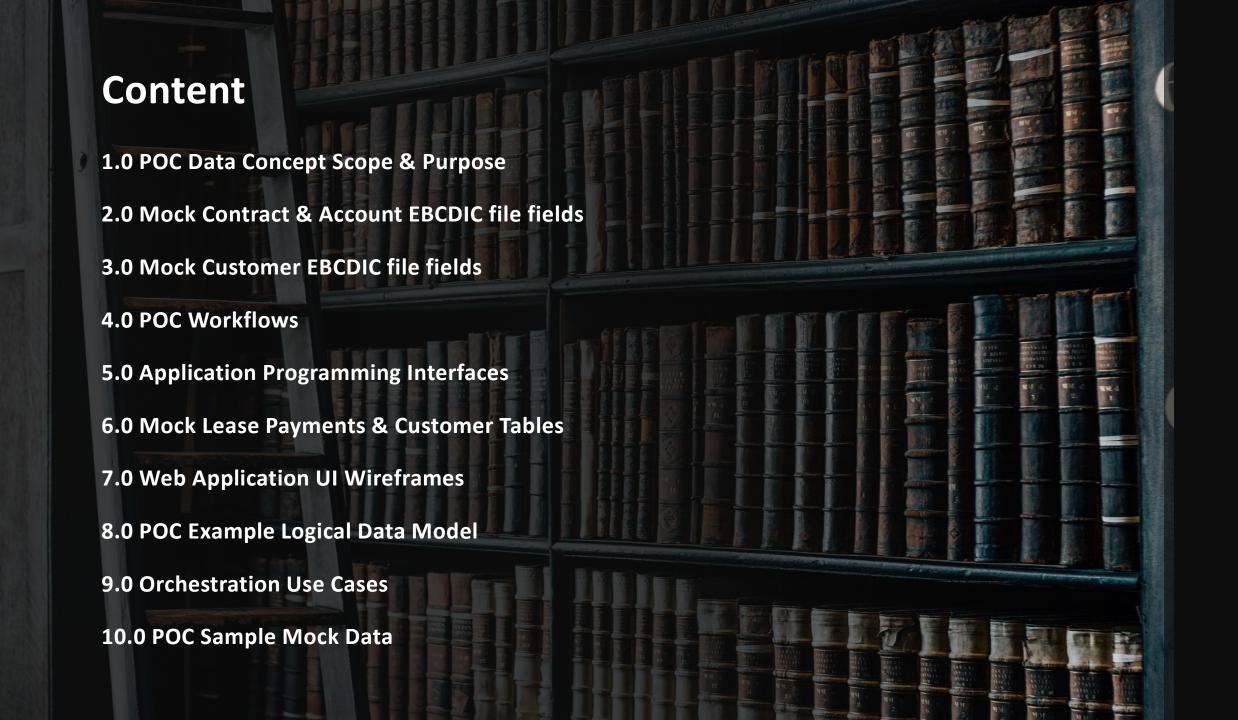
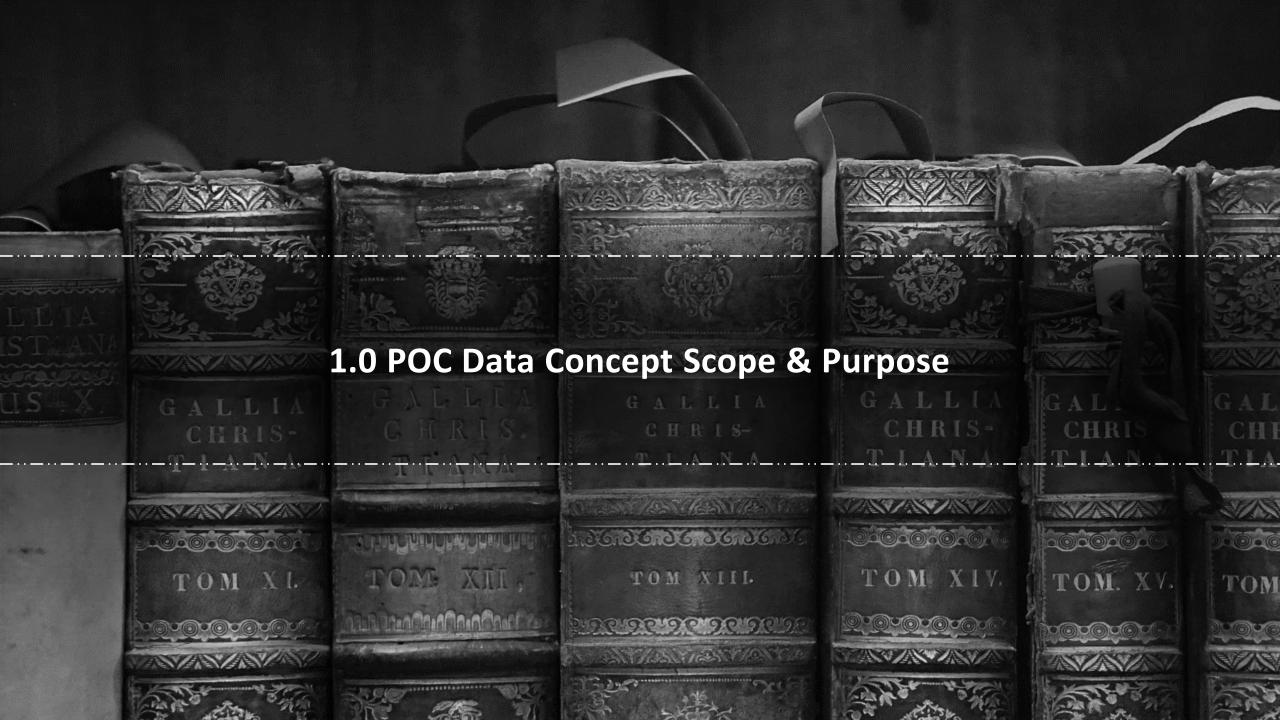




