

Version 25



Trapeze
Enterprise Asset Management

Data Flow

Reference Guide

Trade Secret | February 2025

© 2025 Trapeze Software ULC, its subsidiaries and affiliates (collectively “TSU”). All rights reserved.

Trapeze Software ULC (“TSU”) Proprietary and Confidential: Information contained in this document is proprietary to TSU and its subsidiaries and may be used or disclosed only with written permission from TSU. This guide, or any part thereof, may not be reproduced without the prior written permission of TSU. The recipient acknowledges and agrees that disclosure of this document to recipient, and its use, are subject to the terms and conditions specified in their relevant software license agreement, software maintenance agreement, and/or non-disclosure agreement (“Governing Agreement”) under which this document was disclosed. This document is for internal use only in conjunction with TSU products. This document may not be modified in any way.

All other trademarks, registered trademarks, product names and company names or logos mentioned are the property of their respective owners.

Except as may be provided in the Governing Agreement, TSU and its affiliates, subsidiaries, officers, directors, employees, and agents provide the information contained in this manual on an “as-is” basis and do not make any express or implied warranties or representations with respect to such information including, without limitation, warranties as to non-infringement, reliability, fitness for a particular purpose, usefulness, completeness, accuracy or currentness. TSU shall not in any circumstances be liable to any person for any special, incidental, indirect or consequential damages, including without limitation, damages resulting from use of or reliance on information presented herein, or loss of profits or revenues or costs of replacement goods, even if informed in advance of the possibility of such damages.

TSU reserves the right, to be exercised at its sole discretion and without notice, to change, modify or adapt the contents of this edition in order to accurately reflect any future upgrades to the TSU proprietary software and/or hardware. In the event of such changes, TSU expects, but does not represent or guarantee, that this current edition will continue to remain reasonably accurate insofar as it describes the basic functions of the TSU proprietary software and/or hardware. Furthermore, based on your system settings, certain functionality, such as application screens, may not function exactly as shown or described in this guide.

Technical Support

Trapeze provides several ways to connect with the Customer Care team. Please provide detailed information to the representative. If you are reporting an issue by e-mail, include any error messages, screen shots of your problem, and steps to replicate the issue.

Customer Care is available Monday through Friday, 8:00 a.m. to 8:00 p.m., Eastern Standard Time.

Toll-Free Telephone: 1-877-411-8727

E-mail: cc@trapezegroup.com

FTP Site: <https://ftps.trapezegroup.com/>

Web Site: <https://collaborate.trapezegroup.com>

The website provides access to Trapeze Collaborate which offers resources to implement and operate the software, search knowledge, participate in communities, log/track service requests, sign-up for release alerts, view product health recommendations, and download updates or documentation. For secure access to Collaborate, contact Customer Care through the website or by calling the number above.

Product Compatibility

Refer to the latest [Product Compatibility](#) information on Trapeze Collaborate for requirements including operating system information, databases, Crystal reports, network protocol, HTTP servers and browsers that are supported.

Data Flow - Reference Guide

February 2025

Contents

1. Overview.....	1
Requirements.....	1
Parameters	1
Process.....	2
2. Preparing Data.....	3
Data Definition File (.xml)	3
Supported Actions.....	4
XML TAGS	5
Data Source File (.xlsx)	8
3. Output.....	10
DataflowImport.log	10
Results.....	10
4. Excel Functions and ClosedXML	11

1. Overview

The Data Flow Tool allows you to create workflows for importing data into EAM. Workflows are a combination of screen and control information that is defined in an XML document. The tool uses a workbook excel file (.xlsx 2007+) file as the data source and imports this information into EAM using the workflow crafted in the XML file.

Workflows are a combination of screens where a "screen" is a step within a workflow. The workflow will process the screens in order of the screens being defined within that given workflow.

