Power BI Desktop: New Data Transformation Features

# **Summary**

The purpose of this document is to serve as supporting reference to new data transformation features added to the Power BI Desktop application. Power BI Desktop is a free business intelligence design and development application containing rich capabilities in data connectivity, transformation, modeling, and report/dashboard development. Business intelligence artifacts created within Power BI Desktop such as datasets and reports can be published to the Power BI Service and consumed by Power BI users.

* New features related to report authoring, data modeling, and data connectivity are outside the scope of this document
* Power BI Documentation Update Archive is maintained here: <http://bit.ly/2t6fRUE>
* This document will be updated with future Power BI Desktop data transformation updates and may be enhanced with further details and examples.

# **Monthly Update Links**

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# **Feature Updates**

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| --- | --- | --- | --- | --- |
| **#** | **Feature or Improvement** | **Detail** | **Image(s)** | **Update Month** |
| 1 | Copy to clipboard | * Available for individual Cells, Column(s) and Tables * Data View and Query Editor Window |  | Sep-2015 |
| 2 | Filter date columns by earliest/latest date (dynamic filter) | * See Is Earliest and Is Latest * A dynamic filter; could be very useful to always pass the earliest or latest date from a query into the model/report as a parameter |  | Sep-2015 |
| 3 | Extract Min or Max Date/Time value from a column | * Transform tab, Date and Time options have this filter option as well |  | Sep-2015 |
| 4 | Replace Values – support for special characters | * Replace Values dialog has advanced options to make it easy to swap between line break indications |  | Sep-2015 |
| 5 | Detect Column Types Option | * ‘On Demand’ column type detection (previously only when first loaded data) * Available on Transform tab * PBI Desktop will detect which column type is now best for the columns selected |  | Sep-2015 |
| 6 | Refresh All Preview | * Refresh All Query Editor previews with a single click * Previously had to refresh each query individually |  | Sep-2015 |
| 7 | Performance Improvements | * Choose columns dialog (Home tab) faster for wide table * Filter and Expand/Aggregate popups faster for large numbers of values/fields | Items within a filter dropdown (e.g. list of products) will populate faster as well  Much more fluent to work with query editor | Sep-2015 |
| 8 | Filter by “Not Earliest/Latest Date” | * Also included in the “In the Next..” and “In the Previous” filter dialog * Makes it easy to define dynamic rolling queries (last 7 days, ex) |  | Oct-2015 |
| 9 | Filter by “is in Previous N minutes/hours/seconds” | * Select a Date Column in Query Editor Window * Click dropdown * Click Date/Time Filters   + In previous or In next options |  | Oct-2015 |
| 10 | Copy/Paste Queries between PBI Desktop and Excel | * Copy query from Query Editor * Open a different PBI Desktop file * Can also copy an entire group of queries by clicking on the folder group of queries * Can Paste to Excel 2010/2013/2016 (with PQ add in for 2010 and 2013) |  | Oct-2015 |
| 11 | Special Characters in Split Column | * Split Column Dialog supports a split by special character if Delimiter property is set to –Custom— * Selecting the special character at botton will insert this character into the second input box |  | Oct-2015 |
| 12 | Refresh Previews in Merge Queries Dialog | * Refreshing both tables in preview gives updated matches in join |  | Oct-2015 |
| 13 | Monospaced font for Query Editor Preview | * Easier to spot data cleanliness issues via preview (see additional characters or spaces) |  | Oct-2015 |
| 14 | Improved Function Invocation experience | * Easier to provide parameter values in navigator and preview when connecting to data sources * Available for data sources that support functions |  | Nov-2015 |
| 15 | Option to set credentials at Server vs. Database level | * New radio button in credentials dialog prompt |  | Nov-2015 |
| 16 | Add Prefix/Suffix to a Text column | * Transform Tab   + Format   + Add Prefix or Sufix * Also available in Add Column tab for creating a derived column with suffix or prefix * Previously had to use a custom column and ampersand symbol |  | Nov-2015 |
| 17 | Append Multiple Tables | * Have always supported only two tables at a time and had to create multiple queries to support many source tables * Can also append multiple copies of an existing table |  |  |
| 18 | “Refresh Data” for individual tables from Field List (Report and Data Views) | * Previously had to click Refresh from Home Tab and this would refresh all queries in the model | Option also exists from dialog in Data View with Table selected |  |