Enterprise Data Platform (EDP)

Proof of Concept (POC) Specific Requirements & Design





Enterprise Data Platform (EDP) POC: Data Concept Scope & Purpose

Business Data Scope

- Lease Contract / Account
- Lease Customer
- Lease Payment

Purpose

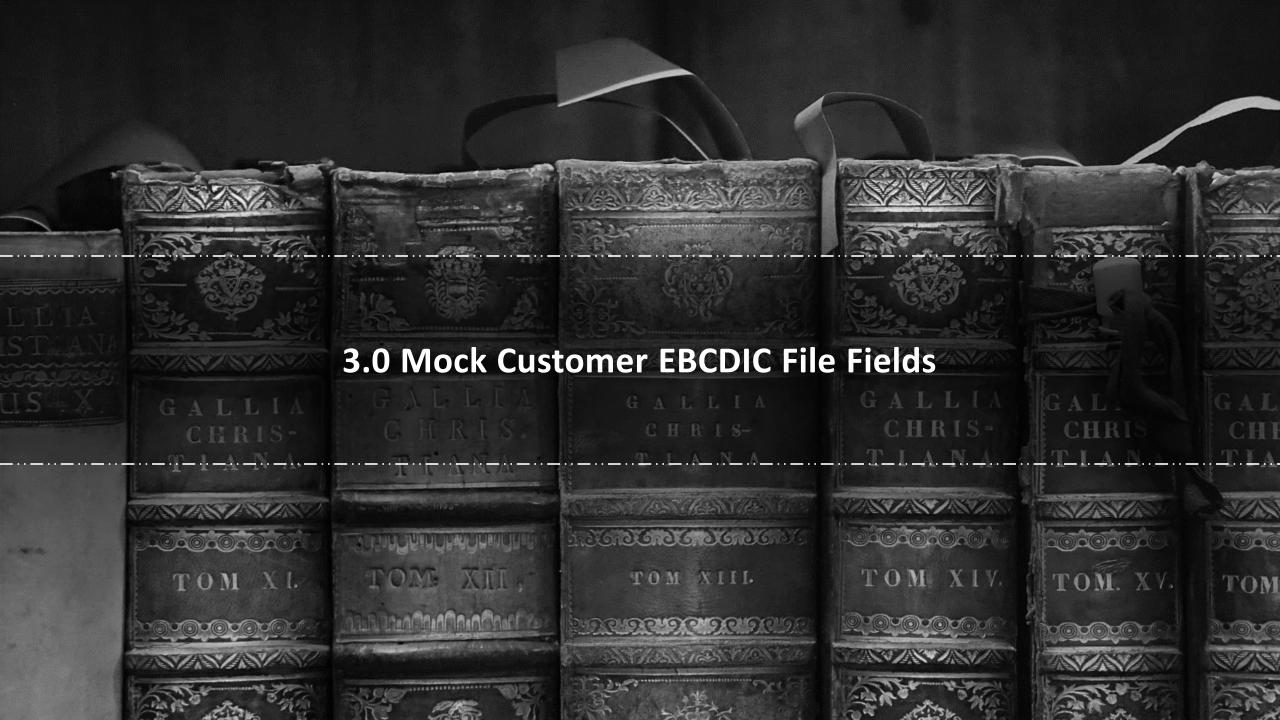
- > The purpose of these basic business data objects, for proof of concept, is to enable a working model and have initial basic workflows around this data and allow POC implementation to expand on this to showcase functionality of the platform.
- ➤ POC implementations can expand on this data and workflows to showcase the various functionality of the platform in a business functional way.



Enterprise Data Platform (EDP) POC: Mock Contract/Account File Fields

| Data Field | Key | FPE | Derived | Note |
|------------------------------|-----|-----|---------|--|
| BRANCH_NUMBER | Υ | | | Branch the account belongs to |
| LEASE_NUMBER | Υ | | | Unique number within a branch identifying the lease account |
| CONTRACT_STATE | | | | Original state in which contract originated. Non mutable |
| LEASE_TOTAL_RENT_PMT_AMT | | | | |
| LEASE_SCHEDULE_BASE_RENT_AMT | | | | |
| LEASE_SCHEDULE_SALES_TAX_AMT | | | Υ | Derived sales tax amount based on current tax percentage |
| CONTRACT_STATUS | | | | Current state of the contract. |
| LEASE_SIGN_DATE | | | | Date on which contract is signed. Non mutable |
| LEASE_START_DATE | | | | Date from which lease starts |
| LEASE_CONTRACT_MATURITY_DATE | | | | Maturity date of the contract |
| LEASE_TAX_PCT | | | Υ | Derived value, by looking up the customers address information and detailed tax rates per city, state and zip code |
| LEASE_ORIG_PMT_NUM | | | | Original number of payments |
| CUST_BANK_ACCT_NUM | | Υ | | Customer bank account number, to be encrypted using field preserving encryption |
| CUST_BANK_ROUTING_NUM | | Υ | | Customer bank routing number, to be encrypted using field preserving encryption |
| CUST_BANK_ACCT_TYPE | | Υ | | Customer bank account type, to be preserved using field preserving encryption |
| TOTAL_DUE_AMT | | | Υ | Derived current total due, after applying all payments |

