RESERVE BANK OF AUSTRALIA

Securitisation System Technical Support Notes

April 2015

Version Control

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Date	28 April 2015
Document Owner	Reserve Bank of Australia

Contents

1. Purpose and Overview

This document describes the process by which an Information Provider (IP) can submit Securitisation data to the RBA that complies with the RBA's XML submission data schema (XSD).

This document specifically relates to and references the following published material:

a) RMBS,CMBS & OABS XML Schemas (XSD)
b) RMBS,CMBS & OABS Excel Data Submission Templates
c) RMBS,CMBS & OABS Example Excel Data Submission Files
d) RMBS,CMBS & OABS Example XML Outputs; and
e) Cash Flow Waterfall XML Generation Tool

A brief overview of the submission validation process

Each file uploaded to the RBA's Securitisation System will need to pass various levels of validation before the submission is accepted by the Securitisation System. The file can be manually uploaded via the online System or automatically submitted through the B2B API interface.

The Submission Validation process ascertains that each submitted file meets the following conditions:

1) XSD Validation – The file must be a valid and properly formed XML file that contains all required fields.
2) Deal and Tranche Registration – The file must refer to a deal that is registered on the Securitisation System, and there must be data for each tranche of the deal.
3) Virus and Malicious code – The file (and in particular, the VBA code for the cash flow waterfall (CFW) model) cannot contain any virus or malicious code.

If the file meets all conditions, the IP receives a Submission Receipt, and the file progresses to Submission Data Validation. Submission Data Validation subjects the data to two general types of tests:

1) Internal consistency tests — The data within the file must be internally consistent. For example, the Ending Pool Balance must reconcile to the Beginning Pool Balance.
2) Inter-temporal tests – Certain data within the submission must reconcile to data in previous submissions. For example, the Beginning Pool Balance in the current submission must equal the Ending Pool Balance in the preceding submission.

If the file passes all Submission Data Validation tests, the data in the file updates the database maintained by the Securitisation System. Certain failures of Submission Data Validation tests cause the submission to be rejected, while others merely trigger warning messages. In all cases, whether the file is accepted or not, the IP receives a Validation Report detailing all failed tests.

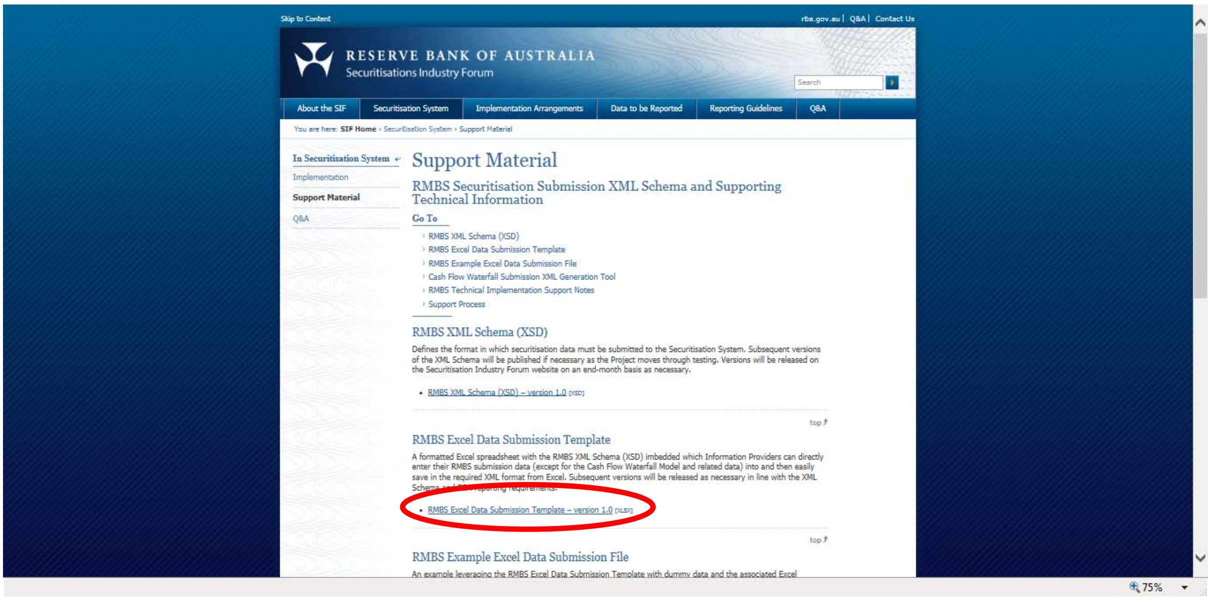
2. RMBS, CMBS & OABS Excel Data Submission Templates Usage Guide

In addition to the RMBS, CMBS & OABS XML Schema's, the RBA has published an RMBS, CMBS & OABS Excel Data Submission Templates. These Templates are formatted Excel spreadsheet with the RMBS, CMBS or OABS XML Schema (XSD) imbedded. Information Providers can directly enter their submission data (except for the CFW model and related data) into the relevant Template and then easily save in the required XML format from Excel.

IMPORTANT: When creating XML maps and exporting data in Excel to XML files, there is a limit on the number of rows that can be exported. Export to XML from Excel will save a maximum of 65536 rows. If your file contains more than 65536 rows, Excel will export the first (#ROWS mod 65537) rows. For example, if your worksheet has 70000 rows, Excel will export 70000 mod 65537 = 4464 rows. This is a known issue in all office versions up to and including 2010.

(A separate utility – Cash Flow Waterfall XML Generation Tool – is used to read the CFW Excel file and generate an associated XML Data file.) Subsequent versions will be released as necessary in line with the XML Schema and RBA reporting requirements.

1. Download a copy of the RMBS, CMBS or OABS Excel Data Submission Template from the Securitisation Industry Forum (SIF) website: (http://www.rba.gov.au/securitisations/system/support-material.html)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Support Material

RMBS Securitisation Submission XML Schema and Supporting Technical Information

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- RMBS XML Schema (XSD)
- RMBS Excel Data Submission Template
- RMBS Example Excel Data Submission File
- Cash Flow Waterfall Submission XML Generation Tool
- RMBS Technical Implementation Support Notes
- Support Process

RMBS XML Schema (XSD)

Defines the format in which securitisation data must be submitted to the Securitisation System. Subsequent versions of the XML Schema will be published if necessary as the Project moves through testing. Versions will be released on the Securitisation Industry Forum website on an end-month basis as necessary.

- RMBS XML Schema (XSD) – version 1.0 [XSD]

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RMBS Excel Data Submission Template

A formatted Excel spreadsheet with the RMBS XML Schema (XSD) imbedded which Information Providers can directly enter their RMBS submission data (except for the Cash Flow Waterfall Model and related data) into and then easily save in the required XML format from Excel. Subsequent versions will be released as necessary in line with the XML Schema and RBA reporting requirements.

- RMBS Excel Data Submission Template – version 1.0 [XLSX]

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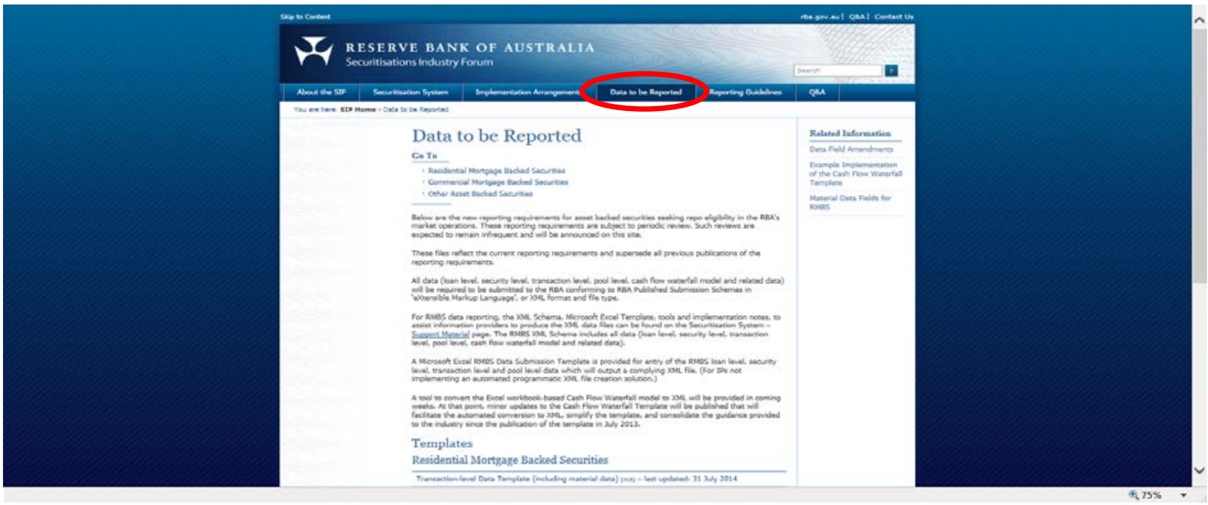
RMBS Example Excel Data Submission File

An example leveraging the RMBS Excel Data Submission Template with dummy data and the associated Excel

2. You can rename your downloaded local copy to anything meaningful to you.

3. You need to create a separate local file per Deal per Reporting Period.

4. Following the published business guidance notes and descriptions on the SIF website populate all the data elements within the file. (http://www.rba.gov.au/securitisations/)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Data to be Reported

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- Residential Mortgage Backed Securities
- Commercial Mortgage Backed Securities
- Other Asset Backed Securities

Below are the new reporting requirements for asset backed securities seeking repo eligibility in the RBA's market operations. These reporting requirements are subject to periodic review. Such reviews are expected to remain infrequent and will be announced on this site.

These files reflect the current reporting requirements and supersede all previous publications of the reporting requirements.

All data (loan level, security level, transaction level, pool level, cash flow waterfall model and related data) will be required to be submitted to the RBA conforming to RBA Published Submission Schemas in 'eXtensible Markup Language', or XML format and file type.

For RMBS data reporting, the XML Schema, Microsoft Excel Template, tools and implementation notes, to assist information providers to produce the XML data files can be found on the Securitisation System – Support Material page. The RMBS XML Schema includes all data (loan level, security level, transaction level, pool level, cash flow waterfall model and related data).

A Microsoft Excel RMBS Data Submission Template is provided for entry of the RMBS loan level, security level, transaction level and pool level data which will output a complying XML file. (For IPs not implementing an automated programmatic XML file creation solution.)

A tool to convert the Excel workbook-based Cash Flow Waterfall model to XML will be provided in coming weeks. At that point, minor updates to the Cash Flow Waterfall Template will be published that will facilitate the automated conversion to XML, simplify the template, and consolidate the guidance provided to the industry since the publication of the template in July 2013.

