alteryx

# Tips & Tricks

2016

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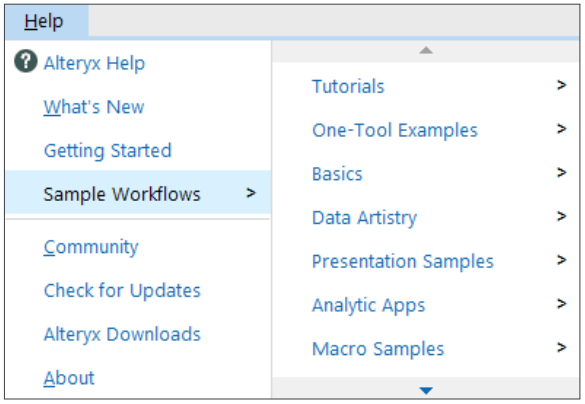
# Getting Started – Alteryx Resources

# Getting Started with Alteryx

## Samples Workflows:

There are a number of Samples that come prepackaged in your Alteryx installation. Simply go to Help>Sample Workflows to find fully annotated Workflows, macros, and apps. Their purpose is to show you real world analytical problems and how to solve them. Get a sense of how to use the Alteryx Interface with the paint-by-number training approach in the "Tutorials". Then move on to the more complex samples that cover everything from basic data joins to Predictive Analytics!




### One-Tool Examples: New to 10.0, made better for 10.5

Within the Sample workflows menu, you'll find a number of One-Tool Examples. These are simple to follow, fully notated, use case examples for specific tools within Alteryx. There are a number of tools available across several different tool categories:

Originally debuted in version 10.0, more tools have been added for 10.5 including the Join Multiple tool, Dynamic Rename, Dynamic Select, Random % Sample, Select Records, and more.

## Alteryx Community:

Check out **http://community.alteryx.com** to engage in the Alteryx open forum for all users! Here you can post questions, answer questions, and search for previously discussed topics. Users also have access to the Knowledgebase which contains articles written by the analytics and data visualization experts from the Alteryx staff. Also feel free to drop Ideas in our Idea Center. This is a place for you to share your ideas or vote on existing ideas for improvements or tweaks to Alteryx. Your suggestions will ultimately drive the advancements in the future versions of Alteryx!

## Gallery:

Check out the Analytics Gallery at **http://gallery.alteryx.com**. Here you can browse the Alteryx Public Gallery to find apps that solve business problems across a variety of industries. Many of these apps can also be downloaded to your machine and opened in your Designer! Use the gallery to learn how apps are constructed and how data flows through properly configured tools. You can reverse engineer apps you are interested in and incorporate those features into your own workflows. The Macro District is also available and always growing with useful macros that simplify reusable processes. You can download Macros from the Gallery and add them to future workflows.


The Macro District includes macros sourced from users within Alteryx as well as other developers. Browse, share, and customize these analytic applications to put them to work for your business!

Do you have a macro to share? To add your macro to the Macro District, save your macro in a workflow as an Analytic App (even if it's not an app), add the text "Macro District" to the Meta Info area where you add your description and then Publish it to

the Gallery. Make sure the option to Download is selected so others can check out your handiwork. If you can set up your workflow as a sample highlighting how to use your macro, that's even better.


The Alteryx Predictive District delivers pre-built tools, workflows, and macros to help analysts incorporate specialized analytic techniques and processes that can help impact the business. Learn more about how Alteryx empowers data analysts and line-of-business users to perform their own predictive analytics.

**Note**: Many of the tools make use of functionality recently added to the Alteryx Predictive Plug-In. As a result, we highly encourage community members to upgrade to the most recent Predictive Plug-in, available from the Alteryx Download site. In addition, some tools require additional R packages. The tools attempt to install the needed R packages, but are not always successful due to firewall and proxy server issues.

## Alteryx Blogs:

Look to blogs written by Alteryx employees to learn more about new macros and Alteryx concepts at Engine Works Blog (**http://community.alteryx.com**) and Chaos Reigns Within (**http://www.chaosreignswithin.com**). The Engine Works Blog features information about new macros published in the Macro District, details about new releases, Inspire related posts, and more. Chaos Reigns Within is the personal blog of a Software Developer at Alteryx and he publishes a Blog Macro Pack each quarter. Some of the macros are prototypes and most have not gone through the extensive testing process it takes to make it into the product, but you just might find a solution to the problem you have been struggling with and it is as easy as downloading a macro!

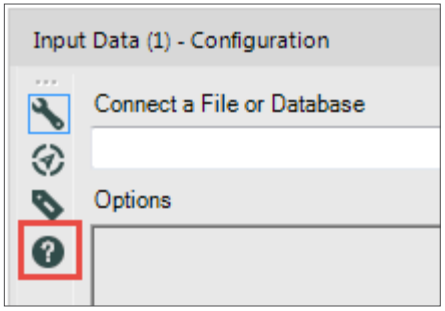


## Help Documentation:

Alteryx has an online repository for all your in-product questions. Every tool within Alteryx has a help page that explains configuration options.

There are three ways to access the Help file from the Designer.

1) Click on any tool on your canvas and press the F1 key.
2) Open any tool's configuration window and click on the Help icon:




3) Click on any tool on your canvas and click the help icon in the top right hand corner of the Designer:

Also within the help documentation is useful information about building macros, constructing formula expressions using the built in functions, data type explanations and more!

# The not-so-new kits on the block: for Tableau, Qlik & PowerBI

Present the output of your Alteryx workflow in a visually appealing way by downloading the Visual Analytics Kits for Tableau, Qlik, and PowerBI. The kits contain key analytic applications, visualizations, and tutorial information. The Tableau kit is available at **http://alteryx.com/kit**,the Qlik kit can be found at **http://pages.alteryx.com/VisualAnalyticsKitforQlik_Reg-LP.html**, and the PowerBI kit can be found at **http://www.alteryx.com/microsoft**.

# Product Training and its many flavors

Alteryx offers an abundance of training online at **http://www.alteryx.com/product-training**. The Getting Started section is great for beginners and includes short videos, accompanying help files, and exercises to solidify the concepts. The On Demand videos cover a variety of topics and can be used to learn about a subject in general or you can watch a video pertaining to the tool or process you are specifically interested in exploring. The Virtual Training Sessions are WebEx's designed to be interactive and offered for users at all levels of Alteryx experience. If you are unable to make the scheduled time for the session, you can always watch a previous recording. Alteryx also offers Classroom Training at the Irvine, CA and Naperville, IL office locations. You will get hands-on experience with one of our trainers and leave with a better understanding of the product and how you can use it to solve your data quandaries.

A new addition to the Product Training site is the **Self-Paced Training**. This section contains various exercises at the Beginner, Intermediate, and Advanced skill levels for users to download and complete at their own speed. Solution files are also available for download here so you can compare your answer to a best practice solution.

# Alteryx Support team…at the ready!

There are four ways to contact Alteryx for support: email, live chat, by phone, and the community. Emailing **clientservices@alteryx.com** is good for a variety of questions ranging from simple to complex. You can send screenshots or attach workflows and provide a description of what you are trying to achieve and someone from Client Services will reach out to you. Live Chat is ideal for simple questions that can be answered quickly. If the question is more intricate than what Live Chat allows for, a Client Services Rep will schedule a phone call or screen sharing session. You can also call us at 1-888-255-1207 for basic questions and troubleshooting. The Community provides you with an opportunity to find the solution to your problem or turn to other users for their input. You can also submit a support ticket if necessary. Links to all of these avenues of support are available at **http://www.alteryx.com/support**.

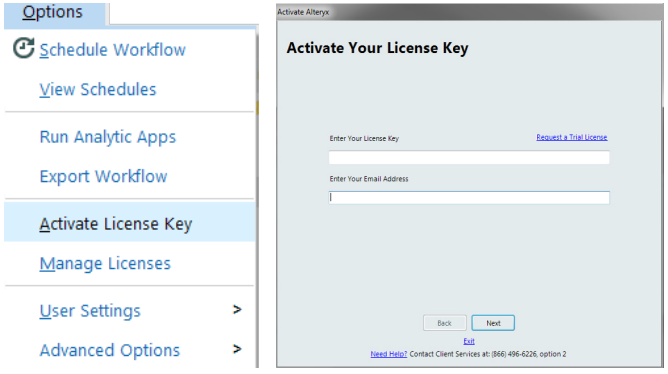


# Turn it on: Activate your License Key

Before you can get started with Alteryx, you will need to activate your License Key.

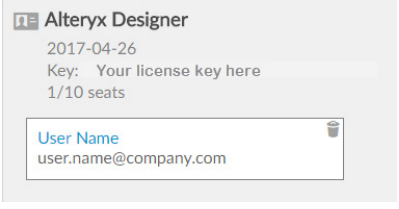
Please activate your License Key by doing the following:

1. Open Alteryx, click on Tools>Activate License Key.
2. Enter your License Key.
3. Enter your email address, click on Next.




# Manage License Key

New with 10.1 is the ability for License Owners to track and manage their license keys through the **Alteryx Public Gallery**. To access these features, log in to your Gallery account (or create one if you don't have one) and click on the settings icon (⚙) in the top right corner. From there click on the tab for Designer Licenses. Here you will see all of the licenses you are the named owner for as well as any activations for each user. From this view you can revoke a license (🗑), view the seats used vs total seats available ( 1/5 seats ), see the expiration date ( 2016-10-08 ), as well as see the name and email address of the users who are activated on each key.

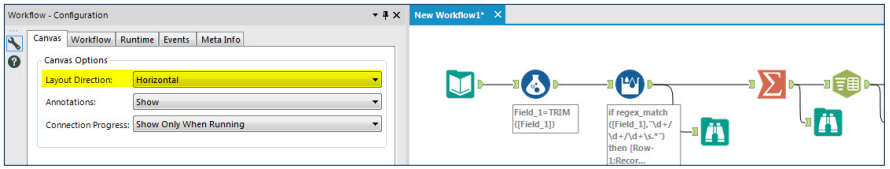


# Getting Started – Workflow Design

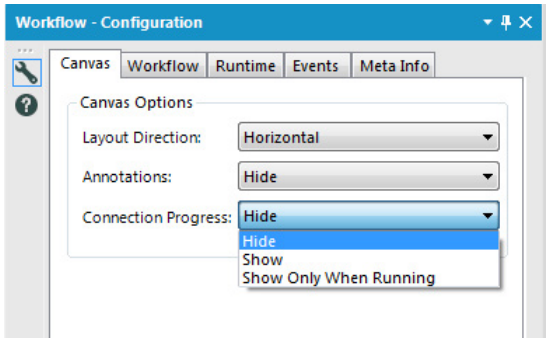
# Workflow Configuration

## Alteryx Canvas, make it yours: Canvas Layout:

Build out your workflows vertically or horizontally. To change a single workflow, click anywhere on your canvas, and in your Workflow – Configuration window, under Canvas options, select your Layout Direction as horizontal or vertical. To set either as the default direction, go to Options>User Settings>Edit User Settings>Canvas. Here you can specify default settings including layout direction, zoom levels, container colors, canvas/ grid colors, and annotation settings.

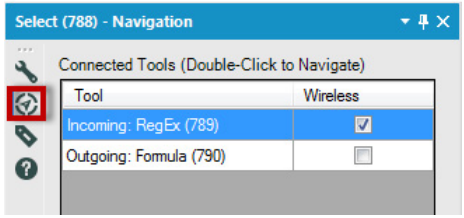



## Connection Process:




The Canvas tab under Workflow – Configuration provides three options for the Connection Progress. If you prefer an uncluttered look, you can hide the connection progress. If you'd like to see it as your workflow is processing, you can select "Show Only When Running". If you'd like to be able to take a closer look at the number of records process, e.g. if you are trouble shooting a workflow, you have the option to keep them visible even after the workflow has finished processing.

## Arrows:

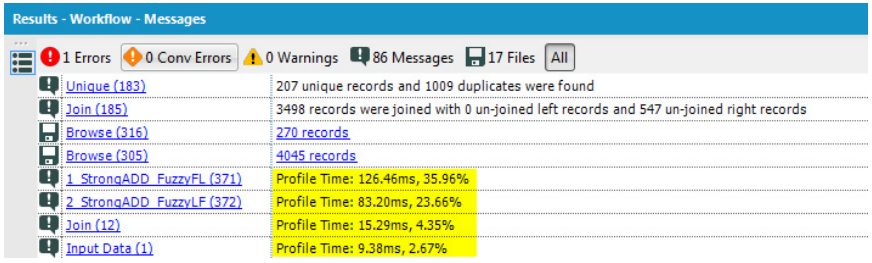



Do your tool connector arrows get a little confusing? You can change your loopy connectors to perpendicular or straight lines under Options>User Settings>Edit User Settings>Canvas. You can even make your connections Wireless! Right-click on any tool to select wireless Incoming or Outgoing connectors or select the wireless checkbox under the navigation for the tool.

## Ready, Set, Go…Runtime:

Set your workflow specifications here: override global Sort/Join memory usage settings and temporary directories; define record limits for all inputs in your workflow to test configurations on a smaller dataset; enable canceling workflow on error; show all Macro messages to better track down errors; disable Output tools for pre-production testing and investigation; disable all Browse tools for faster production runs; and enable performance profiling.

## Performance Profiling:

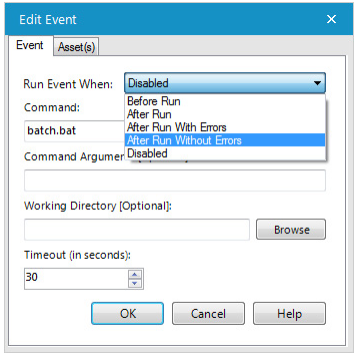



Have you ever wondered why exactly your workflow is taking so long? Is it the inputs or a join that seems to take forever? Performance profiling can answer those questions for you. It will tell you how long each tool took to process and how much of the overall processing time was allocated to that specific tool. Simply check the box in the Runtime tab under Workflow – Configuration and then analyze the Results – Workflow – Messages:

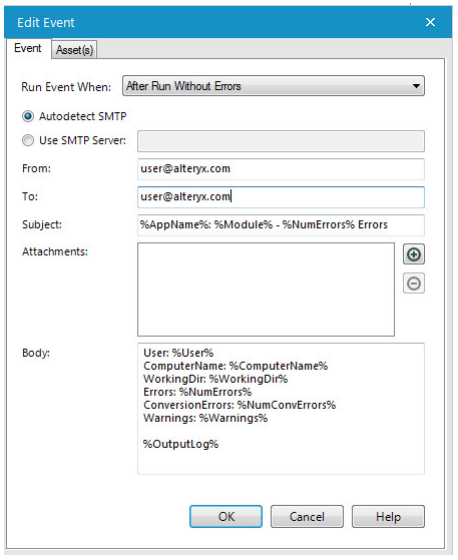
## Two special Events: Send Email & Run Command:

Do you want to trigger a secondary workflow based on the successful run of an initial workflow? Or send email reports after successful workflow runs? Or be alerted to runtime errors? Or kick off a process outside of Alteryx? All of this can be done under the Events tab. An event can be executed before a run, after a run with errors, without errors, or after a run regardless of its success.