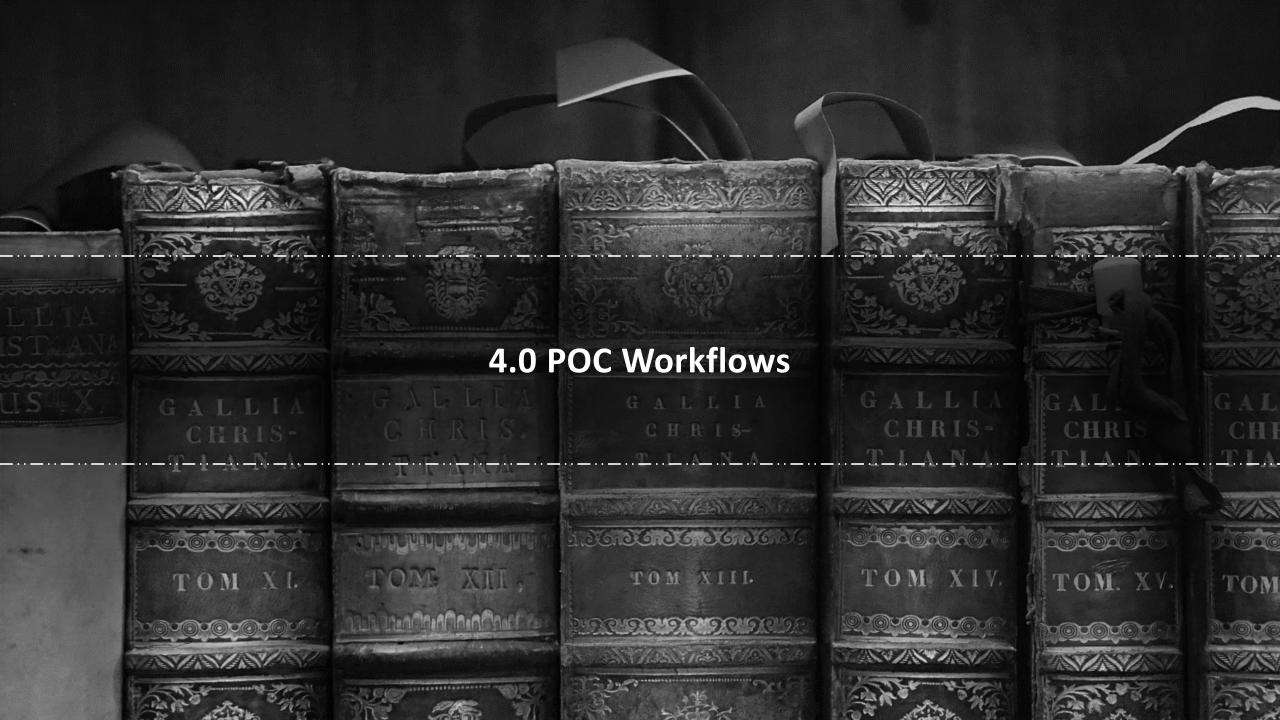
^{*} For field meta information see and derive from the sample data. An additional 150 filler fields should be added for generating higher data volume



Enterprise Data Platform (EDP) POC: Mock Contract/Account File Fields

| Data Field | Key | FPE | Derived | Note |
|------------------------|-----|-----|---------|---|
| BRANCH_NUMBER | Υ | | | Branch the associated lease contract originated |
| LEASE_NUMBER | Υ | | | Unique number within a branch identifying the lease account, this customer record is associated |
| CUSTOMER_NAME | | | | Customer Name |
| CUSTOMER_ADDRESS_LINE1 | | | | Customer Address 1 |
| CUSTOMER_ADDRESS_LINE2 | | | | Customer Address 2 |
| CUTOMER_CITY | | | | Customer City |
| CUSTOMER_STATE | | | | Customer State |
| CUSTOMER_ZIP | | | | Customer ZIP |
| CUSTOMER_SSN | | Υ | | Customer Social Security Number |

- Note that the contract/account to customer record is 1-to-1 relation ship identified by the branch number and lease number
- For PII data encryption simulation only SSN is used, if needed the name and address fields can also be included to demonstrate in-use FPE decryption
- City, State and Zip are used for deriving the tax percentage and also calculating the tax amount and payable amounts
- For POC purposes, the tax tables can be loaded via ingress data access layer or just be loaded as part of the microservice configuration



Lease Contract/Account EBCDIC file - Ingress

- 1. File contains all main objects of a contract / account
- 2. Data transformation to the Enterprise Data Platform (EDP) internal data model
- 3. This is mainly state replication create or replace existing contract / account object
- 4. State replication includes replacing all fields, including all derived fields from source
- 5. Re-compute / Maintain derived data elements (Derivation Microservices)
- 6. Maintain / Update other child, parent referential integrity
- Note handling of processing of contract/account and customer data with respect to order of ingress data

Lease Customer EBCDIC file - Ingress

- 1. File contains all main objects for a customer
- 2. Data transformation to the Enterprise Data Platform (EDP) internal data model
- 3. This is mainly state replication create or replace existing customer information object
- 4. State replication includes replacing all fields, including all derived fields from source
- 5. Re-compute / Maintain derived data elements in the account (Derivation Microservices)
- 6. Maintain / Update other child, parent referential integrity
- Note handling of processing of contract/account and customer data with respect to order of ingress data

Web Application & Mainframe Payment Module: Payment Entry & Payment Processing

- 1. User enters branch number , lease number and payment amount
- 2. Web application captures the current data and time by default, but also gives the ability to select the date and time
- 3. Web application calls mainframe module for processing payment via. ZConnect API gateway
- 4. API parameters to post a payment are branch number, lease number, payment amount, date and time
- 5. Mainframe payment module appends payment record to DB2 'Lease payments table'
- 6. Payment CDC event is generated and sent to data and integration platform
- 7. Payment CDC event must contain branch number, lease number, payment amount, payment date and payment time
- Note payment information is appended (create) to the lease payments table in the mainframe DB2
- CDC event on create record on DB2
- Mainframe API via. ZConnect Gateway

Data and Integration Platform: Payment Processing

- 1. Data access ingress layer received CDC payment event
- 2. CDC event transformation to internal data model
- 3. Payment information is persisted to lease account
- 4. Payment posted must be applied to calculate current balance amount
 - a. Method 1: Balance computation on CDC event processing
 - b. Method 2: Balance computation at End-of-Day applying all payments posted, since last payments processed
- CDC Event Processing
- Transactional Data
- Inline processing or End-of-Day Processing

