Analytics Data Integration Guide

Salesforce, Summer '19

@salesforcedocs

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CONTENTS

INTEGRATE YOUR DATA IN ANALYTICS

You can integrate Salesforce data and external data into Analytics to enable users to explore and visualize the data with explorer and designer. *External data* is data that resides outside of Salesforce, such as data from outside applications and spreadsheets.

When you load data into Analytics, you load it into datasets. A dataset is a collection of related data that is stored in a denormalized, yet highly compressed form. You can prepare data in a dataset to combine data from different sources, calculate new values, and clean data.

You can use these tools to create datasets in Analytics.

	Dataflow	Connections	CSV Upload Wizard	Analytics Connector for Excel	External Data API	Recipe
Data source	Salesforce objects; existing datasets; connected data	Salesforce objects; external data	External data	Microsoft Excel	External data	Existing datasets; connected data
Load data	Yes	Yes	Yes	Yes	Yes	No
Prepare data	Yes	No	No	No	Yes	Yes
Graphical user interface	Yes (dataflow editor)	Yes	Yes	Yes	No (programmatic access)	Yes
Preview data	No	Yes	Yes	Yes	No	Yes
Refresh data	Schedule	Schedule	Manual	Manual	Manual	Schedule

IN THIS SECTION:

Get to Know Datasets

A dataset is a collection of related data that is stored in a denormalized, yet highly compressed form.

Analytics applies one of the following types to each dataset field:

Date
A *date* can be represented as a day, month, year, and, optionally, time. You can group, filter, and perform math on dates.

Dimension
A *dimension* is a qualitative value that usually contains categorical data, such as Product Category, Lead Status, and Case Subject. Dimensions are handy for grouping and filtering your data. Unlike measures, you can't perform math on dimensions. To increase query performance, Analytics indexes all dimension fields in datasets.

Measure
A *measure* is a quantitative value that contains numerical data like revenue and exchange rate. You can do math on measures, such as calculating the total revenue and minimum exchange rate.

For each dataset that you create, you can apply row-level security to restrict access to records in the dataset.

Attention: Before you create a dataset, verify that the source data contains at least one value in each column. Columns with all null values won't be created in datasets and can't be referenced in dataflows, lenses, or dashboards. Consider providing a default value for null values, like "n/a" or "empty."

IN THIS SECTION:

Numeric-Value Handling in Datasets

Analytics internally stores numeric values in datasets as long values. For example, it stores the number "3,200.99" with a scale of "2" as "320099". The user interface converts the stored value back to decimal notation to display the number as "3200.99."

The maximum numeric value that can be stored in a dataset is 36,028,797,018,963,967 and the minimum numeric value is -36,028,797,018,963,968.

Warning: If a numeric value is not within this range, you might receive unexpected results. For example, if you try to load the value 3.7E-16 with a scale of 16 into a dataset, Analytics tries to store the value as 37000000000000000. However, because this value exceeds the maximum, Analytics fails to load the entire record. In addition, if you perform a query that aggregates measures—like sum or group by—and the resulting value exceeds the maximum, the value overflows and Analytics returns an incorrect result.

Date Handling in Datasets

When Analytics loads dates into a dataset, it breaks up each date into multiple fields, such as day, week, month, quarter, and year, based on the calendar year. For example, if you extract dates from a `CreateDate` field, Analytics generates date fields such as `CreateDate_Day` and `CreateDate_Week`. If your fiscal year differs from the calendar year, you can enable Analytics to generate fiscal date fields as well.

Analytics generates the following date fields.

Field Name	Field Type	Description
<date field name>_Second	Text	Number of seconds. If the date contains no seconds, value is '0.'
<date field name>_Minute	Text	Number of minutes. If the date contains no minutes, value is '0.'
<date field name>_Hour	Text	Number of hours. If the date contains no hours, value is '0.'
<date field name>_Day	Text	Day of the month.
<date field name>_Week	Text	Week number in calendar year.
<date field name>_Month	Text	Month number in calendar year.
<date field name>_Quarter	Text	Quarter number in calendar year.
<date field name>_Year	Text	Calendar year.
<date field name>_Week_Fiscal	Text	Week number in fiscal year.
<date field name>_Month_Fiscal	Text	Month number in fiscal year.
<date field name>_Quarter_Fiscal	Text	Quarter number in fiscal year.
<date field name>_Year_Fiscal	Text	Fiscal year.
<date field name>_sec_epoch	Numeric	Number of seconds that have elapsed since January 1, 1970 (midnight UTC).
<date field name>_day_epoch	Numeric	Number of days that have elapsed since January 1, 1970 (midnight UTC).

You can set metadata attributes to control how dates are loaded into datasets and to enable Analytics to generate fiscal date fields. You set the metadata attributes in the sfdcDigest transformation parameters for Salesforce data or in the metadata file for external data.

Important: Before loading dates from an external data file, ensure that you review the date format requirements here. Also, ensure that the column names in the external data file do not conflict with the generated date field names. For example, if you load a CSV with column `Create_Date`, Analytics generates the `Create_Date_Year` field in the dataset. If the CSV also had a field named `Create_Date_Year`, Analytics would throw an error because the names conflict.

Fiscal Periods in Analytics

If the calendar and fiscal year differ, you can enable Analytics to generate the fiscal date fields in the dataset in addition to calendar date fields. To enable Analytics to generate fiscal date fields, set the `fiscalMonthOffset` attribute to a value other than '0'. You set this attribute for each date column for which you want to generate fiscal date fields. If you set the offset to '0' or you do not specify a value, Analytics does not generate any fiscal date fields.

Additionally, to configure the fiscal periods, set the following metadata attributes for each date column:

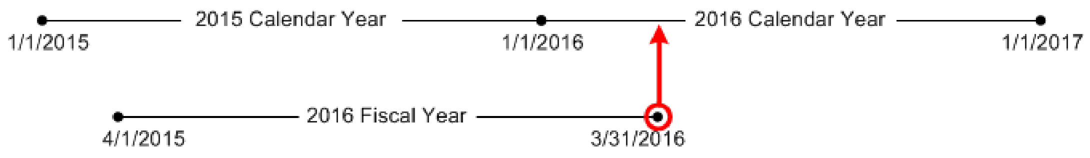
`fiscalMonthOffset`

In addition to enabling the generation of fiscal date fields, this attribute also determines the first month of the fiscal year. You specify the difference between the first month of the fiscal year and first month of the calendar year (January) in `fiscalMonthOffset`. For example, if your fiscal year begins in April, set `fiscalMonthOffset` to '3'.

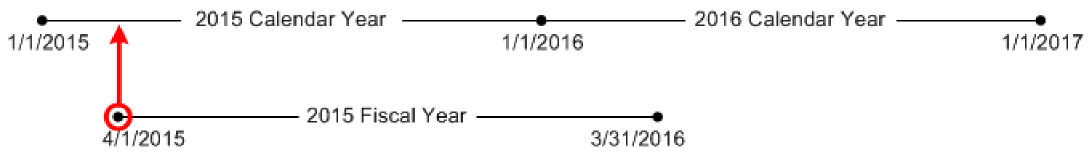
`isYearEndFiscalYear`

Because the fiscal year can start in one calendar year and end in another, you must specify which year to use for the fiscal year. The `isYearEndFiscalYear` attribute indicates whether the fiscal year is the year in which the fiscal year ends or begins.

To see how this works, let's look at a couple of examples. If `isYearEndFiscalYear` = true (or you do not specify this attribute), then the fiscal year is the year in which the fiscal year ends. As shown in the following diagram, any dates between 4/1/2015 and 3/31/2016 are part of the fiscal year 2016 because the fiscal year ends in 2016.



If `isYearEndFiscalYear` = false, then the fiscal year is the year in which the fiscal year begins. As shown in the following diagram, any dates between 4/1/2015 and 3/31/2016 are part of the fiscal year 2015 because the fiscal year begins in 2015.



Week Numbering in Analytics

For each date loaded into a dataset, Analytics generates the corresponding week number for the calendar year and, if applicable, fiscal year. Similar to the SOQL function `WEEK_IN_YEAR`, week 1 in Analytics is January 1 - January 7. (This is different from the UTC `week()` calculation.)

If needed, you can configure the week to start on a particular day of the week by setting the `firstDayOfWeek` attribute. For example, if January 1 is a Saturday and you configure the week to start on a Monday, then week 1 is January 1 - 2. Week 2 starts on Monday, January 3. Week 3 starts January 10, the following Monday. Notice that week 1 can be a short week to ensure that the subsequent weeks start on the specified day of the week.

Einstein Analytics Connector for Excel

The Salesforce Einstein Analytics Connector for Excel makes it easy to import data from Microsoft Excel 2013 to Analytics.

The Einstein Analytics Connector for Excel is available as an add-in for Excel 2013 on the desktop and Excel Online in Office 365. The Connector is available from the Office Add-In Store or your organization's private add-in catalog. After you install the Connector just point and click to import data from Excel to Analytics.

Considerations When Using theEinstein Analytics Connector for Excel

- The Einstein Analytics Connector for Excel doesn't support loading data to Salesforce orgs that use custom domains. To load Excel data to a custom domain org, save the data locally in .csv format, and then use the Analytics .csv upload tool to load the data.
- Null measure handling isn't supported when you load data using the Einstein Analytics Connector for Excel. Null measure values are replaced with zeros in the resulting dataset, even if null measure handling is enabled in your org.

SEE ALSO:

Install the Einstein Analytics Connector for Excel

Upload External Data from the User Interface

Use the upload user interface to create a single dataset based on external .csv data. To refresh the data, you can overwrite the data in the dataset by uploading a new external data file.

When Analytics loads any data into a dataset, it also adds metadata about each column of data. For example, metadata can include the field type, precision, scale, and default value.

For external data, Analytics infers metadata about each column of data in the external data file unless you specify different metadata attributes in a metadata file. A *metadata file* is a JSON file that describes the structure of an external data file. For example, you can use a metadata file to explicitly set the field type and default value for a specific column of external data. If no metadata file is provided when you upload external data, Analytics treats every column as a dimension and sets the field type to 'Text.' This impacts the type of queries that can be placed on the dataset because you can't perform mathematical calculations on dataset columns with a Text field type. You can only perform mathematical calculations on dataset columns with a Numeric field type.

After you create a dataset based on an external data file, you can edit the dataset to apply a new metadata file. This enables you to change the metadata attributes of each column.

Note: Analytics temporarily stores the uploaded CSV and metadata files for processing only. After a dataset is created, Analytics purges the files.

SEE ALSO:

Create a Dataset with External Data

External Data API

You can use the External Data API to create a single dataset based on external data in the .csv format. You can also use the API to edit the dataset by uploading a new .csv file. When you edit the dataset, you can choose to overwrite all records, append records, update records, or delete records.

For more information about the External Data API, see the *Analytics External Data API Developer Guide*.

CREATE DATASETS WITH THE DATAFLOW

You can use the dataflow to create one or more datasets based on data from Salesforce objects or existing datasets. A *dataflow* is a set of instructions that specifies what data to extract from Salesforce objects or datasets, how to transform the datasets, and which datasets to make available for querying. With a dataflow, you can manipulate the extracted data and override the metadata before you load it into a dataset. You can schedule the dataflow to run to keep the datasets up to date.

To configure the dataflow, you add transformations to the dataflow definition file. A *dataflow definition file* is a JSON file that contains transformations that represent the dataflow logic. You add transformations to determine what data to extract, how to transform datasets, and which datasets to register to make available for queries. You can edit the dataflow definition file using the visual dataflow editor, or manually using a JSON editor.

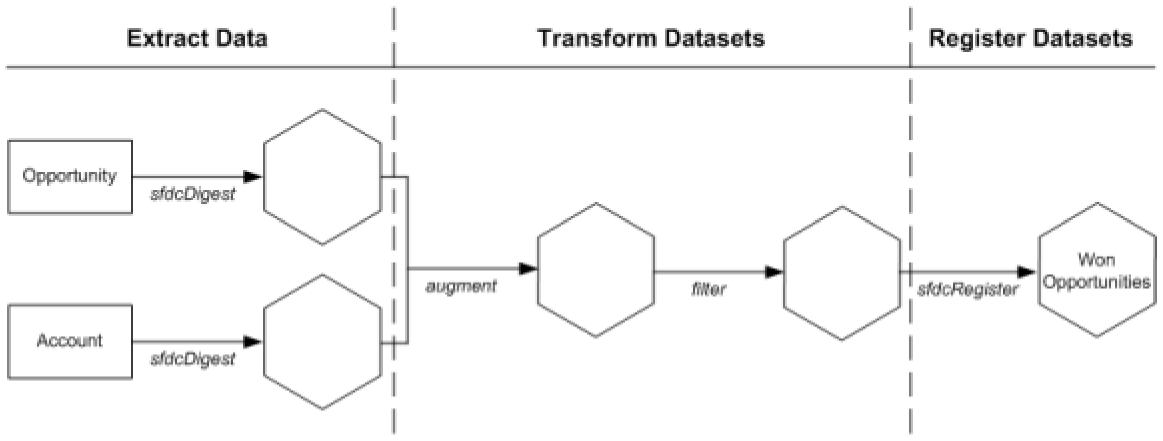
IN THIS SECTION:

Design the Dataflow

Before you start creating the dataflow, think about the dataflow design. Consider what data to make available for queries, where to extract the data from, and whether you need to transform the extracted data to get the data you want.

To illustrate some key design decisions, let's consider an example. In this example, the goal is to create a dataset called "Won Opportunities." The dataset will contain opportunity details, including the account name for each opportunity.

To create this dataset, you design the following dataflow:



The dataflow extracts opportunity data from the Opportunity object and extracts the account name from the Account object. For each extracted object, the dataflow creates a new dataset.

The dataflow then transforms the datasets created from the extracted data. First, the dataflow joins the opportunity and account data into a new dataset. Next, the dataflow filters the records based on the opportunity stage so that the dataset contains only won opportunities. Each time the dataflow transforms a dataset, it creates a new dataset.

Finally, because you want users to be able to query won opportunities only, you configure the dataflow to register the final dataset only. However, if you wanted, you could register any dataset created by the dataflow and register as many datasets as you like.

Carefully choose which datasets to register because:

- The total number of rows in all registered datasets cannot exceed 100 million rows per platform license, or 250 million per platform license *purchased before* October 20, 2015.
- Users that have access to registered datasets can query their data. Although, you can apply row-level security on a dataset to restrict access to records.

Configure the Dataflow Through the Definition File

You can configure the dataflow by adding transformations directly to the dataflow definition file.

A *dataflow definition file* is a JSON file that contains transformations that represent the dataflow logic. The dataflow definition file must be saved with UTF-8 encoding.

Before you can configure a dataflow to process external data, you must upload the external data to Analytics.

1. In Analytics, click the gear icon (⚙) and then click **Data Manager**.
2. Click the Dataflows & Recipes tab.
3. Download the existing dataflow definition file by clicking **Download** in the actions menu.

EDITIONS

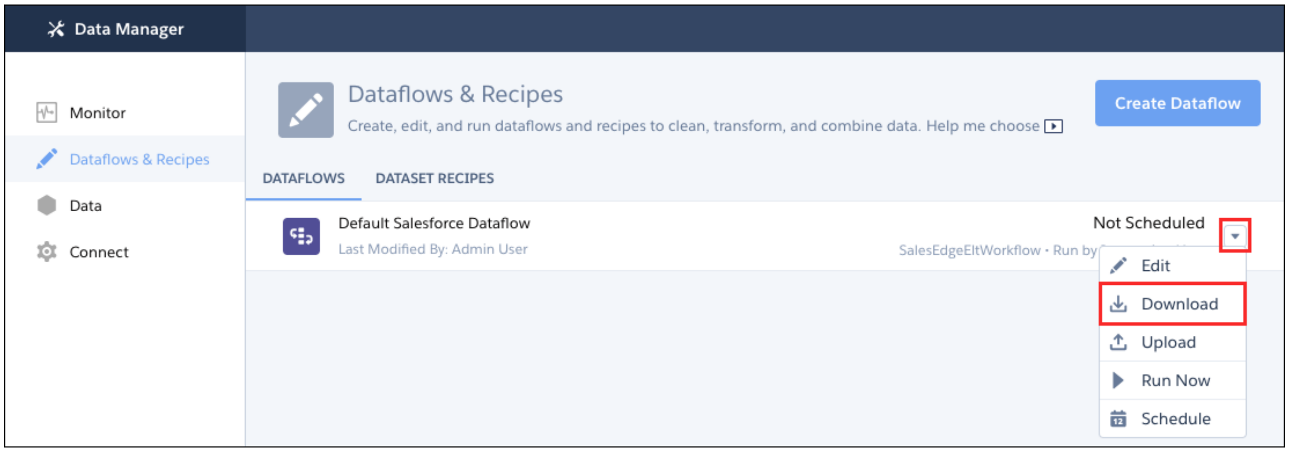
Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

To edit the dataflow definition file:

- Edit Analytics Dataflows


Data Manager
Monitor
Dataflows & Recipes
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Connect
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Create, edit, and run dataflows and recipes to clean, transform, and combine data. Help me choose
Create Dataflow
DATAFLOWS
DATASET RECIPES
Default Salesforce Dataflow
Last Modified By: Admin User
Not Scheduled
SalesEdgeEltWorkflow • Run by
Edit
Download
Upload
Run Now
Schedule

4. Make a backup copy of the existing dataflow definition file before you modify it.

   Analytics doesn't retain previous versions of the file. If you make a mistake, you can upload the previous version to roll back your changes.

5. Add each transformation as a node in the dataflow definition file, using a JSON editor.

   For example, based on the design in the previous step, you can add the following transformation nodes:

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "AccountId" },
            { "name": "OwnerId" }
         ]
      }
   },
   "Extract_AccountDetails": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Account",
         "fields": [
            { "name": "Id" },
            { "name": "Name" }
         ]
      }
   },
   "Transform_Augment_OpportunitiesWithAccountDetails": {
      "action": "augment",
      "parameters": {
         "left": "Extract_Opportunities",
         "left_key": [ "AccountId" ],
         "relationship": "OpptyAcct",
         "right": "Extract_AccountDetails",
         "right_key": [ "Id" ],
         "right_select": [
            "Name"
         ]
      }
   },
   "Transform_Filter_Opportunities": {
      "action": "filter",
      "parameters": {
         "filter": "StageName:EQ:Closed Won",
         "source": "Transform_Augment_OpportunitiesWithAccountDetails"
      }
   },
   "Register_Dataset_WonOpportunities": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "WonOpportunities",
         "name": "WonOpportunities",
         "source": "Transform_Filter_Opportunities"
      }
   }
}
```

See Transformations for Analytics Dataflows for more about each transformation and its JSON.

Note: The JSON keys and values are case-sensitive. Each bolded key in the example JSON is the node name for a transformation. Each node contains an action value, which identifies the transformation type. The order in which you add the transformations to the dataflow definition file doesn't matter. Analytics determines the order in which to process the transformations by traversing the dataflow to determine the dependencies among them.

Important: Node names must be unique in a dataflow definition file, and can't contain space or tab characters. Consider that node names are **not** treated as case sensitive, so names such as "Extract_Opportunities" and "extract_opportunities" are not unique in the same definition file.

6. Before you save the dataflow definition file, use a JSON validation tool to verify that the JSON is valid.

   An error occurs if you try to upload the dataflow definition file with invalid JSON. You can find JSON validation tools on the internet.

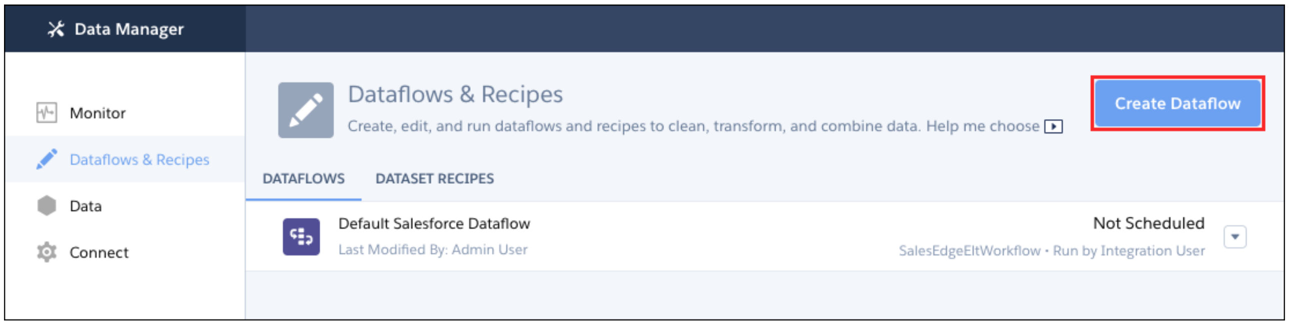
7. Save the dataflow definition file with UTF-8 encoding, and then close the file.

8. In the Dataflow view of the Monitor tab, click **Upload** from the action menu to upload the updated dataflow definition file.

   Note: Uploading the dataflow definition file does not affect any running dataflow jobs and does not automatically start the dataflow job.

You can now start the dataflow on demand or wait for it to run on the schedule. Users cannot query the registered datasets until the dataflow runs.

If you have enabled data sync, you can create multiple dataflows, in addition to the default dataflow, and configure them in the same way. Look out for the **Create Dataflow** button in the Dataflows & Recipes tab of the data manager after you enable data sync. See Optimize Your Dataflows with Data Sync.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Create Dataflow
DATAFLOWS
DATASET RECIPES
Default Salesforce Dataflow
Last Modified By: Admin User
Not Scheduled
SalesEdgeEltWorkflow • Run by Integration User

Note: If you have data sync enabled, your org can have up to 35 dataflows. This number includes the default dataflow, and app dataflows such as the Sales Analytics and Service Analytics dataflows. Keep in mind that dataflows that take longer than 2 minutes to run count towards your 24-hour dataflow run limit.

Start and Stop a Dataflow

You can manually start a dataflow job to load the data into datasets immediately. You can also stop the job while it's running.

You can run a maximum of 60 dataflow jobs during a rolling 24-hour period. For a production org with the Einstein Analytics Plus platform license, Analytics runs up to two dataflows concurrently when multiple dataflow jobs overlap. If more than two jobs overlap, Analytics puts the remaining jobs in queue. Analytics runs one job at a time in production orgs with the Einstein Analytics Growth license and sandbox orgs.

1. In Analytics, click the gear icon (⚙) and then click **Data Manager**.
   The data manager opens on the Monitor tab, with the Jobs view selected by default.
2. Click the Dataflows & Recipes tab.

EDITIONS

Available in Salesforce Classic and Lightning Experience.

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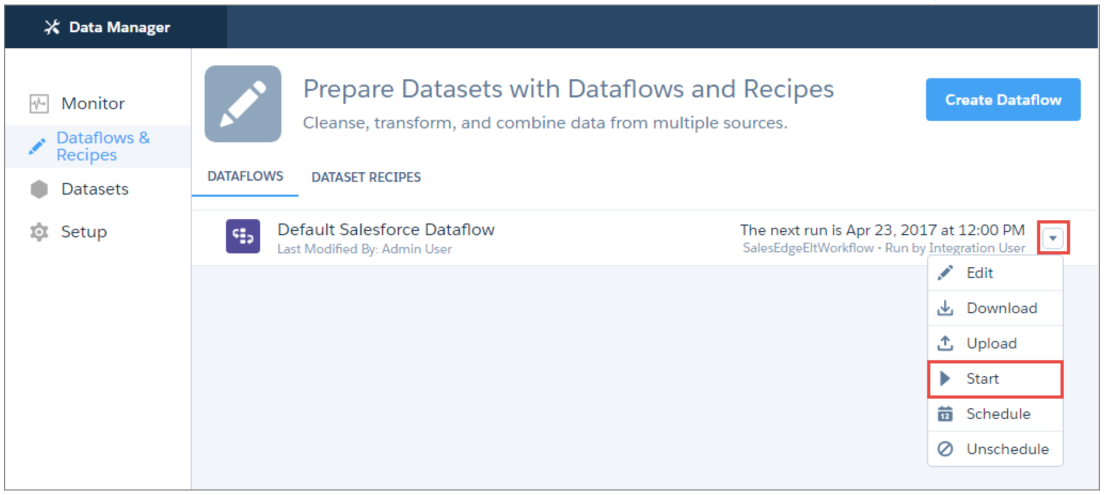
USER PERMISSIONS

To start a dataflow job:
- Edit Analytics Dataflows


Data Manager
Monitor
Dataflows & Recipes
Datasets
Setup
Prepare Datasets with Dataflows and Recipes
Cleanse, transform, and combine data from multiple sources.
Create Dataflow
DATAFLOWS
DATASET RECIPES
Default Salesforce Dataflow
Last Modified By: Admin User
The next run is Apr 23, 2017 at 12:00 PM
SalesEdgeEltWorkflow • Run by Integration User
Edit
Download
Upload
Start
Schedule
Unschedule

3. Click **Start** in the actions menu to start the dataflow job.
   The dataflow job is added to the job queue. The **Start** action is grayed out while the dataflow job runs.
4. After the job completes, Analytics sends an email notification to the user who created the dataflow.

   The email notification indicates whether the job completed successfully. It also shows job details like start time, end time, duration, and number of processed rows. If the job failed, the notification shows the reason for the failure.

   Note: If the dataflow creator is not an active user, the notification is sent to the user who last modified the dataflow schedule or definition file.
5. To stop a dataflow job that is currently running, click ✖ next to the job status.
   If you click **Start** to restart a stopped dataflow, the job starts over—the dataflow job does not resume from the point at which it was stopped.

   Note: A dataflow will automatically restart if it is forcibly terminated by an external process like patches to the OS or Maestro (specifically bifrost).

You can monitor the dataflow job on the Monitor tab to determine when the dataflow completes. After the dataflow completes successfully, refresh the Analytics home page to view the registered datasets.

Monitor a Dataflow Job

Use the Monitor tab in the data manager to monitor dataflow jobs to ensure that they complete successfully or to troubleshoot them if they fail.

The Dataflows subtab on the Monitor tab shows the status, start time, and duration of the last 10 dataflow jobs and retains the last 7 days of history. To help you troubleshoot a failed job, you can view error messages about the job, view the run-time details about every transformation that is processed, and download error logs where available.

Note: Duration is calculated as the sum of the job queue time and job run time.

EDITIONS

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USER PERMISSIONS

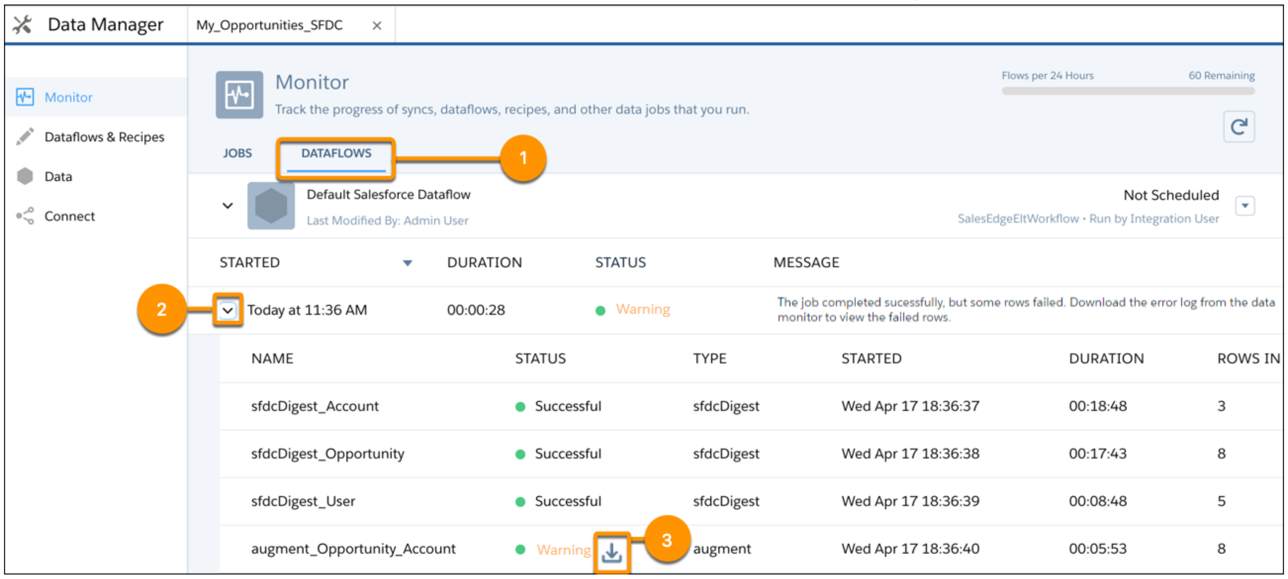
To access the monitor:

- Edit Analytics Dataflows, Upload External Data to Analytics, or Manage Analytics

To download an error log:

- Edit Analytics Dataflows and View All Data

  Note: The dataflow owner doesn't need View All Data to download an error log.


Data Manager
My_Opportunities_SFDC
Monitor
Dataflows & Recipes
Data
Connect
Monitor
Track the progress of syncs, dataflows, recipes, and other data jobs that you run.
Flows per 24 Hours
60 Remaining
JOBS
DATAFLOWS
1
Default Salesforce Dataflow
Last Modified By: Admin User
Not Scheduled
SalesEdgeEltWorkflow • Run by Integration User
2
3

STARTED	DURATION	STATUS	MESSAGE
Today at 11:36 AM	00:00:28	● Warning	The job completed sucessfully, but some rows failed. Download the error log from the data monitor to view the failed rows.

NAME	STATUS	TYPE	STARTED	DURATION	ROWS IN
sfdcDigest_Account	● Successful	sfdcDigest	Wed Apr 17 18:36:37	00:18:48	3
sfdcDigest_Opportunity	● Successful	sfdcDigest	Wed Apr 17 18:36:38	00:17:43	8
sfdcDigest_User	● Successful	sfdcDigest	Wed Apr 17 18:36:39	00:08:48	5
augment_Opportunity_Account	● Warning	augment	Wed Apr 17 18:36:40	00:05:53	8

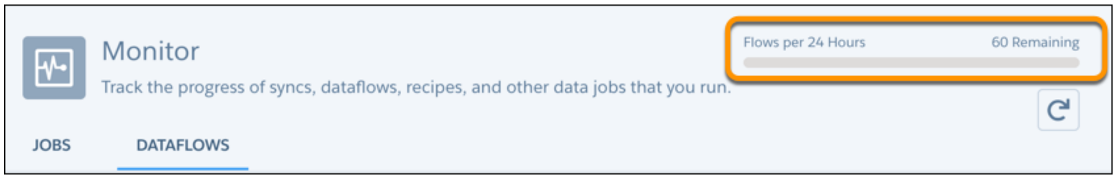
1. In Analytics, click the gear icon ( ) and then click **Data Manager**.
   The data manager opens on the Monitor tab.
2. Click the **Dataflows** subtab (1).
3. Click to see the latest status of a job.
   Each job can have one of these statuses.

Status	Description
Running	The job is running.
Failed	The job failed.
Successful	The job completed successfully.
Warning	The job completed successfully, but some rows failed.

4. If the dataflow job fails, expand the job node (2) and review the run-time details for every transformation that was processed.
5. If an error log is available for a node, click the download log button (3) to download a CSV file containing the failed rows.

   Note: Error logs display the data from rows that have failed to load. To maintain data security and prevent unauthorized access to this data, only the dataflow owner or users with the View All Data permission can download an error log.
6. If there's a problem with the dataflow logic, edit the dataflow and then run it again.

Note: You can have up to 60 dataflow runs in a rolling 24-hour period. Dataflow and recipe runs that take less than 2 minutes to run, and data sync, don't count toward this limit. To track your current usage, use the flow indicator at the top of the Monitor tab.


Monitor
Track the progress of syncs, dataflows, recipes, and other data jobs that you run.
Flows per 24 Hours
60 Remaining
JOBS
DATAFLOWS

Schedule a Dataflow

You can set a dataflow to run on a time-based schedule by hour, week, or month, on specific days of the week or dates in the month. For example, schedule a dataflow to ensure that the data is available by a particular time or to run the job during non-business hours. You can also set an event-based schedule to run a dataflow after the Salesforce Local connection syncs. Set an event-based schedule if the dataflow extracts data from Salesforce objects that have to sync before the dataflow runs.

You can run a maximum of 60 dataflow jobs during a rolling 24-hour period. For a production org with the Einstein Analytics Plus platform license, Analytics runs up to two dataflows concurrently when multiple dataflow jobs overlap. If more than two jobs overlap, Analytics puts the remaining jobs in queue. Analytics runs one job at a time in production orgs with the Einstein Analytics Growth license and sandbox orgs.

EDITIONS

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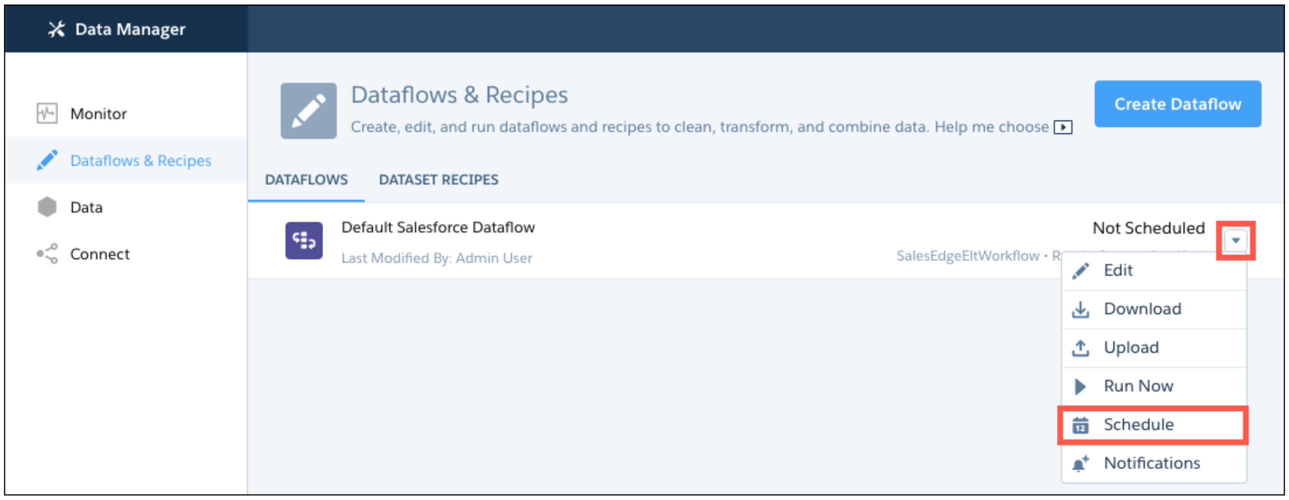
USER PERMISSIONS

To schedule or unschedule a dataflow job:
- Edit Analytics Dataflows

1. In Analytics, click the gear icon (⚙) and then click **Data Manager**.
   The data manager opens on the Monitor tab, with the Jobs tab open by default.
2. Click the Dataflows & Recipes tab.
3. On the right of the dataflow, click ▾ and select **Schedule**.

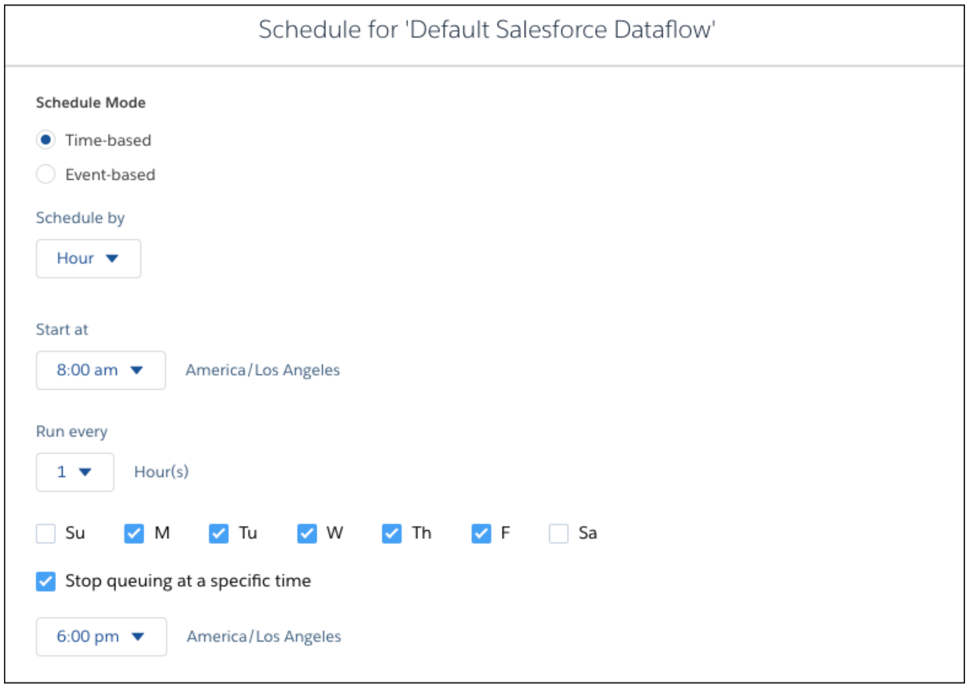


   The scheduler appears.
4. Under Schedule Mode, select the **Time-based** or **Event-based**.

   Choose the time-based mode to schedule the dataflow to run at a specified time. If you select this mode, continue with these steps to set the time information.

   Choose the event-based mode to run the dataflow after the data sync finishes for all Salesforce objects in the dataflow. For example, if the dataflow pulls data from Accounts and Opportunities, both objects must sync before the dataflow can run. If you select this mode, click **Save** to complete the setup.
5. If you selected the time-based mode, from the **Schedule by** picklist, select the time frame that you want to schedule by and complete the other settings.

   By Hour
   : Run the dataflow at specified hourly intervals, starting at the time you select on the selected days.



Schedule for 'Default Salesforce Dataflow'

Schedule Mode

● Time-based

○ Event-based

Schedule by: Hour

Start at: 8:00 am America/Los Angeles

Run every: 1 Hour(s)

☐ Su ☑ M ☑ Tu ☑ W ☑ Th ☑ F ☐ Sa

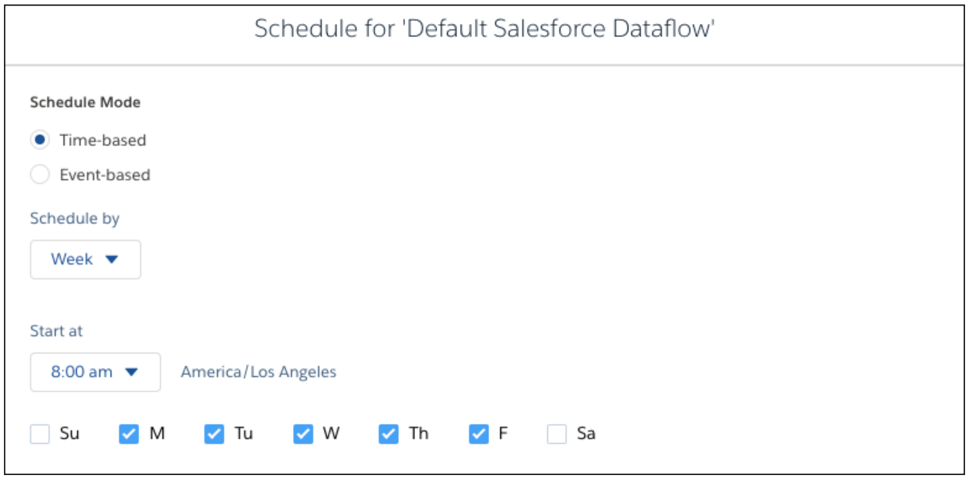
☑ Stop queuing at a specific time

6:00 pm America/Los Angeles

Note: To stop the dataflow from running after a certain time each day, select **Stop queuing at a specific time**. For example, set a job to start at 8:00 am, run every hour, and stop after 6:00 pm to restrict runs to just office hours.

By Week

Run the dataflow at the time you select on the selected days.



Schedule for 'Default Salesforce Dataflow'

Schedule Mode

● Time-based

○ Event-based

Schedule by: Week

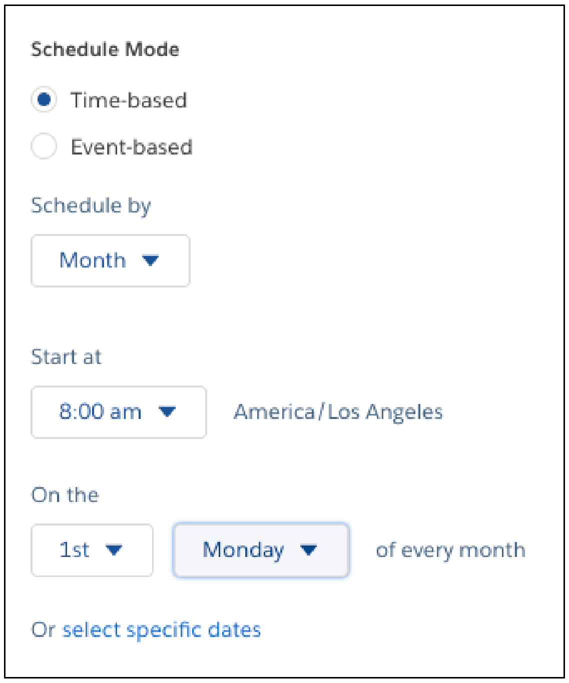
Start at: 8:00 am America/Los Angeles

☐ Su ☑ M ☑ Tu ☑ W ☑ Th ☑ F ☐ Sa

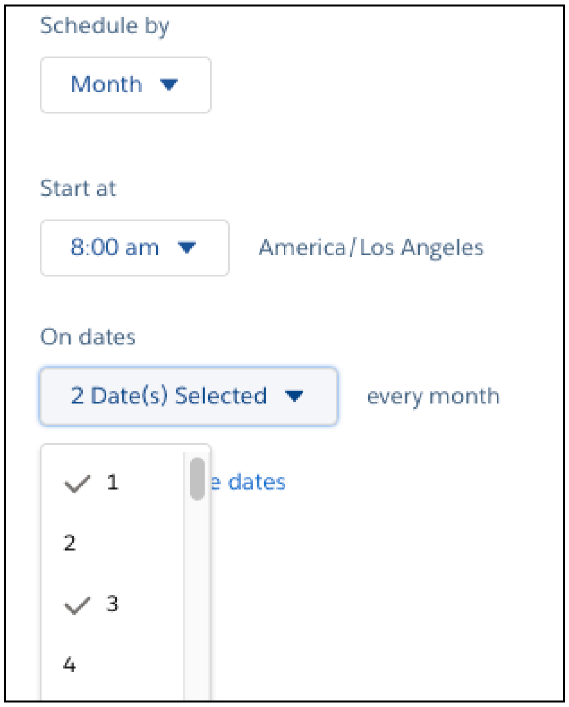
By Month

Run the dataflow on a specific day or days each month. By default, you can schedule the job to run on a relative day each month, for example, the first Monday. If you want the job to run on a specific date or dates, click **select specific dates** and then select from the list.

Schedule on a Relative Date

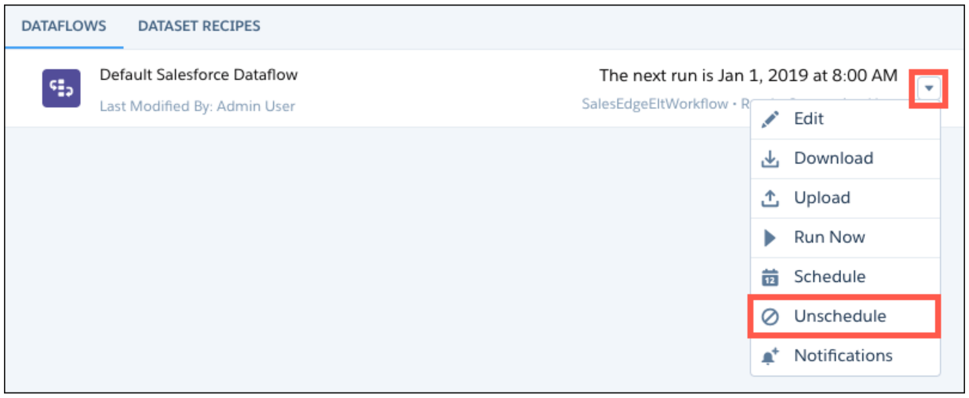


Schedule on Specific Dates



6. Click **Save**.

To remove a dataflow schedule, select Unschedule from the dataflow's menu.



DATAFLOW TRANSFORMATION REFERENCE

Transformations for Analytics Dataflows

A *transformation* refers to the manipulation of data. You can add transformations to a dataflow to extract data from Salesforce objects or datasets, transform datasets that contain Salesforce or external data, and register datasets.

For example, you can use transformations to join data from two related datasets and then register the resulting dataset to make it available for queries.

IN THIS SECTION:

append Transformation

The append transformation combines rows from multiple datasets into a single dataset.

augment Transformation

The augment transformation augments an input dataset by combining columns from another related dataset. The resulting, augmented dataset enables queries across both related input datasets. For example, you can augment the Account dataset with the User dataset to enable a query to return account records and the full names of the account owners.

computeExpression Transformation

The computeExpression transformation enables you to add derived fields to a dataset. The values for derived fields aren't extracted from the input data source. Instead, Analytics generates the values using a SAQL expression, which can be based on one or more fields from the input data or other derived fields. For example, you can use an expression to assign a value to a field, concatenate text fields, or perform mathematical calculations on numeric fields.

computeRelative Transformation

You can use the computeRelative transformation to analyze trends in your data by adding derived fields to a dataset based on values in other rows. For example, to analyze sales pipeline trends, create derived fields that calculate the number of days an opportunity remains in each stage. You can also calculate the changes to the opportunity amount throughout the stages of the opportunity.

delta Transformation

The delta transformation calculates changes in the value of a measure column in a dataset over a period of time. The delta transformation generates an output column in the dataset to store the delta for each record. Create deltas to make it easier for business analysts to include them in queries.

dim2mea Transformation

The dim2mea transformation creates a new measure based on a dimension. The transformation adds the new measure column to the dataset. The transformation also preserves the dimension to ensure that existing lenses and dashboards don't break if they use the dimension.

edgemart Transformation

The edgemart transformation gives the dataflow access to an existing, registered dataset, which can contain Salesforce data, external data, or a combination of the two. Use this transformation to reference a dataset so that its data can be used in subsequent transformations in the dataflow. You can use this transformation and the augment transformation together to join an existing dataset with a new dataset.

filter Transformation

The filter transformation removes records from an existing dataset. You define a filter condition that specifies which records to retain in the dataset.

flatten Transformation
The flatten transformation flattens hierarchical data. For example, you can flatten the Salesforce role hierarchy to implement row-level security on a dataset based on the role hierarchy.

sfdcDigest Transformation
The sfdcDigest transformation generates a dataset based on data that it extracts from a Salesforce object. You specify the Salesforce object and fields from which to extract data. You might choose to exclude particular fields that contain sensitive information or that aren't relevant for analysis.

sfdcRegister Transformation
The sfdcRegister transformation registers a dataset to make it available for queries. Users cannot view or run queries against unregistered datasets.

update Transformation
The update transformation updates the specified field values in an existing dataset based on data from another dataset, which we'll call the lookup dataset. The transformation looks up the new values from corresponding fields in the lookup dataset. The transformation stores the results in a new dataset.

append Transformation

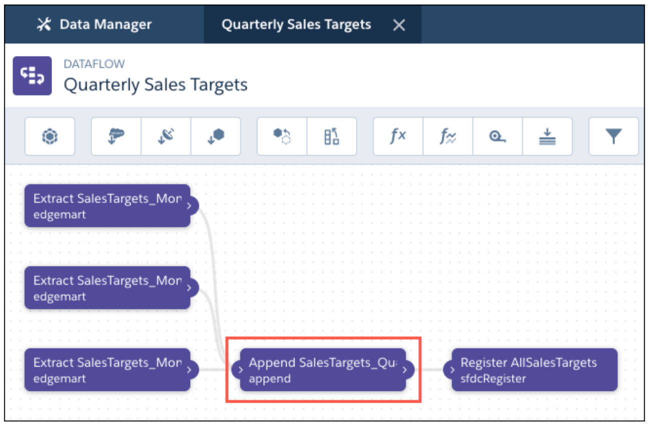
The append transformation combines rows from multiple datasets into a single dataset.

Consider the following rules when using this transformation.

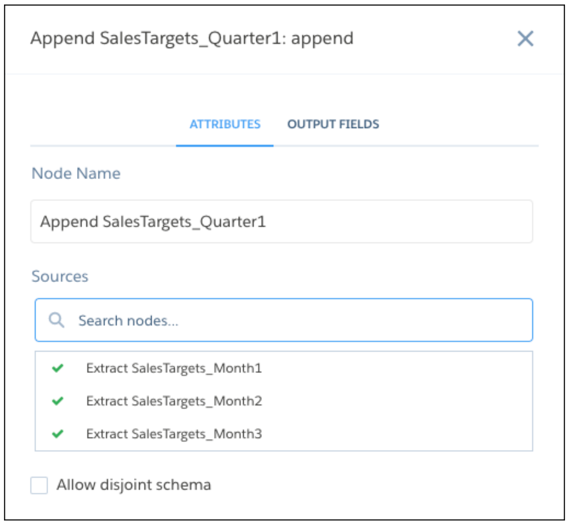
- This transformation does not remove duplicate records.
- All input datasets must have the same structure—the corresponding columns must be in the same order and have the same name and field type.

Example: Let's look at an example. Each month, you create a dataset that contains the month's sales targets. Now, you want a holistic view of sales targets for all months. To do that, you create the following dataflow to merge the existing datasets into a single dataset.

Dataflow



Append Node in Dataflow


Append SalesTargets_Quarter1: append

ATTRIBUTES OUTPUT FIELDS

Node Name

Append SalesTargets_Quarter1

Sources

Search nodes...

✓ Extract SalesTargets_Month1
✓ Extract SalesTargets_Month2
✓ Extract SalesTargets_Month3

☐ Allow disjoint schema

Here’s the dataflow JSON.