### Email:



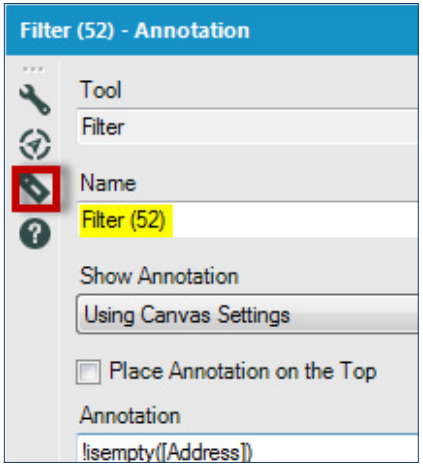

### Batch File:



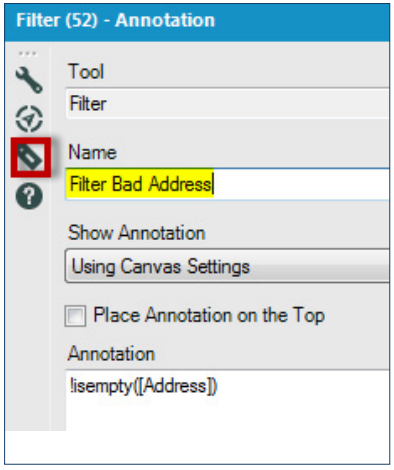
# Search & Rescue Mission: Renaming for easy finding

Tool names can be changed which is helpful when a tool is used many times throughout the course of your Workflow, or if you want to be able to find results for a certain tool in the results tab quickly.

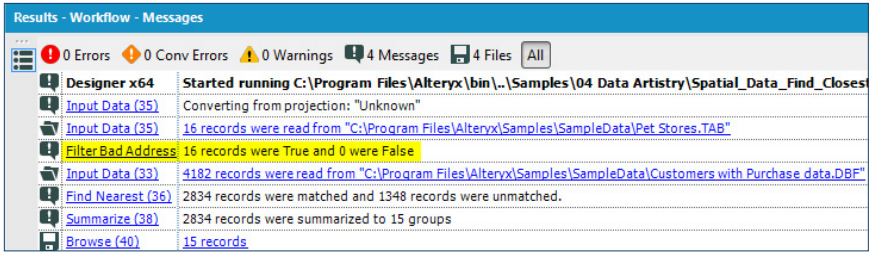
**Before Renaming:**




**After Renaming:**

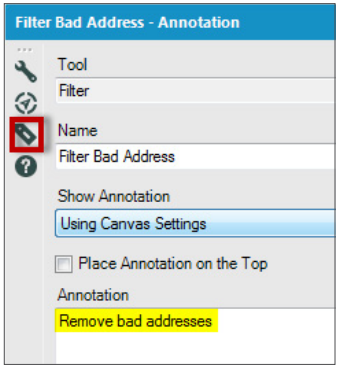


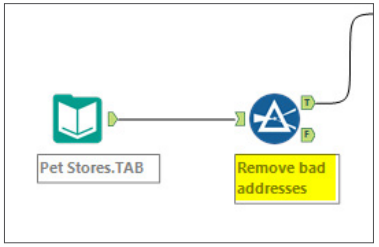

**View in Results – Workflow – Messages:**




## Annotating Tools:

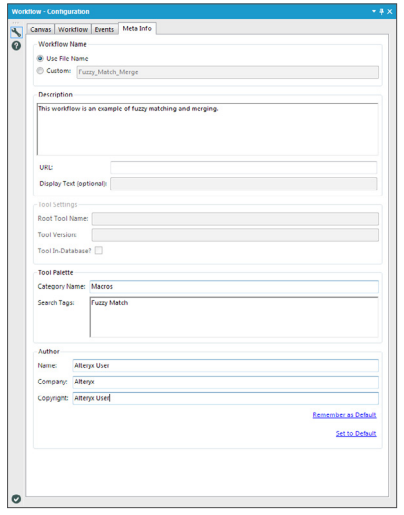
Label your tools for clarity within your workflow by adding or editing annotations for the tool. Some tools have annotations added automatically, e.g. file names for input tools. The annotation moves with the tool. By default, annotations are placed below the tool but you have the option to place them above the tool. You also have the option to change when annotations are seen: based on the canvas, settings, always, or never.




## Leave your mark: Workflow's Meta Info:

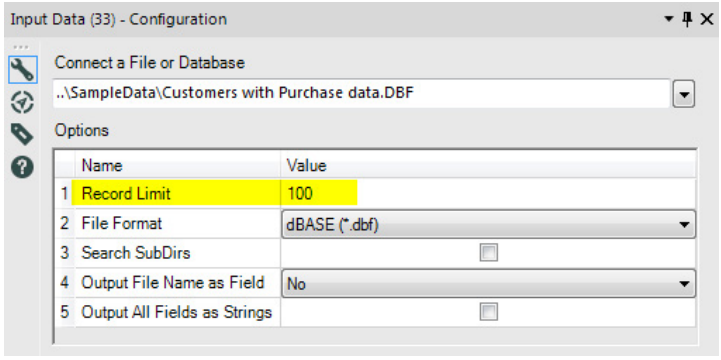
The Meta Info tab allows you to edit information about the workflow. You can give the workflow a name that differs from the file name or you can add a workflow description. This is a useful tool for documenting a workflow that is shared amongst many users. You can also add an Author to the workflow. The Author box lets you set a default so you don't have to type in your information every time.




For Macros you can pick a Category Name where you would like the macro to appear on the Tool Palette. You can also add Search Tags that will help you find the Macro in the Search box.

# Set your limits: Record Limit for the Inputs

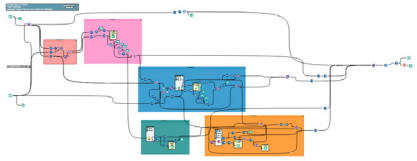
When developing your Workflow, there is no need to bring in all your data during testing. Use the Record Limit option in the Properties for the Input to bring enough records for testing. If you want to set limits for all input tools in your workflow, you can also do this under the Runtime tab under Workflow – Configuration.



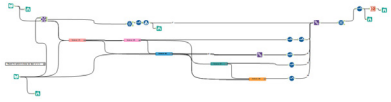

# Think Inside the Box: Tool Containers

The **Tool Container** allows the user to organize a workflow better by combining tools in logical groups. Tool Containers can be collapsed to arrange a workflow more clearly, or they can be disabled to run only certain portions of the workflow.

### Before Tool Containers



### Collapsed Tool Containers:

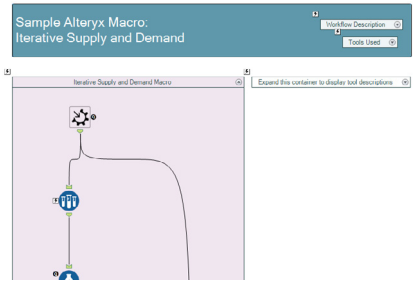


Tools within a disabled container will not be executed. This is especially handy when working with Analytic App and Macros, as you can update the checkbox with an Action based on the end-user's input.

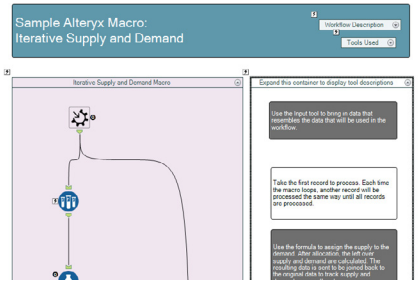
## Documentation:

Tool Containers can also be used to organize and contain workflow documentation:

### Documentation Collapsed:



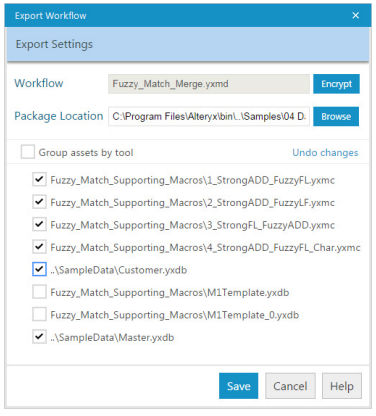

### Documentation Expanded:




# If you take your workflow for a trip…Let's package it

To easily share Workflows and their dependencies you can package them under Options>Export Workflow. By default, the name is the Workflow name. You can also select which datasets and custom tools to package with your workflow. If you would like to send a sample of your data, use the Record Limit option when exporting, this will limit all your Inputs within your Workflow.

To Import a package, double click it and then hit import.



# Getting Started – Workflow Optimization

## Resource Optimization

Alteryx is designed to use all of the resources it possibly can. In order to make Alteryx run as fast as possible, it tries to balance the use of as much CPU, memory, and disk I/O as possible.

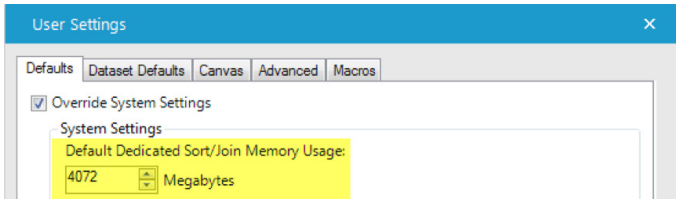
The good news is that most of the resource utilization can be controlled. You can limit the amount of memory that is used on a system, user, or Workflow level.

The Sort/Join memory setting is not a maximum memory usage setting; it's more like a minimum, this allocated memory will be split between all the tools that sort in your workflow, but other tools will still use memory outside that sort/join block, some of them (e.g. drive times with a long maximum time) can use a lot.

If a sorting can be done entirely in memory, it will go faster than if we have to fall back to temp files, so that's why it's good to set this higher. But if the total memory usage on the system pushes it into virtual memory, you'll be swapping data to disk in a much less optimal way, and performance will be much worse and that's why setting it too high is a bigger concern.

The global Default Dedicated Sort/Join Memory Usage at System level can be found at ***Alteryx > Options > Advanced Options > System Settings > Engine > Default sort/join memory usage (MB)***

To set a user level default dedicated Sort/Join Memory Usage, go to ***Options > User Settings > Edit User Settings > Defaults tab***



## Resource Optimization Best Practices

1. Memory Settings

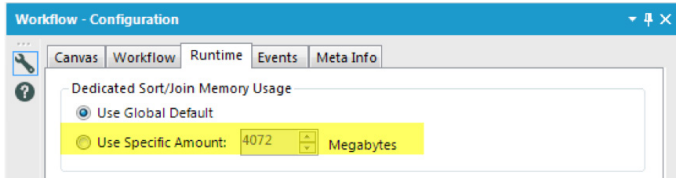
   32-bit machines:
   Setting should be on the lower, conservative side. No matter how much actual RAM is there, only has at maximum 1 GB available, as soon as it is set higher, the machine will cross over into virtual memory and be unable to recover.

   A 32-bit machine should never have a setting over 1000MB, and 512 is a good setting. Set it low (128 MB), especially when using Adobe products simultaneously with Alteryx.

   Important Message on **Alteryx Analytics Support for 32-Bit Windows Systems**

   64-bit machines:
   Set this in the system settings to half your physical memory divided by the number of simultaneous processes you expect to run. If you have 8 GB of RAM and run 2 processes at a time, your Sort/Join memory should be set to 2GB. You might set it lower if you expect to be doing a lot of memory intensive processes on the machine besides Alteryx

2. Set your Dedicated Sort/Join Memory Usage lower or higher on a per-Workflow basis depending on the use of your computer, doing memory intensive non-sort work (i.e. large drive-times) then lower it, doing memory intensive sort-work then higher. go to the Workflow ***Configuration > Runtime tab > Dedicated Sort/Join Memory Usage > Use Specific Amount***




3. Run Alteryx at a lower priority: This will ensure that the Alteryx Engine runs at a lower priority than all the other applications running on the same machine. By doing so, even the Alteryx GUI will remain responsive when you are running a large Workflow in the background. This is an especially good idea for a shared server. ***Alteryx > Options > Advanced Options > System Settings > Engine***

4. Shared Servers: For a shared server, the system owner/IT person should set the memory to no more than (total memory-2GB)/(Number of Users). This way if all the users are running Workflows at the same time the system won't go into virtual memory, which really slows things down.

5. Web Servers: When running Alteryx on a web server, you really want to set the memory to the minimum possible without impacting the performance too much. We recommend trying a system memory setting of 64MB and then increasing the memory on a per Workflow basis as needed. It is important to note that the user setting for memory usually has no impact since the web service typically runs as a separate system user. Make sure to use the system settings.

6. Background Processing: Any time you are planning to run a Workflow in the background while you are going to continue doing other work, it is a good idea to run it with less memory.

7. It is also a good idea to have the temporary directory point to a separate physical hard drive from your boot drive. If your temp drive points to C:\temp and you run a Workflow that consumes 100's of GB of Temp space (it happens), your system may become unstable.

# Lean for Speed

## Select Data to be processed only with Select & Filter Tool

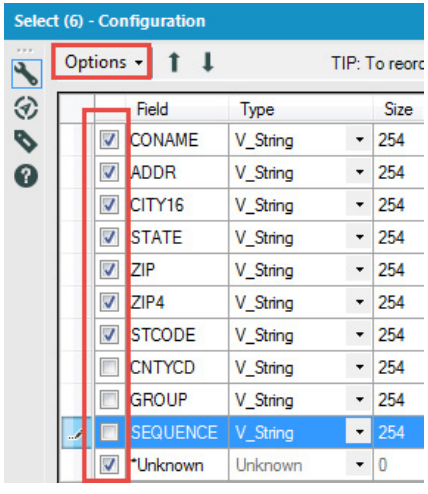
A best practice to optimize the performance of your workflows is to remove data that won't be needed for downstream processing as quickly as possible, you can always bring later the additional data if needed. The Select tool removes fields or columns from your data. Other tools such as Join, Join Multiple, Spatial Match, Find Nearest, and to a certain degree Transform tools and Reporting tools have some Select functionality.

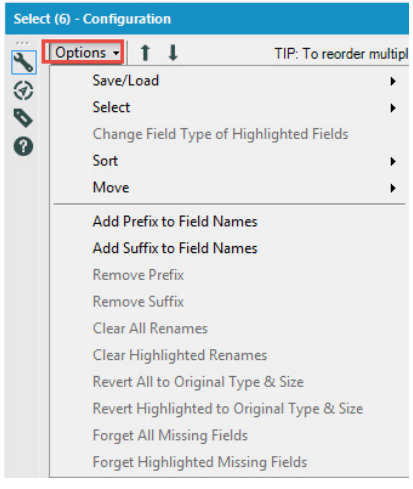
Useful tips when using the Select Tool:

Move highlighted field to top or bottom: ***Option > Move***

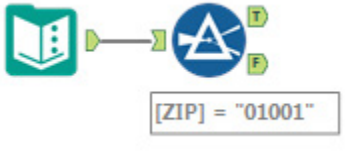
To reorder multiple fields at once: ***Select, right-click and drag***

Changed your mind? To revert to incoming field order: ***Options > Sort***



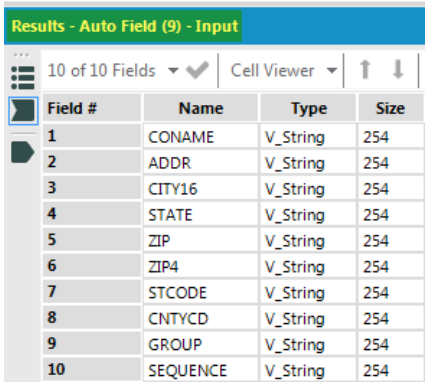

Another good way to optimize workflow performance is using the **Filter** tool to remove unnecessary data. The Filter tool queries records in your file that meet specified criteria and identifies these records in your data, such as ZIP = 01001. You may choose to handle records that come from the **True** output differently than the **False** output by connecting additional tools to the workflow on either side. This will allow smaller amounts of data being passed downstream.

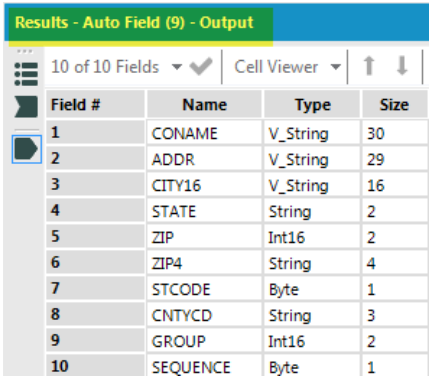



## Assign most efficient data types with the AutoField Tool

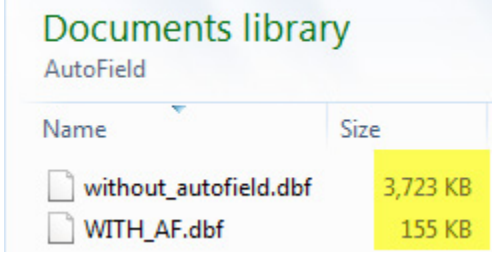
Optimize your workflow for speed by setting the field type to the smallest possible size and most efficient field type. String fields with a big size can be costly and carrying that through your workflow will slow it down. Use the AutoField tool right after your Input Data tool to assign the most efficient type and size to your fields.

