#### Corteva CFIN

#### Technical Design Specifications

Report

**TDS\_I\_249 Non-SAP – Ajur-L**

20 March 2019

Version 1.6

Document Version History

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| --- | --- | --- | --- |
| Version No | **Version date** | Author | **Summary of Changes** |
| **1** | **02/04/2018** | **Mukesh Bhardwaj** | **Initial Draft with BODS Details** |
| **1.1** | **02/06/2019** | **Priya K Asphlani** | **Initial Draft with SLT Details** |
| **1.2** | **02/21/2019** | **Callan Loberg** | **General Non-SAP Integration Design** |
| **1.3** | **03/05/2019** | **Callan Loberg** | **Updated Process, Balance Jobs, and Errors** |
| **1.4** | **03/06/2019** | **Mukesh Bhardwaj** | **Updated BODS Validations and Unit Test Plan** |
| **1.5** | **03/06/2019** | **Priya K Asphlani** | **Updated SLT Function Module Sections** |
| **1.6** | **03/20/2019** | **Callan Loberg** | **Updated with Source Specific Details** |

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| Project Identification | | |
| Project Name | Customer Name | EY Service line |
| Central Finance | DowDuPont Corteva | SAP Data |
| EY Client Partner | EY Engagement Manager | EY Project Manager (PMO) |
| Kathy Denardo | Connie Fitting | Jeff Kurz |
| EY Technical Manager | Customer Technical Manager | EY Quality Manager |
| Adam Zeckel | Tim Hagg |  |

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| Object Overview | | | | | |
| Object ID | 249 | Business Process | | Finance (FI) | |
| Object Type | Transactional Data | Object Description | | FI Postings from non-SAP | |
| Source Systems | CSV Extract | | | | |
| Cycle of Testing | All | | Required Development Completion Date | |  |
| Complexity of Object | Medium | | Interface/run | | Batch |
| Interface type | Inbound | | Priority | | High |
| TS Control | | | | | |
| TS Author | Loberg, Callan | | Customer Process Owner | | Last Name, First Name |
| TS Approved By | Amer, Mahmud | | TS Approval date | | DDMMYY |

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| Source & Target Matrix | | |
| **Application Name** | **Source** | **Destination** |
| MS AX |  |  |
| Sage/Pastel Evolution |  |  |
| Ajur-L | X |  |
| MS Great Plains – Argentina |  |  |
| MS Great Plains – Egypt |  |  |
| Kingdee |  |  |
| Profit Soft |  |  |
| Granular |  |  |
| Dairyland |  |  |
| Alforex |  |  |
| Pfister |  |  |
| Sapiens |  |  |
| S4 CFIN |  | X |

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| Program Attributes |
| **Jobs in SAP Data Services (BODS)**   |  |  | | --- | --- | | Project | PRJ\_CFIN\_NONSAP | | Replication | JOB\_NONSAP\_AjurL\_Replication |   **RFC Enabled Function Module in SAP LT Replication Server (SLT)**   |  |  | | --- | --- | | Program Title | Function Module (FM) for Inbound Staging Data | | Program Name |  | | Program Type | Executable | | Package | ZCFIN | | Authorization Group | N/A |  |  |  | | --- | --- | | Transaction Code |  | | Include Programs | LZFG\_STAGING\_DATATOP, ZLFG\_GET\_STAGING\_DATAD, ZLFG\_GET\_STAGING\_DATAI | | Function Modules | ZGFGEN\_GET\_STAGING\_DATA | | Message Class |  | |  |  | |  |  | |