```
{
  "Extract SalesTargets_Month3": {
    "action": "edgemart",
    "parameters": {
      "alias": "SalesTargets_Month3"
    }
  },
  "Extract SalesTargets_Month2": {
    "action": "edgemart",
    "parameters": {
      "alias": "SalesTargets_Month2"
    }
  },
  "Extract SalesTargets_Month1": {
    "action": "edgemart",
    "parameters": {
      "alias": "SalesTargets_Month1"
    }
  },
  "Append SalesTargets_Quarter1": {
    "action": "append",
    "parameters": {
      "enableDisjointedSchemaMerge": false,
      "sources": [
        "Extract SalesTargets_Month1",
        "Extract SalesTargets_Month2",
        "Extract SalesTargets_Month3"
      ]
    }
  },
  "Register AllSalesTargets": {
    "action": "sfdcRegister",
    "parameters": {
      "name": "All Sales Targets",
      "alias": "AllSalesTargets",
      "source": "Append SalesTargets_Quarter1"
    }
  }
}
```

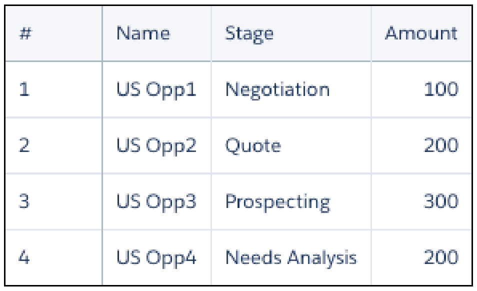
After you create the single dataset, you can use date filters to analyze the sales targets by month, quarter, or year.

Note: The append transformation doesn’t remove duplicate rows.

Append Datasets with Different Schema

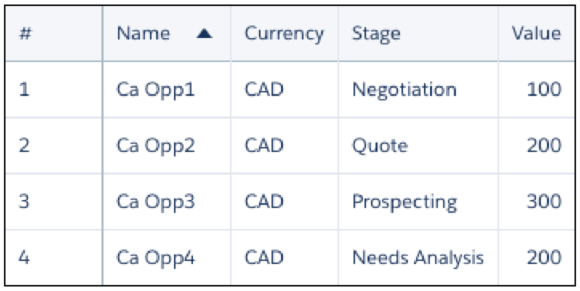
By default, input datasets must have the same structure—the corresponding columns must have the same name and field type. For example, let's say you want to append your Canada opportunities to your U.S. opportunities.

US Sales



#	Name	Stage	Amount
1	US Opp1	Negotiation	100
2	US Opp2	Quote	200
3	US Opp3	Prospecting	300
4	US Opp4	Needs Analysis	200

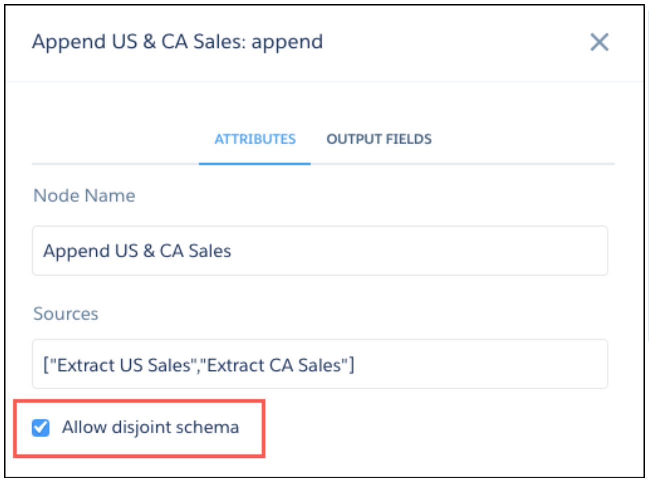
Canada Sales



#	Name ▲	Currency	Stage	Value
1	Ca Opp1	CAD	Negotiation	100
2	Ca Opp2	CAD	Quote	200
3	Ca Opp3	CAD	Prospecting	300
4	Ca Opp4	CAD	Needs Analysis	200

Here, the column names are different, and the Canada data has a Currency column. For the dataflow not to fail, select **Allow disjoint schema** in the append node in the dataflow editor. If you're working in the dataflow JSON, add the `enableDisjointedSchemaMerge` parameter and set its value to `true`.

Append Node in Dataflow Editor



Append US & CA Sales: append

ATTRIBUTES OUTPUT FIELDS

Node Name

Append US & CA Sales

Sources

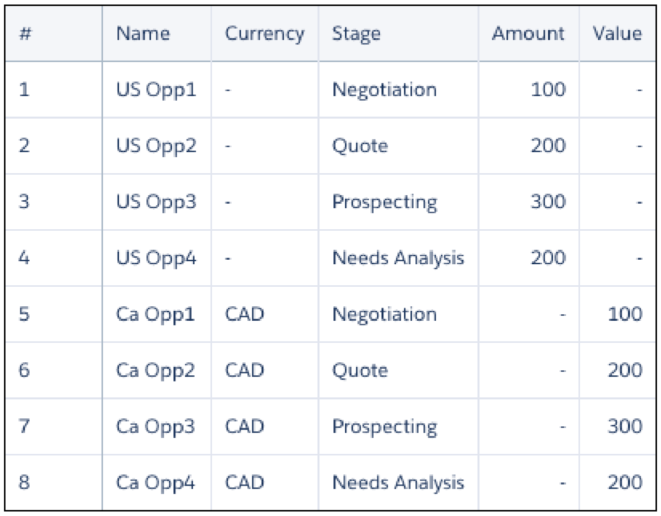
["Extract US Sales","Extract CA Sales"]

☑ Allow disjoint schema

Append Node in Dataflow JSON

```
"Append US & CA Sales": {
  "action": "append",
  "parameters": {
    "enableDisjointedSchemaMerge": true,
    "sources": [
      "Extract US Sales",
      "Extract CA Sales"
    ]
  }
},
```

When you run the dataflow, the data is merged without the dataflow failing.



#	Name	Currency	Stage	Amount	Value
1	US Opp1	-	Negotiation	100	-
2	US Opp2	-	Quote	200	-
3	US Opp3	-	Prospecting	300	-
4	US Opp4	-	Needs Analysis	200	-
5	Ca Opp1	CAD	Negotiation	-	100
6	Ca Opp2	CAD	Quote	-	200
7	Ca Opp3	CAD	Prospecting	-	300
8	Ca Opp4	CAD	Needs Analysis	-	200

The append transformation adds all columns to the dataset and merges values in columns with the same name, such as Name. It also adds null values in a column for rows that didn't previously have that column. You can see this in the Currency column.

Note: If null measure handling in datasets isn't enabled for your org, append adds zeros in a column for rows that didn't previously have that column.

IN THIS SECTION:

append Parameters
When you define an append transformation in the dataflow JSON, you set the action attribute to `append` and specify the parameters.

append Parameters

When you define an append transformation in the dataflow JSON, you set the action attribute to `append` and specify the parameters.

This table describes the settings for the append node in the dataflow editor.

Setting	Required?	Value
Sources	Yes	Nodes in the dataflow that identify the datasets that you want to merge.
Allow disjoint schema	No	Select to allow appending of datasets with different schema. Note: If this setting isn't selected, appending datasets with different schemas causes the dataflow to fail.

This table describes the input parameters for the append transformation in the dataflow JSON.

Parameter	Required?	Value
sources	Yes	Nodes in the dataflow definition file that identify the datasets that you want to merge.

Parameter	Required?	Value
enableDisjointedSchemaMerge	No	Indicates whether appending datasets with different schema is allowed. • To allow appending of disjoint schema, set to true. • To prevent appending of disjoint schema, set to false. The default is false. Example: `"enableDisjointedSchemaMerge": true` Note: If this parameter is set to false, appending datasets with different schemas causes the dataflow to fail.

SEE ALSO:

append Transformation

augment Transformation

The augment transformation augments an input dataset by combining columns from another related dataset. The resulting, augmented dataset enables queries across both related input datasets. For example, you can augment the Account dataset with the User dataset to enable a query to return account records and the full names of the account owners.

When you create the transformation, you identify each input dataset as the left or right dataset and specify the relationship between them. Analytics combines all the columns of the left dataset with only the specified columns from the right dataset. (Keep in mind that each dataset can't have more than 5,000 columns.) Analytics adds the relationship to column names from the right dataset, which is useful when the left and right datasets have columns with the same names.

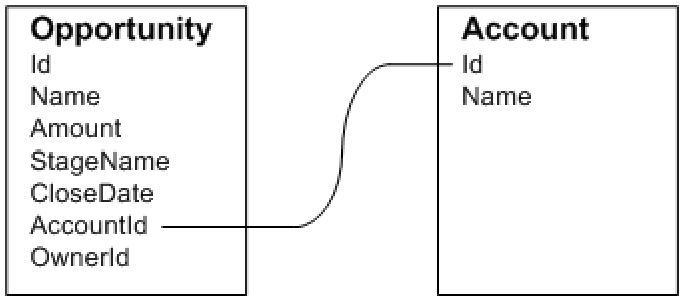
For each record in the left dataset, the augment transformation performs a lookup to find a matching record in the right dataset. To match related records, the augment transformation uses a match condition. You specify the match condition based on a key from each dataset. For example:

```
"left_key": [ "Id" ],"right_key": [ "Prod_ID" ]
```

A key can be a single-column key or a composite key. For a match condition based on a composite key, the keys for both datasets must have the same number of columns, specified in the same order.

Tip: To augment more than two datasets, augment two datasets at a time. For example, to augment three datasets, augment the first two datasets, and then augment the resulting dataset with the third dataset.

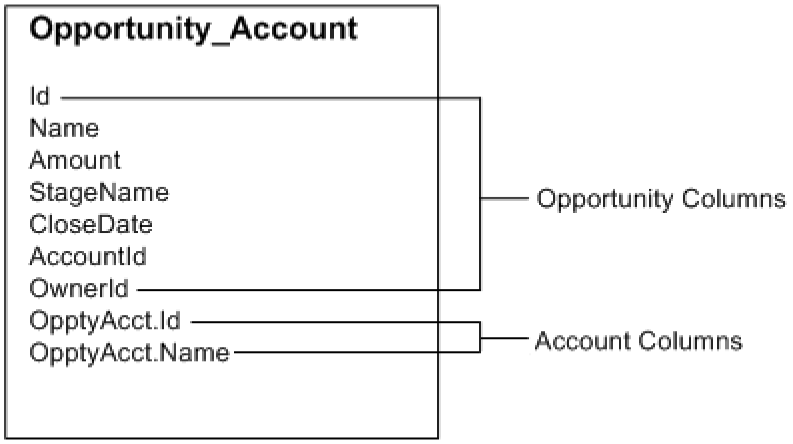
Example: Let's look at an example of the augment transformation. In this example, you want to extract data from the Opportunity and Accounts objects, and then match the data based on the account ID field.



You create the following dataflow definition file.

```
{
    "Extract_Opportunity": {
        "action": "sfdcDigest",
        "parameters": {
            "object": "Opportunity",
            "fields": [
                { "name": "Id" },
                { "name": "Name" },
                { "name": "Amount" },
                { "name": "StageName" },
                { "name": "CloseDate" },
                { "name": "AccountId" },
                { "name": "OwnerId" }
            ]
        }
    },
    "Extract_AccountDetails": {
          "action": "sfdcDigest",
          "parameters": {
              "object": "Account",
              "fields": [
                  { "name": "Id" },
                  { "name": "Name" }
              ]
          }
    },
    "Augment_OpportunitiesWithAccountDetails": {
        "action": "augment",
        "parameters": {
            "operation": "LookupSingleValue",
            "left": "Extract_Opportunity",
            "left_key": [
                "AccountId"
            ],
            "relationship": "OpptyAcct",
            "right": "Extract_AccountDetails",
            "right_key": [
                "Id"
            ],
            "right_select": [ "Name" ]
        }
    },
    "Register_OpportunityDetails": {
        "action": "sfdcRegister",
        "parameters": {
            "alias": "Opportunity_Account",
            "name": "Opportunity_Account",
            "source": "Augment_OpportunitiesWithAccountDetails" }
    }
}
```

After you run the dataflow, Analytics creates and registers the Opportunity_Account dataset. It also adds the relationship as a prefix to all columns from the right dataset.



IN THIS SECTION:

[Special Cases for Matching Records with the augment Transformation]

For each record in the left dataset, the augment transformation performs a lookup to find a matching record in the right dataset. However, it's critical that you understand how the augment transformation handles special cases when matching records.

[augment Parameters]

When you define an augment transformation, you set the action attribute to `augment` and specify the parameters.

Special Cases for Matching Records with the augment Transformation

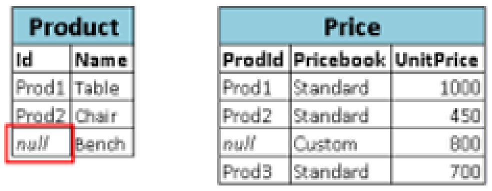
For each record in the left dataset, the augment transformation performs a lookup to find a matching record in the right dataset. However, it's critical that you understand how the augment transformation handles special cases when matching records.

Let's look at some examples that illustrate some special cases.

Handling Null Keys

When a record in the left dataset contains a null key, Analytics doesn't perform a lookup to match the record. Instead, Analytics appends the right columns and inserts null for dimensions (including dates) and '0' for measures.

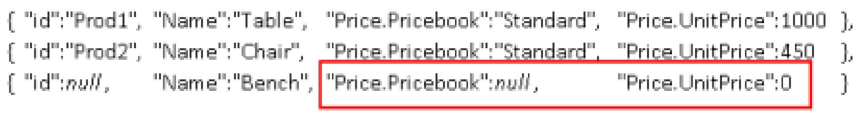
Let's look at an example. You apply the augment transformation on the following datasets, set the relationship to "Price,", and match the records based on the `Id` and `ProdId` fields.



Product	
Id	Name
Prod1	Table
Prod2	Chair
null	Bench

Price		
ProdId	Pricebook	UnitPrice
Prod1	Standard	1000
Prod2	Standard	450
null	Custom	800
Prod3	Standard	700

Analytics doesn't match the last record because the product ID is null. Instead, Analytics inserts a null for the `Price.Pricebook` dimension and '0' for the `Price.UnitPrice` measure. Here's the resulting dataset after the augment.

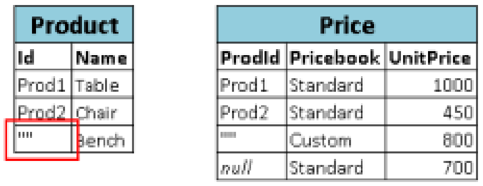


```
{ "id":"Prod1",  "Name":"Table",  "Price.Pricebook":"Standard",  "Price.UnitPrice":1000  },
{ "id":"Prod2",  "Name":"Chair",  "Price.Pricebook":"Standard",  "Price.UnitPrice":450   },
{ "id":null,     "Name":"Bench",  "Price.Pricebook":null,        "Price.UnitPrice":0     }
```

Handling Empty Keys

Analytics matches empty-value left keys and empty-value right keys.

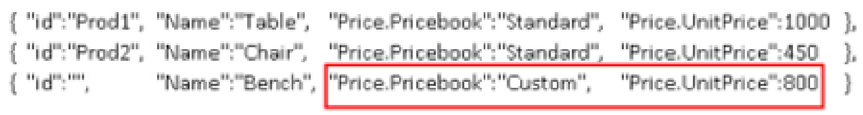
Let's look at an example. You apply the augment transformation on the following datasets, set the relationship to "Price,", and match the records based on the `Id` and `ProdId` fields.



Product	
Id	Name
Prod1	Table
Prod2	Chair
""	Bench

Price		
ProdId	Pricebook	UnitPrice
Prod1	Standard	1000
Prod2	Standard	450
""	Custom	800
null	Standard	700

Analytics matches the last record in the Product dataset with the third record in the Price dataset because they both have empty values (""). Here's the resulting dataset after the augment.

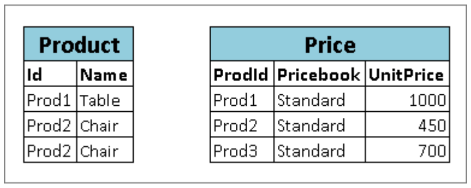


```
{ "id":"Prod1",  "Name":"Table",  "Price.Pricebook":"Standard",  "Price.UnitPrice":1000  },
{ "id":"Prod2",  "Name":"Chair",  "Price.Pricebook":"Standard",  "Price.UnitPrice":450   },
{ "id":"",       "Name":"Bench",  "Price.Pricebook":"Custom",    "Price.UnitPrice":800   }
```

Handling Non-Unique Keys

Although it's recommended, the left key doesn't have to be unique. If multiple records have the same left key, Analytics creates the same values for the appended columns.

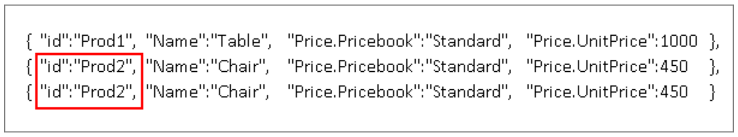
Let's look at an example. You apply the augment transformation on the following datasets, set the relationship to "Price,", and match the records based on the `Id` and `ProdId` fields.



Product	
Id	Name
Prod1	Table
Prod2	Chair
Prod2	Chair

Price		
ProdId	Pricebook	UnitPrice
Prod1	Standard	1000
Prod2	Standard	450
Prod3	Standard	700

Analytics matches the records in the Product dataset with records in the Price dataset. Here's the resulting dataset after the augment.

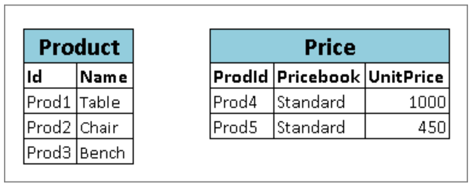


```
{ "id":"Prod1", "Name":"Table",  "Price.Pricebook":"Standard",  "Price.UnitPrice":1000 },
{ "id":"Prod2", "Name":"Chair",  "Price.Pricebook":"Standard",  "Price.UnitPrice":450  },
{ "id":"Prod2", "Name":"Chair",  "Price.Pricebook":"Standard",  "Price.UnitPrice":450  }
```

Handling No Match

If the left key doesn't have a match in the right data stream, Analytics appends the right columns, inserting nulls for dimensions (including dates) and sets measures based on whether null measure handling is enabled. If null measure handling is enabled, the augment transformation sets the measures to null. Otherwise, it sets the measures to '0'.

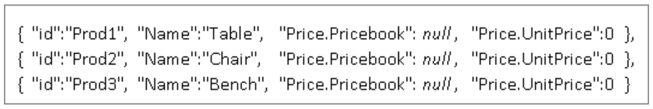
Let's look at an example where null measure handling isn't enabled. You apply the augment transformation on the following datasets, set the relationship to "Price,", and match the records based on the `Id` and `ProdId` fields.



Product	
Id	Name
Prod1	Table
Prod2	Chair
Prod3	Bench

Price		
ProdId	Pricebook	UnitPrice
Prod4	Standard	1000
Prod5	Standard	450

Because no keys match, Analytics doesn't match any records in the Product dataset with records in the Price dataset. Here's the resulting dataset after the augment.



```
{ "id":"Prod1", "Name":"Table",  "Price.Pricebook": null,  "Price.UnitPrice":0 },
{ "id":"Prod2", "Name":"Chair",  "Price.Pricebook": null,  "Price.UnitPrice":0 },
{ "id":"Prod3", "Name":"Bench",  "Price.Pricebook": null,  "Price.UnitPrice":0 }
```

If null measure handling was enabled, Price.UnitPrice would be *null*, instead of 0.

Handling Multiple Matches

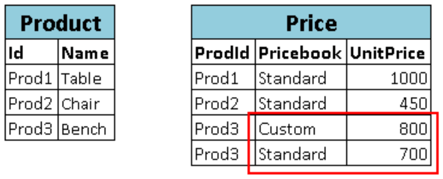
If the left dataset has a one-to-many relationship with the right dataset, Analytics might find multiple matches for a left record. What Analytics does with multiple matches depends on the specified augment operation. You can specify one of the following operations to handle the multiple-match case:

`LookupSingleValue`

The augment transformation returns results from a single row. Analytics randomly selects one row from the list of matched rows.

Note: Each time you run the dataflow, Analytics can return different results depending on the returned row.

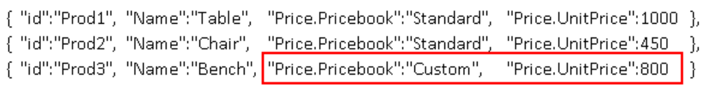
Let's look at an example. You apply the augment transformation on the following datasets, set the relationship to "Price," set the operation to `LookupSingleValue`, and match the records based on the `Id` and `ProdId` fields.



Product	
Id	Name
Prod1	Table
Prod2	Chair
Prod3	Bench

Price		
ProdId	Pricebook	UnitPrice
Prod1	Standard	1000
Prod2	Standard	450
Prod3	Custom	800
Prod3	Standard	700

Although there are multiple rows for Prod3 in the Price dataset, Analytics randomly chooses one matching row and returns values based on that row. Here's the resulting dataset after the augment if Analytics chooses the first Prod3 row.

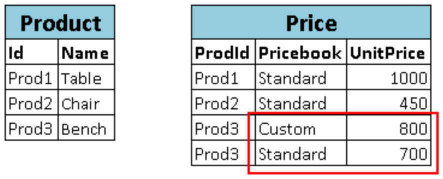


```
{ "id":"Prod1",  "Name":"Table",   "Price.Pricebook":"Standard",   "Price.UnitPrice":1000  },
{ "id":"Prod2",  "Name":"Chair",   "Price.Pricebook":"Standard",   "Price.UnitPrice":450   },
{ "id":"Prod3",  "Name":"Bench",   "Price.Pricebook":"Custom",     "Price.UnitPrice":800   }
```

`LookupMultiValue`

Analytics returns results from all matched rows.

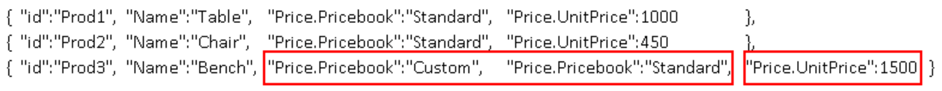
Let's look at an example. You apply the augment transformation on the following datasets, set the relationship to "Price," set the operation to `LookupMultiValue`, and match the records based on the `Id` and `ProdId` fields.



Product	
Id	Name
Prod1	Table
Prod2	Chair
Prod3	Bench

Price		
ProdId	Pricebook	UnitPrice
Prod1	Standard	1000
Prod2	Standard	450
Prod3	Custom	800
Prod3	Standard	700

Because the lookup returns multiple rows for Prod3, the dimension `Price.Pricebook` field in the resulting dataset becomes a multi-value field, showing all dimension values. The measure field `Price.UnitPrice` contains 1500, which is the sum of 800 and 700. Here's the resulting dataset after the augment.



```
{ "id":"Prod1",  "Name":"Table",   "Price.Pricebook":"Standard",   "Price.UnitPrice":1000         },
{ "id":"Prod2",  "Name":"Chair",   "Price.Pricebook":"Standard",   "Price.UnitPrice":450          },
{ "id":"Prod3",  "Name":"Bench",   "Price.Pricebook":"Custom",     "Price.Pricebook":"Standard",  "Price.UnitPrice":1500 }
```

Note: If you are augmenting date fields from the right dataset, the `LookupMultiValue` operation can lead to fields containing multiple date values, which can give unexpected results. We recommend that you use the `LookupSingleValue` operation when augmenting date fields, or augment the date fields in a separate LookupSingleValue augment node.

augment Parameters

When you define an augment transformation, you set the action attribute to `augment` and specify the parameters.

The following table describes the input parameters.

Parameter	Required?	Value
operation	No	Indicates what the transformation does if it matches multiple rows in the right dataset with a row in the left. Valid values: • `LookupSingleValue`. Returns values from one of the matched rows. If you don't specify the `operation` parameter, the transformation uses this operation. • `LookupMultiValue`. Returns values from all matched rows. For more information about each operation, see Special Cases for Matching Records with the augment Transformation.
left	Yes	Node in the dataflow definition file that identifies the left dataset. This is one of two input sources for this transformation.
left_key	Yes	Key column in the left dataset used to augment the datasets. If you use a composite key, the left and right keys must have the same number of columns in the same order. For a composite key, use the following syntax: `[ "Key Column1", "Key Column2", …, "Key ColumnN" ]` Note: The left or right key can't be a multi-value field.
right	Yes	Node in the dataflow definition file that identifies the right dataset. This is one of two input sources for this transformation.
relationship	Yes	Relationship between the left and right datasets. The dataflow adds the relationship to the beginning of the right column names in the output dataset to make the column names unique and descriptive.
right_select	Yes	An array of column names from the right dataset that you want to include in the output dataset. The dataflow adds the relationship as a prefix to the column name to determine the name of the right column in the output dataset.
right_key	Yes	Key column in the right dataset used to augment the datasets. If you use a composite key, the left and right keys must have the same number of columns in the same order.

SEE ALSO:

augment Transformation

computeExpression Transformation

The computeExpression transformation enables you to add derived fields to a dataset. The values for derived fields aren't extracted from the input data source. Instead, Analytics generates the values using a SAQL expression, which can be based on one or more fields from the input data or other derived fields. For example, you can use an expression to assign a value to a field, concatenate text fields, or perform mathematical calculations on numeric fields.

Note: The computeExpression and computeRelative transformations are similar, but they have a key difference. The computeExpression transformation performs calculations based on other fields within the same row. The computeRelative transformation performs calculations based on the previous and next values of the same field in other rows.

Consider the following guidelines when creating a computeExpression transformation:

- You can include only the following SAQL operators and functions in the expression:
  - Arithmetic operators
  - Case operator
  - String operator
  - Date functions
- Multi-value fields aren't supported. The dataflow fails if you include a multi-value field in the SAQL Expression parameter.
- The values of the derived field must match its specified type. For example, set the type of the derived field to *Text* if the values are strings.
- Analytics calculates the values of derived fields in the order in which they are listed in the JSON. Thus, if you create a derived field based on other derived fields in the same computeExpression transformation, the input derived fields must be listed first. For example, Derived_A must be listed before Derived_B in the following computeExpression transformation JSON snippet:

```
"CreateDerivedFields": {
   "action": "computeExpression",
   "parameters": {
      "source": "sourceNode",
      "mergeWithSource": false,
      "computedFields": [
         {
            "name": "Derived_A",
            "type": "Text",
            "label": "Derived Field A",
            "saqlExpression": "\"hello \""},
         {
            "name": "Derived_B",
            "type": "Text",
            "label": "Derived Field B Dependent on Field A",
            "saqlExpression": "Derived_A + \"world\""}
         ]
      }
   }
```

- You can choose whether the resulting dataset includes only the derived fields, or includes the input and derived fields.

Example: Let's look at an example. You want to create a dataset based on Salesforce opportunity data. You create a dataflow that extracts the Id and Amount fields from the Opportunity object. In addition, you also want to add the following derived fields to the dataset: ModifiedId, SalesTax, FinalPrice, and ValueCategory. For the derived fields, you will:

- Append "SFDC" to each opportunity Id to get a new modified Id.
- Calculate the sales tax based on an 8% tax rate.
- Calculate the final price by adding the amount and sales tax.
- Categorize opportunities into low-, medium-, and high-value buckets based on the calculated final price.

You create the following dataflow definition.