The XML file can contain multiple workflows, each with multiple steps and all of these can use the same source columns or data from the .xlsx sheet reducing the amount of redundant data being entered into the source .xlsx sheet. This allows for more complex importing flows to be created where multiple screens are used to process a single data row from the source excel workbook.

The Data Flow Tool utilizes a widely used open-source library known as ClosedXML (v0.95.3.0) for interacting with excel files. This allows Data Flow to read, calculate values based on formulas and write results to excel worksheets. Refer to the ClosedXML section to review supported formulas that can be used within an excel sheet that Data Flow will support extracting a result or value from.



This tool can be obtained from the EAM- Releases folder on <ftp.trapezgroup.com>.

Requirements

- .NET 4.8.0 installed on target machine

Parameters

Required

- -xml is used to provide the local (or full path) data definition file
- -data is used to provide the local (or full path) excel data source file
- -app is used to provide the application connection string
- -user is the user to log into EAM
- -pass is the password to log into EAM

Optional

- -mt # is used to specify the number of threads for processing data into EAM
 - Default is 1
 - Multiple-core CPUs have the ability to run multiple parallel threads and can greatly speed up the import process. However, this is very data-dependent, as running multiple threads to process the same information can result in deadlocks or delays. Considering using only one thread when processing records using the same information. For example:
 - Multiple work orders for the same asset
 - Multiple purchase orders for the same location and parts records
 - Multiple labor entries for the same employee record
 - Any situation where rows are required to be processed in order.
- -ra is used to reprocess all records in the data source.
 - When a results file already exists for the prior run of the tool, if the file is utilizing "CreateOrModify," "CreateOrSkip," or "Update" actions, it is possible the user always wants all rows processed. In this case you can specify "-ra" to force all rows to process, otherwise it will skip processing that given row.
- -srf will put results into a separate file, that is the data workbook.xlsx name plus "Results" on the end. For example, -data Workbook.xlsx -srf creates WorkbookResults.xlsx

Process

1. Obtain a copy of the tool.
2. Create the data definition file and put it in the same folder as the tool.
3. Create the data excel sheet file and put it in the same folder as the tool.
4. Run the console tool (review console usage example).
5. Review the output files.
6. Review validations, adjust the data excel sheet.
7. Re-run the tool to reprocess the records that failed due to validations.

2. Preparing Data

Data Definition File (.xml)

The data definition file is used to create screen workflows. The file requires valid XML and some strict tags/rules which are defined in this section. A Workbook contains Workflows. Workflows contain screens to be processed. Screens contain information about the action (create, create or modify, update or delete), template records (used for a copy), filtering (used for an update or deletion of existing record), base controls, and groups (which contain action, filtering and list of controls). All this information defines a workflow to be processed (which is an ordering of screens with actions/fields to be populated from the excel datasheet) to import data into EAM.

Tips about the XML file:

- Requires only one work book data definition tag (ie. <WorkbookDataDefinition> ... </WorkbookDataDefinition>)
- Multiple workflows can be defined, a workflow should be one to one with the worksheet to be processed in the source data excel sheet.
- Workflow can contain multiple screens to be processed, these screens are used to process a single row from the data definition file.
 - The workflow must have a name and it cannot be greater than 24 characters.
 - Excel only allows for 31 characters on a sheet name, so 24 characters allow for "WorkflowNameResults" to report the results of the process run.
 - Workflows are processed in order as defined in the XML file, the corresponding worksheet can be listed in any order in the .xlsx file.
- Screens are processed in order as defined within a workflow XML; screens are only processed if the prior screen processed successfully.
 - Screen rights are required to be set up properly, all defined screens must be accessible by the user and action determines other required screen rights.
 - The screen can be defined multiple times in a given workflow.
- Template records (<TemplateRecord>) are used to identify a record to be copied when creating a new record within EAM.
 - These may be used by screen actions Create, CreateOrModify and CreateOrSkip.