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| Validation of Selection Criteria |
| **Source System Report Selection**   * Each non-SAP system generates flat file reports based on a given date range * The SAP Data Services (BODS) jobs are the earliest component in the integration process that are outlined in detail in this document   + The selection criteria of which report to select are based on that system’s specific shared folder and file name     - Ajur-L Folder: **PHAZP0072FS\DataExchange\AjurL**     - Ajur-L Filename: **AL\_20190131123456.csv**   **Criteria of the Source System Reports**   * File Format & Consistency   + Each non-SAP system should provide a report in .xlsx or .csv format     - It is critical that this format stays consistent each time it is extracted       * Ex: If AX chooses to use .csv, then it should always be csv   + Each column name should be exactly the same with the exact same order and data type     - Ex: Columns with data type “date” should always use the same short-date format     - As a rule of thumb, we recommend using varchar (text) for every field, and then we will convert the fields to numbers, dates, etc. as needed   + The files should effectively appear as tables     - Only header columns and rows of records     - No supplemental text at the top or bottom of the file     - No page number indicators or headers per page—only one header column and the rest just records   + Text Length on Fields     - The source files do not need to adhere to the text lengths supplied on the template provided * File Name   + Each non-SAP system will use an intelligent file name providing the following info     - Source System     - Timestamp of extract     - Example: **AX\_2019013151243.csv**  [MS AX]   + If the source system must deliver files per company code, then Company Code should also be included     - Example: **EVO\_ZW10\_2019013151243.csv** [Pastel Evo]   + Since balance files may leverage the full timestamp for custom logic, it is critical that the file names use a short 2 character indicator. The following examples are for Profit Soft and Kingdee, respectively     - Example: **PS2019013151243.csv** [Profit Soft]     - Example: **KD2019013151243.csv** [Kingdee] * Storage Location   + As detailed in later sections, each source system has its own folder that is transferred from the source via the integration design (i.e. using OpenText MIM)   + This storage location must not change in name or authorizations or else it will fail the standard criteria for consumption by BODS |

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| Technical Flow Diagram |
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| System Information |
| |  |  | | --- | --- | | **Sending System** | | | System Name | Ajur-L | | System Technology | Ajur-L on Interbase 2017 version 10 | | Trigger Event | Scheduled and manual file extract | | File Type Sent | CSV | | **Integration System #1** | | | System Name | **SAP Data Services - BODS** | | System Technology | SAP technologies – 4.2 SP10 | | Connectivity to Source System | TCP/IP Connection:   * Folder: PHAZP0072FS\DataExchange\AX | | Connectivity to Target System | RFC Connection:   * SLT\_RFC\_PS0 | | Common Business Object to be used / Additional Remarks | N/A | | **Integration System #2** | | | System Name | **SAP SLT Replication Server (PS0)** | | System Technology | SAP technologies – ERP system SP-13 level | | Connectivity to Source System | RFC Connection:   * SLT\_RFC\_PS0 | | Connectivity to Target System | RFC Connection:   * SLT\_RFC\_PE0 | | Common Business Object to be used / Additional Remarks | N/A | | **Receiving System** | | | System Name | **SAP S4/HANA (PE0)** | | System Technology | SAP technologies - SAP S/4HANA 1809 | | File Type Received | CFIN object which populates a table | |

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| Processing Logic |
| 1. **Non-SAP Replication and Balance Load Jobs**  * BODS Initialization   + The SAP Data Services flat file jobs first check whether a new file with the correct naming format is available in that system’s specified folder:     - Ajur-L Folder: **PHAZP0072FS\DataExchange\AjurL**     - Ajur-L Filename: **AL\_20190131123456.csv**   + If available, BODS will then automatically look to consume this file. The job will error out if the file is inconsumable for the below sample reasons:     - Incorrect file type       * Ex: .xlsx when expecting .csv     - Incorrect file formatting       * Ex: File contains miscellaneous free text     - Incorrect column headers       * Ex: Order, name, or count of header columns are incorrect     - Incorrect data definition       * Ex: Columns with data type “date” have text characters     - Incorrect use of column delimiter       * Ex: Text field contains a comma (“,”) in a .csv file     - Incorrect character type or Unicode setting       * Ex: Special characters or hidden escape keys * BODS Validations   + There are a handful of functional validation checks that are then performed on the files. Below are the list of these rules:     - Account Number should not be null     - Posting Date should not be null     - Document Date should not be null     - Filename should be exactly same for each run (with different time stamp).     - File availability check and notification in case of non-availability     - File format check.     - Data format should be same as decided else the file will not be processed     - Amounts for a unique document balance out to zero   + If any of the above validations fail, a file is produced and sent to another subfolder in the shared folder. These reports are used to correct the errored records and discussed in more detail below. * BODS Staging   + The first dataflow will stage the dataset as-is into the BODS HANA staging database:     - Staging DB: **DM\_CFIN\_STG\_NONSAP\_INTEGRATION** * BODS Transformation   + Functional Mapping     - Transformation is dependent on the design of each source system’s mapping file. This information is outlined in further detail on the Functional Design Document (FDD), attached below:   **FDD still TBD from Corteva**   * + Formatting for SLT     - Once the necessary logic has been applied to populate the fields required for a CFIN posting, the tables are transformed to align with the predefined non-SAP SLT staging structures * SLT Function Module   + In order to load data from BODS into the SLT database, the RFC-enabled Function Module (RFM) is trigger from within BODS   + The logic of the RFM is iterative per unique document. It first reads from the BODS header table to populate the SLT header table (/1LT/CF\_E\_HEADER)     - The RFM ensures uniqueness by first checking if the document already exists. If it does, it skips the load of this document   + The next step is to load the individual unique line items within that document to the SLT line item table (/1LT/CF\_E\_ACCT)     - The RFC ensures uniqueness by using Change Data Capture (CDC) logic       * If the line item is new for that document, it inserts it       * If the line item already exists but there is an update to one of the fields, then it drops and replaces the line item       * The CDC logic will not contain modifying functionality * File Movement   + If a job fails at any point, the file is moved from the input folder to the errored folder shown below in the below section.   + Once the job completes successfully, the file is moved to the success folder  1. **Error Handling Process**      * Stopping Location, Error Type, and Resolution   + Stopped at BODS Initialization     - Type – Formatting/flawed source report error     - Notification – Email to source system user     - Resolution – Resolved by generating new report   + Stopped at BODS Validations     - Type – Functional source report errors; i.e. imbalances     - Notification – Email to source system user     - Resolution –       * Automatic – Resolved by generating new report       * Manual – Resolve errors and move corrected file back to input folder   + Stopped in AIF     - Type – Functional value mapping errors     - Notification – Notification to CFIN functional user     - Resolution – Resolved by maintaining key & value mapping in CFIN   + Never Stopped     - Type – Incorrect posting; manually identified, likely via failed reconciliation     - Notification – None     - Resolution –       * Postings are backed out in CFIN (Reversed)       * Replication is suspended in SLT       * Document numbers are passed as parameters to the clearing report in SLT; values are dropped from the SLT table structures       * Corrected postings are generated or manually created and placed in input folder       * Replication job passes the new records * Clearing Program   + SAP produces this clearing program out of box, but it requires separate install and configuration   + The name and process around report will be detailed in future business process documentation |