```
{
   "salesData": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            {"name": "Amount"},
            {"name": "Id"}]}},
   "Derived_Fields": {
      "action": "computeExpression",
      "parameters": {
         "source": "salesData",
         "mergeWithSource": true,
         "computedFields": [
            {
               "name": "ModifiedId",
               "type": "Text",
               "saqlExpression": "\"SFDC\" + Id"},
            {
               "name": "SalesTax",
               "type": "Numeric",
               "precision": 18,
               "defaultValue": "0",
               "scale": 5,
               "saqlExpression": "Amount * 0.08"},
            {
               "name": "FinalPrice",
               "type": "Numeric",
               "precision": 18,
               "defaultValue": "0",
               "scale": 5,
               "saqlExpression": "Amount + SalesTax"},
            {
               "name": "ValueCategory",
               "type": "Text",
               "saqlExpression": "case when FinalPrice < 1000 then \"Low\" when
FinalPrice >= 1000 and FinalPrice < 2000 then \"Medium\" else \"High\" end"}
         ]
      }
   },
   "Register_CategorizedSales": {
       "action": "sfdcRegister",
       "parameters": {
           "alias": "Categorized_Sales",
           "name": "Categorized_Sales",
           "source": "Derived_Fields" }
   }
}
```

IN THIS SECTION:

computeExpression Parameters

When you define a computeExpression transformation, you set the action attribute to `computeExpression`. You also specify the parameters for the input source and the expression used to generate the values.

You can specify parameters in the following sections of the computeExpression node: parameters and computedFields.

Parameters

The following table describes the parameters in the `parameters` section.

Parameter	Required?	Value
source	Yes	Node in the dataflow definition file that identifies the input source for this transformation.
mergeWithSource	No	Indicates whether the input fields are included with the derived fields in the resulting dataset. When true, the resulting dataset contains all input fields from the source and the newly generated derived fields. When false, the resulting dataset contains the derived fields only. Default is true.
computedFields	Yes	Attributes and expression used to generate derived fields in the dataset. See computedFields.

computedFields

The following table describes the attributes in the `computedFields` section. It also describes optional attributes that you can provide to override the field metadata to make the data appear differently in a dataset. For example, Analytics can replace null values in a field with a default value.

Attribute	Required?	Value
name	Yes	API name of the generated field. Note: The API names must be unique. Otherwise, the dataflow fails to run.
type	Yes	Analytics field type associated with the field. Valid types are Text, Numeric, or Date. Example: `"type": "Text"`
label	No	The display name of the generated field that appears in the Analytics user interface. Can be up to 255 characters. Defaults to input field name if not specified.

Attribute	Required?	Value

saqlExpression	Yes	SAQL expression used to calculate the value for the derived field. The expression can be based on input fields or other derived fields in the transformation.
		Example:
		`"saqlExpression":"toDate(birth_day, \"yyyy-M-d\")"`
		Note: If a field name in a SAQL expression contains characters other than letters, numbers, or underscores, enclose the name in single quotes. For example, field names resulting from an augment are prefixed with the relationship name and a dot, and must be. enclosed in single quotes.
		`"saqlExpression":"'AccountId.Sales_Q4__c'-'AccountId.Sales_Q3__c'"`
		Note: The use of multi-value fields as input fields isn't supported.

format	Yes (for Date fields only)	Format of the derived date field. For information about formats, see the Analytics External Data Format Reference.
fiscalMonthOffset	No	For date fields only. The difference, in months, between the first month of the fiscal year and the first month of the calendar year (January). For example, if the fiscal year starts in January, the offset is 0. If the fiscal year starts in October, the offset is 9. Example: `"fiscalMonthOffset": 9` When you set `fiscalMonthOffset` to a value other than 0, Analytics generates fields to show the fiscal week, month, quarter, and year that a date value falls in. You can use these fields to group and filter by fiscal period in a dataset. For more information, see Date Handling in Datasets. Warning: Analytics doesn't support fields with different `fiscalMonthOffset` values in the same dataset. Using different `fiscalMonthOffset` values can produce unexpected results when you filter by relative fiscal date ranges. We recommend that you set the same value for all `fiscalMonthOffset` attributes in a dataset.
isYearEndFiscalYear	No	For date fields only, when `fiscalMonthOffset` is greater than 0. Indicates whether the fiscal year is the year in which the fiscal year ends or begins. Because the fiscal year can start in one calendar year and end in another, you specify which year to use for the fiscal year. • If true, then the fiscal year is the year in which the fiscal year ends. The default is true. • If false, then the fiscal year is the year in which the fiscal year begins. Example: `"isYearEndFiscalYear": true`

Attribute	Required?	Value
		Warning: Analytics doesn't support fields with different `isYearEndFiscalYear` values in the same dataset. Using different `isYearEndFiscalYear` values can produce unexpected results when you filter by relative fiscal date ranges. We recommend that you set the same value for all `isYearEndFiscalYear` attributes in a dataset. For more information, see Date Handling in Datasets.
firstDayOfWeek	No	For date fields only. The first day of the week for the calendar year and, if applicable, fiscal year. Use 0 to set the first day to be Sunday, 1 to set the first day to be Monday, and so on. Use -1 to set the first day to be on January 1. The default is -1. Example: `"firstDayOfWeek": 0` Warning: Analytics doesn't support fields with different `firstDayOfWeek` values in the same dataset. Using different `firstDayOfWeek` values can produce unexpected results when you filter by relative week date ranges. We recommend that you set the same value for all `firstDayOfWeek` attributes in a dataset. For more information, see Date Handling in Datasets.
precision	Yes (for Numeric fields only)	The maximum number of digits in a numeric value, or the length of a text value. For numeric values: Includes all numbers to the left and to the right of the decimal point (but excludes the decimal point character). Value must be from 1 to 16. For text values: Value defaults to 255 characters, and must be from 1 to 32,000 characters. Example: `"precision": 10`
scale	Yes (for Numeric fields only)	The number of digits to the right of the decimal point in a numeric value. Must be less than the precision value. Value must be from 1 to 15 characters. Example: `"scale": 2`
defaultValue	No	For text and numeric fields that can be null. Default value that replaces a null value for the specified field. Enter a string value. Example: `"defaultValue": "0"`

SEE ALSO:

computeExpression Transformation

computeRelative Transformation

You can use the computeRelative transformation to analyze trends in your data by adding derived fields to a dataset based on values in other rows. For example, to analyze sales pipeline trends, create derived fields that calculate the number of days an opportunity remains in each stage. You can also calculate the changes to the opportunity amount throughout the stages of the opportunity.

Note: The computeExpression and computeRelative transformations are similar, but the computeExpression transformation performs calculations based on fields within the same row. The computeRelative transformation performs calculations based on the same field in other rows—particularly the current, first, previous, or next rows.

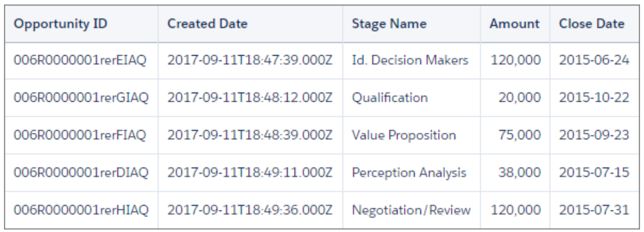
When you define a computeRelative transformation, you specify a source transformation as the input, partition the records, and sort the records within each partition. For example, you can use sfdcDigest to extract opportunity history records, and then use computeRelative to calculate changes in each opportunity over time. You can partition opportunity history records by opportunity ID, and then chronologically sort records within each partition to correctly identify the previous and next values.

Note: Derived fields can be based on a source field or on a SAQL expression.

Example: Let's look at an example. To perform trending analysis on the sales pipeline, create a dataflow that contains the following transformations.

sfdcDigest transformation

Extracts the following data from the OpportunityHistory object.



Opportunity ID	Created Date	Stage Name	Amount	Close Date
006R0000001rerEIAQ	2017-09-11T18:47:39.000Z	Id. Decision Makers	120,000	2015-06-24
006R0000001rerGIAQ	2017-09-11T18:48:12.000Z	Qualification	20,000	2015-10-22
006R0000001rerFIAQ	2017-09-11T18:48:39.000Z	Value Proposition	75,000	2015-09-23
006R0000001rerDIAQ	2017-09-11T18:49:11.000Z	Perception Analysis	38,000	2015-07-15
006R0000001rerHIAQ	2017-09-11T18:49:36.000Z	Negotiation/Review	120,000	2015-07-31

computeRelative transformation

Performs the following tasks:

- Partitions the extracted records by opportunity ID.
- Within each partition, sorts the extracted records by CreatedDate in ascending order. Sorting by CreatedDate ensures that the changes that occur for each opportunity are listed in chronological order.
- Adds the following derived fields to the final dataset.

OpportunityCreatedDate

Determines the date that the opportunity was first created. You can use this date with the actual close date to determine the number of days required to close the sale. The goal is to shorten the sales cycle to recognize revenue.

AmountPrev

Determines the previous amount of the opportunity. You can use this field to determine if the values of opportunities are increasing or decreasing, which can affect whether you hit your sales targets.

CloseDatePrev

Determines the previous expected close date for the opportunity. You can use this field to analyze how the expected close date changes over the sales cycle of the opportunity. If the expected close date keeps getting pushed out, identify the issues that are causing the longer sales cycle.

AmountChange

Uses a SAQL expression to calculate the percentage change of the opportunity amount from its previous amount.

AmountChangeDirection
Uses a SAQL expression to generate a text value to show the direction in which an opportunity amount has changed: Up, Down, or No Change.

sfdcRegister transformation
Registers the final dataset that contains the extracted fields from the sfdcDigest transformation and the derived fields from computeRelative transformation.

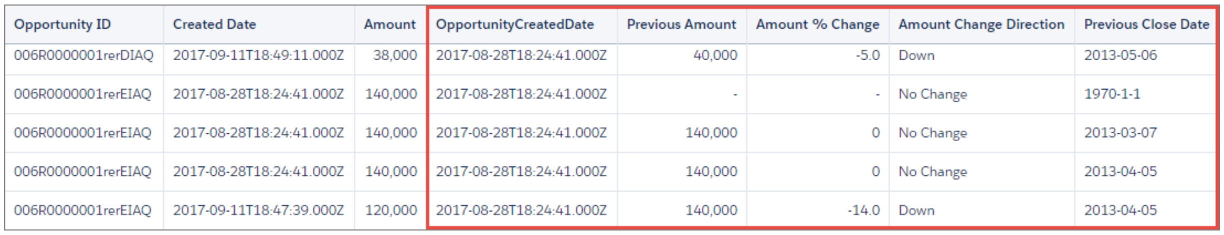
You create the following dataflow definition.

```
{
  "extractOppHistory": {
        "action": "sfdcDigest",
        "parameters": {
            "object": "OpportunityHistory",
            "fields": [
                {"name": "OpportunityId"},
                {"name": "CreatedDate"},
                {"name": "StageName"},
                {"name": "Amount"},
                {"name": "CloseDate"}
            ]
        }
    },
  "computeTrending": {
    "action": "computeRelative",
    "parameters": {
      "source": "extractOppHistory",
      "partitionBy": ["OpportunityId"],
      "orderBy": [
        {
          "name": "CreatedDate",
          "direction": "asc"
        }
      ],
      "computedFields": [
        {
          "name": "OpportunityCreatedDate",
          "label": "Opportunity Created Date",
         "description": "Determines the date that the opportunity was first created.",

          "expression": {
            "sourceField": "CreatedDate",
            "offset": "first()",
            "default": "current()"
          }
        },
        {
          "name": "AmountPrev",
          "label": "Previous Amount",
          "description": "Determines the previous amount of the opportunity",
          "expression": {
            "sourceField": "Amount",
            "offset": "previous()",
            "default": "null"
          }
        },
        {
          "name": "CloseDatePrev",
          "label": "Previous Close Date",
          "description": "Determines the previous expected close date for the
opportunity",
          "expression": {
            "sourceField": "CloseDate",
            "offset": "previous()",
            "default": "current()"
          }
        },
        {
          "name": "AmountChange",
          "label": "Amount % Change",
          "description": "Determines percentage change from previous amount",
          "expression": {
          "saqlExpression": "(current(Amount)-previous(Amount))/previous(Amount)*100",

            "type": "Numeric",
            "scale": 2,
            "default": "null"
          }
        },
        {
          "name": "AmountChangeDirection",
          "label": "Amount Change Direction",
          "description": "Determines text to indicate direction of change",
          "expression": {
            "saqlExpression": "case when current(Amount)>previous(Amount) then \"Up\"
 when current(Amount)<previous(Amount) then \"Down\" else \"No Change\" end",
            "type": "Text",
            "default": ""
          }
        }
      ]
   }
  },
  "Register_OppportunityHistory_Dataset": {
    "action": "sfdcRegister",
    "parameters": {
      "alias": "SalesPipelineTrending1",
      "name": "Sales Pipeline Trending1",
      "source": "computeTrending"
    }
  }
}
```

The dataflow runs and creates the dataset with the new derived fields.



Opportunity ID	Created Date	Amount	OpportunityCreatedDate	Previous Amount	Amount % Change	Amount Change Direction	Previous Close Date
006R0000001rerDIAQ	2017-09-11T18:49:11.000Z	38,000	2017-08-28T18:24:41.000Z	40,000	-5.0	Down	2013-05-06
006R0000001rerEIAQ	2017-08-28T18:24:41.000Z	140,000	2017-08-28T18:24:41.000Z	-	-	No Change	1970-1-1
006R0000001rerEIAQ	2017-08-28T18:24:41.000Z	140,000	2017-08-28T18:24:41.000Z	140,000	0	No Change	2013-03-07
006R0000001rerEIAQ	2017-08-28T18:24:41.000Z	140,000	2017-08-28T18:24:41.000Z	140,000	0	No Change	2013-04-05
006R0000001rerEIAQ	2017-09-11T18:47:39.000Z	120,000	2017-08-28T18:24:41.000Z	140,000	-14.0	Down	2013-04-05

Notice that Analytics partitions the records by opportunity ID and then sorts the records in ascending order based on the CreatedDate field within each partition. Analytics can now use the previous and next rows within each partition to determine changes in field values in the dataset.

IN THIS SECTION:

computeRelative Parameters

When you define a computeRelative transformation, you set the action attribute to `computeRelative`. You also specify the parameters for the input source, partition-by field, sort field, and derived field definitions.

You can specify parameters in the following sections of the computeRelative node.

Parameters

The following table describes the parameters in the `parameters` section.

Parameter	Required?	Value
source	Yes	Node in the dataflow definition file that identifies the input source for this transformation.
partitionBy	Yes	API name of the field used to partition the records in the dataset. Specify one partition-by field only.
orderBy	Yes	Field used to sort the records within each partition and the sort order: ascending (`asc`) or descending (`desc`). Specify one sort field only. Example: `"orderBy": [ { "name":"CreatedDate", "direction":"asc" } ]`

<table>
<tr><th>Parameter</th><th>Required?</th><th>Value</th></tr>
<tr><td>computedFields</td><td>Yes</td><td>A list of definitions for derived fields. Derived fields can be based on a source field or on a SAQL expression.
Example showing derived fields based on a source field and on a SAQL expression:<pre>
"computedFields": [
                {
          "name": "PreviousAmount",
          "label": "Previous Amount",
          "description": "Previous amount of
opportunity",
          "expression": {
            "sourceField": "Amount",
            "offset": "previous()",
            "default": "null"
          }
        },
        {
          "name": "AmountChange",
          "label": "Amount % Change",
          "description": "Percentage change from
previous amount",
          "expression": {
            "saqlExpression":
"(current(Amount)-previous(Amount))/previous(Amount)*100",

            "type": "Numeric",
            "scale": 2,
            "default": "null"
          }
        }
      ]
</pre>See computedFields.</td></tr>
</table>

computedFields

The following table describes the attributes in the `computedFields` section.

Parameter	Required?	Value
name	Yes	API name of the derived field to add to the dataset. The name must be unique in the dataset. Note: If the name is not unique, the dataflow fails to run.
label	No	The display name of the derived field that appears in the Analytics user interface. Can be up to 255 characters. Defaults to the API name if not specified.
description	No	Description of the derived field for information only.

Parameter	Required?	Value

expression	Yes	Expression attributes used to calculate the value for the derived field. The expression can be based on input fields or other derived fields in the transformation.
		Example:
		`"expression": {`
		`    "sourceField": "CloseDate",`
		`    "offset": "previous()",`
		`    "default": "01-01-1970"`
		See expression.

expression

The following table describes the attributes in the `expression` section when creating a derived field based on a source field.

Parameter	Required?	Value
sourceField	Yes	API name of the input field from the source node that's used in the expression.

offset	Yes	The function used in the expression. You can use the following functions:
		`current()`
		Gets the value from the current record.
		Example:
		`"offset": "current()"`
		`first()`
		Gets the value from the first record in the partition, like the first CreateDate for an opportunity.
		Example:
		`"offset": "first()"`
		`next()`
		Gets the value from the next record.
		Example:
		`"offset": "next()"`
		`previous()`
		Gets the value from the previous record.
		Example:
		`"offset": "previous()"`
		Note: Derived fields are computed in the order that they're defined. The calculation of a derived field can be based on the value from another

Parameter	Required?	Value
		derived field as long as it has already been defined. For example, `next()` can't access the value of a derived field in the next row. Tip: To get the correct results when using the `previous()` and `next()` functions, the computeRelative transformation requires you to sort the records.

default	Yes (for numeric fields only)	The default value if one can't be calculated. For example, you can specify a default value when no previous or next value exists. You can insert a constant value or `current()` as a default value.
		Examples:
		`"default": "3000-01-01T00:00:00.000Z"`
		`"default": "current()"`

The following table describes the attributes in the `expression` section when creating a derived field based on a SAQL expression.

Parameter	Required?	Value

saqlExpression	Yes	SAQL expression used to calculate the value for the derived field. The expression can be based on input fields or other derived fields in the transformation. You can use the offset functions `current()`,`first()`,`next()`, and `previous()` in the expression.
		Example to calculate the percentage change from the previous amount to the current amount:
		`"saqlExpression": "(current(Amount)-previous(Amount))/previous(Amount)*100"`
		You can also use the SAQL case operator in the expression.
		Example to output *`Up`*, *`Down`*, or *`No Change`* values based on the change from the previous amount to the current amount:
		`"saqlExpression": "case when current(Amount)>previous(Amount) then \"Up\" when current(Amount)<previous(Amount) then \"Down\" else \"No Change\" end"`

type	Yes	Analytics field type associated with the field. Valid types are Numeric and Text. Example: `"type": "Text"`

Parameter	Required?	Value
scale	No	The number of digits to the right of the decimal point in a numeric value. Example: `"scale": 2`
default	Yes (for numeric fields only)	The default value if one can't be calculated. Example: `"default": "null"`

delta Transformation

The delta transformation calculates changes in the value of a measure column in a dataset over a period of time. The delta transformation generates an output column in the dataset to store the delta for each record. Create deltas to make it easier for business analysts to include them in queries.

Note: The `delta` transformation isn't supported when null measure handling is enabled and dataflows containing delta transformations fail. Use `computeRelative` and `computeExpression` transformations instead in your dataflows, to calculate changes in measure values over time. For an example, see Enable Null Measure Handling.

The delta transformation calculates each delta value by comparing the value in each record with the value in the previous record. Because records might not be sorted, the delta transformation orders the records before computing the delta values. To do this, the transformation sorts the data by the specified dimension, and then by the specified epoch date column.

Note: When Analytics processes dates, it creates the following epoch date columns for each date processed:

Epoch Time Column	Description
<date_column_name>_sec_epoch	For example, if the date column is CloseDate, the generated epoch second column is CloseDate_sec_epoch. This column provides the number of seconds that have elapsed since January 1, 1970 (midnight UTC/GMT).
<date_column_name>_day_epoch	For example, if the date column is CloseDate, the generated epoch day column is CloseDate_day_epoch. This column provides the number of days that have elapsed since January 1, 1970 (midnight UTC/GMT).

Example: Let's look at an example. You want to create an OppHistoryDelta dataset that contains opportunity history from the OpportunityHistory object and also calculates the deltas for opportunity amounts.

The OpportunityHistory object contains the following data.

OpportunityId	CloseDate	StageName	Amount
1	1/1/2014	New	100
2	1/1/2014	New	100

OpportunityId	CloseDate	StageName	Amount
2	2/1/2014	ClosedWon	200
1	3/1/2014	ClosedWon	100

You create the following dataflow definition.

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "OpportunityHistory",
         "fields": [
            { "name": "OpportunityId" },
            { "name": "CloseDate" },
            { "name": "StageName" },
            { "name": "Amount" }
         ]
      }
   },
   "Calculate_Delta": {
      "action": "delta",
      "parameters": {
         "dimension": "OpportunityId",
         "epoch": "CloseDate_day_epoch",
         "inputMeasure": "Amount",
         "outputMeasure": "DeltaAmount",
         "source": "Extract_Opportunities"
      }
   },
   "Register_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "OppHistoryDelta",
         "name": "OppHistoryDelta",
         "source": "Calculate_Delta"
      }
   }
}
```

To calculate the delta values for each opportunity amount, the delta transformation sorts the records by the dimension (OpportunityId) first, and then by time (CloseDate_day_epoch) as shown here.

OpportunityID	CloseDate	StageName	Amount
1	1/1/2014	New	100
1	3/1/2014	ClosedWon	100
2	1/1/2014	New	100
2	2/1/2014	ClosedWon	200

After the records are sorted, for each dimension (OpportunityId), the transformation compares the previous value to the next value to determine the delta for each record. The transformation creates the following dataset.

OpportunityId	CloseDate	StageName	Amount	DeltaAmount
1	1/1/2014	New	100	0
1	3/1/2014	ClosedWon	100	0
2	1/1/2014	New	100	0
2	2/1/2014	ClosedWon	200	100

For the first record of each dimension, the transformation inserts '0' for the delta value.

Note: If an opportunity contains multiple changes on the same day, you must sort the records on a shorter time interval. In this case, sort on CloseDate_sec_epoch column. Otherwise, records might not be sorted correctly, which means delta values will be incorrect.

IN THIS SECTION:

delta Parameters

When you define a delta transformation, you set the action attribute to `delta` and specify the parameters.

The following table describes the input parameters:

Parameter	Required?	Value
dimension	Yes	Dimension column in the dataset used to sort records when calculating the delta values.
epoch	Yes	Epoch date column in the dataset used to sort records within each dimension when calculating delta values.
inputMeasure	Yes	Measure column on which you want to calculate the delta.
outputMeasure	Yes	Name of the output column that contains the delta value.

Parameter	Required?	Value
source	Yes	Node in the dataflow definition file that contains the dataset to which you want to add the delta column.

SEE ALSO:

delta Transformation

dim2mea Transformation

The dim2mea transformation creates a new measure based on a dimension. The transformation adds the new measure column to the dataset. The transformation also preserves the dimension to ensure that existing lenses and dashboards don't break if they use the dimension.

If the transformation cannot create a measure from a dimension, the transformation populates the measure with the specified default value. If no default value is provided, the transformation inserts '0.'

Example: Let's look at an example. Your Opportunity object contains a custom text field called StageVal__c, which contains the opportunity amount at a particular stage. Because this is a text field, Analytics loads this data as a dimension. However, you'd like to create a measure from this dimension to enable users to perform calculations on stage amount.

You create the following dataflow definition.

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "AccountId" },
            { "name": "StageVal__c" }
         ]
      }
   },
   "Create_Measure_From_Dimension": {
      "action": "dim2mea",
      "parameters": {
         "dimension": "StageVal__c",
         "measure": "StageValue",
         "measureDefault": "0",
         "measureType": "long",
         "source": "Extract_Opportunities"
      }
   },
   "Register_The_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "OpportunitiesWithConvertedMeasure",
         "name": "OpportunitiesWithConvertedMeasure",
         "source": "Create_Measure_From_Dimension"
      }
   }
}
```

IN THIS SECTION:

dim2mea Parameters

When you define a dim2mea transformation, you set the action attribute to `dim2mea` and specify the parameters.

The following table describes the input parameters:

Parameter	Required?	Value
dimension	Yes	Dimension column in the dataset from which you want to create the measure.
measure	Yes	Name of the output measure. This column name must be unique within the dataset. Do not use the same name as the dimension because the transformation preserves the dimension in the dataset. Note: The measure name is also the new field's API name, so it: • Can contain only alphanumeric and underscore characters. • Must begin with a letter. • Can't end with an underscore. • Can't contain 2 consecutive underscore characters, except when ending with "__c" (case-sensitive).
measureDefault	Yes	Default value for the measure if the transformation is unable to create a measure from a dimension.
measureType	Yes	Type of measure. Valid value: "long"

Parameter	Required?	Value
source	Yes	Node in the dataflow definition file that contains the dataset to which you want to add the measure.

SEE ALSO:

dim2mea Transformation

edgemart Transformation

The edgemart transformation gives the dataflow access to an existing, registered dataset, which can contain Salesforce data, external data, or a combination of the two. Use this transformation to reference a dataset so that its data can be used in subsequent transformations in the dataflow. You can use this transformation and the augment transformation together to join an existing dataset with a new dataset.

Example: Let's look at an example. You would like to compare the final sales amount against the opportunity amount to determine if heavy discounts were offered to close deals. You previously created and registered the FinalSales dataset. The FinalSales dataset contains the final sale amount of each opportunity that was closed and won.

Table 1: FinalSales Dataset

OppID	UpdateDate	StageName	SaleAmount
1	1/1/2014	ClosedWon	100,000
2	11/1/2013	ClosedWon	150,000
3	2/1/2014	ClosedWon	200,000

You would now like to create a dataset that contains opportunity information from the Opportunity object. Then, you would like to join the data from the existing FinalSales dataset with the Opportunity dataset.

You create the following dataflow definition.

```
{
    "Extract_Opportunities": {
        "action": "sfdcDigest",
        "parameters": {
            "object": "Opportunity",
            "fields": [
                { "name": "Id" },
                { "name": "Name" },
                { "name": "Amount" }
            ]
        }
    },
    "Extract_Final_Sales_Data": {
        "action": "edgemart",
        "parameters": { "alias": "FinalSales" }
    },
    "Combine_Opportunities_FinalSales": {
        "action": "augment",
        "parameters": {
            "left": "Extract_Opportunities",
            "left_key": [ "Id" ],
            "relationship": "Opportunity",
            "right": "Extract_Final_Sales_Data",
            "right_key": [ "OppID" ],
            "right_select": [ "SaleAmount" ]
        }
    },
    "Register_Opportunity_FinalSales_Dataset": {
        "action": "sfdcRegister",
        "parameters": {
            "alias": "OpportunityVersusFinalSales",
            "name": "OpporunityVersusFinalSales",
            "source": "Combine_Opportunities_FinalSales"
        }
    }
}
```

IN THIS SECTION:

edgemart Parameters
When you define an edgemart transformation, you set the action attribute to `edgemart` and specify the parameters.

edgemart Parameters

When you define an edgemart transformation, you set the action attribute to `edgemart` and specify the parameters.

The following table describes the input parameter:

Parameter	Required?	Value
alias	Yes	API name of the dataset from which you want to extract data. To determine the API name of a dataset, edit the dataset and view the system name.

SEE ALSO:

edgemart Transformation

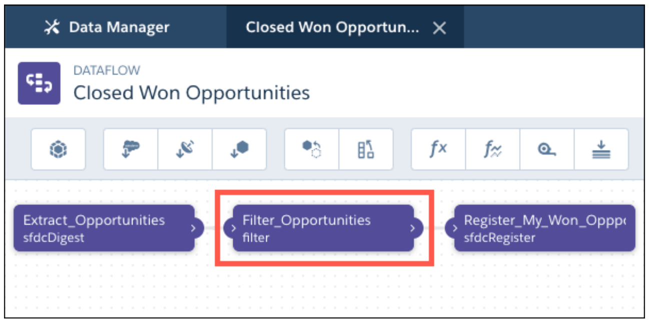
filter Transformation

The filter transformation removes records from an existing dataset. You define a filter condition that specifies which records to retain in the dataset.

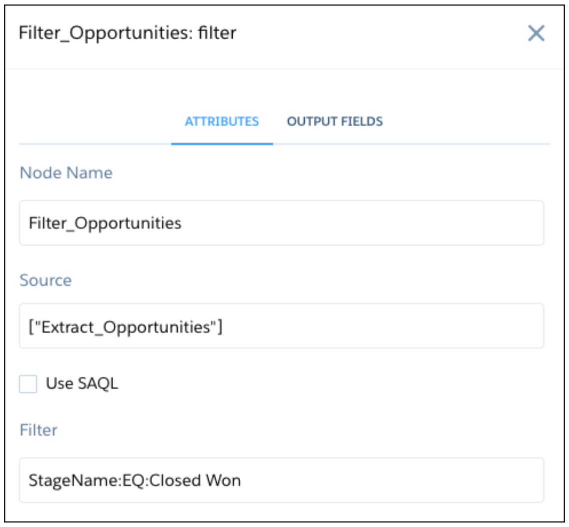
Example: Let's look at an example. You would like to create a dataset that contains only opportunities that were Closed Won. First, you extract all opportunities from the Opportunity object. Next, you filter the records so that you only include opportunities with a Closed Won stage name.

You create the following dataflow.

Dataflow



Filter Node in Dataflow



Node Name: Filter_Opportunities

Source: ["Extract_Opportunities"]

Use SAQL

Filter: StageName:EQ:Closed Won

Here's the dataflow JSON.

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "AccountId" },
            { "name": "OwnerId" }
         ]
      }
   },
   "Filter_Opportunities": {
      "action": "filter",
      "parameters": {
         "filter": "StageName:EQ:Closed Won",
         "source": "Extract_Opportunities"
      }
   },
   "Register_My_Won_Oppportunities_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "MyWonOpportunities",
         "name": "MyWonOpportunities",
         "source": "Filter_Opportunities"
      }
   }
}
```

For more complex filters, you can use SAQL in a filter node.