Templates

Residential Mortgage Backed Securities

Transaction-level Data Template (including material data) [XLS] – last updated: 31 July 2014

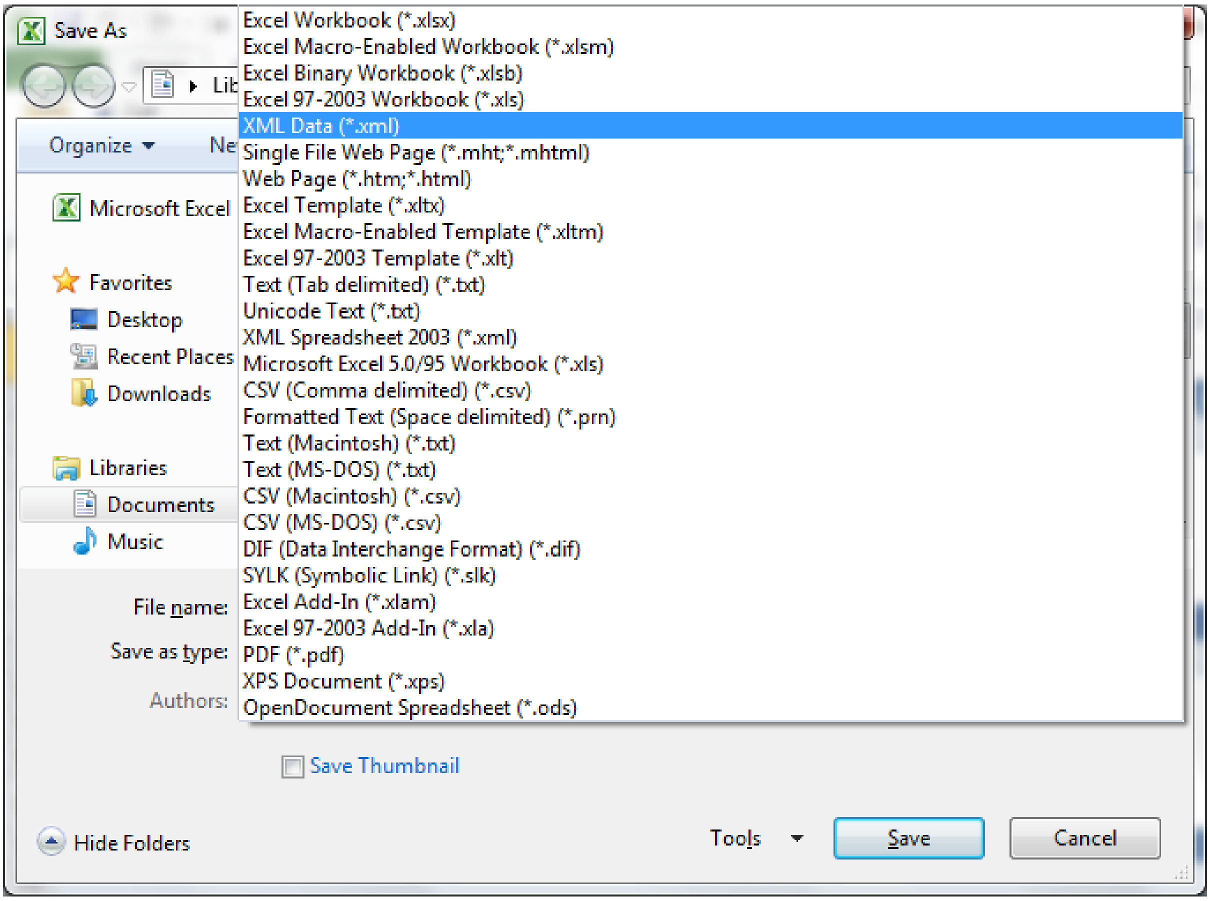
Related Information

- Data Field Amendments
- Example Implementation of the Cash Flow Waterfall Template
- Material Data Fields for RMBS

Some tips regarding data entry:

- If you inadvertently add an extra row to an element (for example, an extra Trigger), to reduce the size of the XML table, delete the incorrect data row.
- All fields require some data, either the correct value, or an "ND" code (see Section 6.1 below).
- XML is very picky when it comes to dates and percentages. Please remember to do the following:
  - For all date fields, format the field as a date value before entering your data. For example, you can set the number format for Loan Maturity Date to be "dd/mm/yyyy" before you enter the values. Once you have done this, Excel will properly convert that date to the XML date format (which is always "yyyy-mm-dd").
  - For all percentages, please enter them as decimal numbers: e.g. 3.5 in place of 3.5%.

5. Once you have completely populated the data in the workbook, simply select "Save As" from the file menu and then select "XML Data" from the file format list.


Save As
Lib
Organize
Ne
Microsoft Excel
Favorites
Desktop
Recent Places
Downloads
Libraries
Documents
Music
File name:
Save as type:
Authors:
Excel Workbook (*.xlsx)
Excel Macro-Enabled Workbook (*.xlsm)
Excel Binary Workbook (*.xlsb)
Excel 97-2003 Workbook (*.xls)
XML Data (*.xml)
Single File Web Page (*.mht;*.mhtml)
Web Page (*.htm;*.html)
Excel Template (*.xltx)
Excel Macro-Enabled Template (*.xltm)
Excel 97-2003 Template (*.xlt)
Text (Tab delimited) (*.txt)
Unicode Text (*.txt)
XML Spreadsheet 2003 (*.xml)
Microsoft Excel 5.0/95 Workbook (*.xls)
CSV (Comma delimited) (*.csv)
Formatted Text (Space delimited) (*.prn)
Text (Macintosh) (*.txt)
Text (MS-DOS) (*.txt)
CSV (Macintosh) (*.csv)
CSV (MS-DOS) (*.csv)
DIF (Data Interchange Format) (*.dif)
SYLK (Symbolic Link) (*.slk)
Excel Add-In (*.xlam)
Excel 97-2003 Add-In (*.xla)
PDF (*.pdf)
XPS Document (*.xps)
OpenDocument Spreadsheet (*.ods)
□ Save Thumbnail
Hide Folders
Tools
Save
Cancel

6. To complete your submission file you then need to append the CFW XML Data File. (A utility – Cash Flow Waterfall XML Generation Tool – that will read a CFW Excel Model file and generate an associated XML Data file is available for download and use on the Securitisation Industry Forum (SIF) website. http://www.rba.gov.au/securitisations/system/support-material.html)

7. Either via the Online Site or B2B API submit the final XML file.

3. Cash Flow Waterfall XML Generation Tool Usage Guide

The RBA has created an Excel based tool (Cash Flow Waterfall XML Generation Tool.xlsm) that can be used to generate the CFW node section of the XML Schema. The tool can also be used to merge the generated CFW node XML with your XML data file containing the other non-CFW reporting data. It is available for download on the Securitisation Industry Forum (SIF) website.
http://www.rba.gov.au/securitisations/system/support-material.html

Cash Flow Waterfall XML Generation Tool v1.0.xlsm

Note: It is possible for an IP to create the XML file using many different technological solutions. (i.e. The CFW node section of the XML Schema can be programmatically created without the need to use the Cash Flow Waterfall XML Generation Tool)

If you decide to build your own utility to package the CFW data, please consider the following points to ensure that no elements of the code itself will be misinterpreted by the XML import process.

- *The Securitisation System specifies XML with UTF-8 encoding. Thus, any code or comments with non-UTF-8 characters will be converted to UTF-8. This is normally not an issue for the VBA code itself, but can be for some comments.*

- *The CFW/Model/VBA_Code_Module/CodeDetails element should be enclosed in <![CDATA[ ]]> tags. For example:*

```
<![CDATA[
node details…
]]>
```

Subsequent versions of the Cash Flow Waterfall XML Generation Tool will be released as necessary in line with the XML Schema and RBA reporting requirements.

3.1 Minimum Operating Requirements

3.1.1 Excel Supported Version

The tool is certified against Excel 2010 and 2013, 32-bit & 64-bit versions. Whilst it’s expected to be compatible with more current versions of Excel this hasn’t been tested and can’t be guaranteed.

3.1.2 Excel References

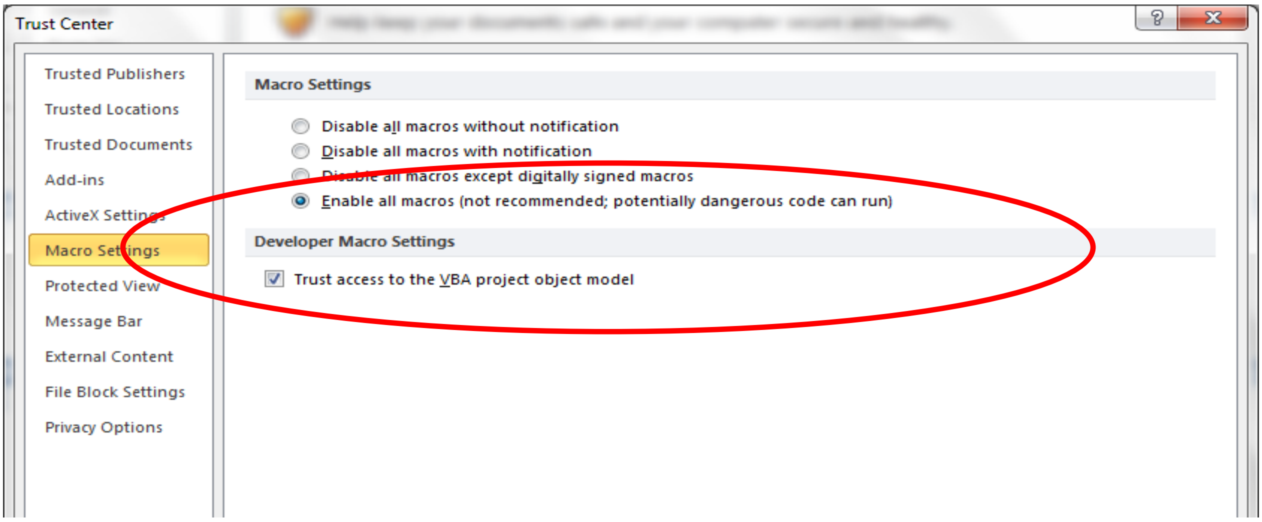
The following four libraries are referenced by the Exporter:

- Visual Basic For Applications
- Microsoft Excel 14.0 Object Library
- Microsoft Scripting Runtime
- Microsoft Visual Basic for Applications Extensibility 5.3

The Applications Extensibility library is used if you allow programmatic access to the VBA project. An ADODB.Stream object is used for creating the XML file as UTF-8 encoded text; the system uses late binding to remove dependency on any specific version of the Microsoft ActiveX Data Objects library.

3.1.3 Excel Trust Settings

The tool requires macros to be enabled and Trust access to VBA project object model to be checked.



Macro Settings

○ Disable all macros without notification

○ Disable all macros with notification

○ Disable all macros except digitally signed macros

● Enable all macros (not recommended; potentially dangerous code can run)

Developer Macro Settings

☑ Trust access to the VBA project object model

3.2 Tool Configuration and Usage Guide

The Cash Flow Waterfall XML Generation tool is an Excel file that contains a set of VBA macros to produce a combined XML submission file for the Securitisation System.