Below the data types before and after the AutoField tool.



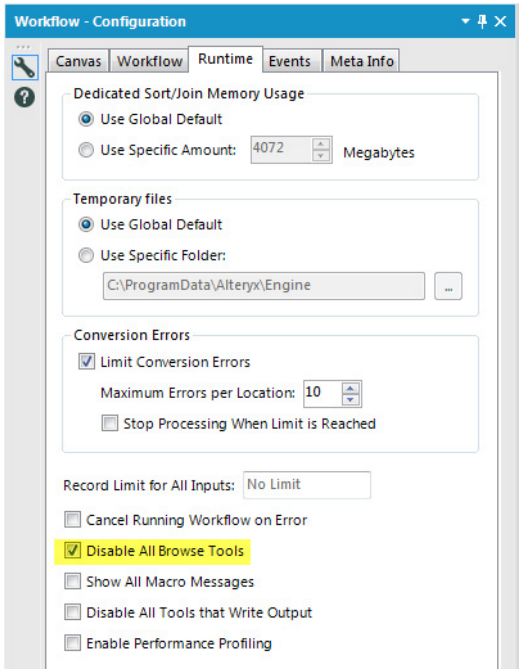




Another benefit of using the AutoField tool is that it will reduce the size of your output file.



# Speed up Processing: Disable All Browse tools

The Browse tool quickly becomes a data artisan's best friend, it allows to see/review the entire data at any given step in the workflow building process, however, each of these browse tools creates a temporary yxdb and writing these files do take some time and slow down the processing. When the workflow is ready for production is better to remove them, there is an option to just disable them so they can be easily enabled if need it. This setting can be found at ***Workflow > Runtime > Disable All Browse Tools***




# Getting Started – Time Savers

# Time Savers

Looking for ways to save some time? You've come to the right place. The following tips are designed to aid you in your development with Alteryx to help ensure maximum efficiency.

**Faster Formulas:**
When building out expressions that use multiple existing variables it can get tiring to double click on each variable name within the formula tool. The good news is you don't have to! Simply click and drag the variable into the expression window (drag and drop) to save clicks.
***A bonus trick:*** Add comments to your formulas using two slashes:
//anything on this line will be treated as a comment

**Rapid Results:**
Accidentally closed the results window? Now you don't have to go back into the View menu to enable it. Simply click on an Input or Output anchor for any tool on your canvas and the results window reappears to show your data.

**Nimble Navigation:**
Multiple Tool Containers in a large workflow? No problem! Right click on your canvas, select zoom, and choose the Container you wish to view. Alteryx will zoom to that container so you don't have to search for it!

Confused by crossing connections? Try using **Ctrl Shift +** and **Ctrl Shift** - to align tools vertically or horizontally to keep things organized.

Forget to add browse tools while working and need to view your full data set? Simply select the tools you want to add a Browse to and press **Ctrl Shift + B** to add a Browse to each anchor of each selected tool.

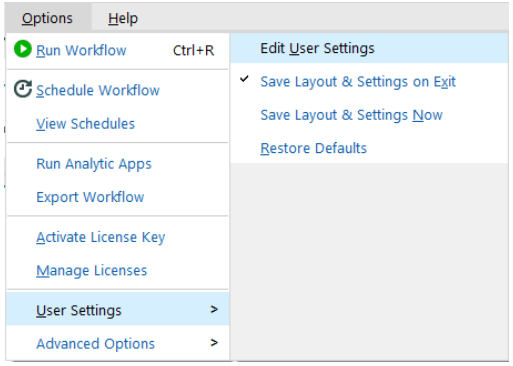
Lost in your workflow? Press **Ctrl + 0** (zero) to zoom out to the entire canvas to regain your barings. Once you find where you want to go, right click and select the area of your workflow to zoom in on to jump to that location. If your workflow is too large and zooming to the whole thing makes it hard to see, try using the pan feature. Instead of using the slide bars press the center button of your mouse (mouse wheel) or holding down the space bar and using left click to freely pan around your workflow faster.



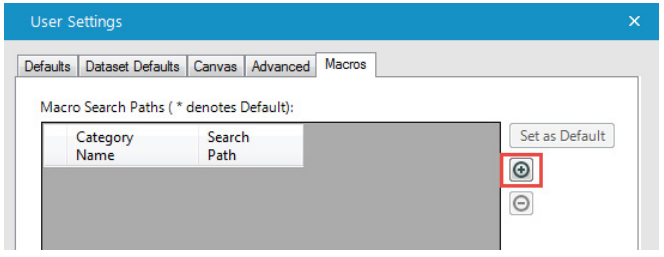
**Manageable Macros:**

Custom macros are a great way to make Alteryx more efficient for your use cases, allowing for increased flexibility, customization, and shareability. To save yourself some time, try creating a custom Macro tool category within the Deisgner. To do so, follow the simple instructions below:

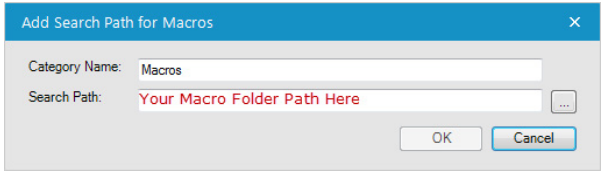
1. Create a macro (or many)!
2. Save your macro(s) in the same directory




3. In the Designer, go into Options – User Settings – Edit User Settings




4. Click on the Macros tab and click the plus sign:
5. Enter a name for your custom category, and enter the path where you have your macro(s) stored:



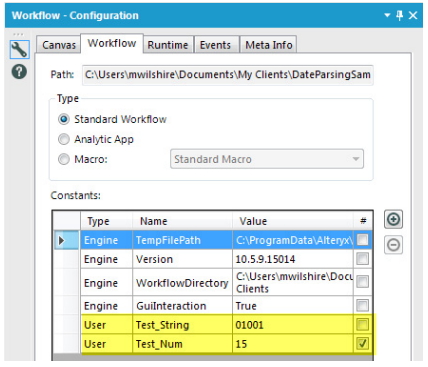

6. Scroll to the end of your Tool Categories and you'll see your custom folder with any macros stored in that directory as Tool Icons you can now quickly drag and drop into your workflow.

## Pinned Possibilies

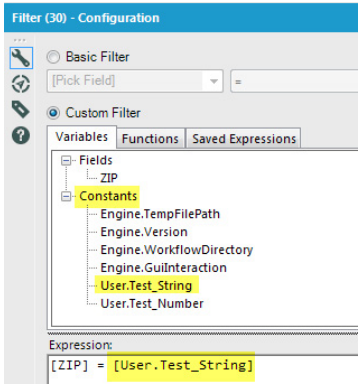
Is there a tool category you use on a regular basis but you don't want to click all the way to the end to find it? Did you know you can pin a tool category to the front of the list? Simply right click on any tool category and select Pin to bring that category to the beginning of the list and pin it next to Favorites so it never gets lost as you scroll through the other categories:

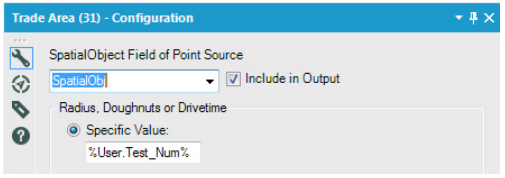

## Global Variables

Global Variables are called Constants within Alteryx. Have you ever needed to change a value in multiple places within your workflow? There are 4 constants per default and users can add as many constants as needed.



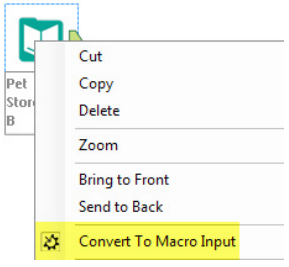

Once the constant is declared, it can be used throughout the workflow, to reference it, just select the constant from the Constants tree or using the %User. ConstantName%




## Macro Input shortcut:

In many cases a macro is built upon an existing workflow that needs to be automated, when that happens, most certainly the Input Data or Text Input tool will have to be converted to a Macro Input for the macro to accept incoming connections, often times, users will bring the Macro Input tool from the Interface category and browse to the data which can take a bit of time, the shortcut is to right click on the Input or Text Input tool and select Convert to Macro Input



# Database Processing

## In-Database Processing

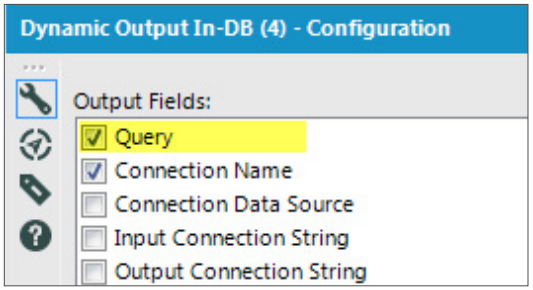
Are you connecting to any of the databases listed below? Then, give the In-Database tools a try if not doing so already. Introduced in 9.5, we have expanded the supported platforms from Oracle and SQL to all those listed below. In-Database tools allow you to perform processing and analysis in the database where the data resides, this translates into performance improvements. Link to the In-Database Overview document at **http://help.alteryx.com/10.5/index.htm#In-DatabaseOverview.htm%3FTocPath%3D_____4**

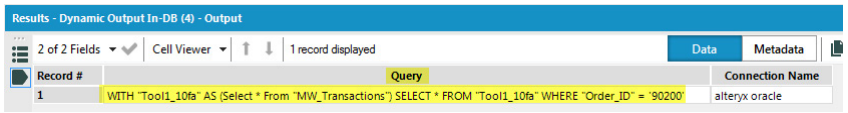
- Amazon Redshift
- Cloudera Impala
- Hive NEW to 10.5
- Microsoft Azure SQL Data Warehouse NEW to 10.5
- Teradata
- Spark
- Oracle
- Microsoft SQL Server

### Visualize the Query

A SELECT statement is triggered by the Connect In-DB tool and additional queries are created by downstream tools and nested within this query. The addition of one of the following three tools completes the query and sends it to the underlying database: Write In-DB, Data Stream Out, Browse In-DB.

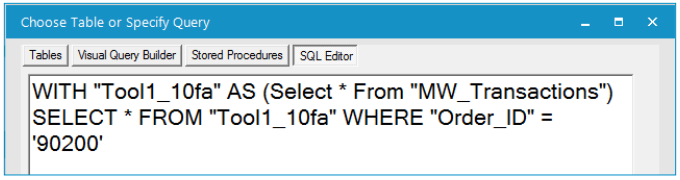
Would you like to visualize the query at any point in your workflow? Use the Dynamic Output In-DB Tool!



## Troubleshooting tip: Test the In-DB query in the Input Data tool:

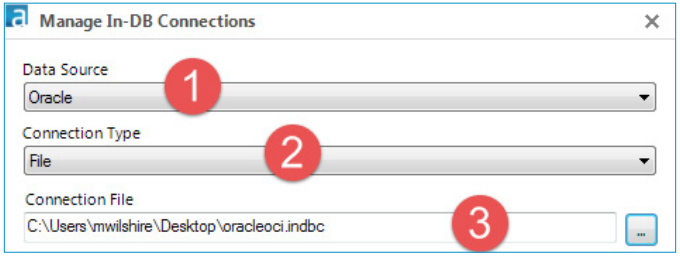
One helpful trick when troubleshooting the In-DB query is testing it with the regular Input Data tool. Copy the query from the Dynamic Output In-DB tool, bring an Input Data tool, connect to your database, paste the query in the SQL Editor and execute. If your query could return too many rows, you can add a limit or top clause to limit the number of records.




## Share your In-DB connection with In-DB Connection File

The In-DB Connection File type allows to share database connections with other users. A database connection is saved as an .INDBC file so it can be packaged with a workflow. The password is encrypted in the INDBC file.

When creating the connection, select the Data Source from the dropdown **(1)**, then select File for the connection type **(2)**, navigate to a folder where the INDBC file will be stored and provide a name for this file **(3)**.




For more details, check this Alteryx Community post at: **http://community.alteryx.com/t5/Alteryx-Knowledge-Base/Alteryx-In-DB-Connection-File/ta-p/17574**

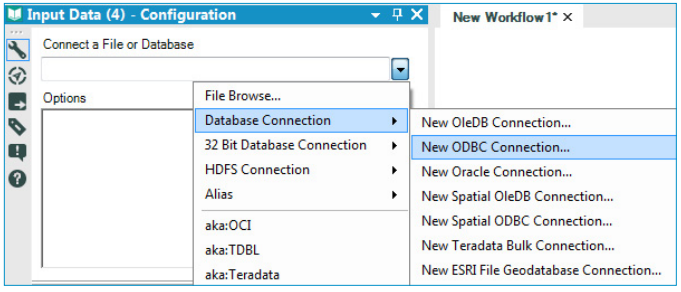
# Database Connections Best Practices

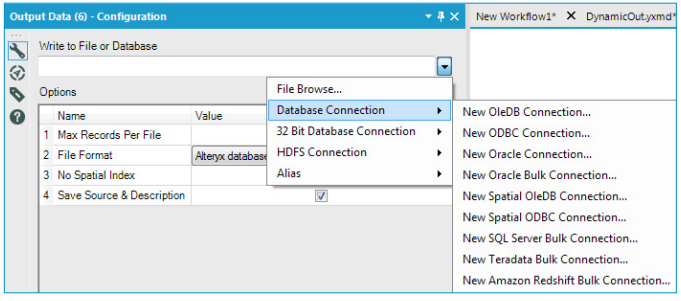
Alteryx can access data that resides in a database and either bring that data into memory in Alteryx for processing or conduct the processing within the database itself where the data resides. Alteryx supports both ODBC and OLEDB database connections. Here are few tips to follow when connecting to databases.

## Database Connection

***Database Type:***

1. OCI (Oracle Connection) is the fastest when connecting to Oracle. OleDB is recommended for SQL databases. Teradata Bulk Connection for Teradata. ODBC for BigQuery, Cassandra, Hive, Impala, Spark and Amazon Redshift Bulk Connection (only available for Output) SQL Server Native Client 11.0 for SQL Server Bulk Connection (only available for Output).



2. **Teradata Bulk Connection:** Increases the speed when reading and loading large volumes of data to an empty table on a Teradata database. Requires Teradata Tools and Utilities to be installed (preferably v14), at minimum: Shared ICU Libraries, ODBC Driver for Teradata, Teradata GSS Client, Teradata Parallel Transporter Base and Teradata Parallel Transporter Stream. Ideally, running Alteryx 64-bit (using 64-bit ODBC driver)

***Selecting Driver***

3. It is best to use the **Native Client Driver** provided by the database company. Also make sure you are selecting the version that matches your database. Native Driver names would look like OraClient10g_home2 for Oracle and SQL Server Native Client 10.0 for MS SQL Server.

4. **User vs System**

   User is for the specific user that created the DSN Source and System can be accessed by anyone with access to that machine. Local admin access is needed to create a System DSN or a System Alias. If scheduling a workflow that has a database connection, the DSN and Alias must be System.

5. Alteryx has been authorized to distribute the drivers listed below, to request them, go to **http://pages.alteryx.com/Alteryx-Driver-Downloads-LP.html**

   Cassandra/DataStax, Google BigQuery, Hive, Impala and Spark

6. **Allow saving password** for OleDB connection: When setting up an OleDB connection, check the **Allow saving password** box in the **Connection** tab. This way the session will store the password and won't discard it once the test is successful, also change the Persist Security info in the All **tab** to True.