Tip: Depending on your need, you can filter Salesforce object records at different levels.

Transformation level

To filter a stream of data loaded into a dataset, add a filter transformation to the dataflow. (Use a filter transformation instead of an sfdcDigest transformation filter because complex filters in an sfdcDigest transformation impact global filters.) To reduce the amount of data processing downstream, add the filter transformation as early as possible in the dataflow.

Connection level

To prevent Salesforce records from being loaded into any dataset, add the filter on the connected object. You can add a filter in the sync settings for the connected Salesforce object.

IN THIS SECTION:

filter Parameters

When you define a filter transformation, you set the action attribute to `filter` and specify the parameters.

filter Expression Syntax

You create a filter expression in the filter transformation based on one or more dimensions in a dataset. You can use a standard filter expressions or a SAQL filter expression.

filter Parameters

When you define a filter transformation, you set the action attribute to `filter` and specify the parameters.

This table describes the settings for the filter node in the dataflow editor.

Setting	Required?	Value
Source	Yes	Node in the dataflow definition file that contains the dataset that you want to filter.
Use SAQL	No	Select whether to use a SAQL expression in the filter.
Filter	No	Standard filter expression that specifies which records to include in the new dataset. See filter Expression Syntax. Note: This field is visible when the Use SAQL option is not selected.

Setting	Required?	Value
SAQL Filter	No	SAQL filter expression that specifies which records to include in the new dataset. See filter Expression Syntax. Note: This field is visible when the Use SAQL option is selected.

This table describes the input parameters for the filter transformation in the dataflow JSON.

Parameter	Required?	Value
filter	No	Filter expression that specifies which records to include in the new dataset. See filter Expression Syntax.
saqlFilter	No	SAQL filter expression that specifies which records to include in the new dataset. See filter Expression Syntax.
source	Yes	Node in the dataflow definition file that contains the dataset that you want to filter.

Note: You can include either the `filter` parameter or the `saqlFilter` parameter in a filter node in the dataflow JSON, but not both.

SEE ALSO:

filter Transformation

filter Expression Syntax

You create a filter expression in the filter transformation based on one or more dimensions in a dataset. You can use a standard filter expressions or a SAQL filter expression.

Note:

- String comparisons in a filter expression are case-sensitive.
- When you filter on a Salesforce ID field extracted in an upstream sfdcDigest node, use 18-character ID values in your filter expression. sfdcDigest nodes extract 18-character IDs, and the filter transformation performs string comparisons on ID fields.

  Example: `RecordTypeId:EQ:0126A0000016QfyQAE`

To use a standard filter expression, deselect the **Use SAQL** option in the dataflow editor, or use the `filter` parameter in the dataflow JSON. You can use the following types of filter expressions:

Filter Expression Syntax	Description
dim:EQ:value	True if the dimension and value are equal. Dataflow editor example: *`StageName:EQ:Closed Won`* Dataflow JSON example: `"filter": "StageName:EQ:Closed Won"`
dim:R:val0:val1	True if the left dimension falls within the specified range between val0 and val1. Dataflow editor example: *`EmployeeId:R:100:1000`* Dataflow JSON example: `"filter": "EmployeeId:R:100:1000"`
dim:R:val	True if the dimension is greater than or equal to the value based on binary sort order. For example, this is true when the dimension is 'City' and the value is 'Anderson' because ' 'City' > 'Anderson'). Dataflow editor example: *`LastName:R:Li`* Dataflow JSON example: `"filter": "LastName:R:Li"`
dim:R::val	True if the dimension is less than or equal to the value based on binary sort order. Dataflow editor example: *`LastName:R::Levy`* Dataflow JSON example: `"filter": "LastName:R::Levy"`
dim:N:val	True if the dimension and value are not equal. Dataflow editor example: *`RoleName:N:Manager`* Dataflow JSON example: `"filter": "RoleName:N:Manager"`
dim:EQ:val1|val2	True if the dimension equals values val1 or val2. This filter expression uses the logical OR operator (|). You can compare the dimension value against more than 2 values. For example, to compare against 3 values, use the following syntax: dim1:EQ:val1|val2|val3. Dataflow editor example: *`Lead Status:EQ:Open|Contacted`* Dataflow JSON example: `"filter": "Lead Status:EQ:Open|Contacted"`
dim1:EQ:val1,dim2:EQ:val2	True if dimension dim1 equals value val1 and dimension dim2 equals value val2. This filter expression uses the logical AND operator (,). You can compare more than 2 dimensions. For example, to compare 3 dimensions, use the following syntax: dim1:EQ:val1,dim2:EQ:val2,dim3:EQ:val3.

Filter Expression Syntax	Description
	Dataflow editor example: *`Lead Status:EQ:Qualified,Rating:EQ:Hot`* Dataflow JSON example: `"filter": "Lead Status:EQ:Qualified,Rating:EQ:Hot"`

To use a SAQL filter expression, select the **Use SAQL** option in the dataflow editor, or use the `saqlFilter` parameter in the dataflow JSON. Use the SAQL filter statement in your expression without the `a = filter a by` part. See

Example: This example returns rows where the Stage Name field contains *`Proposal/Price Quote`* or *`Negotiation/Review`*.

Dataflow editor: *`StageName in ["Proposal/Price Quote", "Negotiation/Review"]`*

Dataflow JSON: `"saqlFilter": "StageName in [\"Proposal/Price Quote\", \"Negotiation/Review\"]"`

Note: In the JSON, escape double quotes in the filter with `\`.

For complete information about SAQL operators, see *Analytics SAQL Reference*.

SEE ALSO:

filter Transformation

flatten Transformation

The flatten transformation flattens hierarchical data. For example, you can flatten the Salesforce role hierarchy to implement row-level security on a dataset based on the role hierarchy.

When you configure the flatten transformation to flatten a hierarchy, you specify the field that contains every node in the hierarchy and the field that contains their corresponding parent based on the hierarchy. The flatten transformation generates one record for each hierarchy node, which we refer to as the "self ID." Each record contains two generated columns that store the hierarchy for each self ID node. One column contains a comma-separated list of all ancestors for each node in the hierarchy. The other column contains the hierarchy path.

See the Roles and RolePath columns in the following flattened dataset to see how ancestors are stored.

Role ID (Self ID)	Role Name	Parent Role ID	Roles	RolePath
1	Salesperson 1	10	10, 20, 30	\10\20\30
2	Salesperson 2	10	10, 20, 30	\10\20\30
3	Salesperson 3	11	11, 20, 30	\11\20\30
10	Regional Manager 1	20	20, 30	\20\30
11	Regional Manager 2	20	20, 30	\20\30
20	Vice President 1	30	30	\30
21	Vice President 2	30	30	\30

Role ID (Self ID)	Role Name	Parent Role ID	Roles	RolePath
30	CEO	Not applicable	Not applicable	Not applicable

You can also configure the flatten transformation to include the self ID node in the generated hierarchy columns. The following dataset shows the self ID in bold.

Role ID (Self ID)	Role Name	Parent Role ID	Roles	RolePath
1	Salesperson 1	10	**1**, 10, 20, 30	**1**\\10\\20\\30
2	Salesperson 2	10	**2**,10, 20, 30	**2**\\10\\20\\30
3	Salesperson 3	11	**3**,11, 20, 30	**3**\\11\\20\\30
10	Regional Manager 1	20	**10**,20, 30	**10**\\20\\30
11	Regional Manager 2	20	**11**,20, 30	**11**\\20\\30
20	Vice President 1	30	**20**,30	**20**\\30
21	Vice President 2	30	**21**,30	**21**\\30
30	CEO	Not applicable	**30**	**30**

Example: Let’s look at an example. You want to create a dataset that contains all opportunities. For each opportunity, you want to include user and role information about the opportunity owner. Also, to implement row-level security based on the role hierarchy, each opportunity record must also contain a list of all ancestors above each opportunity owner based on the role hierarchy. To generate the list of ancestors, use the flatten transformation to flatten the role hierarchy.

You create the following dataflow definition file:

```
{
"Extract_Opportunity": {
   "action": "sfdcDigest",
   "parameters": {
      "object": "Opportunity",
      "fields": [
         { "name": "Id" },
         { "name": "Name" },
         { "name": "Amount" },
         { "name": "StageName" },
         { "name": "AccountId" },
         { "name": "OwnerId" }
      ]
   }
},
"Extract_User": {
   "action": "sfdcDigest",
   "parameters": {
      "object": "User",
      "fields": [
         { "name": "Id" },
         { "name": "Name" },
         { "name": "Department" },
         { "name": "UserRoleId" }
      ]
   }
},
"Extract_UserRole": {
   "action": "sfdcDigest",
   "parameters": {
      "object": "UserRole",
      "fields": [
         { "name": "Id" },
         { "name": "Name" },
         { "name": "ParentRoleId" }
      ]
   }
},
"Flatten_UserRole": {
   "action": "flatten",
   "parameters": {
      "source": "Extract_UserRole",
      "self_field": "Id",
      "parent_field": "ParentRoleId",
      "multi_field": "Roles",
      "path_field": "RolePath",
      "include_self_id":false
   }
},
"Augment_User_FlattenUserRole": {
   "action": "augment",
   "parameters": {
      "left": "Extract_User",
      "left_key": [ "UserRoleId" ],
      "relationship": "Role",
      "right": "Flatten_UserRole",
      "right_key": [ "Id" ],
      "right_select": [
         "Id",
         "Name",
         "Roles",
         "RolePath"
      ]
   }
},
"Augment_Opportunity_UserWithRoles": {
   "action": "augment",
   "parameters": {
      "left": "Extract_Opportunity",
      "left_key": [ "OwnerId" ],
      "right": "Augment_User_FlattenUserRole",
      "relationship": "Owner",
      "right_select": [
         "Name",
         "Department",
         "Role.Id",
         "Role.Name",
         "Role.Roles",
         "Role.RolePath"
      ],
      "right_key": [ "Id" ]
   }
},
"Register_OpportunityWithRoles_Dataset": {
   "action": "sfdcRegister",
   "parameters": {
      "alias": "OppRoles",
      "name": "OppRoles",
      "source": "Augment_Opportunity_UserWithRoles",
     "rowLevelSecurityFilter": "'Owner.Role.Roles' == \"$User.UserRoleId\" || 'OwnerId'
== \"$User.Id\""
   }
}
}
```

To flatten the Salesforce role hierarchy, the flatten transformation uses the following input fields from the UserRole object.

Id
Id identifies each node in the Salesforce role hierarchy.

ParentRoleId
ParentRoleId identifies the parent as defined in the role hierarchy.

After traversing through each parent-child relationship in the UserRole object, the flatten transformation generates one record for each role ID. Each record contains all ancestor roles for each role in the hierarchy. The flatten transformation generates two output columns—Roles and RolePath—to store all ancestor roles for each role.

IN THIS SECTION:

flatten Parameters
When you define a flatten transformation, you set the action attribute to `flatten` and specify the parameters.

flatten Parameters

When you define a flatten transformation, you set the action attribute to `flatten` and specify the parameters.

The following table describes the input parameters:

Parameter	Required?	Value
include_self_id	No	Indicates whether to include the self ID node in the generated multi_field and path_field columns. Valid values are `false` (default) and `true`.
self_field	Yes	Name of the input field that identifies each node in the hierarchy.

Parameter	Required?	Value
parent_field	Yes	Name of the input field that identifies the direct parent of each node in the hierarchy. For example, the Regional Manager 1 role is the parent of the Salesperson 1 role in a role hierarchy.
multi_field	Yes	Name of the multi-value output field that contains a list of all ancestors in the hierarchy, in order from the lowest to the highest level. The flatten transformation creates this field and generates the list of ancestors for each node in the hierarchy. For example, for Salesperson 1 role, the hierarchy of ancestors is: `Sales Manager 1, Regional Manager 1, Vice President 1, CEO`.
path_field	Yes	A string representation of the multi-field field, separated by backslashes. This output field contains the hierarchical path of all ancestors in the hierarchy, in order from the lowest to the highest level. The flatten transformation creates this field and generates the ancestry path for each node in the hierarchy. For example, for a salesperson role in a role hierarchy, the value is: `Sales Manager 1\Regional Manager 1\Vice President 1\CEO`.
source	Yes	Node in the dataflow definition file that contains the hierarchical data that you want to flatten. This node is the input source for this transformation and it must contain the input fields mapped to self_field and parent_field.

Note: By default, the multi_field and path_field fields are created as system fields, which aren't visible in the user interface. To make the fields appear in the user interface, add a schema section to the flatten transformation and set the `IsSystemField` metadata attribute to *`false`* for each field in the transformation. The schema section is shown in bold in this sample JSON.

```
"Flatten_UserRole": {
    "schema": {
      "objects": [
        {
          "label": "UserWithRoles",
          "fields": [
            {
              "name": "Roles",
              "label": "Roles",
              "isSystemField": false
            },
            {
              "name": "RolePath",
              "label": "RolePath",
              "isSystemField": false
            }
          ]
        }
      ]
    },
    "action": "flatten",
    "parameters": {
      "source": "Extract_UserRole",
      "self_field": "Id",
      "parent_field": "ParentRoleId",
      "multi_field": "Roles",
      "path_field": "RolePath",
      "include_self_id": false
    }
  },
```

For more information about overriding metadata using a schema section in a transformation, see Overriding Metadata Generated by a Transformation.

SEE ALSO:

flatten Transformation

sfdcDigest Transformation

The sfdcDigest transformation generates a dataset based on data that it extracts from a Salesforce object. You specify the Salesforce object and fields from which to extract data. You might choose to exclude particular fields that contain sensitive information or that aren't relevant for analysis.

When you upload the dataflow definition file, Analytics validates access to Salesforce objects and fields based on the user profile of the Integration User. If the user profile does not have read access to a field or object, the upload fails.

At run time, Analytics runs the dataflow as the Integration User. Again, Analytics validates access to the objects and fields based on the profile of the Integration User. For example, if the dataflow tries to extract data from a custom field on which the Integration User does not have read access, the dataflow job fails.

Note: The Integration User is a preconfigured user that is created when Analytics is enabled in your organization. If you or the Integration User need permission on a Salesforce object or field, ask the administrator to grant access.

For more information about preconfigured users in Analytics, see the *Analytics Security Implementation Guide*.

Example: Let's look at an example. You would like to create a dataset that contains all opportunities from the Opportunity object.

You create the following dataflow definition.

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "AccountId" },
            { "name": "OwnerId" },
            { "name": "OpportunitySupportTeamMembers__c" }
         ]
      }
   },
   "Register_Opportunities_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "Opportunities",
         "name": "Opportunities",
         "source": "Extract_Opportunities"
      }
   }
}
```

Considerations When Using the sfdcDigest Transformation

- Consider dataset storage limits when extracting data. For example, a dataset can contain a maximum of 5,000 fields, so be selective when choosing fields. See Analytics Limits.
- The sfdcDigest transformation runs a SOQL query to extract data from a Salesforce object, and so is subject to SOQL limits. If the query exceeds any of these limits, it may return no results or cause the dataflow job to fail. For example, The length of the SOQL query cannot exceed 20,000 characters. To reduce the SOQL query length, consider breaking up the extract into two or more sfdcDigest transformations and then use the augment transformation to combine the results. For example, you might create one sfdcDigest transformation to extract half of the fields and create another sfdcDigest transformation to extract the remaining fields. See SOQL and SOSL Limits.
- The sfdcDigest transformation can extract data from Salesforce Big Objects, but incremental extract isn't supported and filtering is possible only on primary key fields.

IN THIS SECTION:

Filtering Records Extracted from a Salesforce Object

Add a filter to the sfdcDigest transformation to extract a subset of all records from a Salesforce object. You can filter records to reduce the number of extracted and processed records, exclude records that contain irrelevant or sensitive data, and increase dataflow performance.

Overriding Salesforce Field Metadata

You can override the field metadata that the sfdcDigest transformation extracts from a Salesforce object to make the data appear differently in a dataset. For example, Analytics can add a default value to records that have missing values for a field.

Unsupported Salesforce Objects and Fields in Analytics

The sfdcDigest transformation can't extract data from all Salesforce objects and fields. Consider these limitations before configuring the extraction of Salesforce objects.

sfdcDigest Parameters

When you define an sfdcDigest transformation, you set the action attribute to `sfdcDigest` and specify the parameters for the object and fields that you want to extract. Optionally, you can also specify parameters to filter the records extracted from the Salesforce object.

Filtering Records Extracted from a Salesforce Object

Add a filter to the sfdcDigest transformation to extract a subset of all records from a Salesforce object. You can filter records to reduce the number of extracted and processed records, exclude records that contain irrelevant or sensitive data, and increase dataflow performance.

A filter consists of one or more filter conditions, where each filter condition compares a field value to a value. For example, `Amount >= 1000000`. You can also apply SOQL functions on the field value in a filter condition, like `CALENDAR_YEAR(CreatedDate) = 2011`. You can add multiple filter conditions using logical operators AND, OR, and NOT. You can also use a backslash (\) to escape double quotes included in strings.

The sfdcDigest transformation extracts all records for which the filter is true. If you configured the sfdcDigest transformation for incremental extraction, the filter applies to data extracted during the incremental run only—Analytics doesn't apply the filter to records that were previously loaded into the dataset. If you add an invalid filter, the dataflow fails at run time.

For each instance of sfdcDigest, you can use one of the following types of filters:

- Structured filter
- Advanced filter

Tip: Are you trying to decide whether to use a filter in the sfdcDigest transformation or use a filter transformation? Use a filter transformation to filter records at any point in the dataflow. For example, you can add it after the dataflow joins two datasets. However, to reduce the number of rows processed in the dataflow and optimize dataflow performance, add the filter closest to the point at which records are extracted—when possible, add the filter in the sfdcDigest transformation.

Note: Filtering records extracted from Salesforce Big Objects is supported only on primary key fields in the sfdcDigest transformation.

IN THIS SECTION:

SEE ALSO:

sfdcDigest Transformation

Structured Filter in sfdcDigest Transformation

You define a structured filter using JSON syntax.

A structured filter uses the following JSON syntax for each filter condition.

```
{
"field": "<field name>",
"operator": "<operator>",
"value": "<value>"|"["<value 1>", "<value 2>"]",
"isQuoted": true|false}
```

The value can be a number, date, string, list of strings, or date literal. Analytics automatically quotes strings unless you set `isQuoted` to true, which indicates that the string is already quoted.

You can use one of the following operators in a filter condition.

Operator	Comment
=	Filter condition is true if the value in the field equals the specified value. String comparisons using the equals operator are case-insensitive. Example: `"filterConditions": [ { "field": "OwnerId", "operator": "=", "value": "0056A0000020jzDQAQ" } ]`
!=	Filter condition is true if the value in the field does not equal the specified value. Example (using backslashes to escape double quotes in a string value): `"filterConditions": [ { "field": "Nickname__c", "operator": "!=", "value": "\"Sammy\"" } ]`
>	Filter condition is true if the value in the field is greater than the specified value. Example: `"filterConditions": [ { "field": "Amount", "operator": ">", "value": "100000" } ]`
<	Filter condition is true if the value in the field is less than the specified value. Example (using a date literal): `"filterConditions": [ { "field": "CloseDate", "operator": "<", "value": "THIS_MONTH", "isQuoted": false`

Operator	Comment
	`} ]`
>=	Filter condition is true if the value in the field is greater than or equal to the specified value. Example: `"filterConditions": [ { "field": "Amount", "operator": ">=", "value": "100000" } ]`
<=	Filter condition is true if the value in the field is less than or equal to the specified value. Example (using a SOQL function): `"filterConditions": [ { "field": "CALENDAR_YEAR (CreatedDate)", "operator": "<=", "value": "2015", "isQuoted": true } ]`
LIKE	Filter condition is true if the value in the field matches the specified value. The LIKE operator is similar to the LIKE operator in SQL; it provides a mechanism for matching partial text strings and supports wildcards. • The % and _ wildcards are supported for the LIKE operator. • The % wildcard matches zero or more characters. • The _ wildcard matches exactly 1 character. • The LIKE operator is supported for string fields only. • The LIKE operator performs a case-insensitive match. • The LIKE operator supports escaping of special characters % or _. Use a backslash (\) to escape special characters. Example: `"filterConditions": [ { "field": "FirstName", "operator": "LIKE", "value": "Chris%"`

Operator	Comment
	```
	   }
	 ]
	```

IN	Filter condition is true if the value in the field equals any one of the values in the specified list. You can specify a quoted or non-quoted list of values. If the list is quoted, set `isQuoted` to true.
	Example:
	```
	"filterConditions": [
	   {
	   "field": "StageName",
	   "operator": "IN",
	   "value": ["Closed Won", "Closed Lost"]
	   }
	]
	```

NOT IN	Filter condition is true if the value in the field does not equal any of the values in the specified list.
	Example:
	```
	"filterConditions": [
	   {
	   "field": "BillingState",
	   "operator": "NOT IN",
	   "value": ["California", "New York"]
	   }
	]
	```

INCLUDES	For picklist or multi-select picklist fields only. Filter condition is true if the value in the picklist field includes the specified value.
	Example:
	```
	"filterConditions": [
	   {
	   "field": "BillingState",
	   "operator": "INCLUDES",
	   "value": ["California"]
	   }
	]
	```

EXCLUDES	For picklist or multi-select picklist fields only. Filter condition is true if the value in the picklist field excludes the specified value.
	Example:
	```
	"filterConditions": [
	   {
	   "field": "BillingState",
	```

Operator	Comment

	`"operator": "EXCLUDES",`
	`"value": ["California", "New York"]`
	`}`
	`]`

Let's look at a few examples of structured filters.

Example: Let's look at an example with a basic structured filter. To perform pipeline analysis on opportunities in fiscal quarter 2 of fiscal year 2015, you create this dataflow definition file to create the relevant dataset.