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| Scheduling Details |
| **Global Variables**   * Each replication job will have preconfigured global variables for the following values:   + Shared Folder Name   + Filename * When setting up a schedule in BODS Management Console, these values will be saved into the global variable fields   + The schedule name will be saved with the appropriate indicator of the Folder Name and Filename   + This is a robust solution enabling the client to add or delete company codes later on as needed. Example below for Pastel Evolution, since it requires discernment between company codes   + Example:     - Job Name: JOB\_NONSAP\_EVO\_Replication     - Schedule: CFIN\_NONSAP\_EVO\_ZW10     - $G\_Folder: ‘\\PHAZP0072FS\DataExchange\Pastel\_Evo\’     - $G\_Filename: ‘EVO\_ZW10\_\*.csv’   **Scheduling**  The standard processing schedule will be as follows:   * Source System Report Generation   + On regular, non-period close days, the report is generated once a day   + On period close (days -4 to +3), the report is generated from most source systems every 3 hours. Based on limitations, other source systems produce the report just a few times a day or still once a day * MIM Integration   + Within minutes of the file being place into the correct source folder, MIM will automatically move it to the Azure Shared Folder * BODS Schedule   + The BODS replication jobs are scheduled to check for the file every 10-30 minutes. The frequency is determined based on whether that system produces files by company code or produces them together and if there are any performance concerns that arose during testing. |

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| Design Consideration |
| **File Archiving**   * Files that are loaded successfully are moved automatically by BODS into the SUCCESS\_FILES subfolder per system * Per SOX requirements, this may be a future location to set for archiving of the files   **Table Settings**   * The staging tables will be set to drop and reload each time a BODS job is triggered and proceeds past looking for   **Performance Settings**   * Standard BODS settings will likely produce the optimal performance as the jobs are purely loading flat files * SLT Replication Server is set to Performance Optimized with 10 parallel processing jobs |

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| Internal Tables (Table referenced/used) |
| |  |  | | --- | --- | | Name | Description | | STG\_AX\_FILE\_LAST | Latest staged as-is source system report | | STG\_AX\_LKP\_\* | Any lookup mapping tables for the BODS transformation | | /1LT/CF\_E\_HEADER | SLT table defined for CFIN – Accounting Header | | /1LT/CF\_E\_ACCT | SLT table defined for CFIN – Accounting Item | | /1LT/CF\_E\_DEBIT | SLT table defined for CFIN – Items for Debtors (Vendors) | | /1LT/CF\_E\_CREDIT | SLT table defined for CFIN – Items for Creditors (Customers) | |

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| Text Elements |
| |  |  | | --- | --- | | Name | Text Description | | 001 | Data couldn't be transferred | | 002 | Foreign key error | | 003 | No header data found | |  |  | |