- Filtering (<Filter>) are used to specify filterable controls on a screen, so a single record can be identified when updating or deleting a record.
- Each group (<Group>...</Group>) performs a separate group row action when defining group tags for a screen.
- Controls must have at least one of the following defined: excel column letter or default data defined.
- Controls definition order will drive the order controls are set in filters, on-screen, and in group controls.

Performance Notes:

- More screens defined in a single workflow will make a single row take longer to process.
- CreateOrModify with a template record may have to perform several screen actions before creating the record.
 - Filter for the record, not found next step
 - Filter for template record
 - Now copy template record
 - Enter data and save

Supported Actions

The following is a list of actions that can be performed on screens through the data flow tool.

- Create - Creates a new record in EAM
- CreateOrModify - Filters for the record, if found it will update that record, otherwise, it will create a new record.
- CreateOrSkip - Filters for the record, if found skip it, otherwise, will create a new record.
- Update - Filters for the record and if found will update information on that record.
- Delete - Filters for the record and if found will delete information on that record.

Additional Notes:

- CreateOrModify, CreateOrSkip, Update, and Delete all require a filter to be specified and that filter must bring back one row for the action to either Modify, Skip, Update or Delete.

- The tool will report an error if the filter brings back more than one row.
- CreateOrModify and CreateOrSkip allow filtering returning zero rows as a valid data condition and in these cases will move on to Creating the record.
- Update and Delete will report an error if the filter brings back 0 rows.

XML TAGS

XML tags for data definition noted in this section:

XML Tag	Description	Parent XML Tags
<WorkBookDataDefinition>	This is the root XML node and the base definition for the XML data definition file	
<Workflow>	The workflow is defined by a <Name> and <Range>. It is a collection of screens to be processed for each row of data from the data source. The <Name> should match the worksheet name in the excel data source file.	<WorkBookDataDefinition>
<Name>	This defines the workflow name and worksheet name that will be processed by this workflow	<Workflow>
<Range>	Range defines the rows to be processed. Often .xlsx sheets can have instructions, headers or other information above the data to be processed in the excel sheet. Also sometimes there could be totals or summary data at the bottom of an excel sheet and this allows the end of the data rows to be defined as well.	<Workflow>
<RowStart>	Specifies the row number for the first row of data to be processed.	<Range>
<RowEnd>	Specifies the row number for the last row of data to be processed. This can be set to UNLIMITED which then assumes the last row that contains actual values in the worksheet is the last row of data to be processed.	<Range>
<Screen>	Screen defines a screen to be used to process the data and contains information about how to process the data.	<Workflow>

XML Tag	Description	Parent XML Tags
<ScreenObjectName>	Defines the name of the screen to be used to process the data, this must match a defined screen object from the EAM database objects, which can be found in UI_SCREEN table under OBJECT_NAME column	<Screen>
<Action>	This defines the action that will be used on the screen, supported screen actions: Create - will create a new record in EAM CreateOrModify - will filter for the record, if found it will update that record, otherwise, it will create a new record. CreateOrSkip - will filter for the record, if found skip it, otherwise, it will create a new record. Update - will filter for the record and if found it will update information on that record Delete - will filter for the record and if found it will delete information on that record. Note: The EAM screen must also support the specified action as well.	<Screen>
<TemplateRecord>	This tag can only be used with Create, CreateOrModify and CreateOrSkip actions. This tag is used to specify information about an existing record that will be used as the basis for creating the new record in EAM. This is accomplished by filtering for this <TemplateRecord> and if found performing a copy action on the screen.	<Screen>
<Filter>	This tag contains filter information that is used when performing CreateOrModify, CreateOrSkip, Update or Delete actions on a screen. The filter contains filter control information that is used to perform an on-screen filter before updating or deleting an existing record. Note: Filtering must identify a single record to be updated, if there are no records or many records to be updated the action is not performed. Note: If a blank data value is provided as a filter, the tool will skip processing for that specific screen action or group row action.	<Screen>
<Group>	This tag contains information that is utilized to populate group row data within a screen.	<Screen>