```
{
   "Extract_Filtered_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "AccountId" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "OwnerId" },
            { "name": "FiscalYear" },
            { "name": "FiscalQuarter" },
            { "name": "SystemModstamp" }
         ],
         "filterConditions": [
               {
                  "field": "FiscalYear",
                  "operator": "=",
                  "value": "2015"
               },
               {
                  "field": "FiscalQuarter",
                  "operator": "=",
                  "value": "2"
               }
         ]
      }
   },
   "Register_Opportunities_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "Opportunities_2015Q2",
         "name": "Opportunities_2015Q2",
         "source": "Extract_Filtered_Opportunities"
      }
   }
}
```

Note: If you do not specify a logical operator for multiple filter conditions—as is the case in this example—Analytics applies AND between the conditions.

Example: Let's look at an example of a structured filter with a logical operator. To help forecast expected revenue, you create this dataflow to view all opportunities that have either closed or have greater than 90% probability of closing.

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "AccountId" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "OwnerId" },
            { "name": "Probability" },
            { "name": "FiscalYear" },
            { "name": "FiscalQuarter" }
         ],
         "filterConditions": [
            {
               "operator": "OR",
               "conditions": [
                  {
                     "field": "StageName",
                     "operator": "=",
                     "value": "Closed Won"
                  },
                  {
                     "field": "Probability",
                     "operator": ">=",
                     "value": "90"
                  }
               ]
            }
         ]
      }
   },
   "Register_Opportunities_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "OpportunitiesExpectedToWin",
         "name": "OpportunitiesExpectedToWin",
         "source": "Extract_Opportunities"
      }
   }
}
```

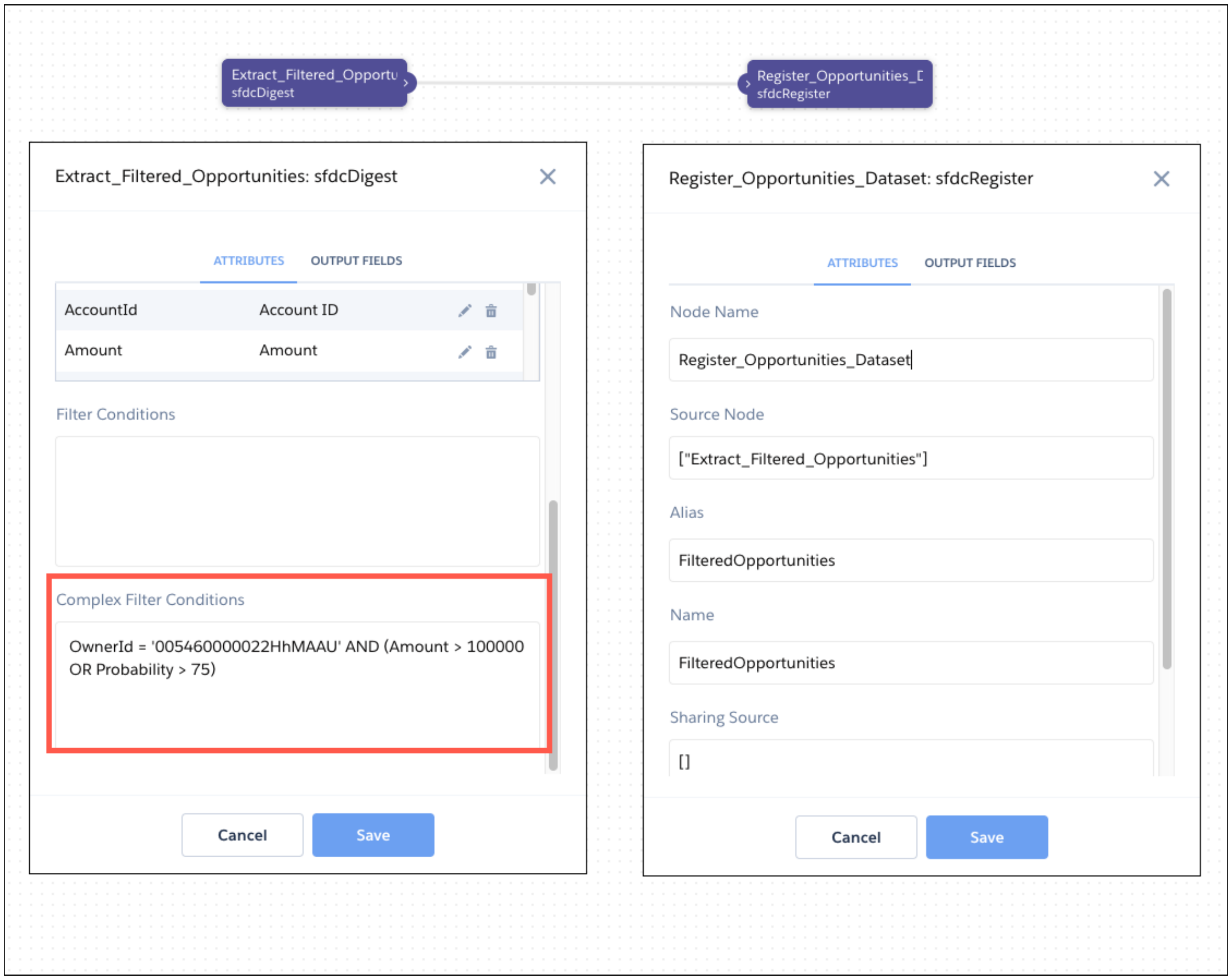
Example: Finally, let's look at an example of a structured filter with nested logical operators. You create this dataflow to view all opportunities that closed in the current fiscal quarter and are owned by either one of your two direct reports.

```
{
    "Extract_Opportunities": {
        "action": "sfdcDigest",
        "parameters": {
            "object": "Opportunity",
            "fields": [
                { "name": "Id" },
                { "name": "Name" },
                { "name": "AccountId" },
                { "name": "Amount" },
                { "name": "StageName" },
                { "name": "CloseDate" },
                { "name": "OwnerId" },
                { "name": "FiscalYear" },
                { "name": "FiscalQuarter" }
            ],
            "filterConditions": [
                {
                    "operator": "AND",
                    "conditions": [
                        {
                            "field": "CloseDate",
                            "operator": "=",
                            "value": "THIS_FISCAL_QUARTER",
                            "isQuoted": false
                        },
                        {
                            "operator": "OR",
                            "conditions": [
                                {
                                    "field": "OwnerId",
                                    "operator": "=",
                                    "value": "0056A0000020jzDQAQ"
                                },
                                {
                                    "field": "OwnerId",
                                    "operator": "=",
                                    "value": "0056A0000020jzGQAQ"
                                }
                            ]
                        }
                    ]
                }
            ]
        }
    },
    "Register_Opportunities_Dataset": {
        "action": "sfdcRegister",
        "parameters": {
            "alias": "DirectReport_Opportunities",
            "name": "DirectReport_Opportunities",
            "source": "Extract_Opportunities"
        }
    }
}
```

Advanced Filter in sfdcDigest Transformation

You define an advanced filter using a Salesforce Object Query Language (SOQL) WHERE clause expression. Use an advanced filter only if you are familiar with SOQL.

Example: Let's look at an example of an advanced filter. You want to extract only opportunity records that are owned by a specific user and that have either high value or a high probability of closing. You create this dataflow in the dataflow editor and add a filter in the Complex Filter Conditions field of the sfdcDigest node.



Extract_Filtered_Opportunities: sfdcDigest

AccountId	Account ID
Amount	Amount

Filter Conditions

Complex Filter Conditions

OwnerId = '005460000022HhMAAU' AND (Amount > 100000 OR Probability > 75)

Register_Opportunities_Dataset: sfdcRegister

Node Name: Register_Opportunities_Dataset

Source Node: ["Extract_Filtered_Opportunities"]

Alias: FilteredOpportunities

Name: FilteredOpportunities

Sharing Source: []

To add an advanced filter in the dataflow JSON, add a `complexFilterConditions` parameter in the sfdcDigest node.

```
{
   "Extract_Filtered_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "AccountId" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "Probability" },
            { "name": "OwnerId" }
         ],
         "complexFilterConditions": "OwnerId = '005460000022HhMAAU' AND (Amount >
100000 OR Probability > 75)"
        }
   },
   "Register_Opportunities_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "FilteredOpportunities",
         "name": "FilteredOpportunities",
         "source": "Extract_Filtered_Opportunities"
      }
   }
}
```

Consider the following requirements for advanced filters.

- Always enclose OR conditions in parentheses in advanced filters, even if there are no other conditions. For example, to extract only closed won or closed lost opportunities, use this advanced filter: *(StageName = 'Closed Won' OR StageName = 'Closed Lost')*. Excluding parentheses causes the dataflow to fail.
- You can't use subqueries in an advanced filter if incremental sync is enabled on the Salesforce object.

Overriding Salesforce Field Metadata

You can override the field metadata that the sfdcDigest transformation extracts from a Salesforce object to make the data appear differently in a dataset. For example, Analytics can add a default value to records that have missing values for a field.

You can add the following field parameters to the sfdcDigest transformation node to override the field metadata:

- defaultValue
- type
- fiscalMonthOffset
- isYearEndFiscalYear
- firstDayOfWeek
- isMultiValue
- multiValueSeparator (not available in dataflow editor)
- precision
- scale

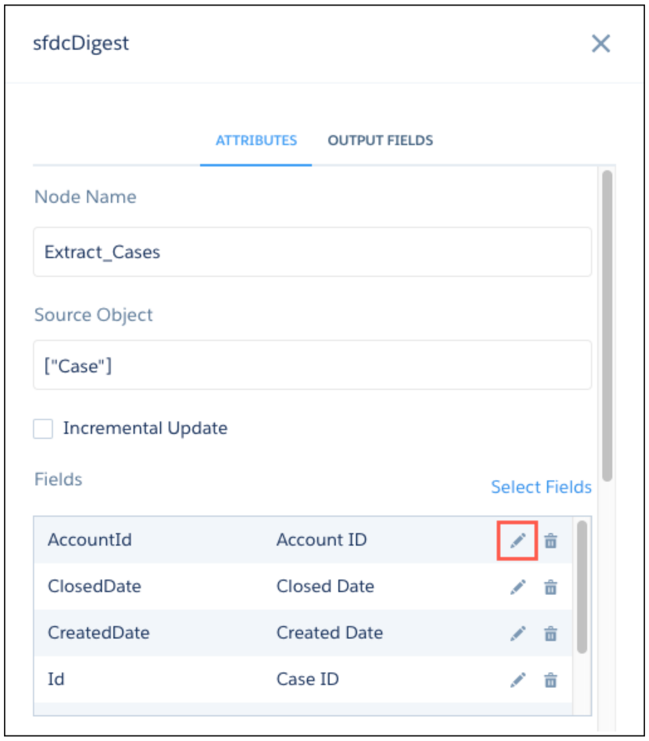
For a description of each of these field parameters, see Field Parameters. For information about using metadata attributes to configure dates, see Date Handling in Datasets.

Example: Let's look at an example. You would like to override metadata extracted from the Opportunity object.

To override field metadata from the Opportunity object, you add the bold text to the sfdcDigest node in the datflow definition file.

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            {
               "name": "Amount",
               "defaultValue":"0",
               "precision":18,
               "scale":2
            },
            { "name": "StageName" },
            {
               "name": "CloseDate",
               "fiscalMonthOffset":9,
               "firstDayOfWeek":2,
               "isYearEndFiscalYear":true
            },
            { "name":"AccountId" },
            { "name":"OwnerId" },
            {
               "name": "OpportunitySupportTeamMembers__c",
               "type":"Text",
               "isMultiValue":true,
               "multiValueSeparator":",",
               "precision":255
            }
         ]
      }
   },
   "Register_Opportunities_Dataset":{
      "action":"sfdcRegister",
      "parameters":{
         "alias":"Opportunities",
         "name":"Opportunities",
         "source":"Extract_Opportunities"
      }
   }
}
```

If you're working in the dataflow editor, click the sfdcDigest node and then click next to the field that you want to change.



Node Name: Extract_Cases

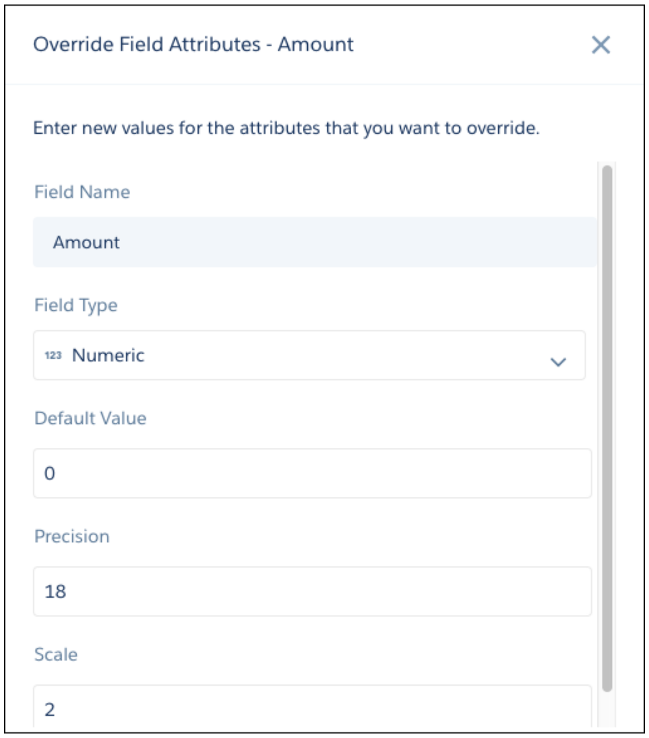
Source Object: ["Case"]

Incremental Update

Fields

AccountId	Account ID
ClosedDate	Closed Date
CreatedDate	Created Date
Id	Case ID

Update the field attributes, and then click **Save**.



Enter new values for the attributes that you want to override.

Field Name: Amount

Field Type: Numeric

Default Value: 0

Precision: 18

Scale: 2

Note: Changing a field's type attribute to anything other than Text can result in an error in your dataflow or unexpected values in your datasets. For example, if you change a text field to a numeric field, you see an error when you try to update the dataflow.

SEE ALSO:

sfdcDigest Transformation

Unsupported Salesforce Objects and Fields in Analytics

The sfdcDigest transformation can't extract data from all Salesforce objects and fields. Consider these limitations before configuring the extraction of Salesforce objects.

For information about all Salesforce objects and fields, see the Object Reference for Salesforce and Lightning Platform.

Unsupported Objects

The sfdcDigest transformation can't extract data from these Salesforce objects.

- ActivityMetric
- ApexEmailNotification
- AuthProvider
- BrandTemplate
- ChatterConversation
- ChatterConversationMember
- ChatterMessage
- ConnectedApplication
- ContentFolderLink
- ContentFolderMember
- ContentWorkspace
- ContentWorkspaceDoc
- ContentWorkspaceMember
- ContentWorkspacePermission
- CopyExport
- CorsWhitelistEntry
- DataAssessmentFieldMetric
- DataAssessmentMetric
- DataAssessmentValueMetric
- DataHubSetupData
- DataHubSetupDefinition
- DirectMessage
- DirectMessageFeed
- DirectMessageMember
- EmailCapture

- EmailDomainKey
- EmailServicesAddress
- EmailServicesFunction
- EmailStatus
- EmailTemplate
- EnvironmentHub
- EnvironmentHubInvitation
- EnvironmentHubMemberRel
- EventType
- EventTypeParameter
- ExternalString
- FeedLike
- FeedPollChoice
- FeedPollVote
- KnowledgeArticle
- KnowledgeArticleVersion
- KnowledgeArticleVersionHistory
- KnowledgeArticleViewStat
- KnowledgeArticleVoteStat
- LeadChangeEvent
- LoginGeo
- LoginHistory
- NetworkActivityAudit
- NetworkModeration
- OrganizationProperty
- OrgWideEmailAddress
- PackageLicense
- PartnerNetworkSyncLog
- ReputationLevel
- ReputationLevelLocalization
- ReputationPointsRule
- SalesforceIqUser
- SampledEntity
- SandOmInfo
- SandOmInfoDetail
- SandOmObserver
- ScoreIntelligence
- SearchPromotionRule
- SecurityCustomBaseline
- SelfServiceUser

- SsoUserMapping
- TenantSecret
- TwoFactorInfo
- TwoFactorTempCode
- UserPackageLicense
- UserProvAccount
- UserProvAccountStaging
- UserProvisioningConfig
- UserProvisioningLog
- UserProvisioningRequest
- UserProvisioningRequestOwnerSharingRule
- UserProvisioningRequestShare
- UserProvMockTarget
- UserRecordAccess
- VerificationHistory
- VoiceUserLine
- VoiceUserLineOwnerSharingRule
- VoiceUserLineShare
- VoiceVendorLine
- VoiceVendorLineOwnerSharingRule
- VoiceVendorLineShare
- WebLink
- WebLinkLocalization

The sfdcDigest transformation cannot extract data from external objects created in Salesforce. External objects are similar to custom objects, except that they map to data located outside Salesforce.

If you include an unsupported or inaccessible object in the sfdcDigest transformation, the dataflow fails at run time with an error message.

Unsupported Fields

The sfdcDigest transformation can't extract data from these fields.

Object	Unsupported Fields
Account	CleanStatus
ActionPlanItem	ItemId
AuthSession	• LoginGeoId • LoginHistoryId
CaseArticle	KnowledgeArticleId
Contact	• CanAllowPortalSelfReg • CleanStatus

Object	Unsupported Fields
ContentDocument	ParentId
CustomPerson__p	Title
DocumentAttachmentMap	ParentId
EmailMessage	ActivityId
EmailRoutingAddress	EmailServicesAddressId
EnvironmentHubMember	EnvironmentHubId
ExternalEventMapping	EventId
InstalledMobileApp	ConnectedApplicationId
Lead	CleanStatus
KnowledgeArticle	MasterLanguage
Network	• CaseCommentEmailTemplateId • ChangePasswordEmailTemplateId • ForgotPasswordEmailTemplateId • WelcomeEmailTemplateId
Organization	• SelfServiceEmailUserOnCaseCreationTemplateId • SelfServiceNewCommentTemplateId • SelfServiceNewPassTemplateId • SelfServiceNewUserTemplateId • WebToCaseAssignedEmailTemplateId • WebToCaseCreatedEmailTemplateId • WebToCaseEmailTemplateId • WebToLeadEmailTemplateId
PermissionSet	• PermissionsEditEvent • PermissionsEditTask
PermissionSetLicense	• MaximumPermissionsEditEvent • MaximumPermissionsEditTask
Profile	• PermissionsEditEvent • PermissionsEditTask
ThirdPartyAccountLink	SsoProviderId
User	• LastPasswordChangeDate • UserPreferencesEnableVoicePilot

Object	Unsupported Fields
WorkBadge	RewardId
WorkBadgeDefinition	RewardFundId

If you include a field with an unsupported field in the sfdcDigest transformation, the dataflow ignores the field.

In addition, Salesforce recommends that you do not extract data from the MayEdit field of the Account object. Extracting data from this field significantly decreases performance and can cause the dataflow to fail.

Unsupported Field Types

The sfdcDigest transformation can't extract data from fields with these field types.

- base64
- composite (like address and location)
- data category group reference
- encrypted string

If you include a field with an unsupported field type in the sfdcDigest transformation, the dataflow ignores the field.

SEE ALSO:

sfdcDigest Transformation

sfdcDigest Parameters

When you define an sfdcDigest transformation, you set the action attribute to `sfdcDigest` and specify the parameters for the object and fields that you want to extract. Optionally, you can also specify parameters to filter the records extracted from the Salesforce object.

You can specify parameters in the following sections of the sfdcDigest node: parameters, fields, and filterConditions.

Parameters

The following table describes the parameters in the `parameters` section.

Parameter	Required?	Value
object	Yes	API name of the Salesforce object from which you want to extract data. This object is the input source for this transformation. The sfdcDigest transformation doesn't support extraction from all Salesforce objects.
incremental	No	Performs an incremental sync, which extracts only changes to the Salesforce object since the last dataflow run. Valid values: true or false. Note: Incremental sync: • Is available if you have enabled data sync. • Isn't supported for Salesforce big objects.

Parameter	Required?	Value
fullRefreshToken	No	Performs a one-time full extraction to synchronize the data in the dataset with data in the Salesforce object. Specify any value for this parameter. After the full extraction, the dataflow performs an incremental extraction each time thereafter even though the `fullRefreshToken` parameter is included in the dataflow definition. To run a full extraction again, change the value of the `fullRefreshToken` parameter to a different value. Note: Incremental sync is available if you have enabled data sync.
fields	Yes	An array of names of all fields from which you want to extract data from the specified Salesforce object. The sfdcDigest transformation doesn't support extraction from all field types. See Field Attributes.
filterConditions	No	A filter that restricts the records extracted from the specified Salesforce object. The sfdcDigest transformation extracts all records from the Salesforce object for which the filter is true. You can specify a structured or advanced filter. See Filter Conditions Parameters.
complexFilterConditions	No	For advanced filters only. A SOQL WHERE clause used to filter records extracted from the specified Salesforce object.

Field Attributes

The following table describes the attributes in the `fields` section. It also describes optional attributes that you can provide to override the field metadata. You can override the metadata that the sfdcDigest transformation extracts from a Salesforce object to make the data appear differently in a dataset. For example, Analytics can add a default value to records that have missing values for a field. If you don't override the values, Analytics gets the values from Salesforce.

Attribute	Required?	Value
name	Yes	API name of the field in the Salesforce object that you want to include in the dataset. You can specify multiple fields.
defaultValue	No	For text and numeric fields that can be null. Default value that replaces a null value for the specified field. Enter a string value. Example: `"defaultValue": "0"`
type	No	Analytics field type associated with the specified field. Valid types are Text, Numeric, or Date. Any value, including numeric values, can be Text. For example, by default, fiscal quarter from Salesforce objects is Number. However, you can change it to Text. Specify a type to override the type determined by Analytics. Example: `"type": "Text"`

Attribute	Required?	Value
		Note: You can't change a field's type to Numeric or Date.
fiscalMonthOffset	No	For date fields only. The difference, in months, between the first month of the fiscal year and the first month of the calendar year (January). For example, if the fiscal year starts in January, the offset is 0. If the fiscal year starts in October, the offset is 9. Example: `"fiscalMonthOffset": 9` Note: This attribute also controls whether Analytics generates fiscal date fields. To generate fiscal date fields, set `fiscalMonthOffset` to a value other than 0. Warning: Analytics doesn't support fields with different `fiscalMonthOffset` values in the same dataset. Using different `fiscalMonthOffset` values can produce unexpected results when you filter by relative fiscal date ranges. We recommend that you set the same value for all `fiscalMonthOffset` attributes in a dataset. For more information, see Date Handling in Datasets.
isYearEndFiscalYear	No	For date fields only. Indicates whether the fiscal year is the year in which the fiscal year ends or begins. Because the fiscal year can start in one calendar year and end in another, you must specify which year to use for the fiscal year. • If true, then the fiscal year is the year in which the fiscal year ends. The default is true. • If false, then the fiscal year is the year in which the fiscal year begins. Example: `"isYearEndFiscalYear": true` This field is relevant only when `fiscalMonthOffset` is greater than 0. Warning: Analytics doesn't support fields with different `isYearEndFiscalYear` values in the same dataset. Using different `isYearEndFiscalYear` values can produce unexpected results when you filter by relative fiscal date ranges. We recommend that you set the same value for all `isYearEndFiscalYear` attributes in a dataset. For more information, see Date Handling in Datasets.
firstDayOfWeek	No	For date fields only. The first day of the week for the calendar year and, if applicable, fiscal year. Use 0 to set the first day to be Sunday, 1 to set the first day to be Monday, and so on. Use -1 to set the first day to be on January 1. The default is -1. Example: `"firstDayOfWeek": 0` Warning: Analytics doesn't support fields with different `firstDayOfWeek` values in the same dataset. Using different

Attribute	Required?	Value
		`firstDayOfWeek` values can produce unexpected results when you filter by relative week date ranges. We recommend that you set the same value for all `firstDayOfWeek` attributes in a dataset. For more information, see Date Handling in Datasets.
isMultiValue	No	For text fields only. Indicates whether the specified field has multiple values. Example: `"isMultiValue": false`
multiValueSeparator	No	For text fields only. Character used to separate multiple values in the specified field when isMultiValue equals true. This value defaults to a semicolon (;) if you do not specify a value and isMultiValue equals true. Set to null when isMultiValue equals false. Example: `"multiValueSeparator": ";"`
precision	No	The maximum number of digits in a numeric value, or the length of a text value. For numeric values: Includes all numbers to the left and to the right of the decimal point (but excludes the decimal point character). Value must be from 1 through 18, inclusive. For text values: Value defaults to 255 characters, and must be from 1 through 32,000 characters, inclusive. Example: `"precision": 10`
scale	No	The number of digits to the right of the decimal point in a numeric value. Must be less than the precision value. Value must be from 0 through 17 characters, inclusive. Example: `"scale": 2`

Filter Conditions Parameters

The following table describes the structured filter parameters in the `filterConditions` section. These parameters do not apply to advanced filters.

Parameter	Required?	Value

field	No	The field in the Salesforce object on which you want to apply a filter condition. Each filter condition in a structured filter uses the following syntax:
		`{`
		`"field": "<field name>",`
		`"operator": "<operator>",`
		`"value": "<value>",`
		`"isQuoted": true|false}`

Parameter	Required?	Value
operator	No	The purpose depends on the context. • `operator` can be used as a comparison operator–like =, <, and IN–that compares the field value against a constant value. • `operator` can also be used as a logical operator (AND, OR, or NOT) that links multiple filter conditions together. In the example below, the bold `operator` is the logical operator. The other instances of `operator` are comparison operators.

```
"filterConditions": [
   {
      "operator": "OR",
      "conditions": [
         {
            "field": "StageName",
            "operator": "=",
            "value": "Closed Won"
         },
         {
            "field": "Probability",
            "operator": ">=",
            "value": "90"
         }
      ]
   }
]
```

Parameter	Required?	Value
value	No	The value used in a filter condition.
isQuoted	No	Indicates whether you quoted the string value in a filter condition. Example with quoted values:

```
"filterConditions": [
   {
   "field": "StageName",
   "operator": "IN",
   "value": "('Closed Won', 'Closed Lost')",
   "isQuoted": true
   }
]
```

Example with non-quoted values:

```
"filterConditions": [
   {
   "field": "StageName",
   "operator": "IN",
   "value": ["Closed Won", "Closed Lost"],
   "isQuoted": false
   }
]
```

Parameter	Required?	Value
		If you don't include isQuoted for a filter on a string value, Analytics assumes that the string value is not quoted and adds the quotes for you.
conditions	No	Use to specify a logical operator to link multiple filter conditions together.

SEE ALSO:

sfdcDigest Transformation

Filtering Records Extracted from a Salesforce Object

sfdcRegister Transformation

The sfdcRegister transformation registers a dataset to make it available for queries. Users cannot view or run queries against unregistered datasets.

Note: The sfdcRegister transformation overwrites the current version of the dataset if it already exists.

You don't need to register all datasets. For example, you don't need to register an intermediate dataset that is used to build another dataset and does not need to be queried. In addition, you don't need to register datasets that are created when you upload external data because Analytics automatically registers these datasets for you.

Carefully choose which datasets to register because:

- The total number of rows in all registered datasets cannot exceed 100 million rows per platform license, or 250 million per platform license *purchased before* October 20, 2015.
- Users that have access to registered datasets can query their data. Although, you can apply row-level security on a dataset to restrict access to records.

Example: Let's look at an example. You create a dataflow that extracts opportunities from the Opportunity object. To register the dataset, name it "Opportunities," and apply row-level security on it, you add the sfdcRegister transformation as shown in the following dataflow definition file.

```
{
   "Extract_Opportunities": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "CloseDate" },
            { "name": "AccountId" },
            { "name": "OwnerId" }
         ]
      }
   },
   "Register_Oppportunities_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "Opportunities",
         "name": "Opportunities",
         "source": "Extract_Opportunities",
         "rowLevelSecurityFilter": "'OwnerId' == \"$User.Id\""
      }
   }
}
```

IN THIS SECTION:

sfdcRegister Parameters

When you define an sfdcRegister transformation, you set the action attribute to `sfdcRegister` and specify the parameters.

The following table describes the input parameters:

Parameter	Required?	Value
alias	Yes	API name of the registered dataset. This name can contain only underscores and alphanumeric characters, and must be unique among other dataset aliases in your organization. It must begin with a letter, not include spaces, not end with an underscore, and not contain two consecutive underscores. It also cannot exceed 80 characters. Note: When the alias is unique, the sfdcRegister transformation registers a new dataset with the alias. When an existing dataset has the alias, the transformation overwrites the current version of that dataset.
name	Yes	Display name of the registered dataset. The name cannot exceed 80 characters. Note: To change the name after you create the dataset, you must edit the dataset.
source	Yes	Node in the dataflow definition file that identifies the dataset that you want to register. This node is the input source for this transformation.
rowLevelSharingSource	No	The API name of the object from which to inherit sharing. Used when applying row-level security on the dataset when the dataset is first created. Example: "rowLevelSharingSource": "Opportunity" Note: To change the sharing source after you create the dataset, you must edit the dataset. If they don't match, you see a warning that says, "The sharing source and security predicate in this dataset version must be the same as in the dataflow." For more information, refer to Salesforce Sharing Inheritance for Datasets.

Parameter	Required?	Value
rowLevelSecurityFilter	No	The predicate used to apply row-level security on the dataset when the dataset is first created. Example: "rowLevelSecurityFilter": "'OwnerId' == "$User.Id"" Note: To change the predicate after you create the dataset, you must edit the dataset. When entering the predicate in the Register transformation of the dataflow JSON, you must escape the double quotes around string values. After the dataset is created, Analytics ignores its security predicate setting in the dataflow. To change the security predicate for an existing dataset, edit the dataset in the user interface.

SEE ALSO:

sfdcRegister Transformation

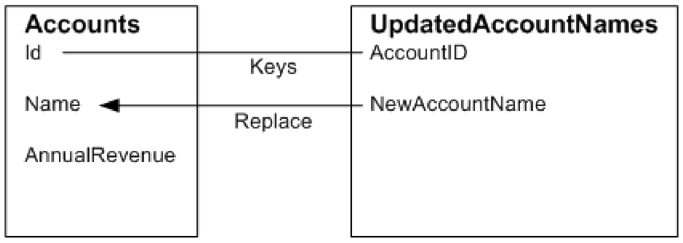
update Transformation

The update transformation updates the specified field values in an existing dataset based on data from another dataset, which we'll call the lookup dataset. The transformation looks up the new values from corresponding fields in the lookup dataset. The transformation stores the results in a new dataset.

When you create the transformation, you specify the keys that are used to match records between the two datasets. To dictate which field in the lookup dataset updates the field in the source dataset, you also map the corresponding fields from both datasets.

Example: Let's look at an example. You have an existing Accounts dataset that contains account information—Id, Name, and AnnualRevenue. Unfortunately, some of the account names in the dataset are now incorrect because of a series of mergers and acquisitions. To quickly update the account names in the dataset, you perform the following tasks.

1. Create a .csv file that contains the new account names and associated account IDs for accounts that have name changes.
2. Upload the .csv file to create a dataset called UpdatedAccountNames.
3. Create a dataflow definition file to update account names in the Accounts dataset by looking up the new account names in the UpdatedAccountNames dataset.



You create the following dataflow definition file.