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| Subroutines/Includes |
| |  |  | | --- | --- | | Name | Description | | LZFG\_STAGING\_DATATOP | Standard Top Include | | ZLFG\_GET\_STAGING\_DATAD | The data definition class for error return structure for BODS | | ZLFG\_GET\_STAGING\_DATAI | The data implementation class for error return structure for BODS | |  |  | |

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| Interface List Output (AIF) |
| The monitoring of the FI document replication and processing will be by using the SAP Application Interface Framework (SAP AIF). In SAP AIF, documents are displayed which have been replicated and posted in the Central Finance system. Also, there are error messages displayed, if documents could not be posted in the Central Finance system.  Severe technical errors, for example, connectivity problems between the systems, can be found in the application log of the SAP LT Replication Server (transaction LTRC - SAP LT Replication Server - Cockpit). |
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| Ongoing Support Requirements |
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| Assumptions in Technical Design |
| * Master Data   + All necessary master data for a successful posting is create, maintained, and mapped via other designs and processes   + There will be no uniqueness violations across systems for key and value mapping * Balance Load   + Initial balance loads are intended to be accomplished by utilizing the preexisting reports. The key assumptions are that the source system can:     - Accurately provide these reports for a given historical timeframe     - The field mapping will for the replication jobs will be able to be recycled; if not, the gaps are identified * Predefined SLT Staging Structures   + Successful setup and configuration of the non-SAP customizing activities is completed before development in each system/client   + All the fields required from the non-SAP systems are contained in the predefined non-SAP staging structures   + The sizing of the SLT HANA database is suitable to maintain the volume of all initial loads and ongoing replication     - If not, then the system will either be scaled or a manual clearing activity will take place * Customization   + Contrary to the SAP designs, there will be no customizing requirements that merit the use of a source system or target system Business Add-In (BAdI) * Support   + The identification of technical support requirements are sufficient for this design specification   + Processes around other ongoing functional upkeep (as noted in the open items) will be determined by the functional team and client, as agreed upon in the Functional Design Specification (FDS) reviews |

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| Open Issues in Technical Design |
| * Plan for Reconciliation Reports   + Reconciliation reports will drive our unit test strategy and help provide useful functional testing scenarios * US GAAP Adjustment Process   + The US GAAP which needs to be outlined as a business process by the functional team and client. The client agreed to own the development of such process; this means that we can close the TDS without this portion being complete, yet it is still important to call out as it is critical for the data to be correct * SOX Review   + Someone from the client will need to review the touchpoints and data archiving plan and confirm that this is up to audit standards. The assumption with this is that the outcome of this review will not merit any significant changes |

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| Unit Test Plan |
| *[Please copy the Business test Conditions and Control scenarios from the FS]*  *[Add relevant Technical scenarios associated with this development. Examples would include 1) testing an error-free run; 2) testing the exception processes; 3) testing the error handling.]*   |  |  |  | | --- | --- | --- | | Scenario # | Input Selection Criteria | Expected Result | | 1 | File Existence Testing | The job should notify in case of non-availability of file at source folder | | 2 | File Format Testing | The job should not process file and move it to Error folder with notification to stakeholders | | 3 | Source file should pass all Validations defined in BODS | Upon failure file is moved to error folder | | 4 | Same posting comes again | SLT will reject the posting if it’s already posted | | 5 | Positive Test: Load a balanced document with one balance sheet, one revenue, one cogs one expense line. | All 4 lines should successfully pass through BODS, through SLT, and finally post into CFIN | | 6 | Negative Test: Load two documents, one which should error out in BODS in various ways. One should error out in AIF in various ways | Documents should fail and error handling processes followed to reconcile all errors and eventually push the documents into CFIN | | 7 | Full Trial Balance Test:  Pull a months’ worth of transactions/balances from the Non-SAP system for one company code and load it | All documents should flow through to CFIN and a successful reconciliation procedure followed | | 8 | All Company Codes Test: Ask for an extract of the system that contains all known Non-SAP company codes in that system | A UJT should be filled out that has at least one document for each company code that should reside in the system | | 9 | US GAAP Adjustment:  Test the US GAAP Adjustment process | TBD | |

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| Transport Details |
| |  |  |  | | --- | --- | --- | | Transport # | Type | Description | | #TBD in SLT | Customizing | Non-SAP SLT Interface Program & Structures | | #TBD in SLT | Customizing | Non-SAP Function Module | | #TBD in S4 | Workbench | CFIN Source System Setup | |