Key points to note in regards to the CFW Model for the XML Generation tool run:

a) Make sure that model versioning follows the guidance provided, specifically
   a. for each version of the CFW model, include a worksheet named “Description_i” where i is an incremental integer
   b. for each version fo the CFW model, include a VBA code module named “WaterfallModel_i” where i is an incremental integer

b) Make sure that your Variable names(specified in row 31 on the Waterfall worksheet) are unique, and that for each output variable, there is a corresponding Actual field

c) Make sure that your Data Types (specified in row 32 on the Waterfall worksheet) are either “Alphanumeric”, “Numeric”, “Date” or “Boolean”.

d) Make sure that your Reported Value Type (specified in row 33 on the Waterfall worksheet) is one of “AV”, “RV” or “NR”

e) Always populate the Currency value (specified in row 34 on the Waterfall worksheet) for each column. If no currency is appropriate for the value, please select the appropriate ND5 value.

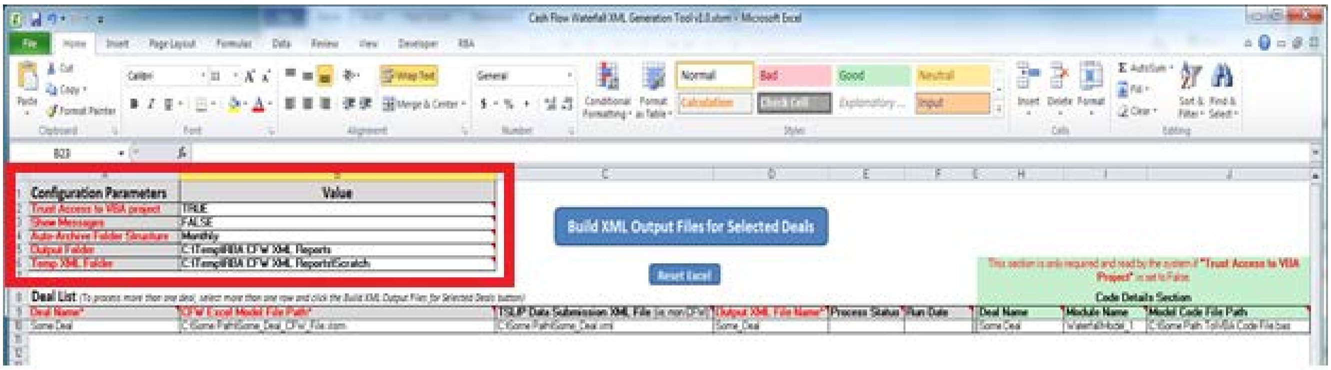
f) Always populate the Description fields (specified in row 35 on the Waterfall worksheet) for inputs and outputs.

g) The system reads row 36 and only processes columns that have one of the following values: “Input”, “Output”, “Distribution” or “Model Version”. The system checks that each output has a unique name; duplicates will cause errors. In addition, for each Model Output field, the system expects to find an Actual Distribution field to match. Failure to find the output field will cause errors.

h) On the Waterfall worksheet, the system assumes that every row that has a value in column ‘C’, from cell ‘C37’ and below, is a valid CFW data series, with each data series corresponding to the report date populated in column ‘B’.

3.2.1 XML Generation Tool Configuration Setup

Configuration Block



Cash Flow Waterfall XML Generation Tool v1.0.xlsm - Microsoft Excel

Configuration Parameters	Value
Trust Access to VBA project	TRUE
Show Messages	FALSE
Auto-Archive Folder Structure	Monthly
Output Folder	C:\Temp\RBA CFW XML Reports
Temp XML Folder	C:\Temp\RBA CFW XML Reports\Scratch

Build XML Output Files for Selected Deals

Reset Excel

This section is only required and read by the system if "Trust Access to VBA Project" is set to False.

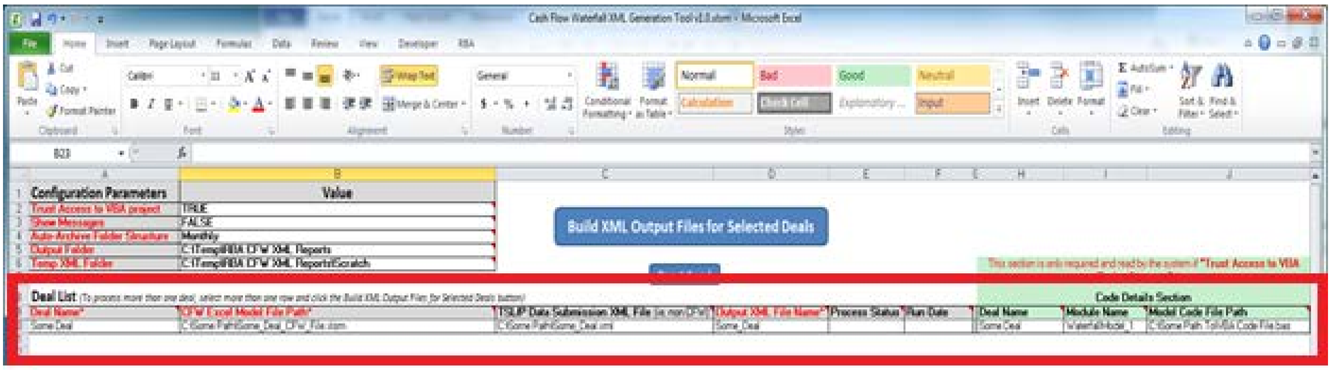
Deal List (To process more than one deal, select more than one row and click the Build XML Output Files for Selected Deals button)

Deal Name*	CFW Excel Model File Path*	TSUP Data Submission XML File (ie. non CFW)	Output XML File Name*	Process Status	Run Date	Deal Name	Module Name	Model Code File Path
						Code Details Section		
Some Deal	C:\Some Path\Some_Deal_CFW_File.xlsm	C:\Some Path\Some_Deal.xml	Some_Deal			Some Deal	WaterfallModel_1	C:\Some Path To\VBA Code File.bas

There are 5 core configuration options (listed above the Deal List section):

1. **Trust Access to VBA Project** – this defines how the VBA code is read. If set to true, the macro reads the VBA module from the source CFW Model Excel file itself. If false, it reads the VBA code from a flat file. More detail on this option below.
2. **Show Messages** – this controls how verbose the system is. All messages are also shown in the Process Status field. This is intended for debugging when first getting started with the tool or for when adding a new deal to the system. Please be warned that the system can get rather chatty if there are many errors in a CFW workbook.
3. **Auto-Archive Folder Structure** – if set to anything other than “None” the tool will create date-stamped copies of the combined XML output files in a time-stamped folder structure. Options are None, Monthly, Quarterly, or Annual.
4. **Output Folder** – where should the finished files be created? The system puts all finished XML files into the same output folder.
5. **Temp XML Folder** – The system reads the CFW Excel Model file and builds the CFW XML node as a discrete file first. Where should the Exporter save this file? This needs to be different from the Output Folder.

Per Deal Configurations



Cash Flow Waterfall XML Generation Tool v1.0.xlsm - Microsoft Excel

Configuration Parameters	Value
Trust Access to VBA project	TRUE
Show Messages	FALSE
Auto-Archive Folder Structure	Monthly
Output Folder	C:\Temp\RBA CFW XML Reports
Temp XML Folder	C:\Temp\RBA CFW XML Reports\Scratch

Build XML Output Files for Selected Deals

Deal List (To process more than one deal, select more than one row and click the Build XML Output Files for Selected Deals button)

Deal Name*	CFW Excel Model File Path*	TSUP Data Submission XML File (ie. non CFW)	Output XML File Name*	Process Status	Run Date	Deal Name	Module Name	Model Code File Path
						Code Details Section		
Some Deal	C:\Some Path\Some_Deal_CFW_File.xlsm	C:\Some Path\Some_Deal.xml	Some_Deal			Some Deal	WaterfallModel_1	C:\Some Path To\VBA Code File.bas

For each deal configured on the Exporter, the utility needs to know the following (minimum mandatory columns in Red and suffixed with an *:

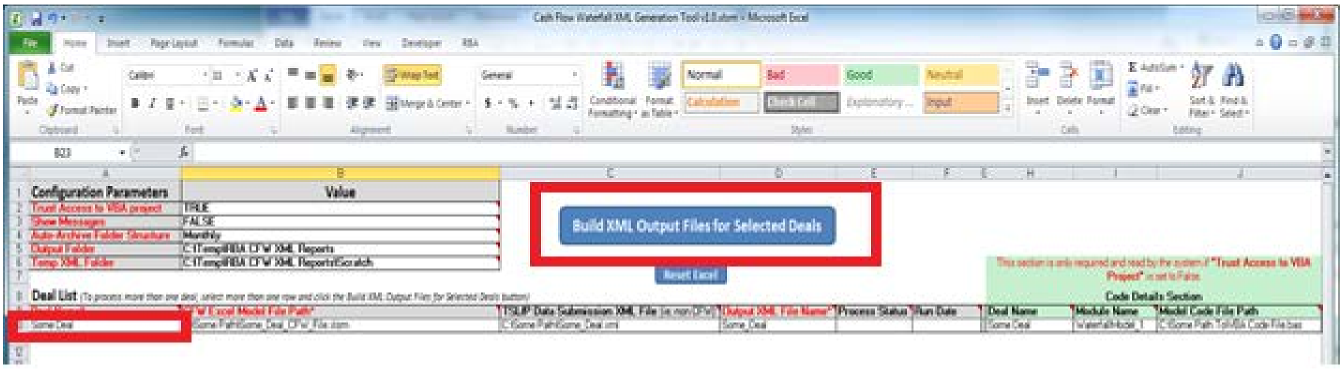
1. **Deal Name** – How would you like the deal to be identified for your purposes? Required field.
2. **CFW File Path** – the fully qualified path to the CFW Excel Model file. Required field.

3. **Submission XML File** – Fully qualified path to the deal's non-CFW data XML file. If this field is blank, the system will produce a flat XML file that contains only the CFW node. The idea is that if your systems are capable of ingesting this information and packaging it into your submission file, then the exporter needs to operate in this "simple" mode, too.
4. **Output File Name** – How should the combined XML file be named for the deal? This file will be created in the Output Folder and the Auto-Archive folder, too, if using. Required Field.
5. **Process Status** –If no issues, it reports "Success"; if there are errors, they are detailed.
6. **Run Date** – When was the deal's XML submission file last created (or attempted to be created)?
7. **Deal Name, Module Name and Model Code File Path** – If "Trust Access to VBA Project" is false, you will need to add these details for each model version in your CFW file. It is imperative that the Deal Name specified in column H for each version of the CFW Model matches exactly the name in Column A for the deal. The order if the Code Details Section is independent from the order of the Deal List. The flat file should be in either .txt format (Notepad or equivalent) or .bas format, as exported from Excel.

Please note that the RBA guidance for the CFW Excel Model file states that if ever there are changes to the waterfall programme, you will need to provide both an updated programme contained in a new VBA code module named WaterfallModel_i (where i is an incremental integer), and an updated description of the waterfall in a worksheet titled Description_i (same comment).