```
{
   "Extract_AccountDetails": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Account",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "AnnualRevenue" }
         ]
      }
   },
   "Extract_UpdatedAccountNames": {
      "action": "edgemart",
      "parameters": { "alias": "UpdatedAccountNames" }
   },
   "Update_AccountRecords": {
      "action": "update",
      "parameters": {
         "left": "Extract_AccountDetails",
         "right": "Extract_UpdatedAccountNames",
         "left_key": [ "Id" ],
         "right_key": [ "AccountID" ],
         "update_columns": { "Name": "NewAccountName" }
      }
   },
   "Register_UpdatedAccountRecords": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "Accounts",
         "name": "Accounts",
         "source": "Update_AccountRecords"
      }
   }
}
```

Example: Let’s look at another example, where a composite key is used to match records between both datasets. In this case, you match records using the account ID and account name fields.

You create the following dataflow definition file.

```
{
   "Extract_AccountDetails": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Account",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "AnnualRevenue" }
         ]
      }
   },
   "Extract_UpdatedAccountNames": {
      "action": "edgemart",
      "parameters": { "alias": "UpdatedAccountNames" }
   },
   "Update_AccountRecords": {
      "action": "update",
      "parameters": {
         "left": "Extract_AccountDetails",
         "right": "Extract_UpdatedAccountNames",
         "left_key": ["Id","Name"],
         "right_key": ["AccountId","NewAccountName"],
         "update_columns": {
            "Name": "NewAccountName",
            "CreatedDate":"NewCreatedDate",
            "AnnualRevenue":"NewAnnualRevenue"
      }
   },
   "Register_UpdatedAccountRecords": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "Accounts",
         "name": "Accounts",
         "source": "Update_AccountRecords"
      }
   }
}
```

IN THIS SECTION:

update Parameters

When you define an update transformation, you set the action attribute to `update` and specify the parameters.

The following table describes the input parameters.

Parameter	Required?	Value
left	Yes	Node in the dataflow definition file that identifies the dataset that contains the records that you want to update.
right	Yes	Node in the dataflow definition file that identifies the lookup dataset that contains the new values.
left_key	Yes	Key column in the left dataset used to match records in the other dataset. If you use a composite key, the left and right keys must have the same number of columns in the

Parameter	Required?	Value
		same order. For an example, see update Transformation on page 81.
right_key	Yes	Key column in the right dataset used to match records in the other dataset. If you use a composite key, the left and right keys must have the same number of columns in the same order.
update_columns	No	An array of corresponding columns between the left and right datasets. Use the following syntax: `"update_columns": { "LeftColumn1": "RightColumn1", "LeftColumn2": "RightColumn2",... "LeftColumnN": "RightColumnN" }`. The value from right column replaces the value from the corresponding left column. The field types of the left and right column must match. Note: If you specify a column name that does not exist, the dataflow fails. If you do not specify this parameter, the transformation updates the left dataset by matching all columns in the right dataset with those in the left. In this case, the right column names must match exactly with the left column names. Otherwise, an error might occur.

SEE ALSO:

update Transformation

Overriding Metadata Generated by a Transformation

Optionally, you can override the metadata that is generated by a transformation. You can override object and field attributes. For example, you can change a field name that is extracted from a Salesforce object so that it appears differently in the dataset. To override the metadata, add the overrides to the Schema section of the transformation in the dataflow definition file.

In the Schema section, you can override the metadata attributes for one object only.

The Schema section in this sample sfdcDigest transformation contains metadata overrides:

EDITIONS

Available in: Salesforce Classic and Lightning Experience

Available for an additional cost in: **Enterprise**, **Performance**, and **Unlimited** Editions

```
"Extract_Opportunities": {
   "action": "sfdcDigest",
   "parameters": {
      "object": "Opportunity",
      "fields": [
         { "name": "Name" },
         { "name": "Amount" }
      ]
   },
   "schema": {
      "objects": [
         {
            "label":"Sales Opportunities",
            "fields": [
               {
                  "name": "Amount",
                  "label": "Opportunity Amount"
               }
            ]
         }
      ]
   }
}
```

Object Attributes

You can override the following object attributes.

Object Attribute	Type	Description
`label`	String	The display name for the object. Can be up to 40 characters. Example: `"label": "Sales Data"`
`description`	String	The description of the object. Must be less than 1,000 characters.

Object Attribute	Type	Description
		Add a description to annotate an object in the dataflow definition file. This description is not visible to users in the Analytics user interface. Example: `"description": "The SalesData object tracks basic sales data."`
`fields`	Array	The array of fields for this object.

Field Attributes

You can override attributes of each specified dataset field.

Field Attribute	Type	Description

`name`	String	Name of the field in the dataset. Identifies the field that you want to override.
		Examples:
		`"name": "Amount"`
		`"name": "Role.Name"`

`label`	String	The display name for the field. Can be up to 255 characters. Example: `"label": "Opportunity Amount"`
`description`	String	The description of the field. Must be less than 1,000 characters. Add a description to annotate a field in the dataflow definition file. This description is not visible to users in the Analytics user interface. Example: `"description": "The Amount field contains the opportunity amount."`
`isSystemField`	Boolean	Indicates whether this field is a system field to be excluded from query results. Example: `"isSystemField": false`
`format`	String	The display format of the numeric value. Examples: `"format": "$#,##0.00" (Numeric)` For more information about valid formats, see Numeric Formats.

Numeric Formats

An example of a typical numeric value is $1,000,000.99, which is represented as $#,##0.00. You are required to specify the precision and scale of the number. The format is specified by using the following symbols:

Symbol	Meaning
0	One digit. Use to add leading or trailing 0s, like `#,###.00` for $56,375.00.
#	Adds zero or one digit
.	Default symbol used as the decimal separator. Use the `decimalSeparator` field to set the decimal separator to a different symbol.
-	Minus sign
,	Grouping separator
$	Currency sign

Note: The format for numeric values isn't used in data ingestion. It is used only to specify how numeric values are formatted when displayed in the UI. Also, you can't override date formats.

Example: Let's consider an example where you want to override the following object and field attributes that the sfdcDigest transformation extracts from the Opportunity object.

Object/Field	Attribute Changes
Opportunity object	• Change the object label to "Sales Opportunities" • Add an object description
Id field	• Change the field label to "Opportunity Id" • Hide the field from queries
Amount field	• Change the field label to "Opportunity Amount" • Change the format to $#,##0.00
CloseDate field	• Change the field label to "Closing Date"

To override the attributes, you add the Schema section with the override values to sfdcDigest in the dataflow definition file.

```
{
"Extract_Opportunities": {
   "action": "sfdcDigest",
   "parameters": {
      "object": "Opportunity",
      "fields": [
         { "name": "Id" },
         { "name": "Name" },
         { "name": "Amount" },
         { "name": "StageName" },
         { "name": "CloseDate" },
         { "name": "AccountId" },
         { "name": "OwnerId" }
      ]
   },
   "schema": {
      "objects": [
         {
            "label":"Sales Opportunities",
            "description": "These are all sales opportunities.",
            "fields": [
               {
                  "name": "Id",
                  "label": "Opportunity Id",
                  "isSystemField": true
               },
               {
                  "name": "Amount",
                  "label": "Opportunity Amount",
                  "format": "$#,##0.00"
               },
               {
                  "name": "CloseDate",
                  "label": "Closing Date"
               }
            ]
         }
      ]
   }
},
 "Register_Dataset_Opportunities": {
   "action": "sfdcRegister",
   "parameters": {
      "source": "Extract_Opportunities",
      "alias": "Opportunities",
      "name": "Opportunities"
      }
   }
}
```

Important: Analytics removes Schema sections from all transformations except sfdcDigest when you add a dataflow to a package. If you intend to package a dataflow, we recommend that you specify field attributes in the transformation itself, instead of in a schema section. For example, this computeRelative transformation uses a label attribute to change a field's label.

