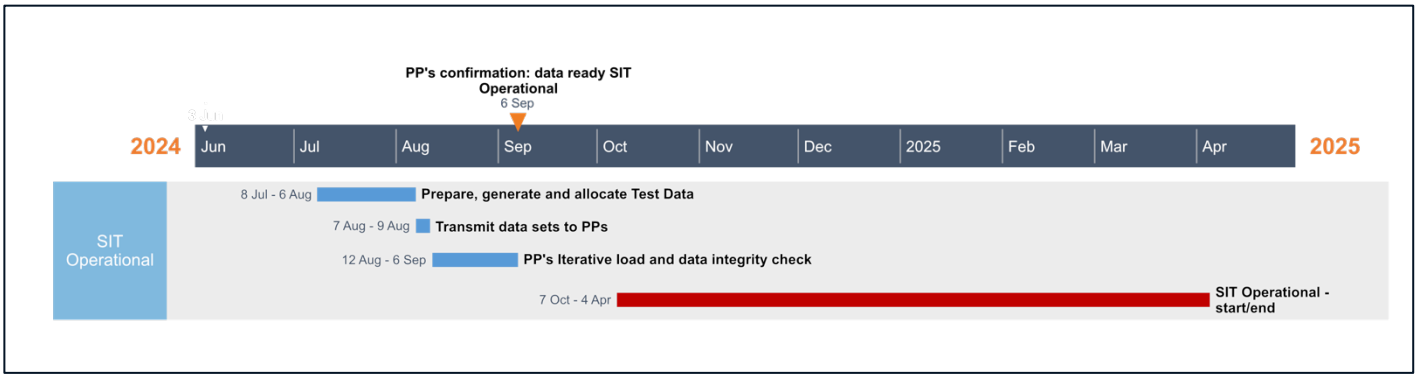

Figure 2: SIT Operational Test Data Schedule

11 Appendix

N/A

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