

Comprehensive Data Mapping Plan

This data mapping plan outlines the process of integrating consumer data from ABC Utility Company's databases into SMART360.

1. Source-Target Mapping:

| Source Column | Target Field | Description |
|---------------------|--------------------------------|---|
| Consumer ID | Consumer ID | Unique identifier for the consumer |
| Name (split) | First Name, Last Name | Split full name into separate fields |
| Address | Address Line 1, Address Line 2 | Break down address into separate lines |
| Contact Number | Phone Number | Consumer's phone number |
| Email Address | Email Address | Consumer's email address |
| Account Number | (Not Applicable) | Not present in SMART360 consumer table |
| Meter Number | (Not Applicable) | Not present in SMART360 consumer table |
| Tariff Plan | (Not Applicable) | Not present in SMART360 consumer table (consider a separate table for tariff plans) |
| Consumption History | (Consider separate table) | Granular data, might require separate table for historical records |
| Payment Status | (Consider separate table) | Might require additional processing and mapping for integration |

2. Data Transformation:

- **Name Splitting:** Python script will split the "Name" column from the source data into "First Name" and "Last Name" for mapping to SMART360.
- **Address Parsing:** The address column might require parsing to separate Address Line 1, Address Line 2, City, State, and Zip Code depending on the format used by ABC Utility Company.

3. Data Loading Strategy:

- Since some source data points don't have direct counterparts in SMART360 (Account Number, Meter Number, Tariff Plan, Consumption History, Payment Status), we have two options:
 - **Exclude:** Exclude these fields from the mapping entirely.
 - **Separate Tables:** Create separate tables within SMART360 to store this information with proper foreign key relationships to the Consumer table.

4. Assumptions and Considerations:

- Data format consistency in source databases.
- Missing or incomplete data handling strategy.
- Error handling for potential issues during data extraction and transformation.

| Test Case ID | Description | Preconditions | Test Steps | Expected Result | Actual Result | Status |
|--------------|---|---|---|---|---------------|--------|
| TC01 | Test database connection | Database credentials are correctly set | 1. Execute the script 2. Check if the script connects to the database without errors | Script connects to the database successfully | | |
| TC02 | Test data extraction from database | Test data is present in the database | 1. Execute the script 2. Verify that data is extracted from the consumer table | Data is extracted correctly and matches the database records | | |
| TC03 | Test transformation of a complete record | A complete consumer record is available | 1. Extract a complete consumer record 2. Check the transformation of the record | Record is transformed correctly according to the mapping logic | | |
| TC04 | Test name splitting | Consumer record with full name is available | 1. Extract a record 2. Verify the first name and last name are split correctly | First name and last name are split correctly and populated in respective fields | | |
| TC05 | Test address splitting | Consumer record with a complete address | 1. Extract a record 2. Verify address line 1 and line 2 are split correctly | Address is split into line 1 and line 2 correctly | | |
| TC06 | Test loading data into SMART360 | Transformed data is ready for loading | 1. Load transformed data to SMART360 2. Verify the response from SMART360 API | Data is loaded successfully and response code is 200 | | |
| TC07 | Test error handling for database connection | Invalid database credentials | 1. Execute the script with incorrect credentials 2. Check the error handling | Script reports an error indicating failure to connect to the database | | |
| TC08 | Test error handling for data loading | SMART360 API endpoint is down | 1. Try to load data into SMART360 while the endpoint is down 2. Check the error handling | Script reports an error indicating failure to load data to SMART360 | | |
| TC09 | Test handling of incomplete records | Consumer record missing some fields | 1. Extract an incomplete record 2. Verify the transformation and loading process | Missing fields are handled gracefully, and the rest of the data is processed | | |

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|------|--|---|---|---|--|--|
| TC10 | Test with large data set | Large number of records in the database | 1. Execute the script to process a large data set 2. Verify performance and successful completion | Script processes and loads all records successfully without performance degradation | | |
| TC11 | Test handling of special characters in names | Consumer name contains special characters | 1. Extract a record with special characters in the name 2. Verify the name is handled correctly | Special characters in names are handled correctly and mapped accurately | | |
| TC12 | Test connectivity issues with SMART360 | Unstable network connection | 1. Load data into SMART360 with an unstable network 2. Check how the script handles network issues | Script retries or reports an appropriate error message | | |