***Workflow Speed***

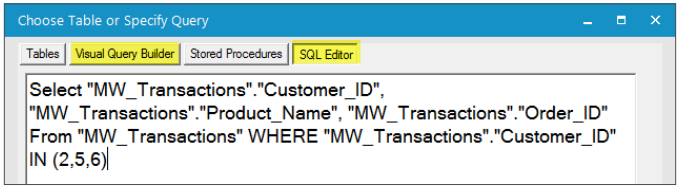
To improve Workflow Speed when:

***Reading-in***

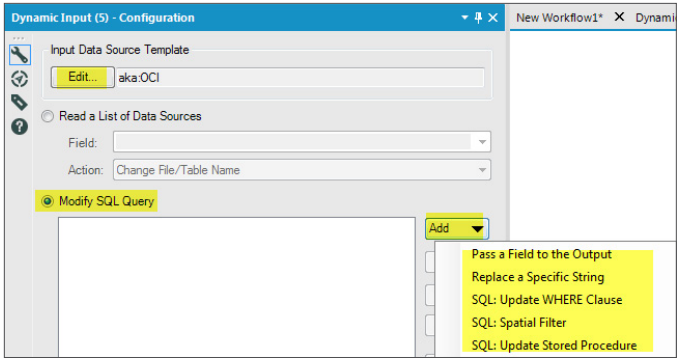
7. **Alias Manager:** Creating an Alias to manage your database connections is a must-do; it will make it easier to access your data and to manage the connection which allows you to update passwords in a single location rather than having to update every Input Data tool. ***Alteryx > Options > Advanced Options > Alias Manager***

This is how the Alias being used looks like in the Input Data Tool.

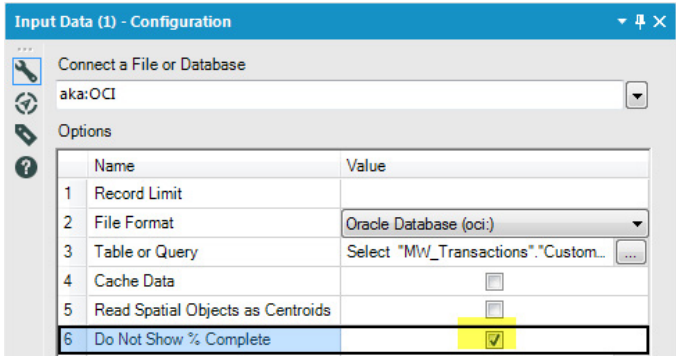

8. In the Input Data tool, use the **SQL editor and/or Visual Query builder** to limit the number of fields and number of records to read-in.



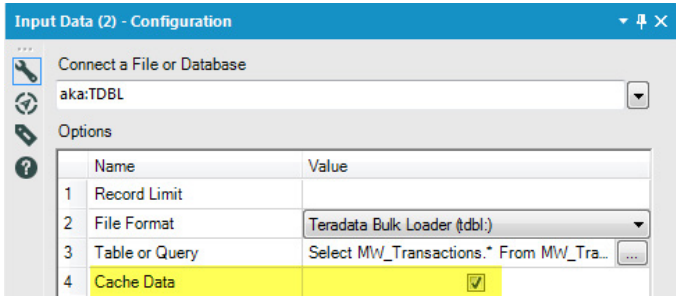

9. **Dynamic Input tool:** Leverage the Dynamic Input tool whenever possible/ needed, this tool allows you to dynamically update your SQL clause, speeding up your processing time as it filters the data and only returns the user specified criteria and joins it to the data coming into the tool.



10. **Do not show % Complete:** When checked, Alteryx will not try to report the status of reading in the file, thus speeding up the reading time.

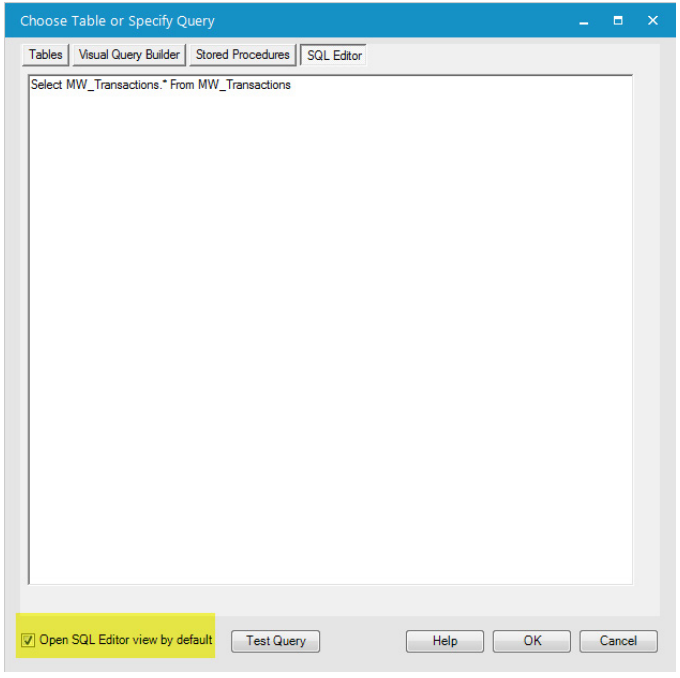



11. **Cache Data:** When checked, data is stored in a .yxdb file on disk so that data sources are not hit repeatedly during workflow development. Data can only be cached when running a workflow in an Alteryx Designer session. The setting is ignored when the workflow is run in the scheduler, in the gallery, or from the command line. Messages will be reported in the Results window when data is being read from a cached location rather than the original data source.

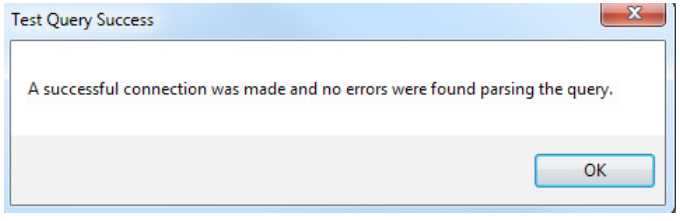



12. For Teradata Queries, specify the # of amps to leverage from your Teradata instance to process the query.

13. **Select your default view** When connected to your database with the Input Data tool, you can select your default view to be either the list of Tables (if you have too many it could take a while to load), Visual Query Builder (VQB), Stored Procedure or SQL Editor.

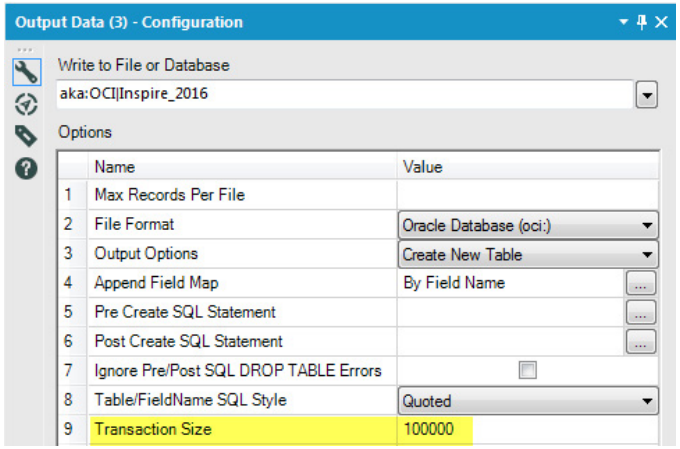



14. Test your Query Now you have the ability to Test your query before submitting, this makes sure your SQL syntax has no errors.



### *Outputting*

15. **Commit as you go:** It is possible to commit a number of records at a time, e.g. to 100,000 records at a time.




16. Problems with connections timing out: add a Block Until Done tool (in the developer section of the toolbox) after your Input Data tool and before the Output Data tool. This also increases the overall speed of the Workflow.

17. A List of supported data sources can be found at **http://help.alteryx.com/10.5/index.htm#DataSources/DatabaseSupport.htm%3FTocPath%3DData%2520Sources%7C_____1**



# Connectors

The following connectors are not included in the default installation of Alteryx but can be downloaded from the Macro District in the Public Gallery (gallery.alteryx.com). They all utilize the .yxi file format and will install automatically when the downloaded file is opened.

# Publish to Power BI


**The Publish to Power BI connector** requires some additional set up outside of Alteryx in order to use it. You will need:

1. Create an Azure Active Directory Tenant: **https://msdn.microsoft.com/en-us/library/mt186542.aspx**
2. Sign up for Power BI Service: **https://msdn.microsoft.com/en-us/library/mt186467.aspx**
3. Register a client app: **https://msdn.microsoft.com/en-us/library/dn877542.aspx**
4. Obtain a client ID: **https://powerbi.microsoft.com/en-us/documentation/powerbi-developer-register-a-client-app/**

Once the necessary information is obtained you can use this tool to publish data directly to Power BI. For more information on specific configurations see the Help documentation.

# Adobe Analytics


The **Adobe Analytics connector** (*NEW for 10.5!*) allows you to connect directly to your data and bring it in to Alteryx so you can perform greater data manipulation to provide further insights than using Adobe Analytics alone. You'll need to install Alteryx v10.5 (downloads.alteryx.com) in order to use this tool.

After installing the connector, choose your login method:

**User Login:** This method is best for ad hoc workflows. Sign in using Adobe Analytics credentials. This option requires re-entering credentials every 30 days or any time a new instance of the tool is added. In order to use this login option you will need to have Web Services access (granted by your Adobe admin) and link your Adobe Analytics account to your Adobe ID for single sign-on capability. To link the accounts:

1. Go to marketing.adobe.com.
2. Log in with your Adobe ID.
3. Click "Get Access" within the Analytics section

**Developer Login:** This method is best for scheduled workflows or when adding workflows to the Alteryx Gallery. Sign in using API credentials. This option requires obtaining a Client ID and Client Secret and does not require re-entering credentials to run a workflow.

The Developer Login requires that you **create an application** from your Adobe Analytics account. Choose client credentials for the authentication type. Once you create the application, Adobe will provide an Application ID (Client ID) and Application Secret (Client Secret) to use for authentication with Alteryx.

# WDC for Tableau

The **Alteryx Web Data Connector (WDC) for Tableau** tool (*NEW for 10.5!*) enables an analytic app to be used as a data source in Tableau (version 9.1 and later).

To create an app that is compatible with Tableau:

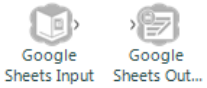
1. User only a single Alteryx WDC for Tableau tool in the app
2. Add the text #TableauWDC to the Description field in the Workflow Properties>Meta Info tab before saving the app to your Private Server Gallery
3. Select the Alteryx WDC for Tableau tool to be included as an asset by selecting Workflow Options>Manage workflow assets while saving the app to your Private Server Gallery

4. Use only the following tools from the Interface category in your app:
    a. Date
    b. Drop Down
    c. List Box
    d. Numeric Up Down
    e. Text Box
    f. Check Box (note that nesting relationships are ignored by Tableau)
5. Avoid using the following interface designer elements as they are ignored by Tableau:
    a. Group Box
    b. Label
    c. Link
    d. Tab
6. Avoid using Blob and SpatialObj field types, as Tableau's Web Data Connector API does not support them

There are additional steps you need to take to connect the Alteryx app to Tableau that can be found here: **http://help.alteryx.com/10.5/index.htm#cshid=TableauWDC.htm**

# Google Sheets Input and Output

**The Google Sheets Input and Output** connectors allow you to connect directly to Google Sheets documents to download the data into Alteryx or push data back into Google Sheets.




Once you download and install the tools from the Alteryx Analytics Gallery you can choose which login method you want to use:

**User Login:** Best for ad-hoc workflows. Sign in using Google Account credentials. This option requires re-entering credentials every 60 minutes or any time a new workflow is opened.

**Developer Login:** Best for scheduled workflows. Sign in using **Google API Credentials**. This option requires obtaining a Client ID, Client Secret, and Refresh Token and does not require re-entering credentials to run a workflow.

**Tip from the tool creator:** Always use Developer if you can get the credentials as it provides more flexibility with scheduling or saving credentials, and for on demand running.

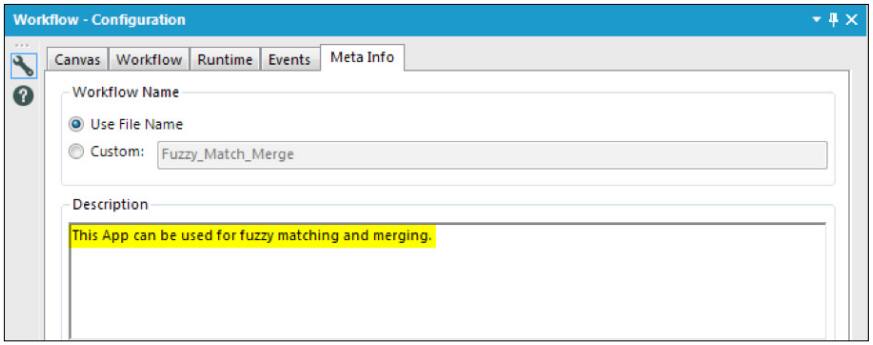
**Google Sheets Input Limitations:** The Developer Login authentication method uses the Google Spreadsheets API and may time out when trying to download large files. If you encounter this issue:

1. Break one large sheet into two or more smaller sheets
2. Use a Google Sheets Input tool for each sheet and combine the results with the Union tool.

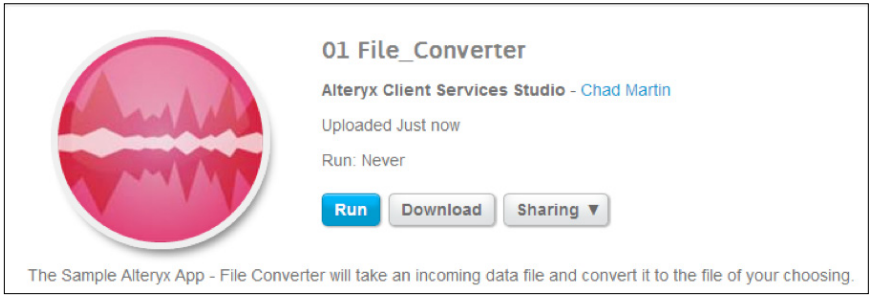
# Analytic Apps and Macros

## Paint a pretty picture and add a good description: App description & icon

Adding a description to your app can help users understand the purpose and goal of your app.

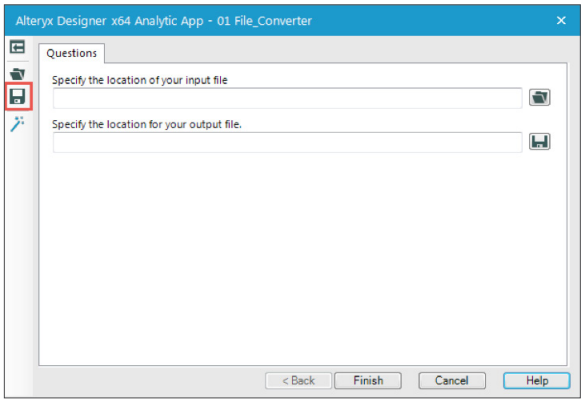



If publishing to the Alteryx Analytics Gallery, this description will display on the app's home screen.




## Keep your values (yxwv)

When you are developing an Analytic App, you have the ability to save the values you have been using for testing, then call those values back through the user interface. This is especially helpful if you are developing an app with several inputs.

