

Phase 8 Report

Data Management & Deployment

Project: Smart Healthcare Appointment & Compliance Hub

Batch: 4

Program: TCS Last Mile SmartBridge

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1. Introduction

This phase ensures that the Smart Healthcare Appointment & Compliance Hub is fully prepared for real-world use through structured data handling, backup strategies, and secure deployment processes. It focuses on migrating historical healthcare records, preventing data duplication, deploying metadata consistently across environments, safeguarding patient information with regular backups, and enabling advanced deployments via modern tools like VS Code and Salesforce DX (SFDX). Together, these steps maintain **data integrity, compliance readiness, and system reliability** for healthcare operations.

2. Objectives

- **Migrate bulk healthcare records** (patients, appointments, compliance data) efficiently using Data Loader.
- **Enforce patient data integrity** by configuring Duplicate Rules on critical fields like Name, Email, and Phone.
- **Deploy metadata configurations** such as Record Types and Page Layouts from Sandbox to Production using Change Sets.
- **Enable regulatory compliance and disaster recovery** with scheduled Data Export and Backup of all key records.
- **Implement version control and advanced deployment** of Apex, Validation Rules, and automation using VS Code and SFDX.

3. Steps Performed

3.1 Data Loader(Insert/Update)

Use Case:

We need to **migrate historical patient and appointment data** into Salesforce. For example:

- Upload **10,000 patient records** into the Contact object.
- Upload **20,000 appointment records** into Appointment__c and link them with the correct Patient (Contact) and Doctor (Clinician).

Since manual entry or importing through Data Import Wizard is not practical for this volume, **Data Loader** is the best tool.

Name	Type	Compressed size	Password p...	Size	Ratio	Date modified
META-INF	File folder					27-08-2025 23:27
util	File folder					27-08-2025 23:27
dataloader-64.1.0	Executable Jar File	27,218 KB	No	28,591 KB	5%	27-08-2025 23:27
install	Windows Batch File	1 KB	No	1 KB	33%	27-08-2025 23:27
install.command	COMMAND File	1 KB	No	1 KB	33%	27-08-2025 23:27

orgfarm-9c399a4996-dev-ed.develop.lightning.force.com/one.app#eyJjb21wb251bnREZWYiOiUvbmU6YWxvaGFQYVdlIiwieYXR0cmliZXNzcyI6eyJhZGRyZXNzIjoil2RhdGFjYXBvc...

Setup Home Object Manager

Getting closer

Choose data Edit mapping Start import

Import your Data into Salesforce

You can import up to 50,000 records at a time.

What kind of data are you importing?

Standard objects Custom objects

Appointments

What do you want to do?

Add new records

Match by: --None--

Which User field in your file designates record owners? --None--

Which User field in your file do you want to match against to set the Doctor lookup field? --None--

Which Contact field in your file do you want to match against to set the Patient lookup field? --None--

Where is your data located?

Drag CSV file here to upload

CSV

File

Choose File No file chosen

Character Code ISO-8859-1 (General US & Western European, ISO-LATIN-1)

Values Separated By Comma

Cancel Previous Next

3.2 Duplicate Rules (Ensuring Patient Data Integrity)

Use Case:

In healthcare, **duplicate patient records are dangerous** because:

- Same patient might appear twice with different appointments.
 - Compliance tracking becomes inaccurate.
- To prevent this, Salesforce **Duplicate Rules** ensure staff/patients don't create duplicate Contact records.

Setup Home Object Manager

Quick Find

Setup Home
Salesforce Go
Service Setup Assistant
Commerce Setup Assistant
Field Service Setup Home (Beta)
Hyperforce Assistant
Release Updates
Salesforce Mobile App
Lightning Usage
Optimizer
Sales Cloud Everywhere

ADMINISTRATION
Users
Data
Big Objects
Conversation Transcript Export
Data Export

SETUP
Duplicate Rules

Contact Duplicate Rule
Prevent Duplicate Patients

Help for this Page

Duplicate Rule Detail Edit Delete Clone Deactivate

Field	Value	Field	Value
Rule Name	Prevent Duplicate Patients	Order	2 of 2 [Reorder]
Description	Blocks creation of duplicate Contact records based on Email or Phone.		
Object	Contact		
Record-Level Security	Enforce sharing rules		
Action On Create	Allow	Operations On Create	Alert Report
Action On Edit	Allow	Operations On Edit	Alert Report
Alert Text	Use one of these records?		
Alert Active	checked		
Matching Rule	Standard Contact Matching Rule	Matching Criteria	Matching rule for contact records. More info
Conditions	Mapped		
Created By	Palla Bhugarbha	Modified By	Palla Bhugarbha
Created	9/29/2025, 7:56 AM	Modified	9/29/2025, 7:56 AM

Edit Delete Clone Deactivate

3.3 Change Sets(Metadata Deployment)

Use Case:

We built Record Types and Page Layouts in Sandbox (development environment). Now we must move them to **Production** so doctors and staff can use them.