3.2.2 Processing – Batch and Single Deal Modes

The Exporter has one primary button and this does everything. To process every deal configured, simply select each row using your mouse and then click "Build XML Output Files for Selected Deals." The rows selected need not be contiguous, and each deal is processed individually.


Cash Flow Waterfall XML Generation Tool v1.0.xlsm - Microsoft Excel
Build XML Output Files for Selected Deals
Reset Excel

Configuration Parameters	Value
Trust Access to VBA project	TRUE
Show Messages	FALSE
Auto-Archive Folder Structure	Monthly
Output Folder	C:\Temp\RBA CFW XML Reports
Temp XML Folder	C:\Temp\RBA CFW XML Reports\Scratch

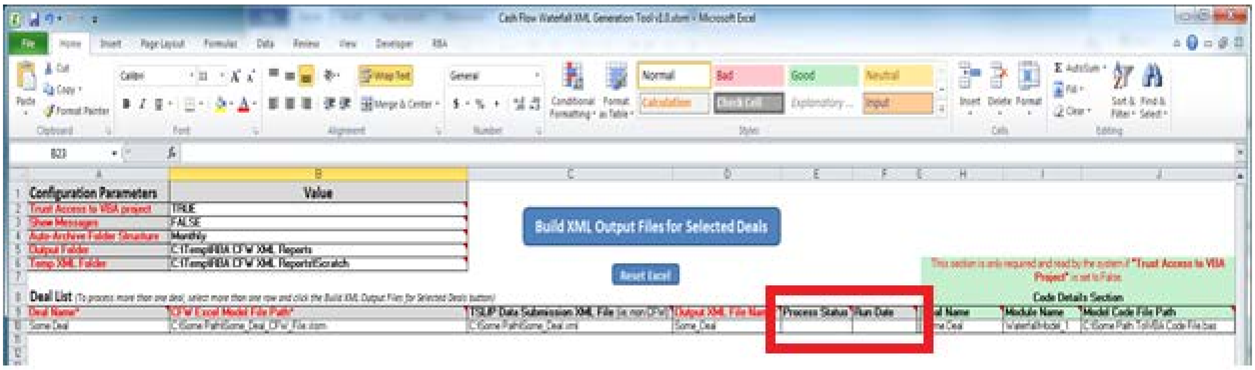
Deal List (To process more than one deal, select more than one row and click the Build XML Output Files for Selected Deals button)

This section is only required and read by the system if "Trust Access to VBA Project" is set to False.

Code Details Section

Deal Name*	CFW Excel Model File Path*	TSLIP Data Submission XML File (ie. non CFW)	Output XML File Name*	Process Status	Run Date	Deal Name	Module Name	Model Code File Path
Some Deal	C:\Some Path\Some_Deal_CFW_File.xlsm	C:\Some Path\Some_Deal.xml	Some_Deal			Some Deal	WaterfallModel_1	C:\Some Path To\VBA Code File.bas

Notification of Success or Failure for each execution is returned in the Process Status column and last run date and time is returned in the Run Date column of the respective Deal.


Cash Flow Waterfall XML Generation Tool v1.0.xlsm - Microsoft Excel
Build XML Output Files for Selected Deals
Reset Excel

Configuration Parameters	Value
Trust Access to VBA project	TRUE
Show Messages	FALSE
Auto-Archive Folder Structure	Monthly
Output Folder	C:\Temp\RBA CFW XML Reports
Temp XML Folder	C:\Temp\RBA CFW XML Reports\Scratch

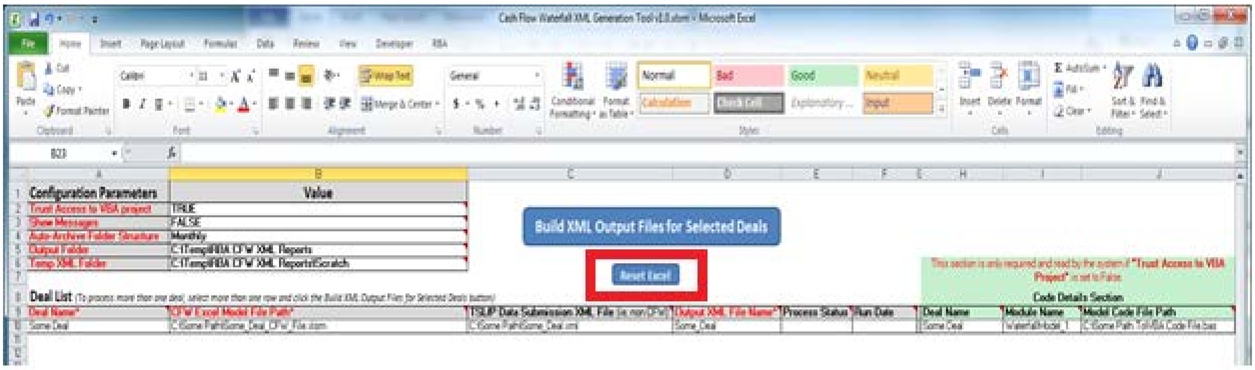
Deal List (To process more than one deal, select more than one row and click the Build XML Output Files for Selected Deals button)

This section is only required and read by the system if "Trust Access to VBA Project" is set to False.

Code Details Section

Deal Name*	CFW Excel Model File Path*	TSLIP Data Submission XML File (ie. non CFW)	Output XML File Name*	Process Status	Run Date	Deal Name	Module Name	Model Code File Path
Some Deal	C:\Some Path\Some_Deal_CFW_File.xlsm	C:\Some Path\Some_Deal.xml	Some_Deal			Some Deal	WaterfallModel_1	C:\Some Path To\VBA Code File.bas

If you get an Excel VBA error and the application appears to be locked or otherwise unresponsive, you can either click on the “Reset Excel” button or execute the macro ResetExcel. View -> Macros -> ResetExcel. If you have a VBA error and hit “Debug” rather than “End” you will need to first exit the VBA Editor before resetting Excel. If this occurs its recommended to close all open Excel sessions on your machine and restart.


Cash Flow Waterfall XML Generation Tool v1.0.xlsm - Microsoft Excel
Build XML Output Files for Selected Deals
Reset Excel

Configuration Parameters	Value
Trust Access to VBA project	TRUE
Show Messages	FALSE
Auto-Archive Folder Structure	Monthly
Output Folder	C:\Temp\RBA CFW XML Reports
Temp XML Folder	C:\Temp\RBA CFW XML Reports\Scratch

This section is only required and read by the system if "Trust Access to VBA Project" is set to False.

Code Details Section

Deal List (To process more than one deal, select more than one row and click the Build XML Output Files for Selected Deals button)

Deal Name*	CFW Excel Model File Path*	TSLIP Data Submission XML File (ie. non CFW)	Output XML File Name*	Process Status	Run Date	Deal Name	Module Name	Model Code File Path
Some Deal	C:\Some Path\Some_Deal_CFW_File.xlsm	C:\Some Path\Some_Deal.xml	Some_Deal			Some Deal	WaterfallModel_1	C:\Some Path To\VBA Code File.bas

We have also include within the Tool in the “Possible System Messages” worksheet a listing of the system error and warning messages and their associated functions, processing impact and help comments.

3.3 In-Depth Code Details

The Cash Flow Waterfall XML Generation Tool makes extensive use of Scripting Dictionaries to store data and report to you any issues with it. If you are unfamiliar with scripting dictionaries, consider them to be structured key/value pairs where the value can be another dictionary, creating a recursive structure similar to XML itself.

This section will detail every function in the workbook’s VBA code module.

3.3.1 Function BuildXMLFiles

This is the main wrapper function, called when you press the button on the Exporter worksheet. It contains the 3 configuration-centric functions, and then a loop for each of the files it is to process.

3.3.2 Function LoadConfigs

Reads the 5 inputs at the top of the worksheet and verifies that the output and Temp XML folders exist. If trusted access to VBA module not supported, verifies that

- There are deal/Module/Module Code Files configured, and
- That the folders exist – if the folders do not exist, the system will try to create them. If it is unable to do so, the system will halt here.

Please note that this step does not verify that settings are correct for the selected deals.

3.3.3 Function LoadToProcessHash

This reads the settings for the selected deals – not for everything, but only for the selected deals. Specifically, it checks that

- CFW File exists
- If there is anything specified in the submission XML file, that this file exists. If the submission XML file entry is blank, then it simply generates an XML file for the CFW node alone.
- If trusted access to the VBA Project is not granted, this step verifies that one or more code modules are specified (as per the LoadConfigs function)

3.3.4 Function SetArchiveFolder

This simple utility verifies that the auto-archive folder structure is correctly set and, if so configured, tries to create required folders. If the system is unable to create a required folder, it will notify you of this and proceed to generate the requested XML file(s) as though Auto Archive Folder Structure was "None."

3.3.5 Function BuildXMLfromCFWWorkbook

This function does all of the heavy lifting of the programme. There are 6 steps required to build the Submission XML file:

1) Verify the structure of the CFW file
2) Collect the VBA from the file or from exported file(s).
3) Collect the Description(s)
4) Collect the Waterfall data
5) Build the temporary CFW XML file
6) Merge that file into the submission file

Between each of the above steps, if there are any errors detected by the system, it will stop processing and report on the error(s) detected.

Please note that if the system finds errors in your file it will leave it open in Excel, but if there are no errors, it will close the workbook **without** saving the file. Please save your important work before running the exporter.

3.3.6 Function Step1VerifyCFWFile

There are two variants of this function, depending on whether you trust access to the VBA project or not. The core purpose of the file is to check that for each and every version of the waterfall, there is both a VBA code module named "WaterfallModel_i" and a description worksheet named "Description_i". Any worksheets or code modules that come close to the naming convention but don't quite make it will cause errors.

3.3.7 Function Step2GetVBAFromFile

As above, there are two variants of this function. This reads the VBA code into memory as strings either from the VBA Project itself, or from the VBA module export files configured in columns H, I and J.

3.3.8 Function Step3CollectCFWDescriptions

This function populates the Description nodes for each of the CFW model versions. This also checks that for each version, there is a description and a VBA code module.

3.3.9 Function Step4ProcessWaterfall

This function will prove problematic if you did not heed the advice given in section Preventing Errors in the CFW files on page 5. Specific things the function checks for include:

- Row 32 has values that are either “Alphanumeric”, “Numeric”, “Date” or “Boolean”
- Row 33 has values that are either “AV”, “RV” or “NR
- Every Distribution field matches an Output field
- Every Output field is matched to a Distribution field
- The CFW_Program is specified for every time series

Failure to comply with these requirements will cause the system to stop processing at this step.

3.3.10 Function Step5ProduceCFWXMLOutput

The system creates an XML file containing just the CFW XML data. Aside from not being able to write the file to the specified folder, there is little that will break this function.

3.3.11 Function Step6MergeCFWXMLIntoMainSubmissionFile

The code is looking for the </Deal> string somewhere in the submission XML file. This indicates the end of the Deal node, and is a suitable place for the CFW node to be inserted.