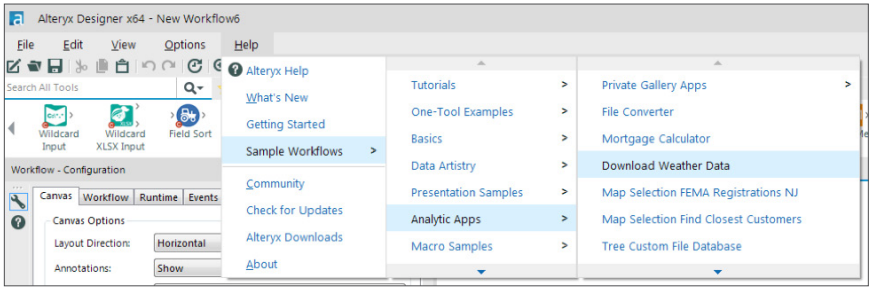



To save, click the **Save** icon on the left of your app UI then choose your specific file name (MyAppValues.yxwv).

To open, click the **Open File** icon, then browse to your App Values file.

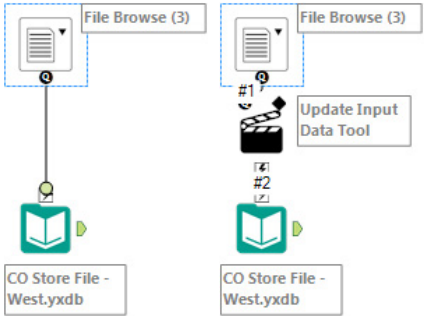
# Analytic Apps Best Practices

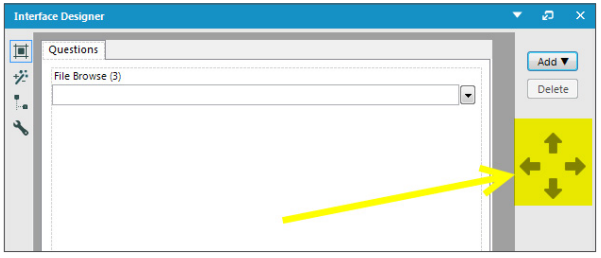
## New Analytic App and Macro building tutorials can be found under Help>Sample Workflows!




Dragging any **Interface Tool** to the canvas automatically changes your Workflow Type to “Analytic App”.

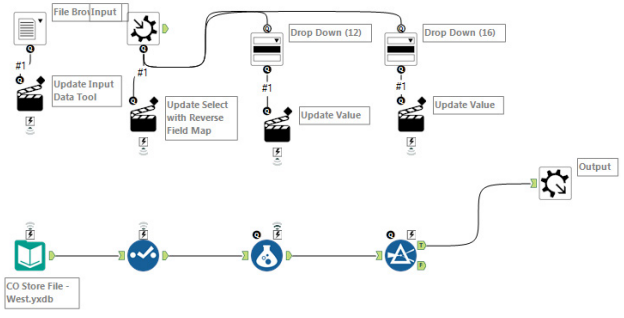
You can connect a **Question Tool** directly to another Tool which will create an **Action Tool** automatically.



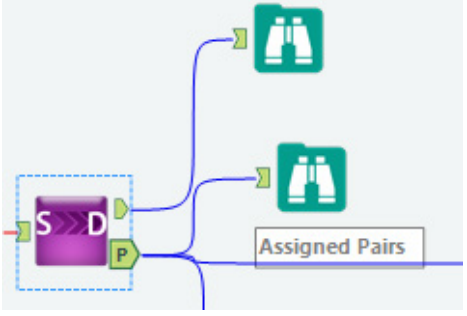

You can move Analytic App questions around the UI using the **Interface Designer**.

To make the app look less cluttered, it is recommended to use wireless connections for the action tools.

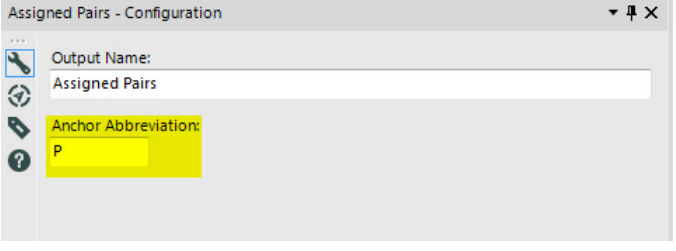


## Give a letter to your anchor: Macro Connection Abbreviation

You can name the connectors for macros to make them more intuitive to the user. In this example, the Iterative Supply and Demand Macro has a connector named “P” to indicate the output that will produce the assigned pairs. The other output should be empty and can be ignored.

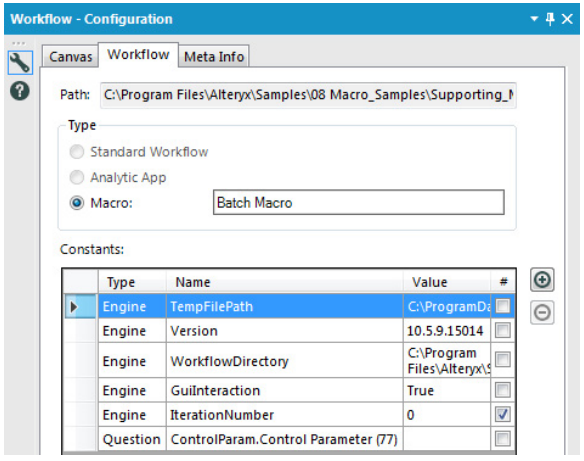



To create or change the Connector Abbreviation, go to the Configuration tab for the Macro Input and Output tools:




## Place a bulk order, Batch macros

A Batch Macro is a special kind of macro that is designed to be run repeatedly in the context of a workflow. It takes a different type of input called a Control Parameter. For each record coming into the Control Parameter input, the entire macro will be re-configured and run beginning to end. Samples for batch macros can be found under Help>Sample Workflows>Macro Samples

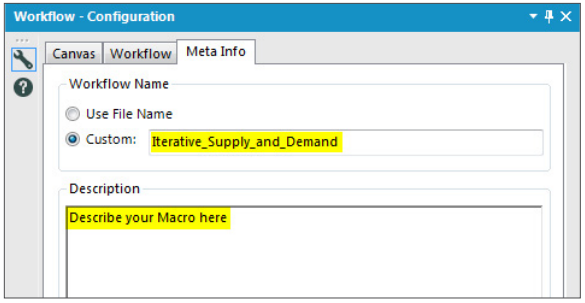



When adding a control parameter to the canvas, the Macro Properties will automatically change to “Batch Macro” and you will not be able to accidentally change this.


**Protip!** While a Control Parameter is often used with a batch macro, it is not entirely necessary!

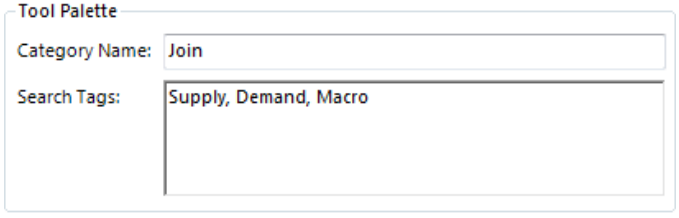
## Where does it go?, name your categories

On the Meta Info Tab under Workflow – Configurations, you can change a number of things about your macro or app that are especially useful if you are planning on sharing your macro with many users.



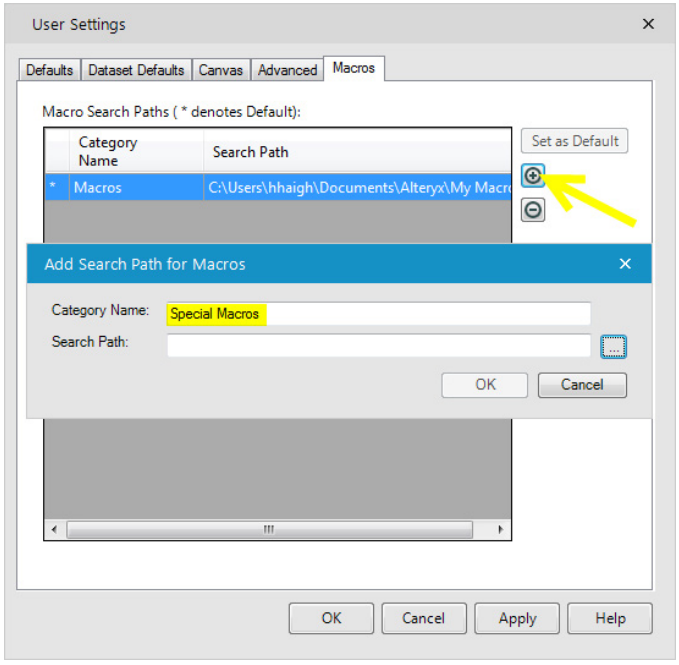

You can specify a Custom tool name to make the macro unique and you can add a Description to let your users know what the macro does.

You can specify a Category Name and search tags for Alteryx to recognize your macro in the Tool Palette and to make it easier for users to find.




If you don't want your macro to appear in one of the existing categories or if you'd like to organize groups of macros, you can create your own custom categories. To do so, go to Options>User Settings>Edit User Settings and click on the Macros tab.

Clicking on the plus sign will allow you to create a new Macro category to use.

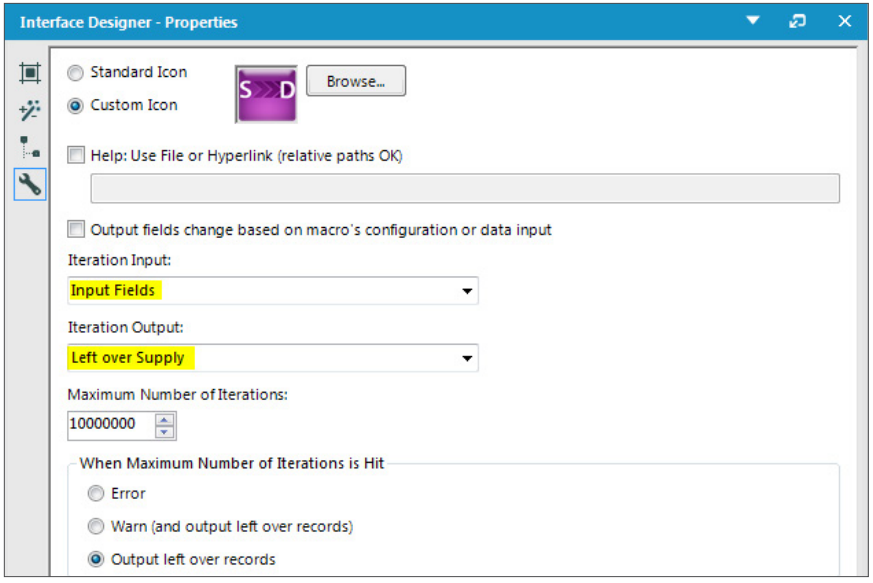



It is recommended is to create categories for Development and Production Macros.

## Getting in the Loop with Iterative macros

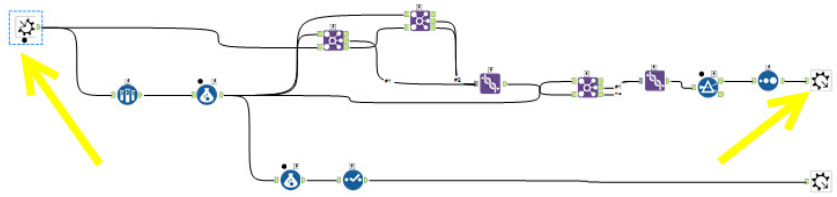
An Iterative Macro will run through every record and then loop the records back through the workflow, repeating the entire process as many times as is specified, or until a condition is met. Samples for iterative macros can be found under Help>Sample Workflows>Macro Samples

Name your inputs and outputs carefully! This will help keep you organized when specifying the iteration inputs and output.

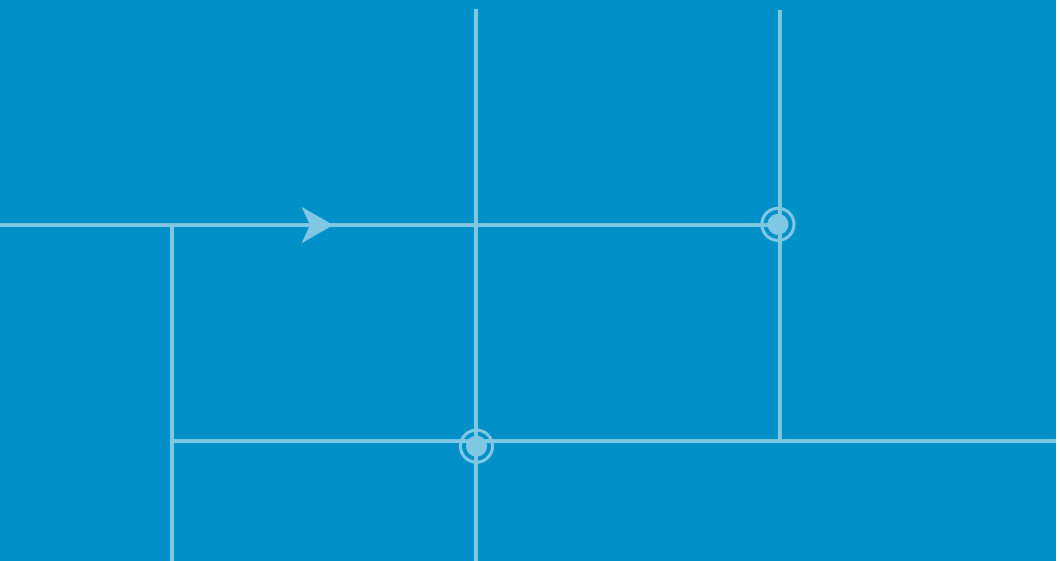



Also pay attention to the maximum number of iterations. This will stop the macro from looping indefinitely if the condition is never met. You have the option to just output left over records, to output left over records and send a warning to the workflow or to throw an error.

To keep the macro organized, it can help to keep the loop output in line with the macro input:



# Server & Gallery



## Workflow and Macro Sharing

You can publish and share your Workflows and Macros with other Alteryx Gallery users. Like Alteryx Apps, Workflows can also be run in the Gallery. Macros can only be downloaded and added to your own Workflows and Apps.

Workflows and Macros are uploaded the same way Alteryx Apps are. Simply open the Workflow in the Alteryx Desktop Designer and click File -> Save As. Select the Gallery you wish to save them to. If you need to make changes to what will be included with your Workflow or Macro, like including sample data, click the Manage workflow assets link to make changes. When you are ready, click the Save button. Once the Workflow or Macro has been published, you can find it in your Private Studio.

## Custom Workflow and District Tagging

With a Private Gallery comes the ability to add custom tags to Workflows, Analytic Apps, and Macros. Your Gallery Curator can set up Tags for users to add to their published processes to help when searching the Gallery, or to add to Districts within the Gallery.

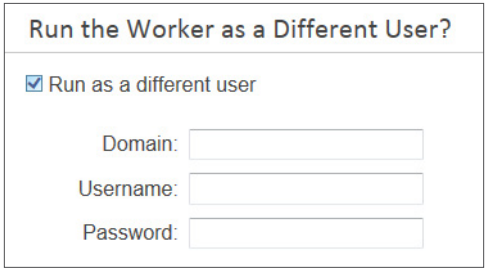
To set up a Tag, the Curator of your Gallery must log in and go into the Admin section of the Gallery. From there, click on the Workflows option on the left, and at the bottom you'll see the Tags area. Admins can create custom tags for users to add, and can also include the option for certain tags to be only usable by Curators, by selecting the "Admin Only" option.

Once created, any Artisan who uploads a Workflow, App, or Macro to the Gallery can go into their Private Studio, select a workflow, and click on the Workflow Properties link. Here you'll be able to select from the list of tags available within your Gallery.

To add a tag to a District, the Curator for your Gallery must first create a District, and then in the setup for that District, can select tags to apply. Once the tags are applied to the District, any Workflow that is added to your company's public gallery with the tags associated with that District will be available within the District itself.