Web Application & Mainframe IMS Address Change Module: Customer Address Change

- 1. User enters branch number, lease number, city, state and zip code
- 2. Web application captures the current data and time, but also gives the ability to enter effective date and time
- 3. Web application calls mainframe IMS address change module via. ZConnect API gateway
- 4. API parameters to post address change are branch number, lease number, city, state, zip, date, time and effective date
- 5. Mainframe module creates/updates address change to IMS 'customer file'
- 6. Address change CDC event is generated and sent to data and integration platform
- 7. Address change CDC event must contain branch number, lease number, city, state, zip, date, time and effective date
- Note address change information is a create/update to IMS file
- CDC event on create or update on an IMS file
- Note the effective date of address change

Data and Integration Platform: Customer Address Change Processing

- 1. Data access ingress layer received CDC payment event
- 2. CDC event transformation to internal data model
- 3. Customer information is persisted to customer account
- 4. Based on customer information change and effective date of address change, tax information and payment amount must be updated
- CDC Event Processing
- Data with effective date
- Derivation processing delegation to later time

Web Application & Enterprise Data Platform (EDP) Data Access: Query for customer based on SSN

- 1. User queries for customer by entering a social security number
- 2. Web application to call API, via. ZConnect API gateway to lookup customer
- 3. API parameters to get address change are SSN
- 4. Microservice in Enterprise Data Platform (EDP) to query for customer records and decrypt SSN field to match records
- 5. Web application to display one or more customer records returned by gateway
- Note API call to platform via ZConnect API gateway. Single point of control
- Note the complex use of in-use FPE



Enterprise Data Platform (EDP) POC: Application Programming Interfaces

Web Application & Mainframe Payment Module: Post New Payment

| | Method: POST, Resource: lease/account/payments/payment |
|-----------------------|---|
| Input Parameters | Branch Number, Lease Number, Payment Amount, Payment Date, Payment Time |
| Output | Success / Failure Indication |
| API Provider Behavior | Add new entry to DB2 'Lease Payments Table' recording branch number, lease number, payment amount, payment date and time Return success / failure indication to API Call CDC agent to generate payment event for the created DB2 entry with the following fields (branch number, lease number, payment amount, payment date and payment time) |

Enterprise Data Platform (EDP) POC: Application Programming Interfaces

Web Application & Mainframe IMS Customer Module: Post address change update

| | Method: POST, Resource: lease/contract/customer/address |
|-----------------------|--|
| Input Parameters | Branch Number, Lease Number, City, State, Zip, Change Date, Change Time, Effective Date |
| Output | Success / Failure Indication |
| API Provider Behavior | If customer (Branch Number, Lease Number) does not exist, create customer customer with the given details in the IMS file If customer (Branch Number, Lease Number) exists, update city, state and zip in the IMS file for the existing customer Return Success/Failure indication to the API call CDC agent to generate address change event for the IMS file update with the following fields (Branch Number, Lease Number, City, State, Zip, Change Date, Change Time, Effective Date) |

Enterprise Data Platform (EDP) POC: Application Programming Interfaces

Web Application & Enterprise Data Platform (EDP) Microservice: Query Customer

| | Method: GET Resource: lease/contract/customer/address |
|-----------------------|--|
| Input Parameters | SSN |
| Output | List of zero or more customer records or error indicator |
| API Provider Behavior | Query for customer records Decrypt SSN field and filter by match to input SSN Return list of matched records |

Query can be further constrained by branch number



Enterprise Data Platform (EDP) POC: Mock Mainframe DB2 Payments Table

| Data Field | Кеу |
|----------------|-----|
| BRANCH_NUMBER | Υ |
| LEASE_NUMBER | Υ |
| PAYMENT_AMOUNT | |
| PAYMENT_DATE | |
| PAYMENT_TIME | |

^{*} For field meta information see and derive from the sample data

Enterprise Data Platform (EDP) POC: Mock Mainframe IMS Customer File

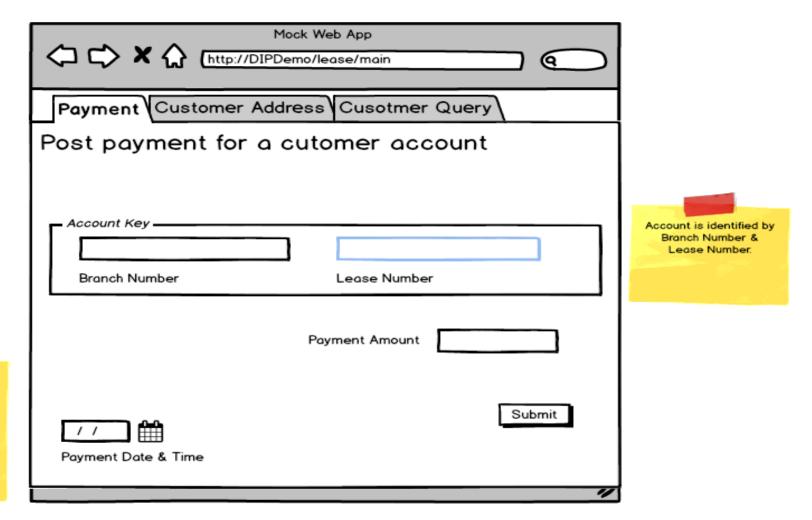
| Data Field | Кеу |
|----------------|-----|
| BRANCH_NUMBER | Υ |
| LEASE_NUMBER | Υ |
| CUSTOMER_CITY | |
| CUSTOMER_STATE | |
| CUSTOMER_ZIP | |
| CHANGE_DATE | |
| CHANGE_TIME | |
| EFFECTIVE_DATE | |