XML Tag	Description	Parent XML Tags
<GroupObjectName>	This tag contains the object name of the group that will be modified or used to process information into EAM. The group object name can be found on the control used as the control from UI_CTRL table and from the OBJECT_NAME column.	<Group>
<Action> (Group)	This defines the action that will be used on the screen within a group for supported group actions: Create - will create a new group row record in EAM CreateOrModify - will search for a group row, if found it will update that group row information, otherwise, it will create a new group row. CreateOrSkip - will search for a group row, if found skip it, otherwise, it will create a new group row. Update - will search for a group row and if found it will update information on that group row Delete - will search for a group row, if found it will enable the delete checkbox on the group row to delete that group row record. Note: The EAM screen must also support the specified action as well. Delete is only supported when the group row contains a delete checkbox.	<Group>
<Control>	Controls are used within screen, filter, group, and template record tabs. In each of these cases, the control section is used to identify and populate a control on a given screen.	<Screen> <TemplateRecord> <Filter> <Group>
<ObjectName>	Object name is used to identify an individual control where the data will be set when populating filters, base controls on screens, or group controls on screens. The object name for an individual control can be found from UI_CTRL table in the OBJECT_NAME column. Note: Controls require either excel column mapping or default value to be specified, both can also be specified.	<Control>
<ExcelColumnLetter>	This specifies the column letter to find data to populate this control when processing data from the datasheet (.xlsx) file.	<Control>

XML Tag	Description	Parent XML Tags
<Default>	The default specifies a default value to populate the control. For example: "Y" may be used to enable an active checkbox when creating a department. It also can specify a hard filter value when the control is used within a filter context.	<Control>
<OnEmpty>	OnEmpty specifies what the Data Flow user wants to do in the case of an empty value on a datasheet (.xlsx) file. Sometimes the client may not have all the information yet or a particular field may be option or empty. If "SkipRecord" is specified inside <OnEmpty>, and there is an empty value at the datasheet hit when processing a group row, the processing of the entire group row will be skipped. If "SkipRecord" is specified above the group row level at an entire screen level and an empty value is hit, the entire screen will not be processed. If "SkipControlUpdate" is specified inside <OnEmpty> and there is an empty value at the datasheet hit when processing a group row or a specific control at the screen level, the specific control value will be skipped over and the rest of the group row / screen processing will continue processing as normal.	<Control>

Additional Notes:

- Workflows without a range will use a default range of 2 - UNLIMITED and assume there is only one header row before the data starts processing.
- Workflows are processed in order of definition in the data definition file.
- Screens are processed in order of the data definition file.
- Screens within a workflow are processed in a single thread and assume the prior screen must be processed successfully before processing the next thread.

Data Source File (.xlsx)

The data source file is an excel sheet that provides rows of data the user wants to import into EAM. This should contain a sheet with the same name for each workflow name defined in the XML file. Often this will contain a header row that is descriptive for the user and then rows of data to be processed by the specified workflow. The excel column letters mapped in the XML workflow file should exist in the worksheet that is being processed by the workflow.

- ❗ It is important that the columns are NOT moved around as it must match the XML workflow for data to be processed correctly.

The data source file worksheets can be listed in any order, the order of the sheets being processed will be determined by the XML workflow definition order. This allows dependent data to be ordered in the XML file to ensure data is processed first, which may later be required by a different worksheet before being processed.

Default Limits

- The tool has a hard limit and will only allow up to 32,000 rows to be processed.
 - Break up the workload into small sheets if more rows are needed. Since a single row can create "many" records via a workflow, this still allows potentially hundreds of thousands of records to be created. This tool is not meant for importing an entire database, there are other database-specific tools for that.
- Range default - row start default is 2 and row-end default is 32000 (although the tool detects the last row used, if before end of the range and stops at the last row used).

3. Output

The tool produces two output files that can be reviewed after the fact to determine how far the tool was able to get in processing and whether individual rows processed successfully.