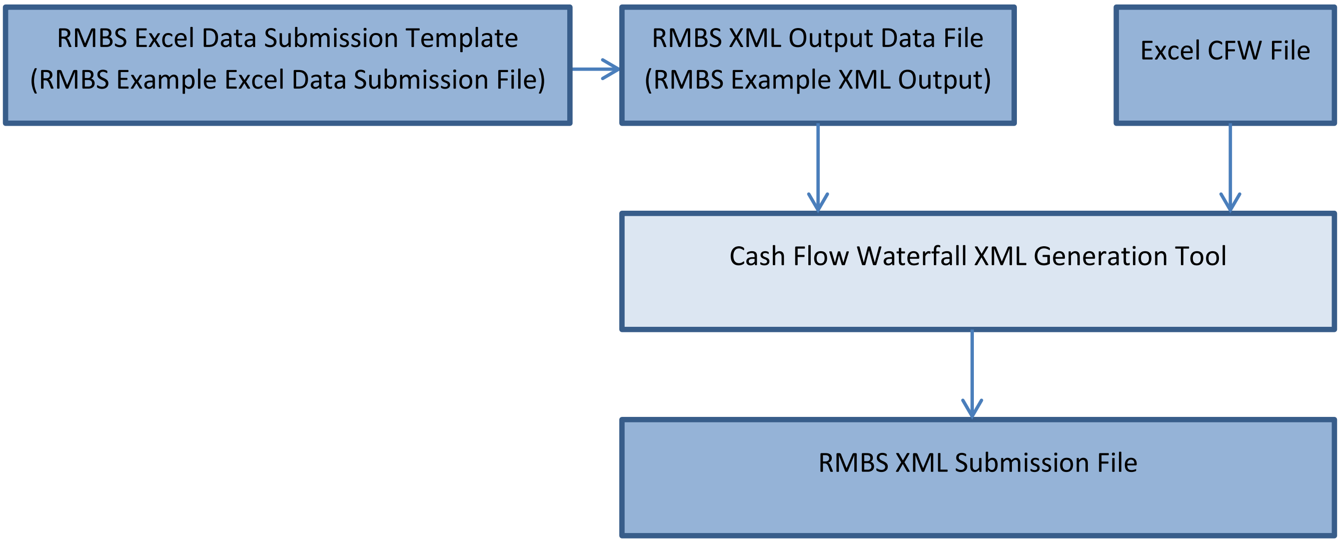
3.3.12 Utility Functions

There are several minor functions in the utility that serve a few purposes:

- **RecordError** – any time the system detects an error, this function executes 5 lines of code
- **CollectGarbage** – at the end of processing, this function clears items from memory
- **OpenFileWrapper** – a utility to open excel files; calls OpenWorkbook if needed
- **CheckFolderPath** – verifies that a folder exists, and if it does not, tries to create it
- **LockExcel** and **UnlockExcel** – controls the application itself; suppresses/enables screen updating, automatic calculation mode, and enable events, three settings that can have a large impact on the performance of the platform
- **ResetExcel** – this subroutine calls UnlockExcel and is visible from the Macro panel. You will want to run this if the VBA generates an error and stops running. This puts the application back in a more responsive mode as described above.
- **RemoveDuplicateSpaces** – a very small utility to remove duplicate spaces from a string; used to consolidate CFW VBA code lines that span more than one line in the Code module

4. Potential End to End Workflow Guide

The picture below shows a potential workflow for an individual RMBS deal (equally applies to the CMBS or OABS deals also using their respective submission templates):



RMBS Excel Data Submission Template (RMBS Example Excel Data Submission File)

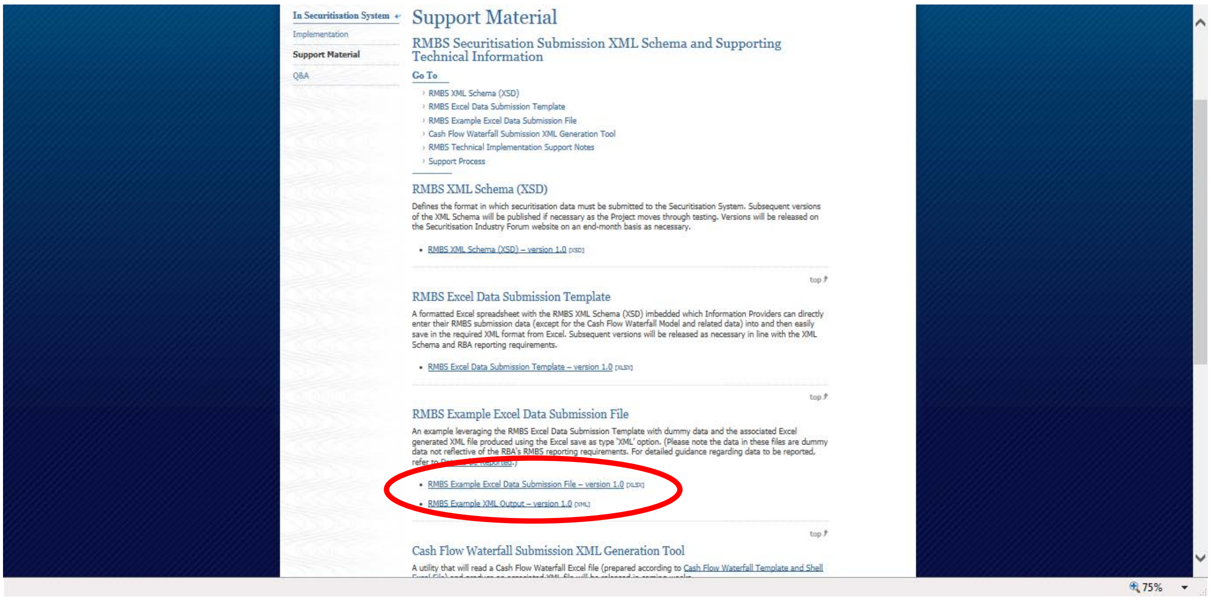
RMBS XML Output Data File (RMBS Example XML Output)

Excel CFW File

Cash Flow Waterfall XML Generation Tool

RMBS XML Submission File

1. The RMBS Example Excel Data Submission File contains all of the data for a submission (except for the CFW model and related data) in an Excel file that has been mapped to the RMBS XML Schema (XSD) for the Securitisation System. Download a copy from the Securitisation Industry Forum website: http://www.rba.gov.au/securitisations/system/support-material.html



Support Material

RMBS Securitisation Submission XML Schema and Supporting Technical Information

Go To

- RMBS XML Schema (XSD)
- RMBS Excel Data Submission Template
- RMBS Example Excel Data Submission File
- Cash Flow Waterfall Submission XML Generation Tool
- RMBS Technical Implementation Support Notes
- Support Process

RMBS XML Schema (XSD)

Defines the format in which securitisation data must be submitted to the Securitisation System. Subsequent versions of the XML Schema will be published if necessary as the Project moves through testing. Versions will be released on the Securitisation Industry Forum website on an end-month basis as necessary.

- RMBS XML Schema (XSD) – version 1.0 [XSD]

top

RMBS Excel Data Submission Template

A formatted Excel spreadsheet with the RMBS XML Schema (XSD) imbedded which Information Providers can directly enter their RMBS submission data (except for the Cash Flow Waterfall Model and related data) into and then easily save in the required XML format from Excel. Subsequent versions will be released as necessary in line with the XML Schema and RBA reporting requirements.

- RMBS Excel Data Submission Template – version 1.0 [XLSX]

top

RMBS Example Excel Data Submission File

An example leveraging the RMBS Excel Data Submission Template with dummy data and the associated Excel generated XML file produced using the Excel save as type 'XML' option. (Please note the data in these files are dummy data not reflective of the RBA's RMBS reporting requirements. For detailed guidance regarding data to be reported, refer to Data to be Reported.)

- RMBS Example Excel Data Submission File – version 1.0 [XLSX]
- RMBS Example XML Output – version 1.0 [XML]

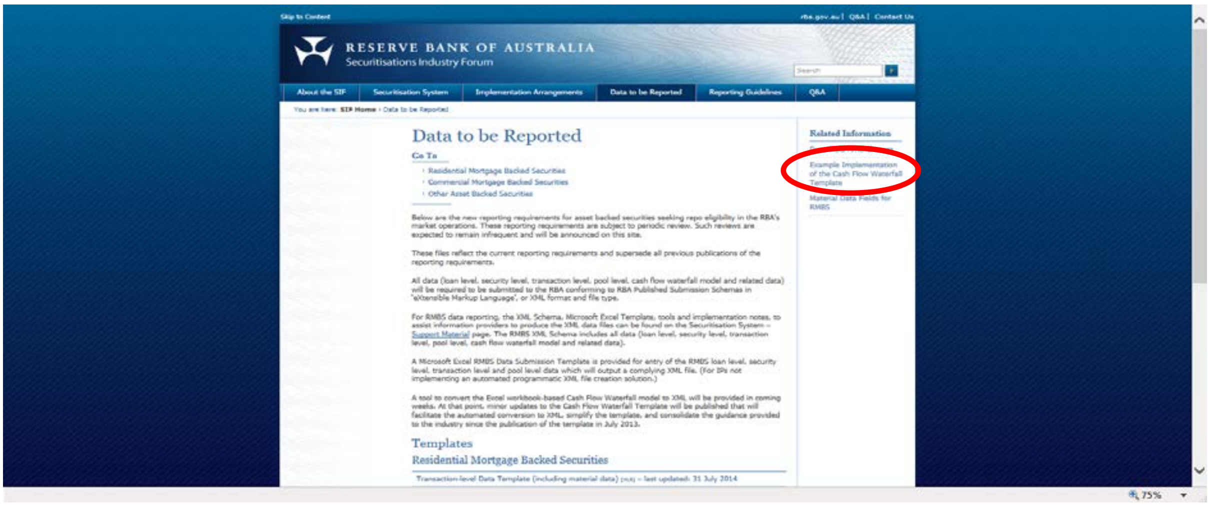
top

Cash Flow Waterfall Submission XML Generation Tool

A utility that will read a Cash Flow Waterfall Excel file (prepared according to Cash Flow Waterfall Template and Shell Excel File) and produce an associated XML file will be released in coming weeks.

2. Saving the Excel Data File through Excel as an XML data file, produces the RMBS Example XML Output Data File.
   Note: This is listed as a separate file because it is possible for an IP to create the XML file using many different technological solutions. (i.e. The RMBS XML Output Data File can be programmatically created directly from your core data sources without the need to use Step 1)

3. The Excel CFW File contains the CFW Model written in VBA and related data in compliance with the RBA guidance on the Securitisation Industry Forum website: http://www.rba.gov.au/securitisations/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Example Implementation of the Cash Flow Waterfall Template
Material Data Fields for RMBS
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Data to be Reported

Go To

- Residential Mortgage Backed Securities
- Commercial Mortgage Backed Securities
- Other Asset Backed Securities

Below are the new reporting requirements for asset backed securities seeking repo eligibility in the RBA's market operations. These reporting requirements are subject to periodic review. Such reviews are expected to remain infrequent and will be announced on this site.