^{*} For field meta information see and derive from the sample data



Enterprise Data Platform (EDP) POC: Web Application UI Wireframes

Web Application UI Wireframe: Post Payment

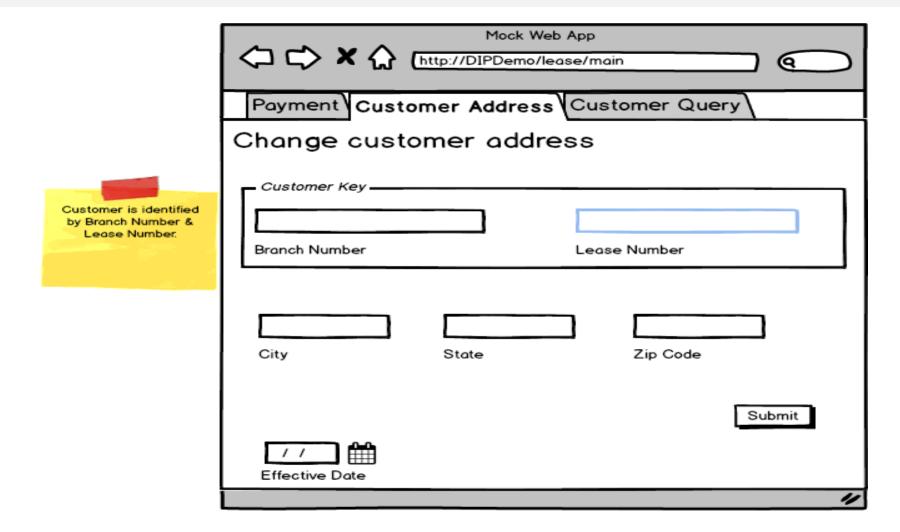


Date & Time by default is the date and time of submit.

But allow the user to select date and time of payment

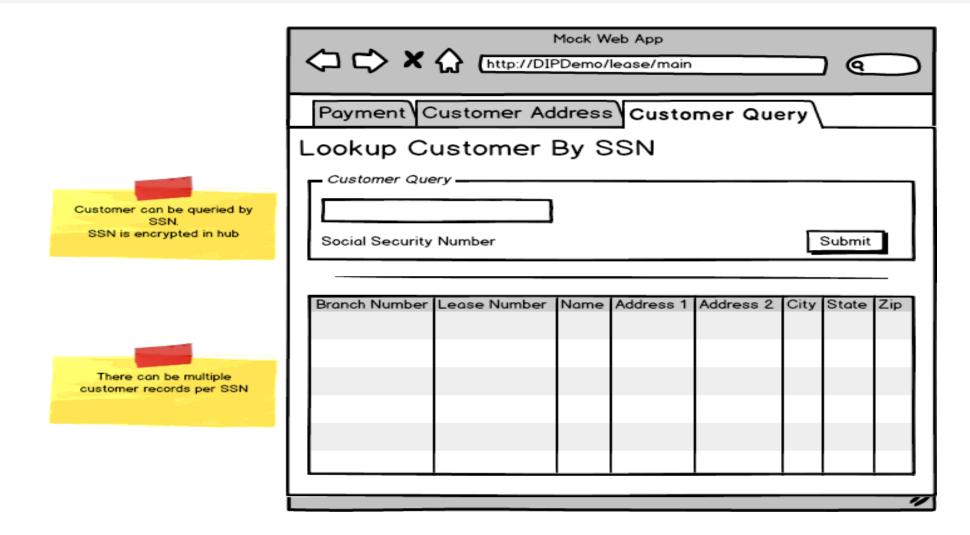
Enterprise Data Platform (EDP) POC: Web Application UI Wireframes

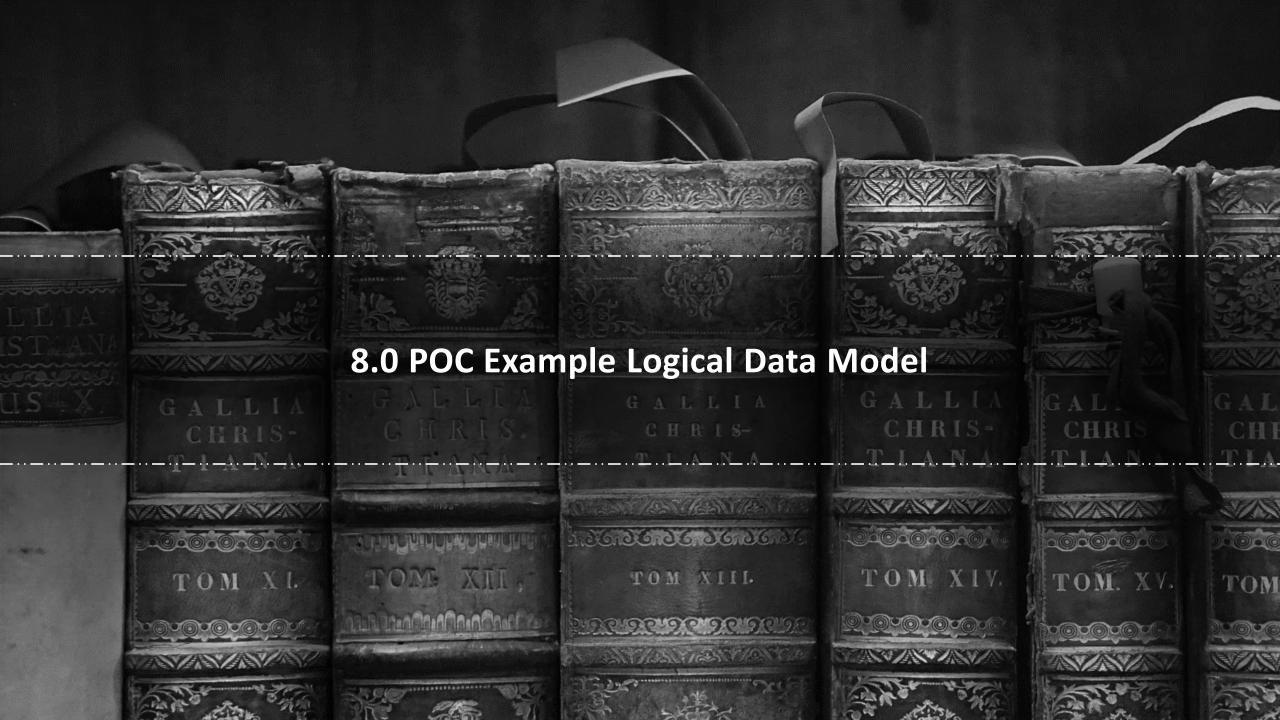
Web Application UI Wireframe: Change Customer Address