| 19 | Option to Disable Data Previews to download in background | * Some data previews could be consuming CPU on machine * File scoped option; only applied to given PBIX file (not a Global Option) * File – Options and Settings - |  |  |
| 20 | Alphabetic sort of columns in Choose Columns dialog | * By default choose columns will show natural order of columns but now you can sort the columns displayed alphabetically |  | Feb-2016 |
| 21 | Improved performance | * Renaming columns is faster * Removing colums is faster * Reordering columns is faster   These three operations now happen locally rather than sending queries to server for refreshing the preview  This feature will be extended to other operations |  | Feb-2016 |
| 22 | Virtualized Preview in Query Editor | * Improved Query Editor preview * No longer any limitation in the amount of data that can be displayed * Previously about 3,000 cells and would cut * As you scroll the table you’ll see more rows & columns |  | Feb-2016 |
| 23 | Visual Indicator for Unloaded queries in Query Editor | * Easier to identify which queries are actually loaded to data model and which are just used by other queries * Tables not loaded show up in Italics |  | Feb-2016 |
| 24 | 1-click % Transform | * Select a column within Query Editor * Specify a % to apply to column in a dialog   Avoids need to create a custom derived column  More one click transforms to come.. |  | Feb-2016 |
| 25 | New Transforms | * Remove Blanks via Column Filter * Convert duration to Years * Keep Duplicates | Remove all rows where value for current column is null or empty.  Accessible via Column Filter menu dropdown  Duration to Years: Divide # of days of duration type column by 365  Available in Transfor or Add Colum tab  Keep duplicates – keep only rows with duplicated values on selected columns  Available on Home tab under Remove Duplicates split button | Mar-2016 |
| 26 | Preview: whitespace and line feeds in Query Editor preview | * View tab – “Show whitespace” (now default) – in Query Editor Window |  | Mar-2016 |
| 27 | Option to disable preview from Navigator | * Reduces the # of calls being made to the data source to retrieve previews |  | Mar-2016 |
| 28 | Technical name support | * Can switch between ‘physical name’ (previous behavior) and ‘technical name’ (new behavior |  | Mar-2016 |
| 29 | Load: auto-step to disambiguate conflicting column names | * Power BI Desktop will automatically rename conflicting column names * New steps in Query Editor that can be customized by user |  | Mar-2016 |
| 30 | Rename queries directly from queries pane | * Query Editor * Select and Right-click the query to Rename |  | Mar-2016 |
| 31 | Smarsheet Connector now GA | * Automatic type detection of columns in sheets you import * “changed type” step in Query Editor shows transforms applied |  | Mar-2016 |
| 32 | Query Parameters | * Create and manage parameters in Query Editor to make the PBI file dynamic * Apply parameters to filter definitions for different columns * Edit Parameters only allows you to edit the values of the parameters, not their definition. | Access parameters from Query Editor (Edit Queries on Home tab) or from Home tab directly.      From Query Editor: | Apr-2016 |
| 33 | Power BI Template files | * PBIT files ony contain the queries, visuals, formatting, model metadata, etc…not the data * Can be used with parameters like an SSRS report – user accesses a template | Main Menu – Export – Power BI Template | Apr-2016 |
| 34 | Conditional Columns | * GUI interface for creating conditional expressions and rules * Can eliminate need for custom M expression |  | Apr-2016 |
| 35 | Column type indicator in Query Editor preview column headers | * Visual indicator distinguishes between Date/Time and Date, Decimal versus Whole Number, and more | ABC, 123, 1.23, Date…easy visual indicator as opposed to seeing Data Type property | Apr-2016 |
| 36 | Reorder Queries and Query Groups via Drag & Drop gestures | * From Query Editor, can right-click to create group rolders and can drag-drop queries and parameters to folders |  | Apr-2016 |
| 37 | Query Mangement menu in the ribbon | * Can use Manage dropdown from Home tab rather than right-clicking an individual query |  | Apr-2016 |
| 38 | Text/CSV connector exposes editable settings in preview dialog | * Preview dialog allows user to configure File Origin, Delimiter, and Data Type Detection |  | May-2016 |
| 39 | Advanced Filter Rows dialog | * Filter rows dialog now has ‘advanced mode’ that allows multiple filter clauses within a single Filter Rows step * Can now combine filter clauses based on multiple columns   (previously all clauses where applied to same column) | Just pick a column and apply a filter to bring up Filter Rows dialog  Basic mode supports only 1 column supports only two clauses combined with an And or OR | May-2016 |