These files reflect the current reporting requirements and supersede all previous publications of the reporting requirements.

All data (loan level, security level, transaction level, pool level, cash flow waterfall model and related data) will be required to be submitted to the RBA conforming to RBA Published Submission Schemas in 'eXtensible Markup Language', or XML format and file type.

For RMBS data reporting, the XML Schema, Microsoft Excel Template, tools and implementation notes, to assist information providers to produce the XML data files can be found on the Securitisation System – Support Material page. The RMBS XML Schema includes all data (loan level, security level, transaction level, pool level, cash flow waterfall model and related data).

A Microsoft Excel RMBS Data Submission Template is provided for entry of the RMBS loan level, security level, transaction level and pool level data which will output a complying XML file. (For IPs not implementing an automated programmatic XML file creation solution.)

A tool to convert the Excel workbook-based Cash Flow Waterfall model to XML will be provided in coming weeks. At that point, minor updates to the Cash Flow Waterfall Template will be published that will facilitate the automated conversion to XML, simplify the template, and consolidate the guidance provided to the industry since the publication of the template in July 2013.

Templates

Residential Mortgage Backed Securities

Transaction-level Data Template (including material data) (XLS) – last updated: 31 July 2014

4. The Cash Flow Waterfall XML Generation Tool is a utility which generates a CFW XML Output Data file from the Excel CFW file and optionally appends it to the RMBS XML Output Data File created in step 2, creating the
Note: It is possible for an IP to create the XML file using many different technological solutions. (i.e. The CFW XML node section of the XML Schema can be programmatically created without the need to use the Cash Flow Waterfall XML Generation Tool)

5. RMBS XML Submission File – a complete set of data required for each deal.

Please note that each RMBS XML Output Data File and Excel CFW file will need to be produced / maintained by the IP separately.

5. XML Overview

Extensible Markup Language (XML) can be thought of as a framework through which to define data structures and relationships. The intention of this document is not to be an exhaustive resource for XML definitions; for that purpose, a good place to begin is http://www.w3.org, the World Wide Web consortium.

The XSD defines the relationships between these elements and the rules by which an XML file is validated for conformity with the schema.

Each data element has a type and value. The type can be either simple or complex. An example of a simple data type is a date, or a string. A complex data type is a grouping of more than one simple element, for example a company reference in an XSD could contain a name and an ABN. Data references can be grouped and nested to define truly complex elements.

For example, in a simple XSD we have the following definition for a company:

```
<xs:complexType name="Company">
	<xs:sequence>
		<xs:element name="name" type="xs:string"/>
		<xs:element name="ABN" type="xs:long"/>
	</xs:sequence>
</xs:complexType>
```

This element can be included by reference in another element, for example, a counter party:

```
<xs:complexType name="Counter_Party">
	<xs:sequence>
		<xs:element name="Role" type="xs:string" />
		<xs:element name="Company" type="Company" />
	</xs:sequence>
</xs:complexType>
```

The resultant XML for a counter party looks like this:

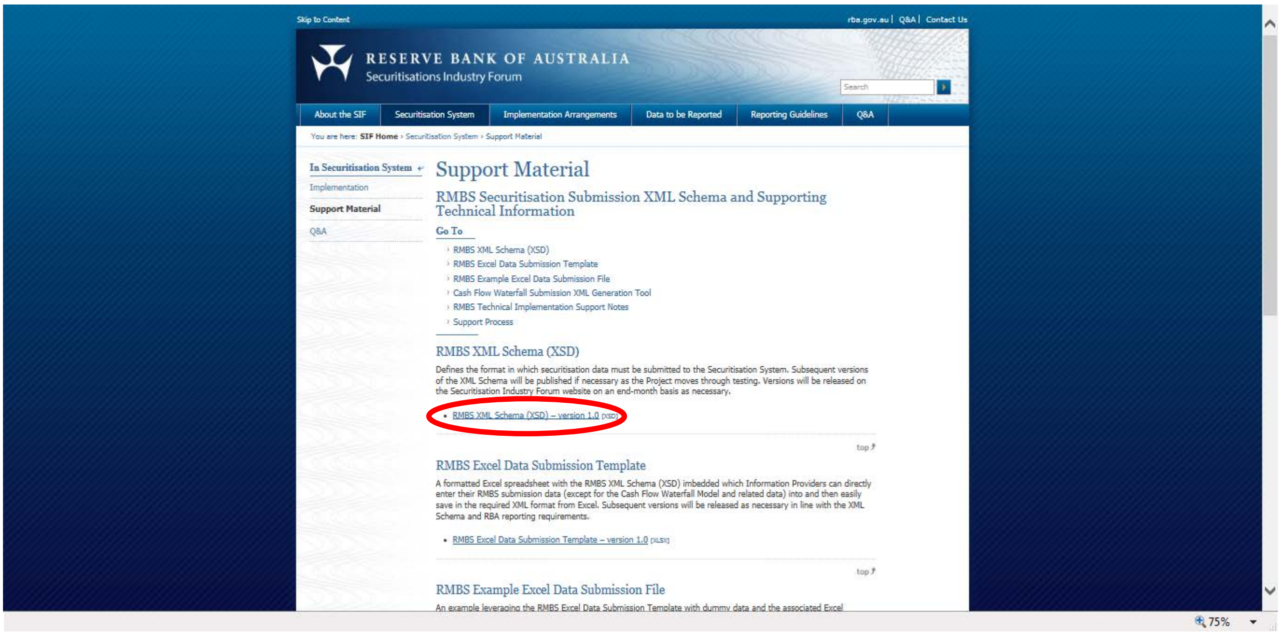
```
<Counter_Party>
	<Role>AUD/USD Swap Counter Party</Role>
	<Company>
		<name>Random Bank</name>
		<ABN>321654897</ABN>
	</Company>
</ Counter_Party >
```

For more information on XML and XML schemas please visit http://www.w3.org/standards/xml/

6. XML Schema Definition - XSD

This section discusses the key elements of the RMBS XML Schema (XSD), available on the Securitisation Industry Forum website:

http://www.rba.gov.au/securitisations/system/support-material.html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RMBS Securitisation Submission XML Schema and Supporting Technical Information

Go To

- RMBS XML Schema (XSD)
- RMBS Excel Data Submission Template
- RMBS Example Excel Data Submission File
- Cash Flow Waterfall Submission XML Generation Tool
- RMBS Technical Implementation Support Notes
- Support Process

RMBS XML Schema (XSD)

Defines the format in which securitisation data must be submitted to the Securitisation System. Subsequent versions of the XML Schema will be published if necessary as the Project moves through testing. Versions will be released on the Securitisation Industry Forum website on an end-month basis as necessary.

- RMBS XML Schema (XSD) – version 1.0 [XSD]

RMBS Excel Data Submission Template

A formatted Excel spreadsheet with the RMBS XML Schema (XSD) imbedded which Information Providers can directly enter their RMBS submission data (except for the Cash Flow Waterfall Model and related data) into and then easily save in the required XML format from Excel. Subsequent versions will be released as necessary in line with the XML Schema and RBA reporting requirements.

- RMBS Excel Data Submission Template – version 1.0 [XLSX]

RMBS Example Excel Data Submission File

An example leveraging the RMBS Excel Data Submission Template with dummy data and the associated Excel

The XSD can be divided into three main sections:

a) The Submission node, which details all of the required elements and enforces the referential integrity (discussed more below),
b) Simple Type Definitions, and
c) Complex Type Definitions.

We will focus on simple data types (as related to individual fields) first, and then discuss the Deal node itself in more detail.

There are numerous references in the XSD to data types, and it is important to note that XSD validation is very strict about this.

NOTE: when exporting data from Excel, the value from the cell will be exported, not the value shown. Edit the value only.

6.1 Data Type Details

The following section details all of the simple data types found in the XSD. Complex data elements are comprised of combinations of these elements.

Dec – Decimal numbers. The only thing to note is that there are 9 decimal places only. Extra precision will break XSD validation. Excel format = “0.0########”

Int – Integer numbers. Excel format = “0”. The limits for an integer value are +/- 2147483647.

Money – positive or negative numbers with only 2 decimal places. Excel format = “0.00”

Currency – a 3-character string for the currency. For example, “AUD”, or “NZD”.

Date – a valid date value. Please note that XML is very particular about dates. When entering your dates, you must format the required range of cells as a date prior to export. Excel will transpose the date value into the XML-date format, which is always “yyyy-mm-dd”.

String100, **String250** – strings limited to this specific length.

NoDataCode –This case insensitive string (i.e., “nd1” or ND1” are both valid) tells the system why a required field is otherwise blank. The six accepted ND values are:

- ND1 – Data not collected
- ND2 – Data collected but not loaded into the reporting system at completion
- ND3 – Data collected but loaded into a separate system from the reporting one
- ND4 YYYY-MM – Data collected shall only be available from the specified future date
- ND5 – Field not applicable – N/A
- ND6 – Pending sale (to be used for [Loss on Sale (loan related data field)] only)

ND4Dec – either a valid *Dec* value, or a valid *NoDataCode* value.

ND4Int – either a valid *Int* value, or a valid *NoDataCode* value.

ND4Currency – either a valid *Currency* string, or a valid *NoDataCode* value.

ND4Money – either a valid *Money* value, or a valid *NoDataCode* value.

ND4String4 – either a 4-character string value, or a valid *NoDataCode* value. This is used for specifying either Governing Law or ratings values.

ND4String, ND4String100, **ND4String250** – either a valid string limited to the appropriate length, or a valid *NoDataCode* value.

ND4Date – either a valid *Date* value or a valid *NoDataCode* value.

ND4Bool – either a valid XML boolean value or a valid *NoDataCode* value.

ND4Long – either a valid XML long value or a valid *NoDataCode* value. The limits for an XML long value are +/- 9223372036854775807.

CFWValueType – an enumerated list of valid input types in line with the guidance provided on the CFW workbook. Acceptable values are one of “Numeric”, “Alphanumeric”, “Date” or “Boolean”.

CFWDataType – an enumerated list of valid data types for the CFW inputs and outputs. Acceptable value include “AV” (actual value), “RV” (redacted value), and “NR” (not reported).