Enterprise Data Platform (EDP) POC: Web Application UI Wireframes

Web Application UI Wireframe: Query for Customer





Enterprise Data Platform (EDP) POC: Example Logical Data Model

Enterprise Data Platform (EDP) Harmonized Layer: Initial Iteration Logical Data Entity - LEASE

```
Data Entity: LEASE
          - Key:
                     - BRANCH NUMBER
                     - LEASE NUMBER
          - CONTRACT
                     - CONTRACT STATE
                     - CONTRACT STATUS
                     - LEASE SIGN DATE
                    - LEASE START DATE
                     - LEASE CONTRACT MATURITY DATE
                     - LEASE TOTAL RENT PAYMENT AMOUNT
                     - LEASE SCHEDULE BASE RENT AMOUNT
          - ACCOUNT
                    - LEASE SCHEDULE SALES TAX AMOUNT
                     - LEASE TAX PERCENTAGE
                     - PAYMENTS
                     - STATUS INFO...
                     - PROCESSING INFO...
```

• Logical data. Filler fields to generate volume. POC to include refactoring of this initial logical data model

Enterprise Data Platform (EDP) POC: Example Logical Data Model

Enterprise Data Platform (EDP) Harmonized Layer: Initial Iteration Logical Data Entity - CUSTOMER

Data Entity: CUSTOMER

- Key:
- BRANCH NUMBER
- LEASE NUMBER
- CUSTOMER_ADDRESS1
- CUSTOMER ADDRESS2
- CUSTOMER CITY
- CUSTOMER_STATE
- CUSTOMER ZIPCODE
- CUSTOMER_SSN
- STATUS_INFO...
- PROCESSING_INFO...

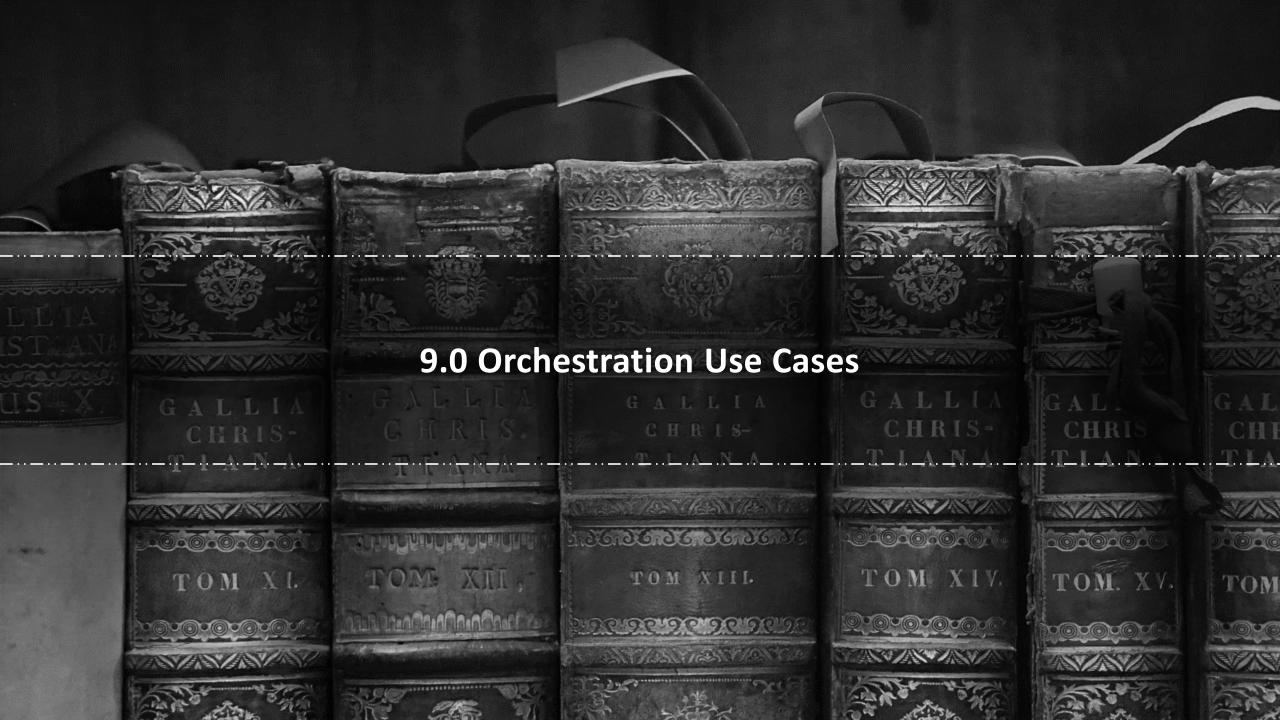
• Logical data. Filler fields to generate volume. POC to include refactoring of this initial logical data model

Enterprise Data Platform (EDP) POC: Example Logical Data Model

Enterprise Data Platform (EDP) Harmonized Layer: Initial Iteration Logical Data Entity - PAYMENT

```
Data Entity: LEASE_PAYMENT
- Key:
- BRANCH_NUMBER
- LEASE_NUMBER
- PAYMENT_DATE
- PAYMENT_TIME
- PAYMENT_AMOUNT
- PAYMENT_PROCESSING_INFO...
```