## Run As

The Alteryx Service runs as a local system account, by default. This can lead to issues accessing data stored on network drives or databases that require specific user permissions. In order to get around this, during your Server configuation on the Worker - Run As tab you can enter credentials for the Service to use when running scheduled and/or Gallery jobs. You'll need to enter the Domain, Username, and Password:

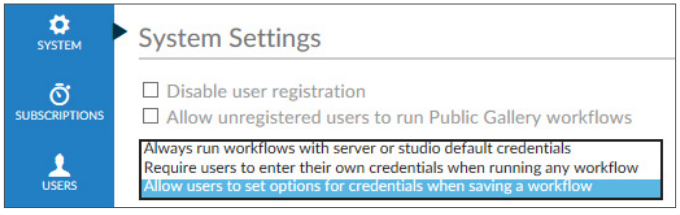



Note that only one user account can be specified here and it applies to all jobs run on the server either through the Scheduler or the Gallery. If you have multi-node deployment with multiple workers, each Worker machine will need this setting entered in order to ensure all workflows can run regardless of which Worker they are sent to.

## Workflow Execution Permissions *NEW to 10.5!*

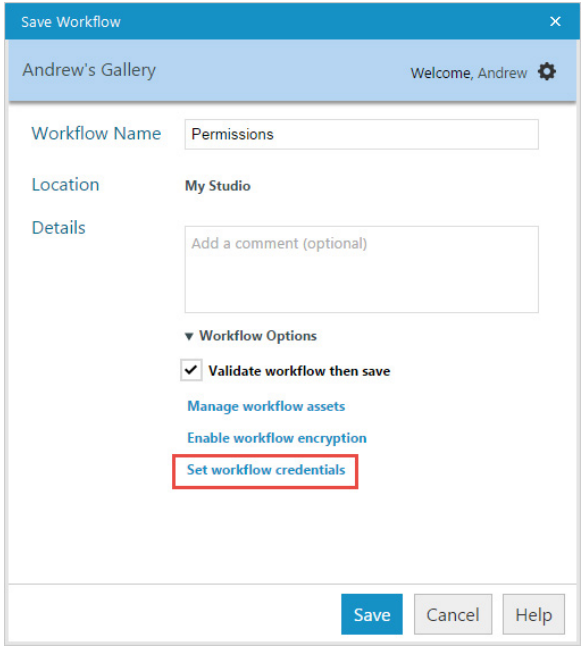
New with 10.5 is the ability to pre-set credentials or require a user enter their credentials at run time when uploading a workflow or an Analytic App to the Gallery.

To enable this functionality, the Gallery Curator must log in and go into the Admin section of the Gallery. From there, click on the System option on the left. You'll see the option for "Default behavior for workflow credentials".



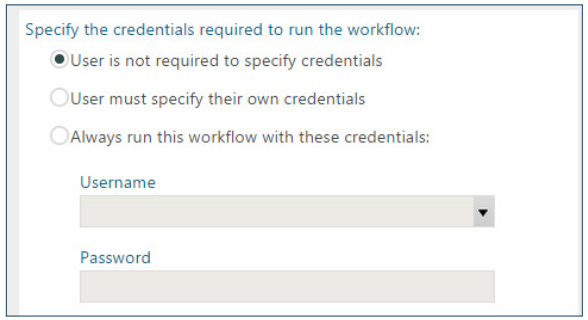

You can choose from:

1. Always run workflows with server or studio default credentials
2. Require users to enter their own credentails when running any workflow
3. Allow users to set options for credentials when saving a workflow




If option 3 is selected, when a user is saving a workflow or app to the Gallery, an additional option will be available under "workflow options" in the saving dialog box:

Clicking this link will take the user to the options to specify any credential requirements for their workflow:




**User is not required to specify credentials:** This option will set the workflow to run as the default credentials for the studio or server.

**User must specify their own credentials:** Users will be prompted to enter their credentials when they run the workflow

**Always run this workflow with these credentials:** The workflow will always run using the credentials specfied.

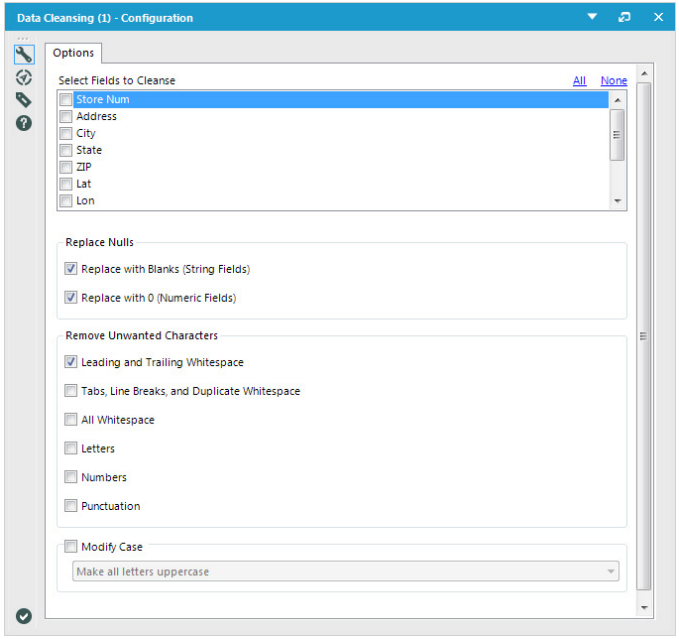


# Tool Spotlight

# Data Cleansing tool *NEW to 10.5!*

This new tool allows you to perform basic data cleansing operations on incoming data such as, replacing null values, removing whitespace and other characters that are not wanted, and convert strings to upper or lower case. The Data Cleansing tool can be found in the Preparation tool set as well as the Favorites. It combines several common cleansing tasks into a single interface making cleaning up your data much faster and easier, especially for the new user.

**The setup for this tool is very simple:**




From the top down, first select the fields that you would like to clean up. Once you have your fields selected it's a simple matter of choosing the options you want to use to cleanse your dataset. Replacing nulls has a different option for string vs numeric fields. Select any unwanted characters you wish to remove, and then select the case you'd like to change you string fields to. You can mix and match your choices and select all or none from a given section.



# Field Info

The Field Info tool allows the user to see, in tabular form, the name of fields within a data stream as well as the field order, field type, and field size. A typical user scenario is to combine with the Test tool to validate a schema is correct before doing scheduled processing.

This tool has no configuration. Simply connect your input stream to the input anchor and it will output the details of that data stream. Note that this tool does not output your original data.

The Field Info tool can be used for any number of things. At face value this tool is very simple however because it is so simple and the output is the same every time, the information it provides can be used in many different ways.

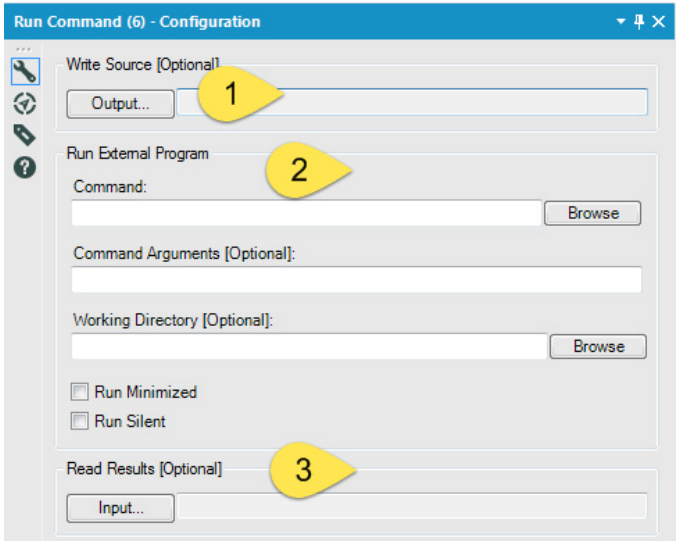
Sample output:

| Name | Type | Size | Scale | Source | Description |
|---|---|---|---|---|---|
| LOCATION | String | 45 | [Null ] | File...\SampleData\Sample.csv | |
| SIZE | Double | 8 | [Null] | File...\SampleData\Sample.csv | |
| VALUE | Int32 | 4 | [Null] | File...\SampleData\Sample.csv | |
| REVENUE | FixedDecimal | 6 | 2 | Formula:TONUMBER([REVENUE]) | |
| ADULTCY | Int32 | 4 | [Null] | Allocate: Software\Alteryx\Portfolio\6.30\Alteryx_US_AGS_07A | Basic Variables Current Year Estimates (2007) Adult Population |
| SPATIALOBJECT | SpatialObj | 536870911 | [Null] | Geocoder: PortfolioExplorer_Tele Atlas Q3 2007 US | |

# Run Command

The Run Command Tool is a very powerful tool in the Developer Tool Set. It allows the user to run external command programs within Alteryx. This tool can be used as an Input, Output or as a pass through, intermediary tool.

To properly understand the tool, let's take a look at the Configuration.




1. It seems odd that the '**Output**' would be at the top of the tool configuration. If we look at this with a top down approach, we then understand that the first thing the tool can do is output data. This is because many external command prompt programs need additional data. Since Alteryx stores data in memory, the Run Command cannot access it unless it is a file, hence the 'Output' option.

2. After the **Output**, we specify the actual external program to in the **Command**, next, we have the option to specify any Command Arguments, or parameters for this tool. If an Output is specified in the Output option, you would generally call this information here.

   Next, we have the ability to specify the directory where we are running the external program.

   The next two options are highly recommended. If 'Run Minimized' is selected, the actual command prompt will stay minimized at runtime. If 'Run Silent' is selected, you will never see the actual command prompt pop up.

3. Finally, if the external program created an additional file, you can specify this file in your 'Read Results' section. This will be output to your Alteryx data stream where you can continue your processing.



# DateTime Tool and DateTime Based Calculations

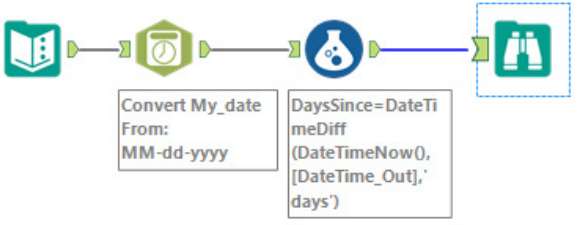
If your data is already formatted as YYYY-MM-DD then Alteryx will most likely read that field in as a Date; however, one of the most common issues with a Date field is that most often the source data reads Dates as a String Field because it is not in the proper format. Alteryx can only do calculations with dates if the field is a true Date/Time Field. String based Date fields require a special conversion tool called the DateTime Tool.

Common Mistakes:

1. Taking your unformatted date into a Select Tool and changing the field type to Date, his will result in *null* values.

2. Setting the new field that will hold the results of the date calculation as DateTime when the result is a number, i.e. calculating the number of days, the new field should be number.

In this example, we are converting the string date in to a Date type with the DateTime Tool and with the formula tool calculating the number of days between my date and today, the result will be a number.



# Multi Field Formula Tool

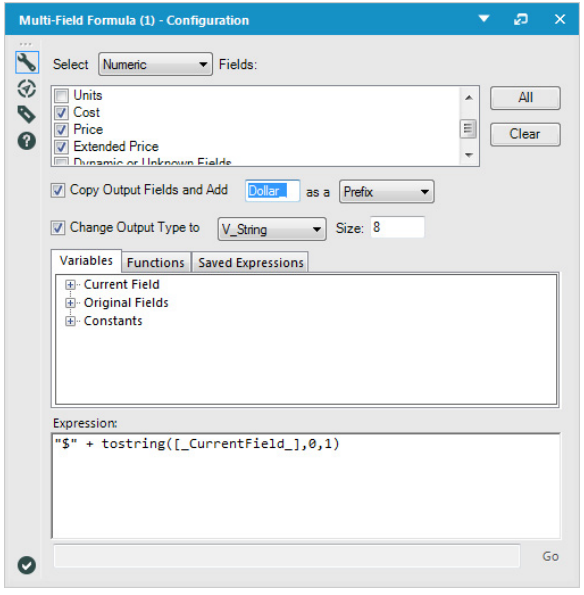

The Multi Field Formula tool makes it easy to execute a single function on multiple fields.

It will present you with a list of fields to select. You can either select numeric or text fields. These are the fields that the formula will manipulate, all other fields will remain untouched. This does NOT function as a select tool removing fields from the data stream.

You have the option to overwrite the existing fields or to create new fields. If you decide to copy the fields, you will have the option to change the field names by adding a prefix or suffix.

You also have the option to change the output type. This is convenient if you are converting dates to strings, or numbers to strings to format them.

Selecting [_CurrentField_] under the variables will modify all of the selected fields. You also have the option to use specific fields.



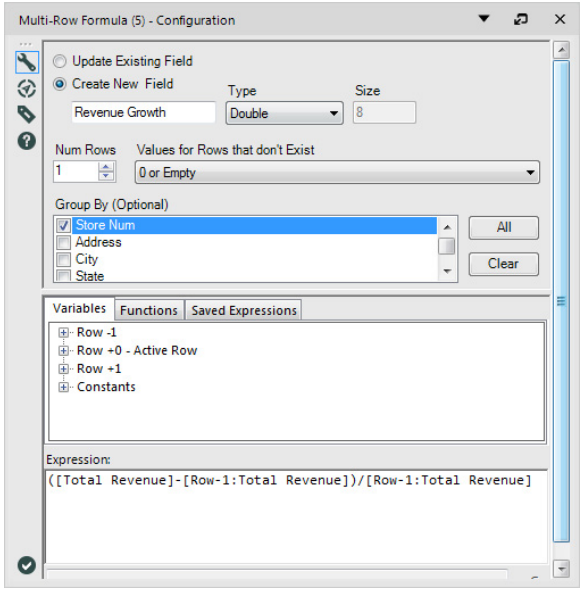

In this example, the fields Cost, Price, and Extended Price are being changed to text fields, with a "$" symbol and separating commas added to the number. E.g. 463956 is changed to $463,956.

This tool is also convenient if you are working with data that was manually entered by user as it lets you perform data cleaning actions (e.g. TRIM()) on all of your fields.

See also the help section for the Multi Field Formula.

# Multi Row Formula Tool


The Multi-Row Formula tool takes the concept of the Formula Tool a step further, allowing the user to utilize row data as part of the formula creation. This tool is useful for parsing complex data, and creating running totals, averages, percentages and other mathematical calculations.




Assuming that the data is sorted correctly, the below example will calculate Revenue Growth by Store and create a new column for the percentages.

See also the help section for the **Multi Row Formula**.

# Combined Multi Row and Multi Field Formula Tool Example

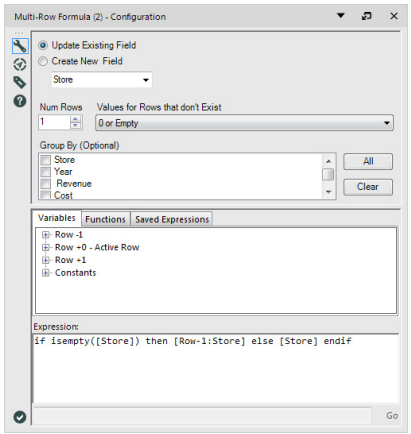
Results - Text Input (1) - Output

4 of 4 Fields | Cell Viewer | 16 records displayed

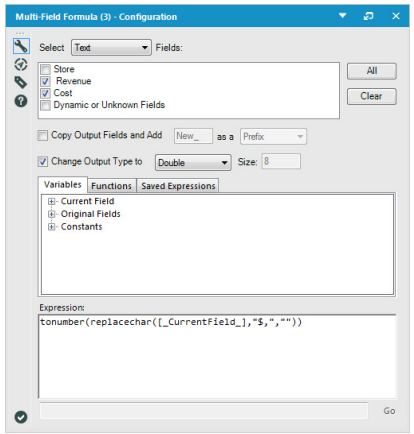
| Record # | Store | Year | Revenue | Cost |
|---|---|---|---|---|
| 1 | Store A | 2013 | $256 | $128 |
| 2 | [Null] | 2014 | $238 | $119 |
| 3 | [Null] | 2015 | $589 | $295 |
| 4 | [Null] | 2016 | $2 | $1 |
| 5 | Store B | 2013 | $3,698 | $1,849 |
| 6 | [Null] | 2014 | $3,589 | $1,795 |
| 7 | [Null] | 2015 | $7,589 | $3,795 |
| 8 | [Null] | 2016 | $265 | $133 |
| 9 | Store C | 2013 | $123 | $62 |
| 10 | [Null] | 2014 | $125 | $63 |

Have you ever seen data like this and wanted to bring the Store forward to fill in the blanks?