<u>Please review the XSD carefully.</u>

6.2 Deal Data

Key elements to note regarding some elements of the Deal data type:

- One limitation of Excel's XML support is its inability to handle recursive structures. This has forced us to break elements of the XSD into sub-nodes. For example, the submission node includes one or more tranches, which are represented by rows in the RMBS Excel Data Submission Template. For each tranche, however, there can be zero or more ratings, and zero or more exchanges associated. This means that we have dedicated tables for ratings, exchange listings and clearing systems.
  Referential integrity is enforced through the XSD, so please pay particular attention to account and tranche names in the sections detailed, below. The full list of these relationships are:
  - Account_Provider -> Signature_Authority (linked by Account_Name)
  - Tranche -> Rating (linked by Tranche_Name)
  - Tranche -> Clearing_System (linked by Tranche_Name)
  - Tranche -> Exchange_Listing (linked by Tranche_Name)

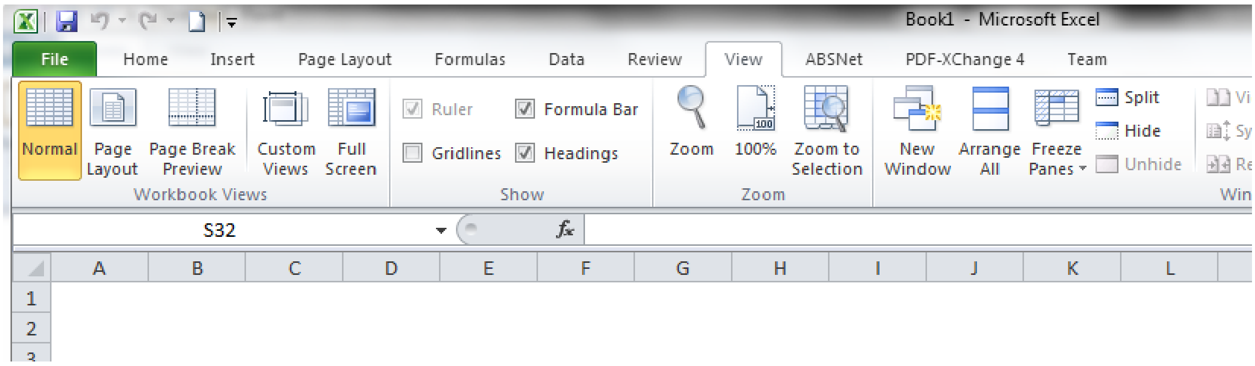
- The Nameblock is a feature of the XSD that appears several times. It is intended to be shorthand for all of the fields required by the RBA to identify a party to the transaction. The Nameblock has five (5) sub-elements:
  - Name – the name of the company/entity
  - ABN – when applicable, the ABN of the firm
  - ID – if an ABN is not available, the identifier used to specify the company
  - ID_Descriptor – if an ABN is not available describes the type of reference in the ID field. For example, if the ID for Moody's is "336969", the ID Descriptor that corresponds to this code is "Australian Financial Services License No.".
  - Jurisdiction - if an ABN is not available
- Some elements are listed with a minOccurs variable set to zero (0) to accommodate scenarios where these elements are not required.
  - **Clearing_System**, **Exchange System** and **Rating** – not every tranche will have its bonds listed somewhere (or cleared, or rated); we want to be flexible to accommodate the situation when this does not apply.
  - **Loan_Level, Trigger, LMI_Provider, Account_Provider, Signature_Authority, Authority_Holder, Liquidity_Provider, Credit_Enhancement_Provider, Swap_or_Hedge_Provider**
  - **CFW** – if the submission is a revision, you are not required to provide a revised CFW node. But for regular submissions, a failure to submit a CFW node will cause the submission to fail XML validation.
- Several elements are expected to be broken out by currency, as appropriate. Specifically:
  - **Originator**, **Seller** and **LMI_Provider** – for each currency and Originator/Seller LMI provider pair, you need to provide details on the Settlement Date Loans Originated and current Loans Originated (or sold, or insured). To be clear, if Originator A originated loans in the pool in both AUD and NZD, the submission should include two entries for Originator A's Settlement Date Loans Originated, one for each currency.
  - **Pool_Rollups** – all statistics will need to be provided for each currency in the pool.

7. The RMBS, CMBS & OABS Excel Data Submission Templates

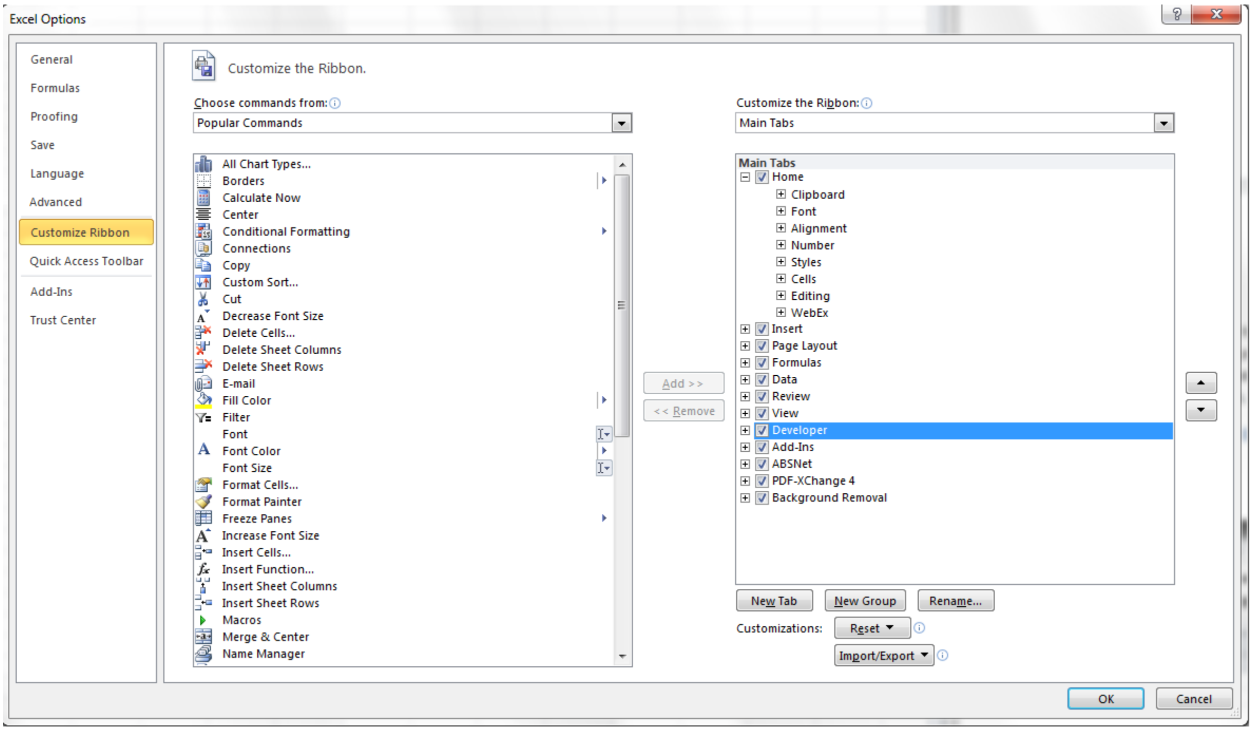
This section of the document will show you how we created the RMBS, CMBS & OABS Excel Data Submission Templates. Once the data is properly mapped, all you will need to do to create your XML submission file is Save As and select XML Data from the dropdown list.

7.1 Adding the Developer Ribbon to Excel

Excel provides a helpful utility for managing XML mappings, but you will need the Developer tab to be present to use. If your Ribbon does not have the Developer tab, it will appear (more or less) like this:



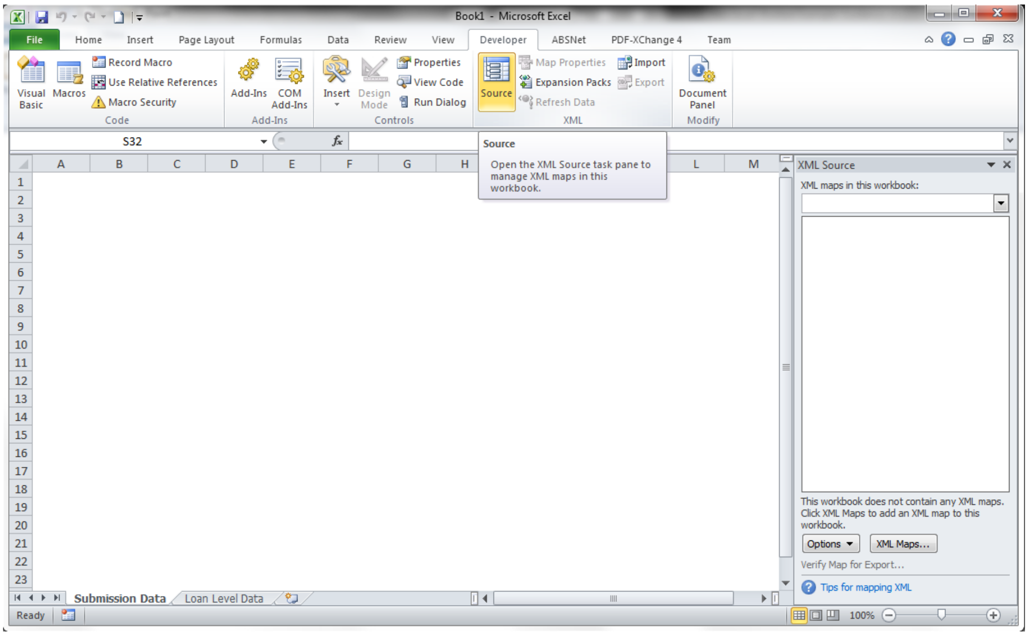
To add the Developer tab, select File -> Options -> Customize Ribbon, and then click on Developer as shown below.



Click OK, and the Developer ribbon will be shown on your Excel.

7.2 Associating the XSD with the File

On the Developer tab, select Source.

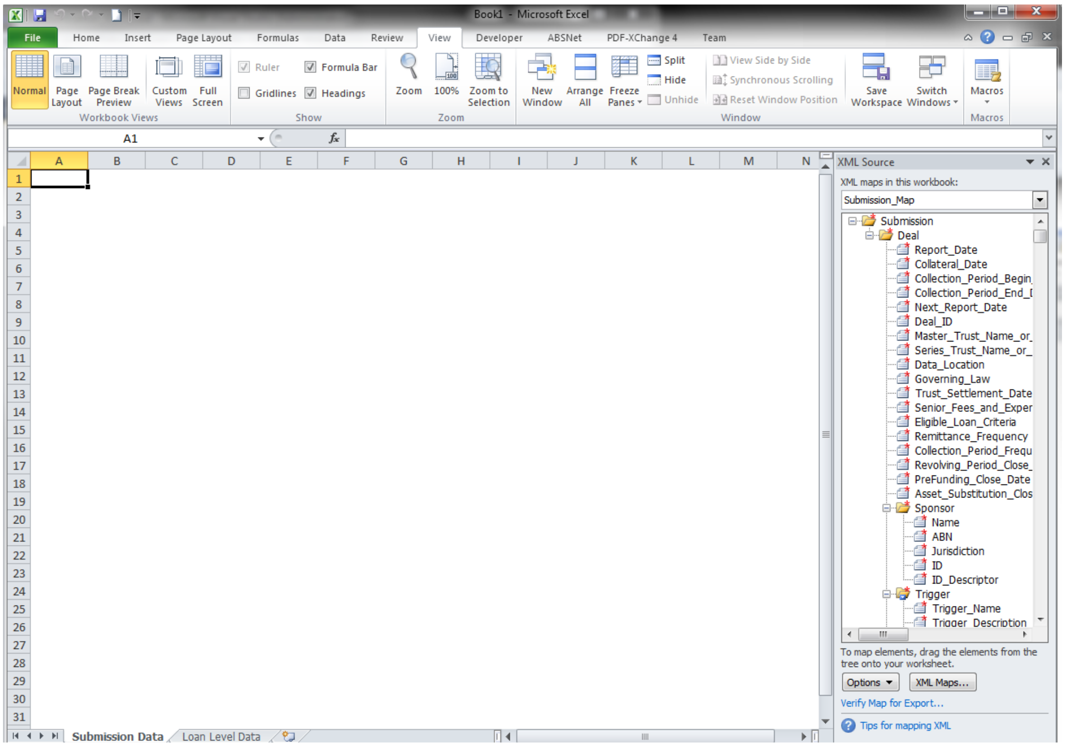


Source

Open the XML Source task pane to manage XML maps in this workbook.