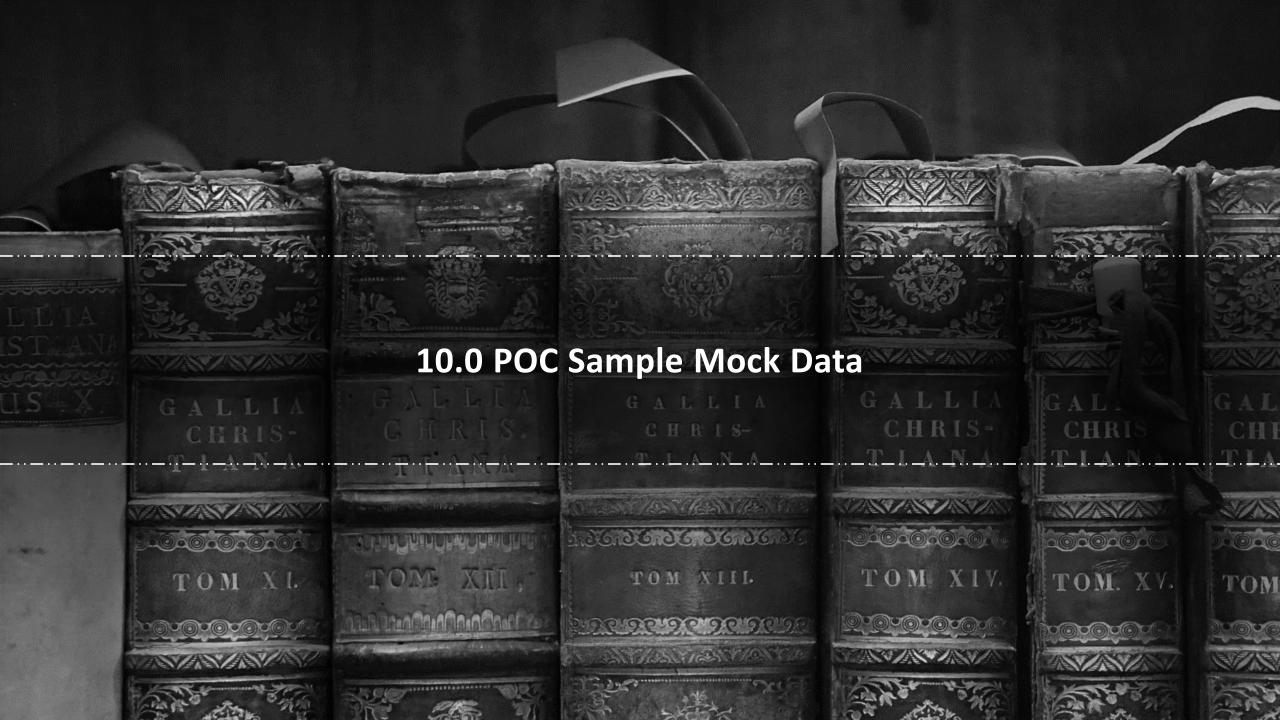
• Logical data. Filler fields to generate volume. POC to include refactoring of this initial logical data model



Enterprise Data Platform (EDP) POC: Orchestration Use Cases

Enterprise Data Platform (EDP) Microservice Orchestration: Use Cases

- 1. Inline Data Transformation
- 2. Inline Data Transformation & Processing
 - 1. Parallel Processing
 - 2. Staged (Dependency) Processing
- 3. End-Of-Day Processing
 - 1. Parallel Processing
 - 2. Staged (Dependency) Processing
- 4. Batch Event Completion
- 5. Materialization



Enterprise Data Platform (EDP) POC: Sample Mock Data

Sample Mock Data: Lease Contract/Account File

| KEY | Data Field | | FPE | | | | | | | | | | | | |
|--------|------------------------------|----------------|--------------------------|------------------|--------------|--------------|-------------|-------------|-------------------------|-------------------|------------|-------------|-----------|-----------|-----------|
| | | | | | | | | | | | | | | | |
| Υ | BRANCH_NUMBER | | | | | | | | | | | | | | |
| Υ | LEASE_NUMBER | | | | | | | | | | | | | | |
| | CONTRACT_STATE | | | | | | | | | | | | | | |
| | LEASE_TOTAL_RENT_PMT_AMT | | | | | | | | | | | | | | |
| | LEASE_SCHEDULE_BASE_RENT_AMT | | | | | | | | | | | | | | |
| | LEASE_SCHEDULE_SALES_TAX_AMT | | | | | | | | | | | | | | |
| | CONTRACT_STATUS | | | | | | | | | | | | | | |
| | LEASE_SIGN_DATE | | | YYMMDD | | | | | | | | | | | |
| | LEASE_START_DATE | | | YYMMDD | | | | | | | | | | | |
| | LEASE_CONTRACT_MATURITY_DATE | | | YYMMDD | | | | | | | | | | | |
| D/R | LEASE_TAX_PCT | | | | | | | | | | | | | | |
| | LEASE_ORIG_PMT_NUM | | | | | | | | | | | | | | |
| | CUST_BANK_ACCT_NUM | | Υ | | | | | | | | | | | | |
| | CUST_BANK_ROUTING_NUM | | Υ | | | | | | | | | | | | |
| | CUST_BANK_ACCT_TYPE | | Υ | | | | | | | | | | | | |
| D/C | TOTAL_DUE_AMT | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| BRANCH | NU LEASE_NUMBER | CONTRACT_STATE | LEASE_TOTAL_RENT_PMT_AMT | IFASE SCHEDULE B | ASLIFASE SCH | IFI CONTRACT | STEASE SIGI | N IFASE STA | AR LEASE_CONTRACT_MATUF | RITY DATIFASE TAX | LIFASE ORI | G CUST BANK | CUST BANK | CUST BANK | TOTAL DUE |
| 0272 | XX100 | CA | 418.79 | 386.87 | 31.92 | | 170205 | 170205 | 190205 | 8.2500 | 24 | | 322271627 | | 600.00 |
| 0272 | XX101 | CA | 414.92 | 386.87 | 28.05 | | 170206 | 170206 | 200206 | 7.2500 | 36 | | 122000247 | | 725.00 |
| 0272 | XX102 | CA | 402.55 | 402.55 | | | 170207 | 170207 | 190207 | 1.200 | 24 | | | | -100.65 |
| 0272 | XX103 | CA | 402.34 | 386.87 | 15.47 | | 170208 | 170208 | 180208 | 4.0000 | 12 | | | | 325.00 |
| 0272 | XX104 | CA | 418.79 | 386.87 | 31.92 | | 170209 | 170209 | 210209 | 8.2500 | 48 | | | | 710.35 |
| 0272 | XX105 | CA | 418.79 | 386.87 | 31.92 | FT | 170210 | 170210 | 190210 | 8.2500 | 24 | | | | 0.00 |
| 0272 | XX106 | CA | 418.79 | 386.87 | 31.92 | • | 170211 | 170211 | 190211 | 8.2500 | 24 | | | | 801.99 |
| 0272 | XX107 | CA | 418.79 | 386.87 | 31.92 | | 170212 | 170212 | 190212 | 8.2500 | 24 | | | | 77.12 |
| 0272 | XX108 | CA | 418.79 | 386.87 | 31.92 | | 170213 | 170213 | 190213 | 8.2500 | 24 | | | | 1.98 |
| 0272 | XX109 | CA | 418.79 | 386.87 | 31.92 | IR | 170214 | 170214 | 190214 | 8.2500 | 24 | | | | 0.00 |