The multi-row formula is your friend! This function will populate the whole store column for you.




But wait! The revenue and cost fields don't look too pretty either...Let's use the Multi Field Formula to clean them up.




The results: Pretty Data!

Results - Multi-Field Formula (3) - Output

4 of 4 Fields | Cell Viewer | 16 records displa

| Record # | Store | Year | Revenue | Cost |
|---|---|---|---|---|
| 1 | Store A | 2013 | 256 | 128 |
| 2 | Store A | 2014 | 238 | 119 |
| 3 | Store A | 2015 | 589 | 295 |
| 4 | Store A | 2016 | 2 | 1 |
| 5 | Store B | 2013 | 3698 | 1849 |
| 6 | Store B | 2014 | 3589 | 1795 |
| 7 | Store B | 2015 | 7589 | 3795 |
| 8 | Store B | 2016 | 265 | 133 |
| 9 | Store C | 2013 | 123 | 62 |
| 10 | Store C | 2014 | 125 | 63 |

# New To 10.5

# File Packaging *NEW to 10.5!*

With the release of 10.5 comes a new file type (.yxi). This file type is not available to be saved to from the Designer, but rather is a more efficient way for us to package our tool downloads in the Macro District to make it easier for users to install.

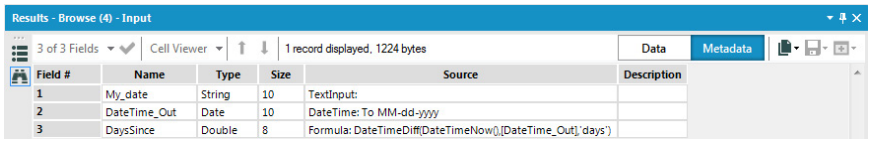
The .yxi file type is just a zip file of the files needed for the tool. This file format allows users to install tools without needing Admin rights as it installs the tools to a local directory (C:\users\username\AppData\Roaming\Alteryx\Tools).

Finally, because it is a zip file, it allows us to package multiple tools in a single file. Look for this set up in updates to complimentary tools.

# Metadata added to Browse Everywhere

Prior to 10.5, the metadata for data going in and out of a specific tool was displayed in the Configuration window, field name, type, size, source and description was displayed. This metadata for data going into a tool was also displayed when clicking on the connector between tools.

Starting with 10.5, the metadata is available in the Results Window a.k.a. Browse everywhere after the workflow executes. Click the Metadata button to view the tool's metadata in the Results window. Metadata includes the field names, data type, size, source, and description. The Source field contains the tool or file the field came from and may also contain additional information such as a specific installed dataset.




| Field # | Name | Type | Size | Source | Description |
|---|---|---|---|---|---|
| 1 | My_date | String | 10 | TextInput: | |
| 2 | DateTime_Out | Date | 10 | DateTime: To MM-dd-yyyy | |
| 3 | DaysSince | Double | 8 | Formula: DateTimeDiff(DateTimeNow(),[DateTime_Out],'days') | |

# Tool Overview

## In/Out

| | | | |
|---|---|---|---|
| Browse | Review your data at any point in the work flow. | Date Time Now | Input the current date and time at module runtime, in a format of the user's choosing. (Useful for adding a date-time header to a report.) |
| Directory | Input a list of file names and attributes from a specified directory. | Input | Bring data into your module by selecting a file or connecting to a database (optionally, using a query). |
| Input SPSS | This Macro is part of the Macro District.<br><br>The SPSS Input tool reads an SPSS .sav data file into Alteryx. This tool supports SPSS variable labels, unlike the standard Input Data tool. | Map Input | Manually draw or select map objects (points, lines, and polygons) to be stored in the workflow. |
| Output Data | Output the contents of a data stream to a file or database. | Output Model | This Macro is part of the Predictive District<br><br>Write to disk either a native R binary file or PMML file an R model object. |
| Text Input | Manually add data which will be stored in the workflow. | XDF Input | This tool enables access to an XDF format file (the format used by Revolution R). |
| XDF Output | This tool reads an Alteryx data stream into an XDF format file (the file format used by Revolution R). | | |

## Preparation

| | | | |
|---|---|---|---|
| Auto Field | Automatically set the field type for each string field to the smallest possible size and type that will accommodate the data in each column. | Create Samples | Split the data stream into two or three random samples with a specified percentage of records in the estimation and validation samples. If the total is less than 100%, the remaining records fall in the holdout sample. |

| | | | |
|---|---|---|---|
| Data Cleansing | Perform basic data cleansing operations on incoming data. Replace null values with real value, remove whitespace and other characters that do not belong in fields, and convert strings to uppercase or lowercase. | Date Filter | Easily filter data based on a date criteria using a calendar based interface. |
| Filter | Query records based on an expression to split data into two streams, True (records that satisfy the expression) and False (those that do not). | Formula | Create or update fields using one or more expressions to perform a broad variety of calculations and/or operations. |
| Generate Rows | Create new rows of data. Useful for creating a sequence of numbers, transactions, or dates. | Imputation | Update specific values in a numeric data field with another selected value. Useful for replacing NULL() values. |
| Multi-Field Binning | Group multiple numeric fields into tiles or bins, especially for use in predictive analysis. | Multi-Field Formula | Create or update multiple fields using a single expression to perform a broad variety of calculations and/or operations. |
| Multi-Row Formula | Create or update a single field using an expression that can reference fields in subsequent and/or prior rows to perform a broad variety of calculations and/or operations. Useful for parsing complex data and creating running totals. | Oversample Field | Sample incoming data so that there is equal representation of data values to enable effective use in a predictive model. |
| Random % Sample | Generate a random number or percentage of records passing through the data stream. | Record ID | Assign a unique identifier to each record. |
| Sample | Limit the data stream to a number, percentage, or random set of records. | Select | Select, deselect, reorder and rename fields, change field type or size, and assign a description. |

| | | | |
|---|---|---|---|
| Select Records | Select specific records and/or ranges of records including discontinuous ranges. Useful for troubleshooting and sampling. | Sort | Sort records based on the values in one or more fields. |
| Tile | Group data into sets (tiles) based on value ranges in a field. | Unique | Separate data into two streams, duplicate and unique records, based on the fields of the user's choosing. |

## Join

| | | | |
|---|---|---|---|
| Append Field | Append the fields from a source input to every record of a target input. Each record of the target input will be duplicated for every record in the source input. | Business Match (US) | Match your business file to the Dun & Bradstreet US business file. You'll need to include a business name and address information - street address, city, state and ZIP. The tool will output the matched records and a report with a summary of the different levels of the match process. |
| Consumer-View Matching | Match your customer file to the Experian ConsumerView data.<br>The tool will output the matched records and a report with a summary of the different levels of the match process. | Find Replace | Search for data in one field from one data stream and replace it with a specified field from a different stream. Similar to an Excel VLOOKUP. |
| Fuzzy Match | Identify non-identical duplicates in a data stream. | Join | Combine two data streams based on common fields (or record position). In the joined output, each row will contain the data from both inputs. |
| Join Multiple | Combine multiple inputs based on record position or common fields. In the joined output, each row will contain the data from each input. | Make Group | Assemble pairs of matches into groups based on their relationships. Generally used with the Fuzzy Match tool. |
| Union | Combine two or more data streams with similar structures based on field names or positions. In the output, each column will contain the data from each input. | | |



## Parse

| | | | |
|---|---|---|---|
| Date Time | Transform date/time data to and from a variety of formats, including both expression-friendly and human readable formats. | RegEx | Parse, match, or replace data using regular expression syntax. |
| Text to Columns | Split the text from one field into separate rows or columns. | XML Parse | Read in XML snippets and parse them into individual fields. |

## Transform

| | | | |
|---|---|---|---|
| Arrange | Manually transpose and rearrange fields for presentation purposes. | Count Records | Count the records passing through the data stream. A count of zero is returned if no records pass through. |
| Cross Tab | Pivot the orientation of the data stream so that vertical fields are on the horizontal axis, summarized where specified. | Running Total | Calculate a cumulative sum per record in a data stream. |
| Summarize | Summarize data by grouping, summing, counting, spatial processing, string concatenation, and much more. The output contains only the results of the calculation(s). | Transpose | Pivot the orientation of the data stream so that horizontal fields are on the vertical axis. |
| Weighted Average | Calculate the weighted average of a set of values where some records are configured to contribute more than others. | | |

## In-Database Tools

| | | | |
|---|---|---|---|
| Browse In-DB | Review your data at any point in an In-DB stream. Each In-DB Browse triggers a db query and can impact performance. | Connect In-DB | Establish a database connection for an In-DB stream. |

| | | | |
|---|---|---|---|
| Data Stream In | Bring data from a standard workflow into an In-DB workflow. | Data Stream Out | Stream data from an In-DB stream to a standard workflow, with an option to sort the records. |
| Dynamic Input In-DB | Take an In-DB Connection Name and Query fields from a standard data stream and input them into an In-DB data stream. | Dynamic Output In-DB | Output information about the In-DB workflow to a standard workflow for Predictive In-DB. |
| Filter In-DB | Filter In-DB records with a Basic filter or with a Custom expression using the database's native language (e.g., SQL). | Formula In-DB | Create or update fields in an In-DB data stream with an expression using the database's native language (e.g., SQL). |
| Join In-DB | Combine two In-DB data streams based on common fields by performing an inner or outer join. | Macro Input In-DB | Create an In-DB input connection on a macro and populate it with placeholder values. |
| Macro Output In-DB | Create an In-DB output connection on a macro. | Sample In-DB | Limit the In-DB data stream to a number or percentage of records. |
| Select In-DB | Select, deselect, reorder, and rename fields in an In-DB stream. | Summarize In-DB | Summarize In-DB data by grouping, summing, counting, and more. The output contains only the result of the calculation(s). |
| Union In-DB | Combine two or more In-DB data streams with similar structures based on field names or positions. In the output, each column will contain the data from each input. | Write Data In-DB | Use an In-DB data stream to create or update a table directly in the database. |

## Reporting

| | | | |
|---|---|---|---|
| Charting | Create a chart (Area, Column, Bar, Line, Pie, etc.) for output via the Render tool. | Email | Send emails for each record with attachments or e-mail generated reports if desired. |
| Image | Add an image for output via the Render tool. | Layout | Arrange two or more reporting snippets horizontally or vertically for output via the Render tool. |
| Map Legend Builder | Recombine the component parts of a map legend (created using the Map Legend Splitter) into a single legend table, after customization by other tools. | Map Legend Splitter | Split the legend from the Report Map tool into its component parts for customization by other tools. (Generally recombined by the Map Legend Builder.) |
| Overlay | Arrange reporting snippets on top of one another for output via the Render tool. | Render | Output report snippets into presentation-quality reports in a variety of formats, including PDF, HTML, XLSX and DOCX. |
| Report Footer | Add a footer to a report for output via the Render tool. | Report Header | Add a header to a report for output via the Render tool. |
| Report Map | Create a map for output via the Render tool. | Report Text | Add and customize text for output via the Render tool. |
| Table | Create a data table for output via the Render tool. | | |

## Documentation

| | | | |
|---|---|---|---|
| Comment | Add annotation or images to the module canvas to capture notes or explain processes for later reference. | Explorer Box | Add a web page or Windows Explorer window to your canvas. |
| Tool Container | Organize tools into a single box which can be collapsed or disabled. | | |

## Spatial

| | | | |
|---|---|---|---|
|  Buffer | Expand or contract the extents of a spatial object (typically a polygon). |  Create Points | Create spatial points in the data stream using numeric coordinate fields. |
|  Distance | Calculate the distance or drive time between a point and another point, line, or polygon. |  Find Nearest | Identify the closest points or polygons in one file to the points in a second file. |
|  Generalize | Simplify a polygon or polyline object by decreasing the number of nodes. |  Heat Map | Generate polygons representing different levels of "heat" (e.g. demand) in a given area, based on individual records (e.g. customers) |
|  Make Grid | Create a grid within spatial objects in the data stream. |  Non Overlap Drivetime | Create drive time trade areas that do not overlap for a point file. |
|  Poly-Build | Create a polygon or polyline from sets of points. |  Poly-Split | Split a polygon or polyline into its component polygons, lines, or points. |
|  Smooth | Round off sharp angles of a polygon or polyline by adding nodes along its lines. |  Spatial Info | Extract information about a spatial object, such as area, centroid, bounding rectangle, etc. |
|  Spatial Match | Combine two data streams based on the relationship between two sets of spatial objects to determine if the objects intersect, contain or touch one another. |  Spatial Process | Create a new spatial object from the combination or intersection of two spatial objects. |
|  Trade Area | Define radii (including non-overlapping) or drive-time polygons around specified points. | | |

## Interface

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|  Action | Update the configuration of a workflow with values provided by interface questions, when run as an app or macro. |  Check Box | Display a check box option in an app. |
|  Condition | Test the values entered through interface questions and return a true or false statement. |  Control Parameter | Allow users to configure a Batch Macro Control Parameter. |
|  Date | Allows users to select a date. |  Drop Down | Allows users to make a single selection from a dropdown list. |
|  Error Message | Display an error message and halt processing. |  File Browse | Allow users to select a file to use as an input or output via a traditional file browse window. |
|  Folder Browse | Allow users to browse to a folder via a traditional file browse window. This tool is not supported for apps shared in the Analytics Gallery. |  List Box | Allow users to make multiple selections from a list box. |
|  Macro Input | Create an input connection on a macro, and populate it with placeholder values for debugging. |  Macro Output | Create an output connection on a macro. |
|  Map | Display an interactive map to allow the user to draw or select location objects |  Numeric Up/ Down | Allow users to choose a number from a predefined range. |
|  Radio Button | Allow users to select an option from a mutually exclusive list when used with other radio button tools. |  Text Box | Allow users to enter characters in a free form text box. |
|  Tree | Allow users to make one or more selections from an organized, hierarchical data structure. | | |

## Data Investigation

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| Association Analysis | Determine which fields in a database have a bivariate association with one another. | Contingency Table | Create a contingency table based on selected fields, to list all combinations of the field values with frequency and percent columns. |
| Distribution Analysis | The Distribution Analysis macro allows you to fit one or more distributions to the input data and compare them based on a number of Goodness-of-Fit statistics. Based on the statistical significance (p-values) of the results of these tests, the user can determine which distribution best represents the data. | Field Summary | Produce a concise summary report of descriptive statistics for the selected data fields. |
| Frequency Table | Produce a frequency analysis for selected fields - output includes a summary of the selected field(s) with frequency counts and percentages for each value in a field. | Heat Plot | Plot the empirical bivariate density of two numeric fields using color to indicate variations in the density of the data for different levels of the two fields. |
| Histogram | Provides a histogram plot for a numeric field. Optionally, it provides a smoothed empirical density plot. Frequencies are displayed when a density plot is not selected, and probabilities when this option is selected. | Importance Weights | This Macro is part of the Predictive District<br>The Importance Weight tool provides methods for selecting a set of variables to use in a predictive model based on how strongly related each possible predictor is to the target variable. |
| Pearson Correlation | Correlation (often measured as a correlation coefficient, p), indicates the strength and direction of a linear relationship between two or more random variables. | Plot of Means | Take a numeric or binary categorical (converted into a set of zero and one values) field as a response field along with a categorical field and plot the mean of the response field for each of the categories (levels) of the categorical field. |