- Example: Appointment__c Record Types → *In-Person & Telehealth*.
- Compliance Document__c Record Types → *Patient Compliance & Staff Compliance*.

3.4 Data Export and Backup

Use Case:

In healthcare, **data backup is legally required** (HIPAA/GDPR compliance). If system data is lost, patient safety and compliance tracking will be at risk. A weekly **Data Export** ensures we always have a backup.

Setup Home Object Manager

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Data
Big Objects
Conversation Transcript Export
Data Export

SETUP
Data Export

Monthly Export Service

Help for this Page

Data Export lets you prepare a copy of all your data in salesforce.com. From this page you can start the export process manually or schedule it to run automatically. When an export is ready for download you will receive an email containing a link that allows you to download the file(s). The export files are also available on this page for 48 hours, after which time they are deleted.

Next scheduled export:
10/5/2025, 9:00 AM

Export Now Schedule Export

Your export has been queued. You will receive an email notification when it is completed.

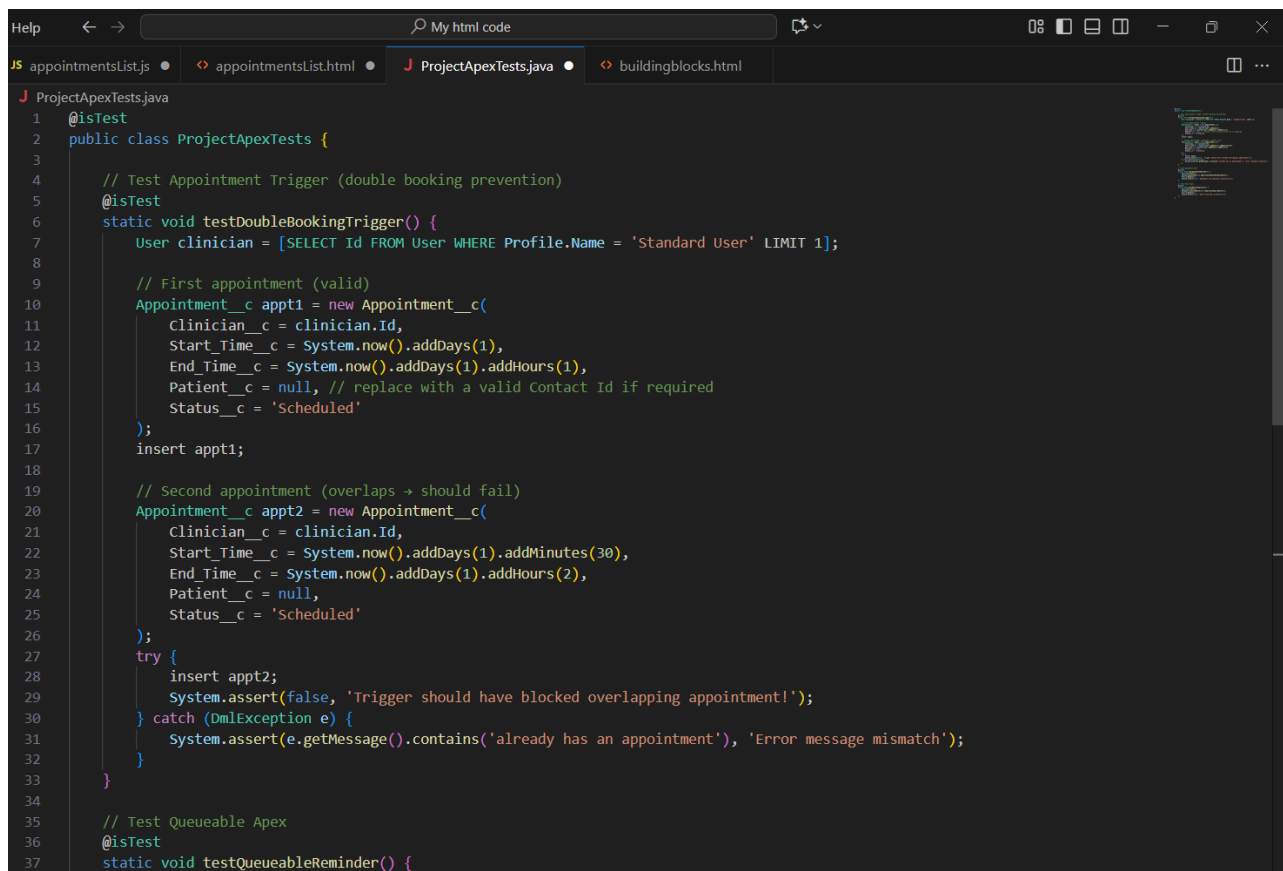
Scheduled By	Palla Bhugarbha
Schedule Date	9/30/2025
Export File Encoding	ISO-8859-1 (General US & Western European, ISO-LATIN-1)