DataflowImport.log

This is the output log from the Data Flow tool process information. It typically will contain start process / finished process messages, along with any pre-import validations and/or unexpected validations that may occur while the tool is running.

Results

Each workflow has a name that translates to a named worksheet in the data workbook.xlsx file. Data Flow import tool will create another worksheet using the workflow name + "Results" and append this to the original workbook.xlsx file. This contains a row for every row that was assigned to be processed while the tool was running. It will show the resulting status, some start/end date-time information, and if applicable last screen and messages from the last screen when a row failed to process. The resulting status maybe NOT PROCESSED, SUCCESS, or FAILED.



When starting the tool if this result worksheet already exists it will be consumed by the tool. It will validate the expected headers, in this case, match any expected Data Flow results column headers.

Any rows already processed with a status of SUCCESS will be skipped (unless -ra option is used to reprocess all rows). Rows with a status of FAILED will start processing on the noted failed screen and skip the completed steps (unless -ra option is used to reprocess all rows).

If argument "-srf" is provided, then the tool will put the result sheets into a separate file using the original workbook.xlsx name but adding "Results" on the end.

4. Excel Functions and ClosedXML

The open-source library the tool uses does not support some of the newer excel functions. ClosedXML is a widely used open-source library for interacting with excel files and includes ability to calculate results based on excel formulas. This library does not support every excel function so below is a listing of supported functions.

Type	Functions	
Datetime Functions	DATE DATEVALUE DAY DAYS DAYS360 EDATE EOMONTH HOUR ISOWEEKNUM MINUTE MONTH	NETWORKDAYS NOW SECOND TIME TIMEVALUE TODAY WEEKDAY WEEKNUM WORKDAY YEAR YEARFRAC
Information Functions	ERRORTYPE ISBLANK ISERR ISERROR ISEVEN ISLOGICAL ISNA ISNONTEXT	ISNUMBER ISODD ISREF ISTEXT N NA TYPE
Lookup Functions	HLOOKUP HYPERLINK INDEX	MATCH VLOOKUP
Logical Functions	AND OR NOT	IF TRUE FALSE IFERROR

Math.Trig Functions	ABS	MMULT
	ACOS	MOD
	ACOSH	MROUND
	ACOT	MULTINOMIAL
	ACOTH	ODD
	ARABIC	PI
	ASIN	POWER
	ASINH	PRODUCT
	ATAN	QUOTIENT
	ATAN2	RADIANS
	ATANH	RAND
	BASE	RANDBETWEEN
	CEILING	ROMAN
	CEILING.MATH	ROUND
	COMBIN	ROUNDDOWN
	COMBNA	ROUNDUP
	COS	SEC
	COSH	SECH
	COST	SERIESSUM
	CSC	SIGN
	CSCH	SIN
	DECIMAL	SINH
	DEGREES	SQRT
	EVEN	SQRTPI
	EXP	SUBTOTAL
	FACT	SUM
	FACTDOUBLE	SUMIF
	FLOOR	SUMIFS
	FLOOR.MATH	SUMPRODUCT
	GCD	SUMSQ
	INT	TAN
	LCM	TANH
	LN	TRUNC
	LOG	
	LOG10	
	MDETERM	
	MINVERSE	

Type	Functions	
Statistical Functions	AVERAGE AVERAGEA COUNT COUNTA COUNTBLANK COUNTIF COUNTIFS MAX MAXA MIN MINA	STDEV STDEVA STDEVP STDEVPA STDEV.S STDEV.P VAR VARA VARP VARPA VAR.S VAR.P
Text Functions	ASC CHAR CLEAN CODE CONCAT CONCATENATE DOLLAR EXACT FIND FIXED LEFT LEN LOWER	MID NUMBERTVALUE PROPER REPLACE REPT RIGHT SEARCH SUBSTITUTE T TEXT TEXTJOIN TRIM UPPER VALUE