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| | | Spearman Correlation | Assesses how well an arbitrary monotonic function could describe the relationship between two variables without making any other assumptions about the particular nature of the relationship between the variables. |
| Violin Plot | A violin plot shows the distribution of a single numeric variable, and conveys the density of the distribution based on a kernal smoother that indicates the density of values (via width) in the area in the neighborhood of the value of the numeric field. | | |

## Predictive

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| AB Analysis | Compare the percentage change in a performance measure to the same measure one year prior. | AB Controls | Match one to ten control units (e.g., stores, customers, etc.) to each member of a set of previously selected test units on the criteria such as seasonal patterns and growth trends for a key performance indicator, along with other user provided criteria. |
| AB Treatments | Determine which group is the best fit for AB testing. | AB Trend | Create measures of trend and seasonal patterns that can be used in helping to match treatment to control units (e.g., stores or customers) for A/B testing. |
| Boosted Model | Create generalized boosted regression models based on the gradient boosting methods of Friedman. It works by serially adding simple decision tree models to a model ensemble so as to minimize an appropriate loss function. | Count Regression | Estimate regression models for count data (e.g., the number of store visits a customer makes in a year), using Poisson regression, quasi-Poisson regression, or negative binomial regression. |

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|  Decision Tree | Predict a target variable using one or more predictor variables that are expected to have an influence on the target variable by constructing a set of if-then split rules that optimize a criteria. |  Forest Model | Predict a target variable using one or more predictor variables that are expected to have an influence on the target variable, by constructing and combining a set of decision tree models (an "ensemble" of decision tree models). |
|  Gamma Regression | Relate a Gamma distributed, strictly positive variable of interest (target variable) to one or more variables (predictor variables) that are expected to have an influence on the target variable. |  Lift Chart | Compare the improvement (or lift) that various models provide to each other as well as a 'random guess' to help determine which model is 'best.'<br><br>Produce a cumulative captured response chart (also called a gains chart) or an incremental response rate chart. |
|  Linear Regression | Relate a variable of interest (target variable) to one or more variables (predictor variables) that are expected to have an influence on the target variable. (Also known as a linear model or a least-squares regression.)<br><br>[Can be used with Oracle R In-DB workflows.] |  Logistic Regression | Relate a binary (yes/no) variable of interest (target variable) to one or more variables (predictor variables) that are expected to have an influence on the target variable.<br><br>[Can be used with Oracle R In-DB workflows.] |
|  MB Affinity | The MB Affinity macro takes "transaction" data and constructs a matrix where each row is a transaction and the columns are the set of "items" that could appear in the transaction. If an item was present in a transaction, it has a value of 1 in the matrix, and 0 if it did not. The matrix is then used to construct a matrix of affinity measures between different items with respect to their likelihood of being in the same transaction. |  MB Inspect | Step 2 of a Market Basket Analysis: Take the output of the MB Rules tool, and provide a listing and analysis of those rules that can be filtered on several critieria in order to reduce the number or returned rules or itemsets to a manageable number. |



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|  MB Rules | Step 1 of a Market Basket Analysis: Take transaction oriented data and create either a set of association rules or frequent itemsets. A summary report of both the transaction data and the rules/itemsets is produced, along with a model object that can be further investigated in an MB Inspect tool. |  Model Coefficients | This Macro is part of the Predictive District<br><br>In some situations a user may be interested in extracting the model coefficients from a standard Alteryx Count, Gamma, Linear, or Logistic Regression model either to create customized reports, or to use in downstream calculations (a process which can be error prone, and for which the Score tool typically provides a safer and more reliable solution). The output of the tool is a data stream that contains a table of model coefficient names and values. |
|  Model Comparison | This Macro is part of the Predictive District.<br><br>The Model Comparison macro compares the performance of one or more different predictive models based on the use of a validation (or test) data set. It generates a report, a table of basic error measurements, and a table of prediction results for each model. |  Naive Bayes Classifier | Create a binomial or multinomial probabilistic classification model of the relationship between a set of predictor variables and a categorical target variable. The Naive Bayes classifier assumes that all predictor variables are independent of one another and predicts, based on a sample input, a probability distribution over a set of classes, thus calculating the probability of belonging to each class of the target variable. |
|  Nested Test | Examine whether two models, one of which contains a subset of the variables contained in the other, are statistically equivalent in terms of their predictive capability. |  Network Analysis | Create an interactive visualization of a network, along with summary statistics and distribution of node centrality measures. |

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|  Neural Network | Create feedforward perceptron neural network model with a single hidden layer. The neurons in the hidden layer use a sigmod activation function, and the output activation function depends on the nature of the target field. |  Score | Calculate a predicted value for the target variable in the model. This is done by appending a 'Score' field to each record in the output of the data stream, based on the inputs: an R model object (produced by the Logistic Regression, Decision Tree, Forest Model, or Linear Regression) and a data stream consistent with the model object (in terms of field names and the field types).<br><br>[Can be used with Oracle R In-DB workflows.] |
|  Spline Model | Predict a variable of interest (target variable) based on one or more predictor variables using the two-step approach of Friedman's multivariate adaptive regression (MARS) algorithm.<br><br>The Spine model is useful for a multitude of classification and regression problems and can automatically select the most appropriate model with minimal input from the user. |  Stepwise | Determine the "best" predictor variables to include in a model out of a larger set of potential predictor variables for linear, logistic, and other traditional regression models.<br><br>The Alteryx R-based stepwise regression tool makes use of both backward variable selection and mixed backward and forward variable selection. |
|  Support Vector Machine | Support Vector Machines (SVM) is a popular supervised learning algorithms for classification problems, and are meant to accommodate instances where the data (i.e., observations) is considered linearly non-separable. It can also apply to Regression problems. |  Survival Analysis | This Macro is part of the Predictive District.<br><br>The Survival Analysis macro implements common methods of survival analysis. The specific methods implemented are the Cox Proportion Hazards Kaplan-Meier models. |

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|  Survival Score | This Macro is part of the Predictive District<br><br>Survival Score provides both the estimated relative risk and restricted mean survival time based on a Cox proportional hazards model. |  Test of Means | Compare the difference in mean values (using a Welch two sample t-test) for a numeric response field between a control group and one or more treatment groups. |
|  Variance Inflation Factors | This Macro is part of the Predictive District.<br><br>The Variance Inflation Factors produces a coefficient summary report that includes either the variance inflation factor (or VIF) or a generalized version of the VIF (GVIF) for all variables except the model intercept. | | |

## Time Series

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|---|---|---|---|
|  ARIMA | Estimate a univariate time series forecasting model using an autoregressive integrated moving average (or ARIMA) method. |  ETS | Estimate a univariate time series forecasting model using an exponential smoothing method. |
|  TS Compare | Compare one or more univariate time series models created with either the ETS or ARIMA tools. |  TS Covariate Forecast | Provide forecasts from an ARIMA model that uses covariates. The number of periods to forecast is determined by the number of periods of covariate data provided. |
|  TS Filler | Fill in date or datetime gaps in a time series, with null values for all remaining columns. |  TS Forecast | Provide forecasts from either an ARIMA or ETS model for a specific number of future periods. Provide forecasts from either an ARIMA or ETS model for a specific number of future periods. |
|  TS Plot | Create a number of different univariate time series plots, to aid in the understanding the time series data and determine how to develop a forecasting model. | | |

## Predictive Grouping

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|---|---|---|---|
| Append Cluster | Appends the cluster assignments from a K-Centroids Cluster Analysis tool to a data stream containing the set of fields (with the same names, but not necessarily the same values) used to create the original cluster solution. | Find Nearest Neighbor | Find the selected number of nearest neighbors in the "data" stream that corresponds to each record in the "query" stream based on their Euclidean distance. |
| K-Centroids Analysis | Partition records into "K groups" around centroids by assigning cluster memberships, using K-Means, K-Medians, or Neural Gas clustering. | K-Centroids Diagnostics | Assess the appropriate number of clusters to specify, given the data and the selected Predictive Grouping algorithm (K-Means, K-Medians, or Neural Gas). |
| Multidimen-sional Scaling | This Macro is part of the Predictive District<br>Multidimensional Scaling (or MDS) is a method of separating univariate data based upon variance. Conceptually, MDS takes the dissimilarities, or distances, between items described in the data and generates a map between the items. | Principal Components | Reduce the dimensions (number of numeric fields) in a database by transforming the original set of fields into a smaller set that accounts for most of the variance (i.e., information) in the data. The new fields are called factors, or principal components. |

## Connectors

| | | | |
|---|---|---|---|
| Adobe Analytics | Generate on demand report data from your Adobe Analytics report suites. | Amazon S3 Download | Read CSV, DBF and YXDB files from Amazon S3. |
| Amazon S3 Upload | Write CSV, DBF and YXDB files to Amazon S3. | Azure ML Text Analytics | Utilize the Cortana Analytics Text Analytics API to apply sentiment analysis and key phrase extraction to your free text fields. |
| Download | Retrieve data from a specified URL, including an FTP site, for use in a data stream. | Foursquare Search | Search the Foursquare Venues API by a location, with multiple options to enhance the returned data. |
| Google Analytics | Query and download data from Google Analytics' Core Reporting API with multiple configuration options. | Google Sheets Input | Allows you to download data from a Google Sheets spreadsheet. |
| Google Sheets Output | Allows you to publish data into a Google Sheets spreadsheet. | Marketo Append | Efficiently retrieve, select and join Marketo records based on values supplied in an incoming data stream. |
| Marketo Input | Read lead and lead activity records from Marketo based on specified parameters. | Marketo Output | Write data to the Marketo database. |
| MongoDB Input | Read and query data from a MongoDB database. MongoDB is a scalable, high-performance, open source NoSQL database. | MongoDB Output | Write data to a MongoDB database. MongoDB is a scalable, high-performance, open source NoSQL database. |
| Publish to Power BI | Publish to Power BI to transform your Alteryx workflows into powerful visualizations in the cloud. | Publish to Tableau Server | Publish data to an instance of Tableau Server or Tableau Online. |
| Salesforce Input | Read and query data from Salesforce.com. | Salesforce Output | Write data to Salesforce.com. |
| SharePoint List Input | Read a list from SharePoint. | SharePoint List Output | Write data to a list in SharePoint. |
| Twitter Search | Search tweets of the last 7 days by given search terms. | | |

## Address

| | | | |
|---|---|---|---|
|  CASS | Standardize address data to conform to the U.S. Postal Service CASS (Coding Accuracy Support System) or Canadian SOA (Statement of Accuracy). |  Parse Address | Parse a single address field into different fields for each component part such as: number, street, city, ZIP. Consider using the CASS tool for better accuracy. |
|  Street Geocoder | Determine the coordinates (Latitude and Longitude) of an address and attach a corresponding spatial object to your data stream. Consider using the U.S. Geocoder or Canadian Geocoder macros for better accuracy. |  US Geocoder | Determine the coordinates (Latitude and Longitude) of an address and attach a corresponding spatial object to your data stream. Uses multiple tools to produce the most accurate answer. |
|  US ZIP9 Coder | Determine the coordinates (Latitude and Longitude) of a 5, 7, or 9 digit ZIP code. | | |

## Demographic Analysis

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|  Allocate Append | Append demographic variables to your data stream from the installed dataset(s). |  Allocate Input | Input geographies and demographics into a data stream from the installed dataset(s). |
|  Allocate Metainfo | Input demographic descriptions and unabbreviated variable names (“popcy” is displayed as “population current year”) from the installed dataset(s). |  Allocate Rename | Dynamically rename all selected demographic data fields using fields from the Allocate Metainfo tool. |
|  Allocate Report | Create pre-formatted reports associated with Allocate data from the installed dataset(s). | | |

## Behavior Analysis

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|---|---|---|---|
|  Behavior Metainfo | Input behavior cluster names, IDs and other meta info from an installed dataset. |  Cluster Code | Append a behavior cluster code to each record in the incoming stream. |
|  Compare Behavior | Compare two behavior profile sets to output a variety of measures such as market potential index, penetration, etc. |  Create Profile | Create behavior profiles from cluster information in an incoming data stream. |
|  Detail Fields | Split a behavior profile set into its individual clusters and details. |  Profile Input | Input a behavior profile set from an installed dataset or external file. |
|  Profile Output | Output a profile set (*.scd file) from behavior profile sets in an incoming data stream. Generally only used when using the standalone Solocast desktop tool. |  Report: Rank | Generate a rank report from a set of behavior profiles for output via the Render tool. |
|  Report: Comparison | Generate a comparison report from two behavior profile sets for output via the Render tool. |  Report: Detail | Generate a detailed report from a behavior profile set for output via the Render tool. |

## Calgary

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|---|---|---|---|
|  Calgary Input | Input data from the Calgary database file with a query |  Calgary Join | Query a Calgary database dynamically based on values from an incoming data stream. |
|  Calgary Loader | Create a highly indexed and compressed Calgary database which allows for extremely fast queries. |  Cross Count | Find the counts of predefined sets of values that occur in a Calgary database file. |
|  Cross Count Append | Find the counts of sets of values (from the incoming data stream) that occur in a Calgary database file. | | |

## Developer

| | | | |
|---|---|---|---|
|  API Output | Return the results of a data stream directly to an API callback function. For use with custom application development. |  Base64 Encoder | Issues a Base64 encode string. |
|  BlobConvert | Convert a Binary Large Object (Blob) to a different data type or convert a data type to a Blob. |  BlobInput | Read a Binary Large Object (Blob) such as an image or media file, by browsing directly to a file or passing a list of files to read. |
|  BlobOutput | Writes out each record as a Binary Large Object (Blob) into its own file. |  Block Until Done | Stop downstream processing until the very last record has arrived, to ensure that only a single output stream processes records at one time. Or, ensure that the reading of a file will be closed before overwriting is attempted. |
|  Detour | Bypass a set of tools. Must end in an Output or Detour End tool. Generally used for authoring an Analytic App or Macro. |  Detour End | Ends a section of tools bypassed by a Detour. Generally used for authoring an Analytic App or Macro. |
|  Dynamic Input | Read from input files or databases at runtime using an incoming data stream to dynamically choose the data. Allows for dynamically generated queries. |  Dynamic Rename | Dynamically (using data from an incoming stream) rename fields. Useful when applying custom parsing to text files. |
|  Dynamic Replace | Replace data values in a series of fields (using a dynamically specified condition) with expressions or values from an incoming stream. |  Dynamic Select | Select or de-select fields by field type or an expression. |
|  Field Info | Output the schema (field types and names, etc.) of a data stream. |  JSON Parse | Separate Java Script Object Notation text into a table schema for the purpose of downstream processing. It can be built back up into usable JSON format by feeding the output into the JSON Build tool. (For JSON Build, see the Laboratory section.) |



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|  Message | Write log messages to the Output Window. Generally used in authoring macros. |  R | Execute an R language script and link incoming and outgoing data from Alteryx to R, an open-source tool used for statistical and predictive analysis. |
|  Run Command | Run external programs as part of an Alteryx process. |  Test | Test assumptions in a data stream. |
|  Throttle | Slows down the speed of the downstream tool by limiting the number of records that are passed through the Throttle tool. |  X-Ray Browse | This Macro is part of the Macro District.<br>Designed primarily for developing & debugging macros, the X-Ray Browse enables you to pick a location within a macro under development, to view the data passing through said macro at said location. The effect is similar to a Browse tool, but the data is made viewable through the encapsulating "skin" of the macro being developed. |

## Laboratory

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|---|---|---|---|
|  Basic Data Profile | Output basic metadata such as data type, min, max, average, number of missing values, etc. |  Charting | Preview an example of upcoming Alteryx reporting functionality. (Requires 64-bit installation) |
|  JSON Build | Take the table schema of the JSON Parse tool and build it back into properly formatted Java Script Object Notation. |  Make Columns | Arrange a group of items horizontally or vertically into multiple columns. |
|  Transpose In-DB | Pivot the orientation of the In-DB data stream so that horizontal fields are on the vertical axis. | | |