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## Table 1. High-Level Report Processing Logic

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| --- | --- |
| Step | Description |
| 1. Verify the taxonomy exists |  |
| 1. Verify the instance exists |  |
| 1. Load taxonomy |  |
| 1. Load instance |  |
| 1. If the current taxonomy contained dimensions, determine report-level allowed dimension/members for each report | Use the following code to determine if the current taxonomy has dimension or not:  tax.NetDefinisionInfo != null &&  tax.NetDefinisionInfo.DefinitionLinks != null &&  tax.NetDefinisionInfo.DefinitionLinks.Count > 0 |
| 1. Build filing summary (FilingSummary.xml) | Filing summary contains   * A collection of reports for this filing * Statistics for the current filings (# of contexts, units, segments, scenarios, elements, context/element distribution, etc.) * Determine the “default” report – report to display by default should be the **first** report in the reports collection. For the new US GAAP taxonomy, normally, the default report would be the “balance sheet”. Preparer can re-sequence the reports by changing the report title. The rendering engine sorts the reports by titles. |
| 1. Process individual reports | ***\*\*\* Table 2 lists the details for processing individual reports*** |
| 1. Process uncategorized items report | The uncategorized items report contains the reported facts that do not belong to the presentation linkbase or taxonomy |
| 1. Create XML file (DEFnREF.xml) | The def and ref file contains the definitions and authoritative references for the reporting elements used in the filing |
| 1. Clean up the reports/report columns | If the report is “Earnings Release”, do not clean up  If the filing is based on old GAAP (2005), remove flow-through reports, and remove flow-through columns  If the filing is based on new GAAP (2009), only remove flow-through columns, not the flow-through reports (some reports in the new GAAP share almost the same set of elements, for example “Income Statement including Gross Margin” and “Income statement excluding Gross Margin”)  If the filing has the word “Statement” plus “Shareholders’ Equity”, “Stockholders’ Equity”, “Partners’ Equity”, or “Capital” and has segments, and   1. If a column does not contain a beginning or ending balance, delete the column 2. If a row that appears at the beginning of the report does not have a balance above it, or if the row appears at the end of the report and does not have a balance below it, then delete the row. 3. If a row has no segmented data, then delete it.   This needs to be processed at the end – need to get all individual reports processed first  \*\*flow-through: entire report or column doesn’t contain elements unique to this report. |