| 40 | Inline Input controls for Function invocation within the Query Editor | * Improved inline preview for M functions – both standard M Engine functions and user defined functions |  | May-2016 |
| 41 | Query Parameters | * Convert queries to parameters and vice versa * URL parameterization   + Can now parameterize part of aURL * Conditional Column Parameterization   + Can pass parameter to a conditional column * Can ONLY convert queries that contain scalar values (text value, number, Date/Time)   + Option is disabled if query returns a list   \*\*in next 2-3 months will be able to populate list of accepted values in parameter from output of a query | Queries Pane in Query Editor as context menu | May-2016 |
| 42 | Support for reordering Query Steps via drag and drop |  |  | May-2016 |
| 43 | Data picker support in Conditional Columns dialog |  |  | May-2016 |
| 44 | New context menu to create new queries from Queries Pane |  |  | May-2016 |
| 45 | Option to load or edit a template when importing template |  |  | June-2016 |
| 46 | Always allow parameterization | * View tab in Query Editor window   + Previously had to create a parameter beforehand |  | June-2016 |
| 47 | Create New parameter in context | * For common dialog boxes you may need/want to parameterize |  | June-2016 |
| 48 | Generate Query Steps in English | * File – Options – Global   + Option only shows up in non-English version of product |  | June-2016 |
| 49 | Description for query steps | * Previously it was possible to provide a description for queries but not steps of queries |  | June-2016 |
| 50 | Extract Week Day and Month Name from a DateTime column | * Available in both Transform and Add Column * Per image, use the Date dropdown * Date – Day – Weekday * Date – Month – Month Name |  | June-2016 |
| 51 | Merge Date and Time columns into a DateTime column | * Select both columns and click “Combine Date and Time” * Use Date or Time dropdown menu * Available in Transform and Add Colum |  | June-2016 |
| 52 | Extract Start or End of an Hour based on a Date/Time or a Time column | * Use the Time dropdown   + Hour * Available for both Transform and Add Column |  | June-2016 |
| 53 | Use R Scripts inside the Query Editor | * Use R script to perform cleansing, shaping, and analytics (predictions, clustering, etc) * Need to have R installed locally * Need to change privacy setting to public for source using R script | 1. Run R Script from the Transform tab in Query Editor | July-2016 |
| 54 | Query Parameters provided by output of other query | * Can now dynamically compute list of allowed values for a parameter (instead of static) * Limitations:   + only queries that produce a List are supported   + In PBI Service, user doesn’t get list of values |  | July-2016 |
| 55 | Overwrite existing UDFs | * Background: can convert query to function (query parameters become function parameters) | Can now overwrite functions when exporting multiple times from the same query | July-2016 |
| 56 | Merge or Append as New Query | * Merge or append operations are added as steps to existing query * ‘as new’ creates new query |  | Aug-2016 |
| 57 | Query Dependencies view | * Open Query Editor * View * Query Dependencies * Can see all queries and dependencies between queries and data sources * Also have indicator of query load status |  | Sep-2016 |
| 58 | Show Errors experience | * Previously, would only see cell level errors within query editor preview. Errors during load were converted to null |  | Sep-2016 |
| 59 | Query Editor Ribbon – Support for Scalar Values |  |  | Sep-2016 |
| 60 | Add Function Invocation Column | * Previously have had to create custom columns and type M expressions to invoke functions against rows to table * Can now use UI to invoke function against rows of a table * Add Column tab – Invoke Custom Function | Can pick a function defined in current file and specify input arguments – static values or references to other columns in the current table query | Sep-2016 |
| 61 | Expand and Aggregate Columns – Support for load more values | * A ‘load more’ option exists for Power BI Desktop will scan up to 1,000 rows of nested data to determine the list of columns to display in the Expand & Agg Columns lists |  | Sep-2016 |
| 62 | New Transform – Convert Table Column to a List | * Select a column of a table in Query Editor and click Convert to List from the Transform tab * Can further modify the list with List Tools ribbon tab * List Queries can be used as input for the Accepted values property in Query Parameters |  | Sep-2016 |
| 63 | Keyboarding – support for ‘smart typing’ in dropdown menus | * Can now type one or more characters and these will get matched with the prefix of dropdown menu items. |  | Sep-2016 |