3.5 VS Code & SFDX

Use Case:

Some items like **Apex Triggers, Classes, Validation Rules** cannot be deployed using Change Sets. We need **VS Code + Salesforce CLI (SFDX)** for professional, script-based deployment with version control (Git).

- Example: Validation Rule → Prevent appointments from being canceled within 24 hours.
- Example: Apex Trigger → Automatically flag “No Show” if appointment not marked attended.

A screenshot of the Visual Studio Code editor interface. The top bar shows the file explorer with four files: appointmentsList.js, appointmentsList.html, ProjectApexTests.java (selected), and buildingblocks.html. The main editor area displays the content of ProjectApexTests.java. The code is written in Java and includes several test methods. The first method, testDoubleBookingTrigger(), is a static void method that uses the @isTest annotation. It starts by querying for a user with the profile name 'Standard User'. Then, it creates a valid appointment (appt1) and inserts it. Next, it creates a second appointment (appt2) that overlaps with the first one and attempts to insert it. The code uses System.assert to verify that an exception is thrown because the trigger should have blocked the overlapping appointment. The second method, testQueueableReminder(), is also a static void method with the @isTest annotation, but its body is not fully visible in the screenshot.

```
1  @isTest
2  public class ProjectApexTests {
3
4      // Test Appointment Trigger (double booking prevention)
5      @isTest
6      static void testDoubleBookingTrigger() {
7          User clinician = [SELECT Id FROM User WHERE Profile.Name = 'Standard User' LIMIT 1];
8
9          // First appointment (valid)
10         Appointment__c appt1 = new Appointment__c(
11             Clinician__c = clinician.Id,
12             Start_Time__c = System.now().addDays(1),
13             End_Time__c = System.now().addDays(1).addHours(1),
14             Patient__c = null, // replace with a valid Contact Id if required
15             Status__c = 'Scheduled'
16         );
17         insert appt1;
18
19         // Second appointment (overlaps → should fail)
20         Appointment__c appt2 = new Appointment__c(
21             Clinician__c = clinician.Id,
22             Start_Time__c = System.now().addDays(1).addMinutes(30),
23             End_Time__c = System.now().addDays(1).addHours(2),
24             Patient__c = null,
25             Status__c = 'Scheduled'
26         );
27         try {
28             insert appt2;
29             System.assert(false, 'Trigger should have blocked overlapping appointment!');
30         } catch (DmlException e) {
31             System.assert(e.getMessage().contains('already has an appointment'), 'Error message mismatch');
32         }
33     }
34
35     // Test Queueable Apex
36     @isTest
37     static void testQueueableReminder() {
```

4. Expected Outcomes

- Successful **migration of bulk patient and appointment data** into Salesforce without data loss.
- **Duplicate prevention** mechanisms ensuring accuracy and integrity of patient records.
- **Seamless deployment** of Record Types and Page Layouts from Sandbox to Production via Change Sets.
- **Regularly scheduled data backups** to meet compliance and disaster recovery requirements.
- **Version-controlled deployment of automation and logic** (Apex, Validation Rules, Triggers) using VS Code and SFDX for professional-grade delivery.

5. Conclusion

Phase 8 ensures that the Smart Healthcare Appointment & Compliance Hub operates with **clean, reliable, and secure data** while being ready for deployment in a live healthcare environment. By combining bulk data migration, duplicate prevention, metadata deployment, regulatory backups, and advanced deployment practices, the system achieves both **operational efficiency and compliance standards**. This phase creates a strong foundation for ongoing healthcare operations and future scalability.