This workbook does not contain any XML maps. Click XML Maps to add an XML map to this workbook.

This will bring up a side-bar that shows the XML maps (schemas) present in the workbook. Click on XML Maps, then Add, Select your Schema file, and click OK. The Source pane will now show a hierarchy of the elements in the XSD.



To map elements, drag the elements from the tree onto your worksheet.

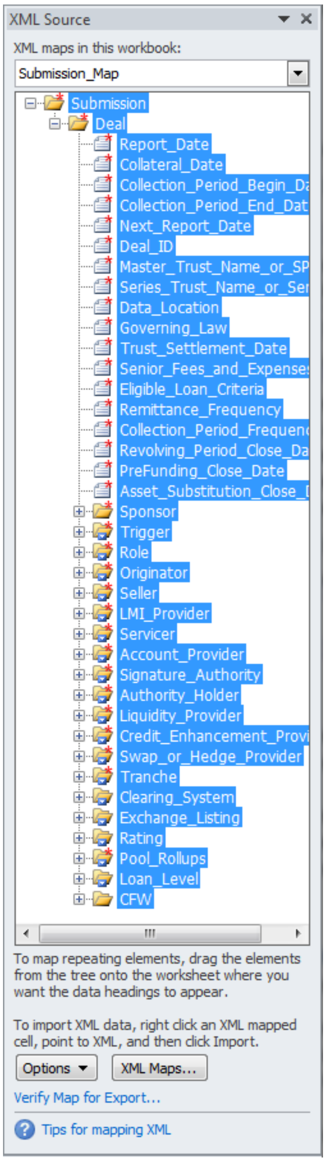
7.3 Mapping Elements of the XSD to the File

One way to map the elements to the XSD is to drag and drop the fields onto the worksheet where you would like to see them. This approach needs to be carefully applied. This is the recommended order to add the fields:

1) Compress the schema's tree structure so that only the "Deal" node (the only node under "Submission") is expanded.

2) De-select all compressed fields (i.e., Sponsor, Trigger, Role, etc.):

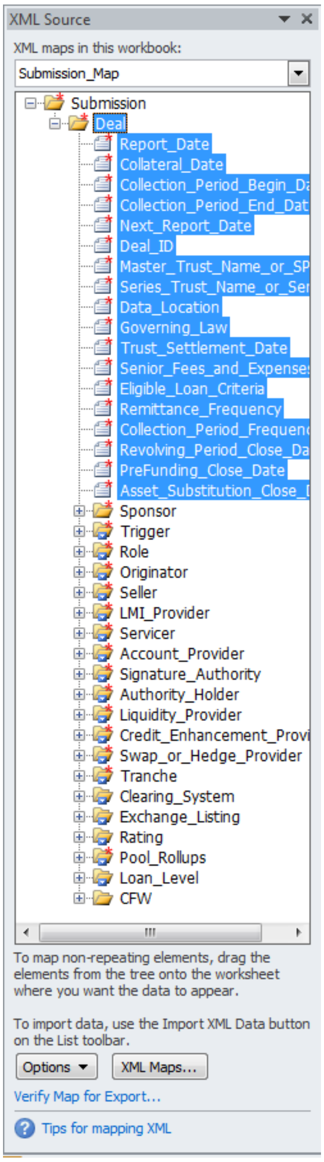
Picture for step 1:



To map repeating elements, drag the elements from the tree onto the worksheet where you want the data headings to appear.

To import XML data, right click an XML mapped cell, point to XML, and then click Import.

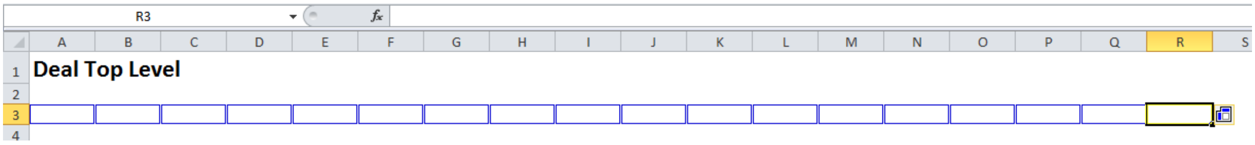
Picture for step 2:



To map non-repeating elements, drag the elements from the tree to the worksheet where you want the data to appear.

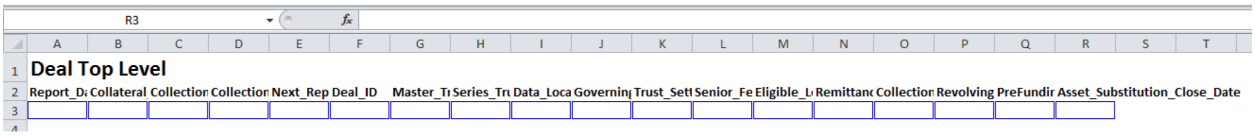
To import data, use the Import XML Data button on the List toolbar.

3) Drag the Deal node to cell A3 (I have added text in A1) and release.



Deal Top Level

4) Click on the blue Header Options icon after the far right cell, and select Place XML Heading Above. Your workbook will now look like this:

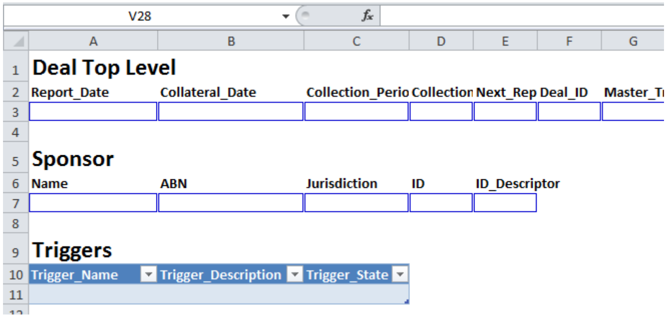


R3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Deal Top Level																			
2	Report_Da	Collateral_	Collection	Collection	Next_Rep	Deal_ID	Master_Ti	Series_Tru	Data_Loca	Governing	Trust_Setl	Senior_Fe	Eligible_Lo	Remittanc	Collection	Revolving	PreFundir	Asset_Substitution_Close_Date		
3																				

5) Repeat with the Sponsor node (the only other node you need to add to the workbook which will not automatically insert the headers.

6) Click on the compressed Trigger node in the XML Source map, and drag that to a place on the workbook. Excel will automatically add the headers because the schema understands that there can be more than one trigger on a deal.



V28

	A	B	C	D	E	F	G
1	Deal Top Level						
2	Report_Date	Collateral_Date	Collection_Perio	Collection	Next_Rep	Deal_ID	Master_Ti
3							
4							
5	Sponsor						
6	Name	ABN	Jurisdiction	ID	ID_Descriptor		
7							
8							
9	Triggers						
10	Trigger_Name	Trigger_Description	Trigger_State				
11							

7) Repeat this process for all other elements in the XML Source except the CFW node. The CFW node is different because it uses a more complex recursive structure that is not supported by Excel's XML mapping utilities

8) Please note that in the RMBS Excel Data Submission Template and the RMBS Example Excel Data Submission File we showed the Loan Level node on a separate worksheet. Where you store the Loan Level data (if submitting it) is entirely up to you. If you want to put everything in one worksheet, you can do that, no problem.

9) In addition, note that in the RMBS Excel Data Submission Template and the RMBS Example Excel Data Submission File distributed with this document, the headings for the Deal Top Level and Sponsor sections were formatted for clarity. What was shown above are what Excel produces by default.

7.4 Additional Points to Note on the RMBS Excel Data Submission Template

There are few points to note regarding mapping elements to the Excel workbook:

- Once you have completely populated the data for the workbook, simply select "Save As" from the file menu and then select "XML Data" from the file format list.
- At the bottom of the XML source window there is a link to "Verify Map for Export…" – this will almost always say that "The schema contains required elements which have not been mapped onto the spreadsheet." Excel wants to see absolutely everything mapped, but the CFW node is processed differently.
- The Exporter Utility, Cash Flow Waterfall XML Generation Tool, takes the CFW workbook for your CFW model and related data and packages it appropriately into XML following the XSD. Download a copy from the Securitisation Industry Forum website: http://www.rba.gov.au/securitisations/system/support-material.html#technical-implementation-support-notes

- If you inadvertently add an extra row to an element (for example, an extra Trigger), to reduce the size of the XML table, click on the lower-right corner of the table and move it up towards the header the required amount.
- All fields require some data, either the correct value, or an “ND” code, described above.
- XML is very picky when it comes to dates and percentages. Please remember to do the following:
    - For all date fields, format the field as a date value before entering your data. For example, you can set the number format for Loan Maturity Date to be “dd/mm/yyyy” before you enter the values. Once you have done this, Excel will properly convert that date to the XML date format (which is always “yyyy-mm-dd”).
    - For all percentages, please enter them as decimal numbers 3.5 in place of 3.5%.

8. Appendix A: Document Control

Version	Date	Details
1.7	28 April 2015	Included reference in section 7.4 to the Securitisation Industry Forum website to access the Cash Flow Waterfall XML Generation Tool.
1.6	5 March 2015	Clarified advice around input values for Row 32 in the Shell Excel File for the Cash Flow Waterfall Template, a possible input value is “numeric”, not “numbers” in section 3.3.9.
1.5	8 December 2014	Clarified that percentages should be reported as decimals (i.e. 3.5% is reported as 3.5).
1.4	1 October 2014	Updated the document to include CMBS and OABS.
1.3	29 August 2014	Added “ND4String” as a data type to cater for String(MAX) characters; added clarification section 6.2, changed `minOccurs` setting to 0 for the `Account_Provider`, `Signature_Authority`, `Trigger`, `LMI_Provider`, `Authority_Holder`, `Liquidity_Provider`, `Credit_Enhancement_Provider` and `Swap_or_Hedge_Provider` XML definitions in the Deal node.
1.2	16 August 2014	Confirmed the Excel supported versions for the Cash Flow Waterfall XML Generation Tool.
1.1	15 August 2014	Added guidance for the Cash Flow Waterfall XML Generation Tool (Section 3).
1.0	31 July 2014	The Securitisation System Technical Support Notes (version 1.0) published.