| 64 | Table parameters in ‘Invoke Function’ dialog | Invoke a function that accepts a table as a parameter input. (Function can be built in or user defined function) | Can use via blank query or via Invoke Custom Function Dialog  From Blank query:    On Add Column dialog    Reference defined table query | Oct-2016 |
| 65 | Function Authoring Improvement | When a function has been created based on another query a link will be created between the original and new function | Can modify the original query steps and linked query will be updated for them | Nov-2016 |
| 66 | Percentage Data Type | Percentage will be detected when imported and you can force a percentage type.  Can use this in your query editor. |  | Nov-2016 |
| 67 | Maximize and Restore buttons in Navigator and Query Dependencies Dialog | Increase size of query |  | Nov-2016 |
| 68 | Extract Values from a Nested List | New transform in Query Editor.  Extract values from a nested list into a text column. | Accessed from right click menu of column header in query editor | Jan-2017 |
| 69 | Change Type using locale | * Now available in Column Headers type menus * Previously (and still) can right click the columns | Second image is right-click context menu of a column | Feb-2017 |
| 70 | Insert Step After Option | * Right click on an existing step * New step created is ‘custom’ and references the previous step * Allows you to quickly add a custom M step that references source step and that following step will reference |  | Feb-2017 |
| 71 | Split column by delimiter: automatic detection of delimiter character | * Split Column dialog defaults to detected delimiter character in source data |  | Mar-2017 |
| 72 | Add column by example | * Can provide examples and query editor determines transformation to apply |  | Apr-2017 |
| 73 | Split column into rows |  |  | Apr-2017 |
| 74 | Group By Dialog now has basic and advanced |  |  | Apr-2017 |
| 75 | Go to Column | * Can avoid scrolling * Choose the column and it will be selected for you |  | Apr-2017 |
| 76 | New Transform: Extract before/after/between delimiters |  |  | May-2017 |
| 77 | New Transform: Unpivot only Selected Columns | * Any new columns added to query will not be Unpivoted |  | May-2017 |
| 78 | Add Column from Examples Enhancements | * More transformations are now supported * Suggestions are provided | Based on sample text entered, autocomplete suggestions with associated transformations are provided | June-2017 |
| 79 | Add Column from Examples Enhancements | * More transformations are supported: number, date, datetime, and datetimezone |  | July-2017 |
| 80 | Add Column from Examples Enhancements | * New scenarios supported | * Basic Conditional Columns * Conditional Column Ranges * Null fallback   + If null then 0 * Bucketing (uniform ranges) | Nov-2017 |
| 81 | M intellisense | * Built into Advanced Editor * Columns in red, types in blue * Autocomplete * Prompts for parameter | * Will eventually bring it into formular bar and column | Sep-2018 |
| 82 | Add Column from Examples - -support for text padding |  |  | Sep-2018 |
| 83 | Data Profiling in Query Editor (Preview) | * Quality bar below the column headers (error values or not) * Column quality option on View tab * Counts of Errors, blanks, and valid values * Can apply remove duplicates from this view |  | Oct-2018 |
| 84 | Fuzzy Matching options for Merge Queries (Preview) | * Match by Fuzzy Matching logic in addition to exact match option * Option is exposed in merge queries dialog |  | Oct-2018 |
| 85 | Fuzzy Merge support for Top N best matches | * Example: can specify to only match 1 row (the best match) |  | Dec-2018 |
| 86 | Data Profiling Enhancements | * Adds to the existing Column Quality bar and Column distribution * Now have the Column Profiles pane   + Column statistics   + Column distribution * Can switch from Preview based data profile to applying your profile over an entire table   + Modify by switching the status bar in the bottom left |  | Apr-2019 |
| 87 | Fuzzy merge performance enhancements & is now GA |  |  | Apr-2019 |
| 88 | M Intellisense is GA and supported in formula bar and custom column dialog |  |  | Apr-2019 |
| 89 | Improvements to M Intellisense | * Parameter hint support now in formula bar   + Previosuly only worked in Advanced Editor * Hover support   + Definitions of variables and functions displayed upon hover |  | Jun-2019 |
| 90 | Split column by positions transformation | * Previously only supported delimitter (comma, semi-colon) and # of characeters | Can split column into columns or rows by a number of positions you provide | Jul-2019 |
| 91 | Query diagnostics | * Can determine what the Mashup Engine is doing during authoring time. | Power Query Editor – Tools – Start Diagnostics | Oct-2019 |