Enterprise Data Platform (EDP) POC: Sample Mock Data

Sample Mock Data: Lease Customer File

| KEY | Data Field | | FPE | | | | | | | | |
|-----------|------------------------|---------------|---------------------------|------------------------|---------------|---------------|-----------|----------------|---|--|--|
| | | | | | | | | | | | |
| Υ | BRANCH_NUMBER | | | | | | | | | | |
| Υ | LEASE_NUMBER | | | | | | | | | | |
| | CUSTOMER_NAME | | | | | | | | | | |
| | CUSTOMER_ADDRESS_LINE1 | | | | | | | | | | |
| | CUSTOMER_ADDRESS_LINE2 | | | | | | | | | | |
| | CUSTOMER_CITY | | | | | | | | | | |
| | CUSTOMER_STATE | | | | | | | | | | |
| | CUSTOMER_ZIP | | | | | | | | | | |
| | CUSTOMER_SSN | | Υ | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| BRANCH_NU | LEASE_NUMBER | CUSTOMER_NAME | CUSTOMER_ADDRESS_LINE1 | CUSTOMER_ADDRESS_LINE2 | CUSTOMER_CITY | CUSTOMER_STAT | CUSTOMER_ | Z CUSTOMER_SSI | ١ | | |
| 0272 | XX100 | Lee, Tom | 1120 Bryan Ave | | Los Angeles | CA | 90038 | 111111111 | | | |
| 0272 | XX101 | Hanks, Bruce | 3265 Melrose Avenue | | Toluca Lake | CA | 91602 | 111111112 | | | |
| 0272 | XX102 | Cruise, Mike | 530 E. 76th Street | SUITE#1200 | New York | NY | 1002 | 1 111111113 | | | |
| 0272 | XX103 | Tyson, Tom | 7 Cape Cod | | Irvine | CA | 9262 | 0 111111114 | | | |
| 0272 | XX104 | Allen, Saun | 12033 Anza Ave | | Torrance | CA | 9050 | 5 111111115 | | | |
| 0272 | XX105 | Pen, Tim | 9830 Wilshire Boulevard | | Beverly Hills | CA | 9021 | 2 111111116 | | | |
| 0272 | XX106 | Carrey, Drew | 3435 Ocean Park Boulevard | | Santa Monica | CA | 9040 | 5 111111117 | | | |
| 0272 | XX107 | Cruise, Mike | 530 E. 76th Street | SUITE#1200 | New York | NY | 1002 | 1 111111113 | | | |
| 0272 | XX108 | Hanks, Bruce | 3265 Melrose Avenue | | Toluca Lake | CA | 91602 | 111111112 | | | |
| 0272 | XX109 | Allen, Saun | 12033 Anza Ave | | Torrance | CA | 9050 | 5 111111115 | | | |



Q&A





Copyright © 2012-2017 Steerwise Inc. All Rights Reserved.

Steerwise Inc. disclaims all warranties with regard to this material and contents herein, including all implied warranties of suitability and fitness for any particular purpose. In no event shall Steerwise Inc. be liable for any special, incidental, indirect or consequential damages or any damages whatsoever resulting from loss of use, data or profits, whether in an action of contract, negligence or other tortious action, arising out of or in connection with the use or inability to use this material or performance of this material.

All or specific content in this material is protected by copyright, and permission must be obtained from the owner prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording or likewise. No one is allowed to remove or modify proprietary markings or legends, logos, trademarks, trade secrets, copyright and rights notices from this material under any circumstances.

This copyrighted material is intended for use by the licensed customers only. None of the information found here can be used for commercial gain of any kind including resale or reproduction for profit. No one is allowed to copy or sell or distribute any of the material or contents thereof or any derivate works to any party as their own, or of any other party, without explicitly obtaining either a commercial or non-commercial license from Steerwise Inc.

Business Technology Architecture® is a registered trademark of Steerwise Inc. Business Value First™, Innowise™, Performwise™, Meaning-Oriented-Modeling™, Meaning-Oriented-Integration™, Business Being™, Data Efficacy & Data Excellence™ are trademarks of Steerwise Inc.

Any inquiries regarding this material, requests for usage rights for the material or contents included herein, should be sent by email to info@steerwise.com