## Table 2. Detailed Individual Report Processing Logic

| Step | Description |
| --- | --- |
| 1. Get data rows that belong to the current report | Language selection. If one of the supported languages is ***en-US***, the system will use it as the preferred language to retrieve the labels (based on the preferred label role). If en-US is not one of the supported languages, the system will use the first supported language as the preferred language.  For any row if the preferred label role is “negate Label”, the parser will set the node property “***IsDisplayReversed***” to be true. This property will trigger the data to be reverse.  For each data row, the following ***properties\*\*\**** are captured:  Element Name  Element Prefix  Element Data Type  Element Short description  Parent Description  Is Base Element?  Balance Type  Period Type  Is Report Title?  Is Segment Title?  Is Abstract Group Header? (Abstract Group Header is the immediate ABSTRACT parent of the reporting line items)  Is Tuple?  Is Beginning Balance?  Is Ending Balance?  ***\*\*\* Some properties are used for formatting (like Is Report Title, Is Segment Title, Is Abstract Group Header and Is Sub Report End). Some properties are used for display additional information based on user request (like Element Name, Prefix, Balance Type, Period Type and Is Base Element).*** |
| 1. Get data columns that belong to the current report | If the column contains dimension members, use the information built from **Table 1 Step 5** to determine if the column belongs in the current report  A dimension column would belong to the current report when:   1. The dimension member is from the common dimensions (like 190000) or 2. The dimension member is from a dimension that belongs specifically to the current report |
| 1. Promote shared labels to the report title | If all columns share the same currency code, promote the currency code (delete the currency code from individual column header)  If all columns share the same segment(s)/scenario(s), promote the label (delete the segment(s)/scenario(s) from individual column header) |
| 1. Merge instance and duration column | Merge the instance column that:  (1) has the As-Of-Date the same as the Period-End-Date of a duration column, and  (2) has the same segment(s)/scenario(s) as the duration column |
| 1. Process Rounding | We support the following rounding options:   1. Round to billions/millions/thousands (whole number) – when all monetary-type facts have the decimals specified correctly; for example, millions = -6, thousand = -3 – the rounding option would be **“In billions”, “In millions”, “In thousands”.** An exception exists, when there is a mixture of -6 and -3, then the system will round to thousands. 2. Round to billions/millions (one decimal point) -- when all monetary-type facts have the decimals specified correctly; for example, millions with one decimal point = -5, billions with one decimal point = -8 – the rounding option would be **“In billions”, “In millions”.** The values will display with one digit to the right of the decimal place (i.e. 1,232.4). We do not support rounding for hundred so using -2 will produce no rounding. 3. If the report contains items with unit ref defined as “USD/Shares” or a perShare item type, then the rounding option would be **“In billions, except per share data”, “In millions, except per share data”, “In thousands, except per share data”.** 4. If the report contains items with unit ref defined as “Shares”, and the shares type data have a different rounding option then the rounding option would be something like **“In billions, except share data in billions”, “In millions, except share data in thousands.”** If the report contains only shares, then the rounding would be equivalent to rule 1, ie , “In billions”, “In millions.” 5. When a report contains monetary, shares, and per share data, and the monetary and shares have different precisions, we will append to the end of each rounding option the phrase “ or otherwise specified”. For example, the complete phrase would read “In billions, except share data in millions or otherwise specified”**.** 6. No rounding – when the system cannot find one of the above rule to processing rounding, the rounding option will be set to No Rounding. For example, the disclosure that only contains text blocks would not have rounding option displayed in the report header. |
| 1. Insert Underlines | If the monetary element on the row has a preferred label role defined as “total” or “negated total”, insert an underline below each value in the row. |
| 1. Insert currency symbols | Add currency symbols to the first and last monetary items and to any earnings per share items (defined as having a unit ref with currency/shares). |
| 1. Process Segments | If the report contains segments, and satisfy either one of the following two conditions, we will render the report in a “vertical” format that would list the “consolidated” facts first (if existed), then display the “segmented” facts. The segmented facts would be grouped and sorted by the segment display label.  Two conditions:   1. If the report contains “consolidated” data, then the reporting periods for the “consolidated” data set must cover all the reporting periods for each of the “segmented” data set 2. If the report doesn’t contain “consolidated” data, and one of the “segmented” data set has reporting periods that cover the reporting periods for each of the remaining “segmented” data set   For example,  If a balance sheet has consolidated data for 12/31/2007, 12/31/2006 and 12/31/2005. Let’s say the balance sheet also contains data for 2 divisions “GE” and “GECS”, and data has been reported for “GE” for 12/31/2008, 12/31/2007 and 12/31/2006; for “GECS”, data was reported for 12/31/2008.  In this case, condition (1) is met, so the report would be displayed in a vertical format: three columns (12/31/2008, 12/31/2007, and 12/31/2006), consolidated first, and then “Consolidated” followed by “GE” then “GECS”. The engine adds a “Segment Title” for the consolidated data set and each segmented data set.    For the statement of Stockholders’ Equity, Statement of Shareholders’ Equity, and Statement of Partners’ Capital, segments will be applied horizontally when the statement contains segments. Any non segmented numbers will be included in the “Total” column which displays as the last column. |
| 1. Process Beginning/Ending Balances | Normally when reporting beginning/ending balances, the preparer are using the same element for both. In the presentation hierarchy, the same element appear twice one with the preferred label role defines as “Beginning Balance” and the other defined as “Ending Balance”  Without special processing, the beginning balance and ending balance for the same column (same reporting period) would have the same value. The processing logic would “shift” the ending balance value to beginning balance column based on the following logic:  For the “Beginning Balance” rows in the report, the rendering engine goes through each cell and compares the “Period End Date” with other cells on the row. If the “Period End Date” is the same or one day before as the “Period Start Date” of another cell, “shift” (copy) the balance to this cell.  For example,  **Before Processing**  1/1/2008 – 3/31/2008 4/1/2008 – 6/30/2008  Cash BB 100 300  Cash EB 100 300  **After Processing**  1/1/2008 – 3/31/2008 4/1/2008 – 6/30/2008  Cash BB **~~100~~** ~~300~~ **100**  Cash EB 100 300 |
| 1. Process Report Column Headers | If the column is an “instant” only column, format the reporting period as "MMM. dd, yyyy" – for example December 31, 2008  If the column is a “duration” column, format the reporting period as two lines: "n Months Ended" and "MMM. dd, yyyy". For eaxmple, 3 Months Ended/December 31, 2008 |