| 92 | Data profiling enhancements | * Grouping options in the Column Profile pane (dist visual) * Filtering options |  | Oct-2019 |
| 93 | AI functions in Power Query (Preview) | * Was previously exclusive to dataflows in the Power BI service * Text analytics and vision models are premium only features. Can specify which premium capacity to use for AI insights. |  | Nov-2019 |
| 94 | Updates to AI Insights functions | * When you connect to an Azure ML model, the columns in your table are automatically mapped to similarly named paramers in the Azure ML Model |  | Dec-2019 |
| 95 | Non-admin support for query diagnostics | * New option to enable diagnostics for users that are not admins of their devices |  | Feb-2020 |
| 96 | Query diagnostics now GA | * Can now diagnose single steps |  | Mar-2020 |
| 97 | Enhacements to query diagnostics | * Query Diagnostics Options for configuring your diagnostics and performance output for Query Diagnostics * New Performance Counters option on the Options page for Diagnostics | * Processor Time * Total Processor Time * IO Data Bytes per Second * Commit (Bytes) * Working Set (Bytes) | Apr-2020 |
| 98 | Direct Query on Dataflows | * Can connect to dataflows in DirectQuery mode. * Need to ensure that A) dataflow is configured on a premium workspace and B) enhanced compute property on the capacity is enabled | Note: This feature is incompattible with the enhanced metadata preview | May-2020 |
| 99 | Web by example now automatically suggests tables by default | * Previously this option was off by default |  | May-2020 |
| 100 | Enhancements to Query Diagnostics: Privacy Level partitions | * These are the logical partitions used to isolate data for privacy when running queries |  | May-2020 |
| 101 | Global option to disable automatic type detection | * Previously only available for the current file |  | Jul-2020 |
| 102 | Text/CSV by Example (preview) | * Extract Table Using Examples option added to the file preview dialog * Automatically generates M expression to produce example (target) structure |  | Aug-2020 |
| 103 | Dynamic M Query Parameters (Preview) | * Improves performance for DirectQuery-based reports. * M parameter is dynamically updated based on their filter or slicer selections. | Allows authors control over how end-users’ filters get incorporated into the source query – can optimize the performance of the query and allow users to freely interact with the report.  Need to have a valid M Query parameter created and referred to in one or more Direct Query tables.  Many DirectQuery sources not supported currently including T-SQL based sources, Analysis Services sources, Oracle, Teradata, etc | Oct-2020 |
| 104 | Automatic Table Detection from Excel files | * Will identify sections of each Excel spreadsheet to extract into a table and show them under a suggested tables group | Will often avoid the need to apply your own transformations to a range or format the data as a table | Oct-2020 |
| 105 | Automatic Table Dection from JSON files | * JSON connector will automatically flatten the JSON into a table. * Previously had to flatten records/lists manually |  | Oct-2020 |
| 106 | DirectQuery support for Dataflows (Generally Available) | * DirectQuery support for PBI dataflows is now generally available | This can be useful for:   * Working with big dataflows * Decreasing orchestration needs (dataflow and dataset) * Avoiding duplication of data between dataflow and dataset | Jun-2021 |
| 107 | Select all operation is supported for Dynamic M Query Parameters (preview) | * Builds on dynamic M Query parameters that allow report viewers to use filters or slicers to set the value for an M query parameter (which can help performance optimization) | Previously did not support the select all operation, requiring users to indivudally select each value if they wanted to see data for all values.  https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-dynamic-m-query-parameters | Jun-2021 |
| 108 | Dynamic M Query Parameters now support SQL Server and more data sources (preview) | * Previously only supported M-based data sources * Now supports more DirectQuery sources | * T-SQL based data sources: SQL Server, Azure SQL Database, Synapse SQL Pools * Oracle * Teradata * SAP Hana Relational * Dataflows   Report viewers can set values for an M query parameter using filters or slicers. This feature can be useful for query optimizations without sacrificing report interactivity. | Feb-2022 |
| 109 | Dynamic M Query Parameters now Generally Available | * Dynamically pass report user filter selections to the M queries used by the dataset. Can boost performance of DirectQuery reports by creating efficient queries against source systems. | * https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-dynamic-m-query-parameters | Apr-2022 |