```
"CalcAmountAfterdiscount": {
  "action": "computeExpression",
  "parameters": {
    "mergeWithSource": true,
    "source": "getOpps",
    "computedFields": [
      {
        "name": "DiscountedAmount",
        "label": "Discounted Amount",
        "type": "Numeric",
        "saqlExpression": "Amount * Discount_Percentage__c",
        "precision": 10,
        "scale": 2
      }
    ]
  }
},
```

LOAD SALESFORCE DATA WITH THE DATASET BUILDER AND THE DATAFLOW

EDITIONS

Available in: Salesforce Classic and Lightning Experience

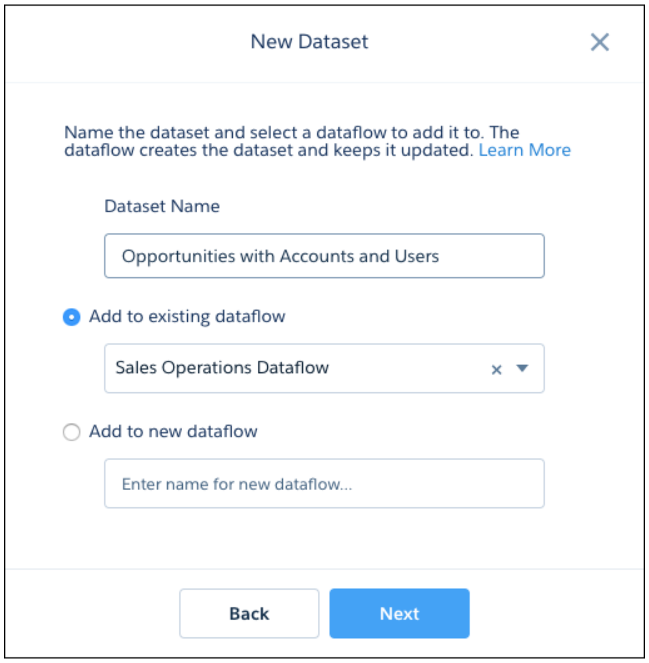
Available for an additional cost in: **Enterprise**, **Performance**, and **Unlimited** Editions

USER PERMISSIONS

To access the dataset builder:
- Edit Analytics Dataflows

Use the dataset builder to create a single dataset based on data from one or more related Salesforce objects. The dataset builder adds transformations to extract, augment, and register the data in a new or existing dataflow. The dataset is created the next time the selected dataflow runs, and refreshes each time the dataflow subsequently runs. You can edit the dataflow to add transformations before you create the dataset.

1. On the home page or on an app page, click **Create** > **Dataset**.
2. Click **Salesforce Data**.
   The New Dataset dialog opens.



New Dataset

Name the dataset and select a dataflow to add it to. The dataflow creates the dataset and keeps it updated. Learn More

Dataset Name: Opportunities with Accounts and Users

[✓ Add to existing dataflow]: Sales Operations Dataflow

Add to new dataflow: Enter name for new dataflow...

3. Enter a name for the dataset.

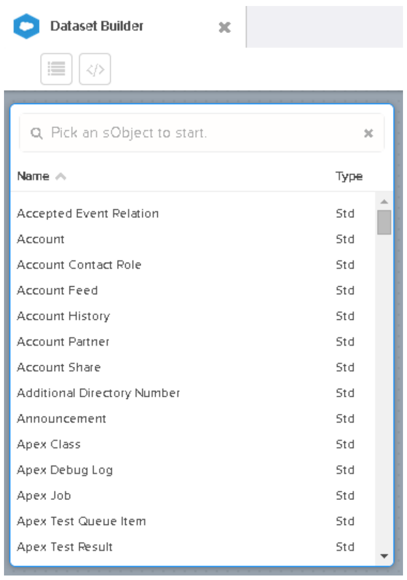
   Note: If you enter a dataset name that is already used, when you create the dataset, the dataset builder appends a number to the dataset name. For example, if you entered MyOpportunities, the dataset builder creates MyOpportunities1. The dataset name cannot exceed 80 characters.

4. Select a dataflow to add the dataset transformations to. You can select an existing dataflow, or a new dataflow.
   a. To add the transformations to an existing dataflow, select **Add to existing dataflow**, and then select the dataflow from the list.
   b. To add the transformations to a new dataflow, select **Add to new dataflow**, and then enter a name for the new dataflow.

   Note: The option to add to a new dataflow is only available if you have enabled data sync in your org.

5. Click **Next**.

The dataset builder opens inside the dataflow editor.

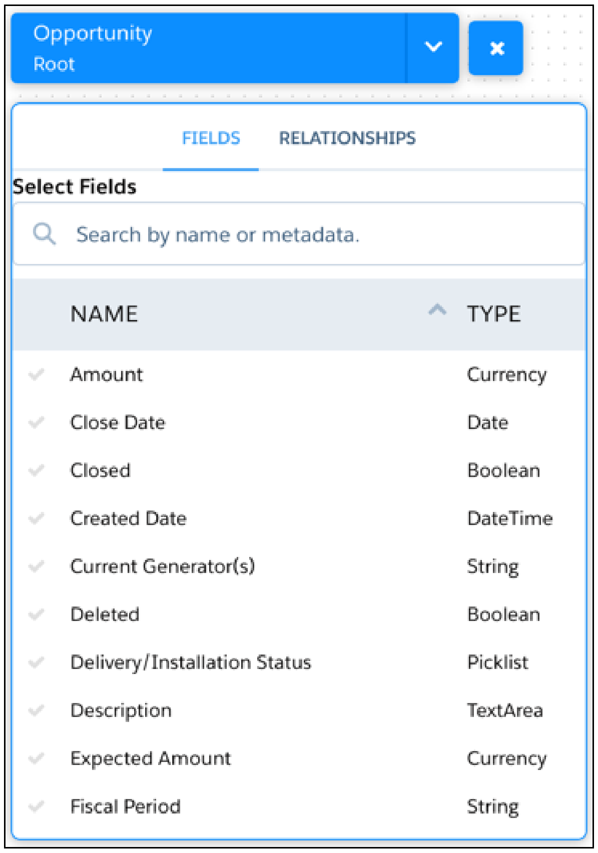


Name	Type
Accepted Event Relation	Std
Account	Std
Account Contact Role	Std
Account Feed	Std
Account History	Std
Account Partner	Std
Account Share	Std
Additional Directory Number	Std
Announcement	Std
Apex Class	Std
Apex Debug Log	Std
Apex Job	Std
Apex Test Queue Item	Std
Apex Test Result	Std

6. Select the root object.

   The root object is the lowest level child object that you can add to the canvas. After you select the root object, you can add only parent objects of the root object—you can't add its child objects. To change the root object, refresh the page and start over.

7. Hover over the root object, and then click +.
   The Select Fields dialog box appears. By default, the Fields tab appears and shows all available object fields from which you can extract data.



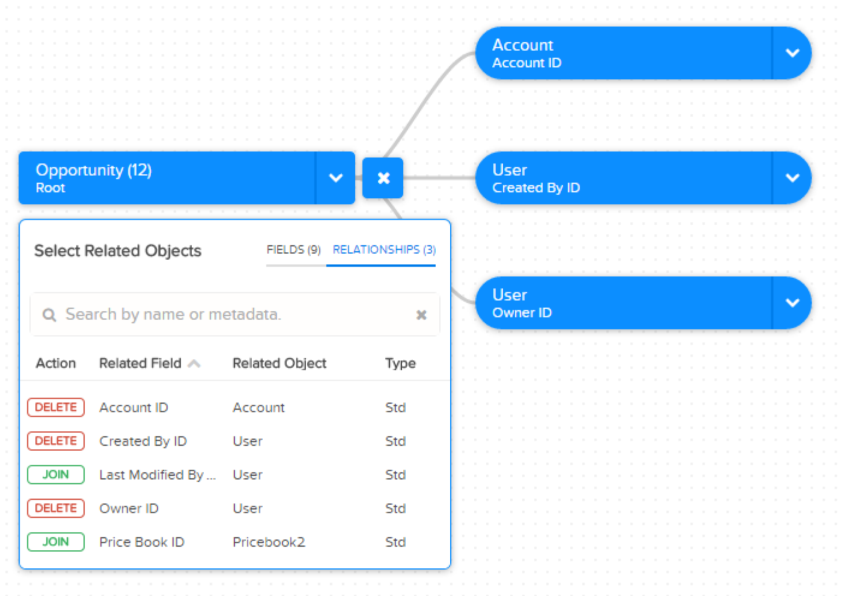
NAME	TYPE
Amount	Currency
Close Date	Date
Closed	Boolean
Created Date	DateTime
Current Generator(s)	String
Deleted	Boolean
Delivery/Installation Status	Picklist
Description	TextArea
Expected Amount	Currency
Fiscal Period	String

Note: You can view this dialog box for any object included in the canvas.

8. In the Fields tab, select the fields from which you want to extract data.
   To locate fields more quickly, you can search for them or sort them by name or type.

   Important: Select at least one field for each object that you add to the canvas. If you add an object and don't add any of its fields, the dataflow fails at run time.

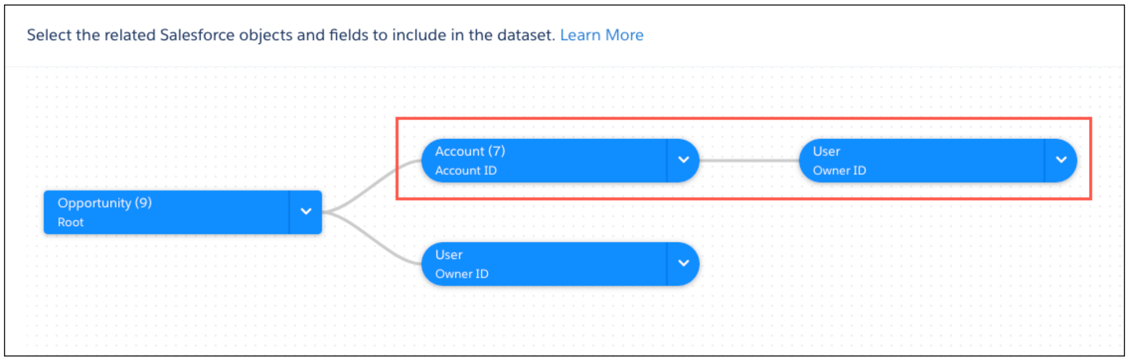
9. In the Relationships tab, click **Join** to add the related objects to the canvas.
   When you add a related object, the related object appears in the canvas.



Action	Related Field	Related Object	Type
DELETE	Account ID	Account	Std
DELETE	Created By ID	User	Std
JOIN	Last Modified By ...	User	Std
DELETE	Owner ID	User	Std
JOIN	Price Book ID	Pricebook2	Std

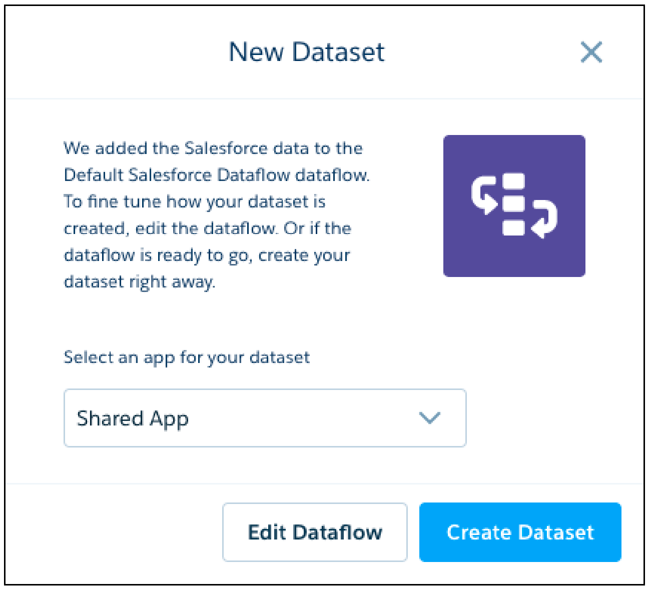
10. To remove a related object, click **Delete**.

Warning: When you delete a related object, you also delete all objects that descend from the related object. For example, if you delete Account shown below, you delete the branch that contains Account and User.


Select the related Salesforce objects and fields to include in the dataset. Learn More

11. For each related object, select the fields from which you want to extract data.
12. To move the entire diagram, select a white space in the canvas and drag it.

    You might need to move the diagram to view a different section of the diagram.
13. When you have finished adding objects and fields, click **Next**.
    The transformations for the new dataset are added to the dataflow you selected.



We added the Salesforce data to the Default Salesforce Dataflow dataflow. To fine tune how your dataset is created, edit the dataflow. Or if the dataflow is ready to go, create your dataset right away.

14. Select the app that will contain the dataset, if it's not already selected.

15. To open the dataset editor to view or edit the dataflow in that you added the transformations to, click **Edit Dataflow**. To run the dataflow now to create the dataset, click **Create Dataset**.

Note: To edit the dataflow, you must select the Shared App for the dataset.

INSTALL THE EINSTEIN ANALYTICS CONNECTOR FOR EXCEL

The Salesforce Einstein Analytics Connector for Excel gives you a fast, easy way to import data from Excel 2013 into Analytics.

If you use Excel 2013 on the desktop or Office 365, the Office Online version of Excel, the Einstein Analytics Connector for Excel gives you a great way to get your data into Analytics. After installing the Connector, you just select data from Excel, click **Submit Data**, and the Connector does the work for you, importing the data to Analytics and creating a dataset.

USER PERMISSIONS

To import data from Excel 2013 to Analytics:
- Upload External Data to Analytics

Here's how to install the Connector:

1. Open Excel, either on your desktop or in Office Online.
2. Click the **Insert** tab.
3. Click **Store**.
4. Search for the Einstein Analytics Connector for Excel, and click **Add** to install it.
5. Click **Log in to Salesforce**, and enter your Salesforce credentials to open the Connector.

Once you've installed the Connector, follow the instructions in the Connector window to create datasets from your Excel data. Opening the Connector automatically logs you in to Analytics. Click the Connector Help icon for complete information about using the app.

CREATE A DATASET WITH EXTERNAL DATA

Create a Dataset with External Data

You can either upload external data through the user interface or through the External Data API to create a dataset. When you upload an external data file, you can also provide a metadata file. A metadata file contains metadata attributes that describe the structure of the data in the external data file. If you upload a .csv from the user interface, Analytics automatically generates the metadata, which you can preview and change.

Tip: Analytics temporarily stores the uploaded CSV and metadata files for processing only. After the datasets are created, Analytics purges the files. If you want to use the files again later, keep a copy.

Before uploading external data files, review the format requirements and examples of the .csv and metadata files in the Analytics External Data Format Reference.

Note: You can also use the External Data API to upload external data files. Use the API to take advantage of more features, like performing incremental extracts and performing append, delete, and upsert operations. For more information about the External Data API, see the External Data API Developer's Guide.

EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

To upload external data:
- Upload External Data to Analytics

1. To start a .csv upload, choose one of these options.
   a. On the Analytics Studio home tab or an app page, click **Create** > **Dataset**, and select **CSV File**.
   b. In the data manager, click the **Datasets** tab and then click **Create Dataset**.
2. Select the .csv file to upload by performing one of these steps.
   a. Click **Select a file or drag it here**, then select the file and click **Open**.
   b. Drag the file into the file drop area.
3. Click **Next**.
4. In the Dataset Name field, enter a name for the dataset.

   By default, Analytics uses the file name as the dataset name. The name cannot exceed 80 characters.
5. Select the app where the dataset will be created.

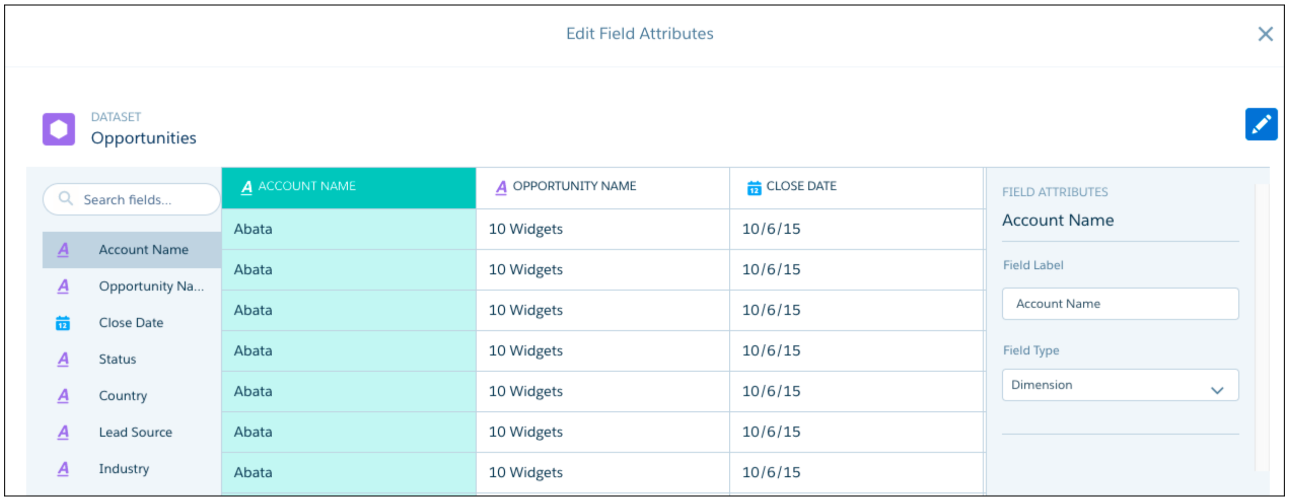
   By default, Analytics selects your My Private App. To change an app, click the cross on it and select a different one.
6. In the File Properties Detected box, check that Analytics has correctly identified the properties of your file.

   Usually, Analytics correctly identifies your file properties. If it doesn't, your data may not load correctly and you will see unexpected results when you preview the data on the next screen. To edit the file properties, click ▼ and select **Edit**.

   Note: Analytics also generates a data schema file for your data. This file contains properties such as field labels, field types, and settings. You can view and change these schema properties when you preview the data on the next screen. However, if you want to download the file first, or replace it with your own file, click ▼ in the Data Schema File field.

7. Click **Next**.

   The Edit Field Attributes screen appears. Here, you can preview the data, and view or edit the attributes for each field.


Edit Field Attributes

DATASET
Opportunities

ACCOUNT NAME	OPPORTUNITY NAME	CLOSE DATE
Abata	10 Widgets	10/6/15
Abata	10 Widgets	10/6/15
Abata	10 Widgets	10/6/15
Abata	10 Widgets	10/6/15
Abata	10 Widgets	10/6/15
Abata	10 Widgets	10/6/15
Abata	10 Widgets	10/6/15

FIELD ATTRIBUTES
Account Name
Field Label: Account Name
Field Type: Dimension

8. To view or change a field's attributes, either click the field in the list on the left, or click the field's column.

   Field attributes appear in a panel on the right. The field attributes that you see are determined by the field type.

   Important: Analytics detects the format for date fields based on a sample of values. If the sample contains values with unsupported formats or a mixture of formats, Analytics sets the field type to Text. If you change the date format that Analytics detects, rows with a different format will fail.

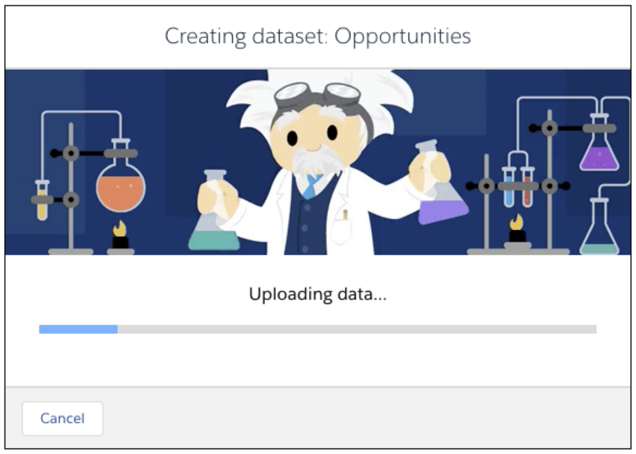
   Consider this example data.

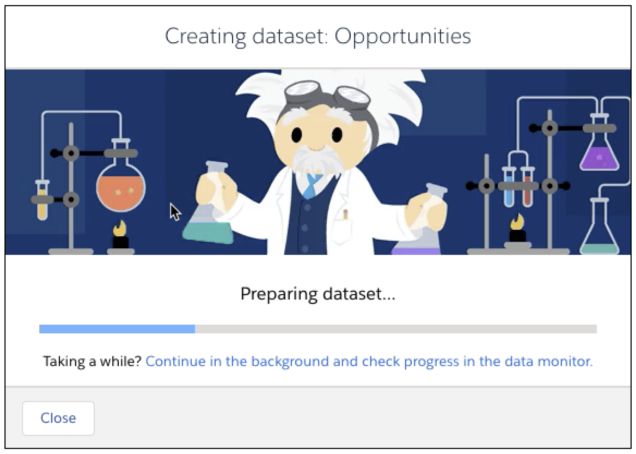
Row	SIC Code	SIC Description	Last Updated
1	1110	Barley growing	1/10/17
2	1120	Rice growing	11/14/17
3	1130	Alliaceous vegetable growing	1/1/17

   Analytics detects the date format for the Last Updated field as *M/d/yy*. This format displays months and days below 10 without leading zeros, and years as 2 digits, as in 1/1/17. If you change the format to *MM/dd/yy*, rows 1 and 3 will fail because Analytics expects the month and day parts of the date values to have 2 digits.

9. When you finish reviewing or editing field attributes, click **Upload File**.

   Analytics uploads the data, prepares and creates the dataset, and shows you progress as it happens.

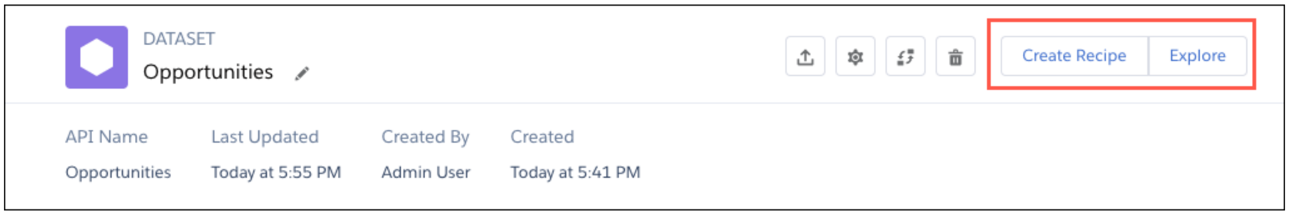



Creating dataset: Opportunities
Preparing dataset...
Taking a while? Continue in the background and check progress in the data monitor.
Close

10. Choose one of these options while Analytics creates the dataset.
    a. To cancel the process and stop dataset creation, click **Cancel** on the progress dialog.

       This option is available only when the data is uploading.
    b. To close the progress dialog and leave the process running in the background, click **Close**.
    c. To close the progress dialog but continue monitoring progress, click the **Continue in the background and check progress in the data monitor** link.

       You're taken to the Monitor tab in the data manager.
    d. Do nothing. When the dataset is created, you're taken to the dataset's edit page, where you can explore the data in a lens, prepare it in a recipe, or create a story in Einstein Discovery.



API Name	Last Updated	Created By	Created
Opportunities	Today at 5:55 PM	Admin User	Today at 5:41 PM

IN THIS SECTION:

Rules for Automatic Generation of a Metadata File

When you upload a CSV file from the user interface, Analytics automatically generates the metadata file as long as the CSV file meets certain requirements.

Rules for Automatic Generation of a Metadata File

When you upload a CSV file from the user interface, Analytics automatically generates the metadata file as long as the CSV file meets certain requirements.

To enable Analytics to generate the metadata file, a CSV file must meet the following requirements.

- The file type must be .csv, not .gz or .zip.

- The file must contain one row for the column header and at least one record.
- The CSV file must meet all Analytics requirements as mentioned in the Analytics External Data Format Reference.

Analytics generates the metadata attributes for each CSV column based on the first 100 rows in the CSV file. Analytics uses the following rules to convert the CSV column names to field labels.

- Replaces special characters and spaces with underscores. For example, "Stage Name" becomes "Stage_Name."
- Replaces consecutive underscores with one underscore, except when column name ends with "__c." For example, "stage*&name" becomes "stage_name."
- Prefixes the field label with "X" when the first character of the column name is numeric. For example, "30Day" becomes "X30Day."
- Replaces the field name with "Column" + column number when all characters in the column name are not alphanumeric. For example, the fourth column name "*&^*(&*(%" becomes "Column4."
- Deletes underscores at the beginning and end of the field label to ensure that it doesn't start or end with an underscore.
- Increments the derived field label if the label is the same as an existing label. For example, if "X2" already exists, uses "X21," "X22," "X23."

Tip: You can download the generated metadata file to change the metadata settings, and then upload it to apply the changes. You can download the metadata file when you create or edit a dataset.

SEE ALSO:

Create a Dataset with External Data

Monitor an External Data Upload

When you upload an external data file, Analytics kicks off a job that uploads the data into the specified dataset. You can use the Monitor tab of the data manager to monitor and troubleshoot the upload job.

The Jobs subtab (1) of the Monitor tab shows the status, start time, and duration of each dataflow, data sync, recipe, and external data upload job. It shows jobs for the last 7 days.

Note: Duration is calculated as the sum of the job queue time and job run time.

EDITIONS

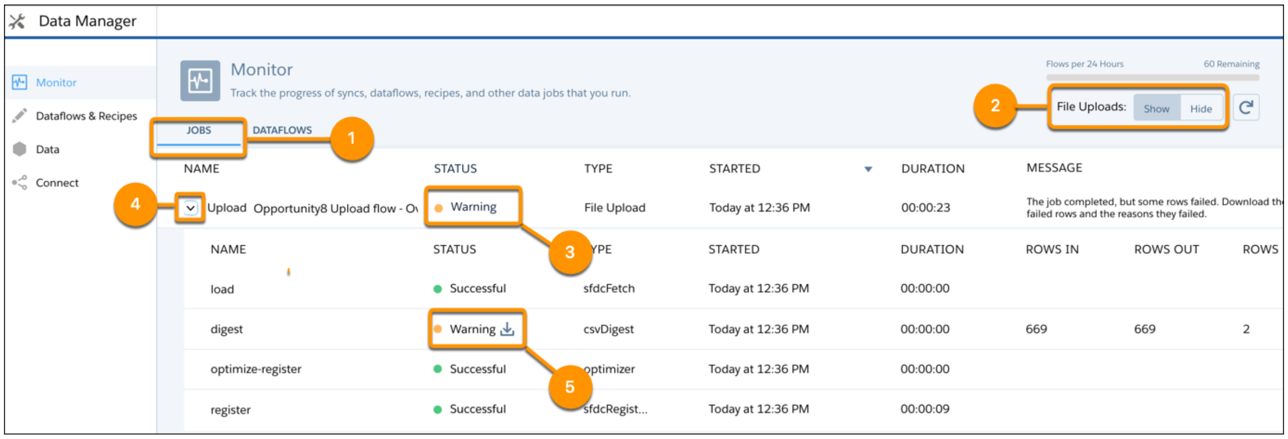
Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

To access the Monitor tab of the data manager:

- Edit Analytics Dataflows, Upload External Data to Analytics, or Manage Analytics



Monitor

Track the progress of syncs, dataflows, recipes, and other data jobs that you run.

NAME	STATUS	TYPE	STARTED	DURATION	MESSAGE
Upload Opportunity8 Upload flow - O\	● Warning	File Upload	Today at 12:36 PM	00:00:23	The job completed, but some rows failed. Download th failed rows and the reasons they failed.

NAME	STATUS	YPE	STARTED	DURATION	ROWS IN	ROWS OUT	ROWS
load	● Successful	sfdcFetch	Today at 12:36 PM	00:00:00			
digest	● Warning	csvDigest	Today at 12:36 PM	00:00:00	669	669	2
optimize-register	● Successful	optimizer	Today at 12:36 PM	00:00:00			
register	● Successful	sfdcRegist...	Today at 12:36 PM	00:00:09			

1. In Analytics, click the gear icon (⚙) and then click **Data Manager**.
   The data manager opens on the Monitor tab, with the Jobs subtab selected by default. It displays each upload job name as `<dataset_name upload flow>`. You can hover a job to view the entire name.

   Note: To view external data upload jobs in the Jobs view, make sure that the File Uploads selector (2) is set to **Show**. Show is the default selection.

2. To see the latest status of a job, click the Refresh Jobs button (↻).
   Each job can have one of these statuses.

Status	Description
Queued	The job is in queue to start.
Running	The job is running.
Failed	The job failed.
Successful	The job completed successfully.
Warning	The job completed successfully, but some rows failed.

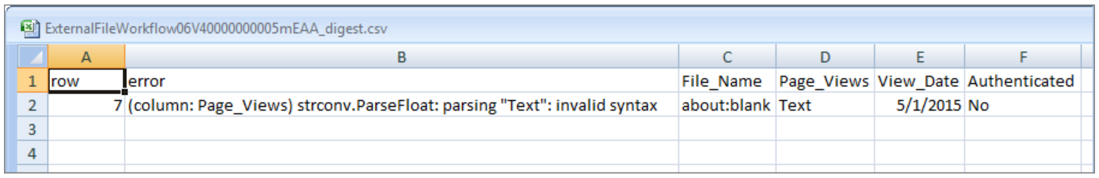
   A message is displayed next to jobs with a status of Warning (3) or Failed . If you can't see the complete message, click the message to view all of it.

3. To view the run-time details for a job, expand the job node (4).
   The run-time details display under the job. In the run-time details section, scroll to the right to view information about the rows that were processed.

4. To troubleshoot a job that has failed rows, view the error message. If an error log is available, click the status text or download button (5) to download the log.

   Note: Only the user who uploaded the external data file can download the error log.

   The error log contains a list of failed rows.



ExternalFileWorkflow06V40000000005mEAA_digest.csv

	A	B	C	D	E	F
1	row	error	File_Name	Page_Views	View_Date	Authenticated
2	7	(column: Page_Views) strconv.ParseFloat: parsing "Text": invalid syntax	about:blank	Text	5/1/2015	No
3						
4						

5. To troubleshoot a failed job, view the error message and the run-time details.

EDIT A DATASET

USER PERMISSIONS

To view a dataset edit page:	Use Analytics AND Editor access to the dataset's app
To update a dataset name, app, and extended metadata:	Use Analytics AND Editor access to the dataset's app
To delete a dataset:	Use Analytics AND Editor access to the dataset's app
To upload and preview data:	Upload External Data to Analytics AND Editor access to the dataset's app
To edit a dataset security:	Edit Analytics Dataflows
To restore a dataset:	Edit Analytics Dataflows

EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

Edit a dataset to change its name, app, security, or extended metadata (XMD). You can also replace data in a dataset, restore it to a previous version, or delete it. The dataset edit page also provides key information about when the dataset was created and last updated, and where it is used.

You can edit a dataset from Analytics home or from the data manager.

- To edit a dataset from Analytics home, follow these steps.
  1. Hover over the dataset and click ▼.
  2. Click **Edit**.
- To edit a dataset from the data manager, follow these steps.
  1. In the data manager, click the **Datasets** tab.
  2. On the right of the dataset, click ▼.
  3. Click **Edit Dataset**.
- Edit the following settings, as needed.

Option	Description
Dataset name	Enter a new name if you'd like to change the name of the dataset. The name cannot exceed 80 characters.
App	Select a new app if you'd like to move the dataset to a different app.

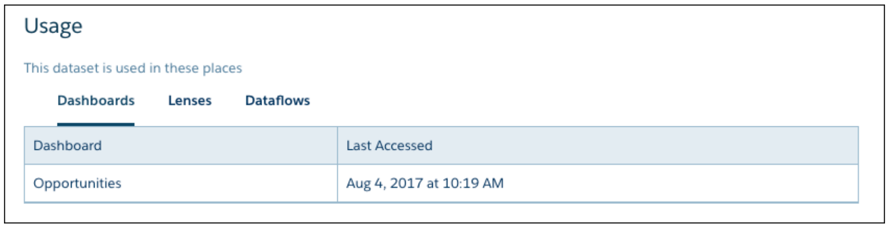
Option	Description
Extended Metadata File	Specify an extended metadata file if you'd like to customize the formatting of dashboards associated with the dataset. Refer to *Extended Metadata (XMD) Reference* for information about extended metadata files.
Sharing Source	If you have enabled sharing inheritance, specify the object from which you want to inherit sharing for this dataset. You can't specify a sharing source for datasets created from CSV files. When you select a sharing source, you must also add a security predicate. Analytics populates the Security Predicate field with the value *`false`*. See Salesforce Sharing Inheritance for Datasets.
Security Predicate	Add a security predicate if you'd like to apply row-level security on the dataset. For information about predicates, see Row-Level Security for Datasets.

DELETE A DATASET

Delete unnecessary datasets from shared apps on which you have at least Editor access, your My Private App, and, with a special user permission, another user's My Private App. Removing datasets reduces clutter and helps avoid reaching your org's total row limit for all registered datasets.

You can't delete a dataset that is used in a dashboard, lens, or dataflow. Before you delete a dataset, first remove references to it from dashboards or dataflow transformations, and delete associated lenses.

Tip: Review the usage information on the dataset's edit page to see where the dataset is used.


Usage

This dataset is used in these places

Dashboards Lenses Dataflows

Dashboard	Last Accessed
Opportunities	Aug 4, 2017 at 10:19 AM

Warning: You can't recover a deleted dataset.

1. To edit a dataset from Analytics home or an app page, follow these steps.
   a. Hover over the dataset and click ▼.
   b. Click **Edit**.
2. To edit a dataset from the data manager, follow these steps.
   a. In the data manager, click the **Data** tab.
   b. On the right of the dataset, click ▼.
   c. Click **Edit Dataset**.
3. On the dataset edit page, click the Delete Dataset button (🗑).
   If the dataset is in use, Analytics stops the deletion and shows a list of assets that reference the dataset. Click **Got It** and resolve these references before trying again.
4. Click **Delete Permanently**.

   Important: Analytics doesn't check if a dataset is used in recipes. If you delete a dataset that's used in a recipe, the recipe fails.

EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

To delete a dataset:
- Use Analytics AND Editor access to the dataset's app

To delete a dataset in another user's My Private App:
- Manage All Private Einstein Analytics

ROW-LEVEL SECURITY FOR DATASETS

If an Analytics user has access to a dataset, the user has access to all records in the dataset by default. However, you can implement row-level security on a dataset to restrict access to records. Some records contain sensitive data that must not be accessible by everyone.

To implement row-level security for a dataset, either define a security predicate or turn on sharing inheritance. Specify from which objects to migrate the sharing rules. Sharing inheritance works together with security predicates. You can specify a security predicate to take over for those users who fall outside the scope of sharing inheritance.

IN THIS SECTION:

SEE ALSO:

sfdcRegister Transformation

sfdcRegister Parameters

Security Predicates for Datasets

Applying a predicate to a dataset is more than just defining the predicate expression. You also need to consider how the predicate is dependent on the information in the dataset and where to define the predicate expression.

Define a predicate for each dataset on which you want to restrict access to records. A *security predicate* is a filter condition that defines row-level access to records in a dataset.

When a user submits a query against a dataset that has a predicate, Analytics checks the predicate to determine which records the user has access to. If the user doesn't have access to a record, Analytics does not return that record.

Note:

- Changes to security settings (rowLevelSharingSource or rowLevelSecurityFilter) in a dataflow have no effect on datasets that already exist. You must change those settings on the edit dataset page.
- When sharing inheritance is enabled, you can set the security predicate to 'false' to block all users not covered by sharing. In fact, this predicate is the default when sharing is enabled on existing datasets.

The predicate is flexible and can model different types of security policies. For example, you can create predicates based on:

- Record ownership. Enables each user to view only records that they own.
- Management visibility. Enables each user to view records owned or shared by their subordinates based on a role hierarchy.
- Team or account collaboration. Enables all members of a team, like an opportunity team, to view records shared with the team.
- Combination of different security requirements. For example, you might need to define a predicate based on the Salesforce role hierarchy, teams, and record ownership.

The type of security policy you implement depends on how you want to restrict access to records in the dataset.

Warning: If row-level security isn't applied to a dataset, any user that has access to the dataset can view all records in the dataset.

You can create a predicate expression based on information in the dataset. For example, to enable each user to view only dataset records that they own, you can create a predicate based on a dataset column that contains the owner for each record. If needed, you can load additional data into a dataset required by the predicate.

The location where you define the predicate varies.

- To apply a predicate on a dataset created from a dataflow, add the predicate in the **rowLevelSecurityFilter** field of the Register transformation. The next time the dataflow runs, Analytics will apply the predicate.
- To apply a predicate on a dataset created from an external data file, define the predicate in the **rowLevelSecurityFilter** field in the metadata file associated with the external data file. Analytics applies the predicate when you upload the metadata file and external data file. If you already created the dataset from a external data file, you can edit the dataset to apply or change the predicate.

Row-Level Security Example based on Record Ownership

Let's look at an example where you create a dataset based on a CSV file and then implement row-level security based on record ownership. In this example, you will create a dataset that contains sales targets for account owners. To restrict access on each record in the dataset, you will create a security policy where each user can view only sales targets for accounts that they own. This process requires multiple steps that are described in the sections that follow.

Note: Although this example is about applying a predicate to a dataset created from a CSV file, this procedure can also be applied to a dataset that is created from Salesforce data.

IN THIS SECTION:

1. Determine Which Data to Include in the Dataset

   First, determine what data you want to include in the dataset. For this example, you will create a Targets dataset that contains all sales targets.

2. Determine Row-Level Security for Dataset

   Now it's time to think about row-level security. How will you restrict access to each record in this dataset?

3. Add the Predicate to the Metadata File

   For a dataset created from a CSV file, you can specify the predicate in the metadata file associated with the CSV file or when you edit the dataset.

4. Create the Dataset

   Now that you updated the metadata file with the predicate, you can create the dataset.

5. Test Row-Level Security for the Dataset

   You must verify that the predicate is applied properly and that each user can see their own sales targets.

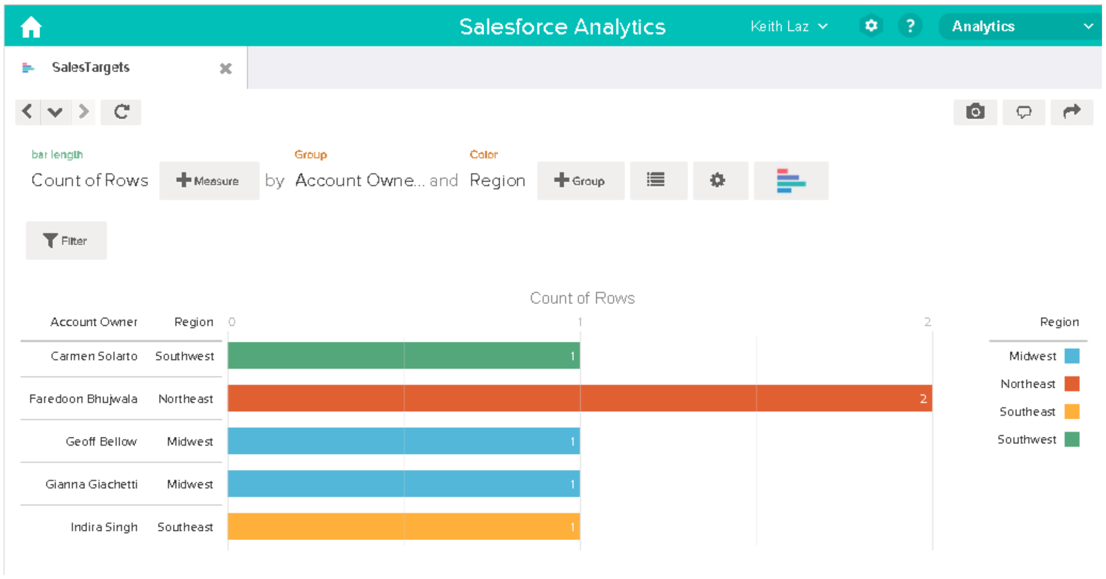
Determine Which Data to Include in the Dataset

First, determine what data you want to include in the dataset. For this example, you will create a Targets dataset that contains all sales targets.

You will obtain sales targets from the CSV file shown below.

AccountOwner	Region	Target	TargetDate
Tony Santos	Midwest	10000	1/1/2011
Lucy Timmer	Northeast	50000	1/1/2011
Lucy Timmer	Northeast	0	12/1/2013
Bill Rolley	Midwest	15000	1/1/2011
Keith Laz	Southwest	35000	1/1/2011
Lucy Timmer	Southeast	40000	1/1/2011

If you were to create the dataset without implementing row-level security, any user that had access to the dataset would be able to see the sales targets for all account owners. For example, as shown below, Keith would be able to view the sales targets for all account owners.



You need to apply row-level security to restrict access to records in this dataset.

Determine Row-Level Security for Dataset

Now it's time to think about row-level security. How will you restrict access to each record in this dataset?

You decide to implement the following predicate on the dataset.

```
'AccountOwner' == "$User.Name"
```

Note: All predicate examples in this document escape the double quotes because it's required when you enter the predicate in the Register transformation or metadata file.This predicate implements row-level security based on record ownership. Based on the predicate, Analytics returns a sales target record when the user who submits the query on the dataset is the account owner.

Let's take a deeper look into the predicate expression:

- AccountOwner refers to the dataset column that stores the full name of the account owner for each sales target.
- $User.Name refers to the Name column of the User object that stores the full name of each user. Analytics performs a lookup to get the full name of the user who submits each query.

Note: The lookup returns a match when the names in AccountOwner and $User.Name match exactly—they must have the same case.

Add the Predicate to the Metadata File

For a dataset created from a CSV file, you can specify the predicate in the metadata file associated with the CSV file or when you edit the dataset.

You must escape the double quotes around string values when entering a predicate in the metadata file.

In this example, you add the predicate to the metadata file shown below.

```
{
   "fileFormat": {
   "charsetName": "UTF-8",
   "fieldsDelimitedBy": ",",
   "fieldsEnclosedBy": "\"",
   "numberOfLinesToIgnore": 1 },
   "objects": [
      {
         "name": "Targets",
         "fullyQualifiedName": "Targets",
         "label": "Targets",
         "rowLevelSecurityFilter": "'AccountOwner' == \"$User.Name\"",
         "fields": [
      {
         "name": "AccountOwner",
         "fullyQualifiedName": "Targets.AccountOwner",
         "label": "Account Owner",
         "type": "Text"
      },
      {
         "name": "Region",
         "fullyQualifiedName": "Targets.Region",
         "label": "Region",
         "type": "Text"
      },
      {
         "name": "Target",
         "fullyQualifiedName": "Targets.Target",
         "label": "Target",
         "type": "Numeric",
         "precision": 16,
         "scale": 0,
         "defaultValue": "0",
         "format": null
      },
      {
         "name": "TargetDate",
         "fullyQualifiedName": "Targets.TargetDate",
         "label": "TargetDate",
         "description": "",
         "type": "Date",
         "format": "dd/MM/yy HH:mm:ss",
         "isSystemField": false,
         "fiscalMonthOffset": 0
      }
      ]
      }
   ]
}
```

Create the Dataset

Now that you updated the metadata file with the predicate, you can create the dataset.

Warning: If you wish to perform the steps in this sample implementation, perform the steps in a non-production environment. Ensure that these changes do not impact other datasets that you already created.

To create the dataset, perform the following steps.

1. In Analytics, go to the home page.
2. Click **Create** > **Dataset**
3. Click **CSV**.

   The following screen appears.

EDITIONS

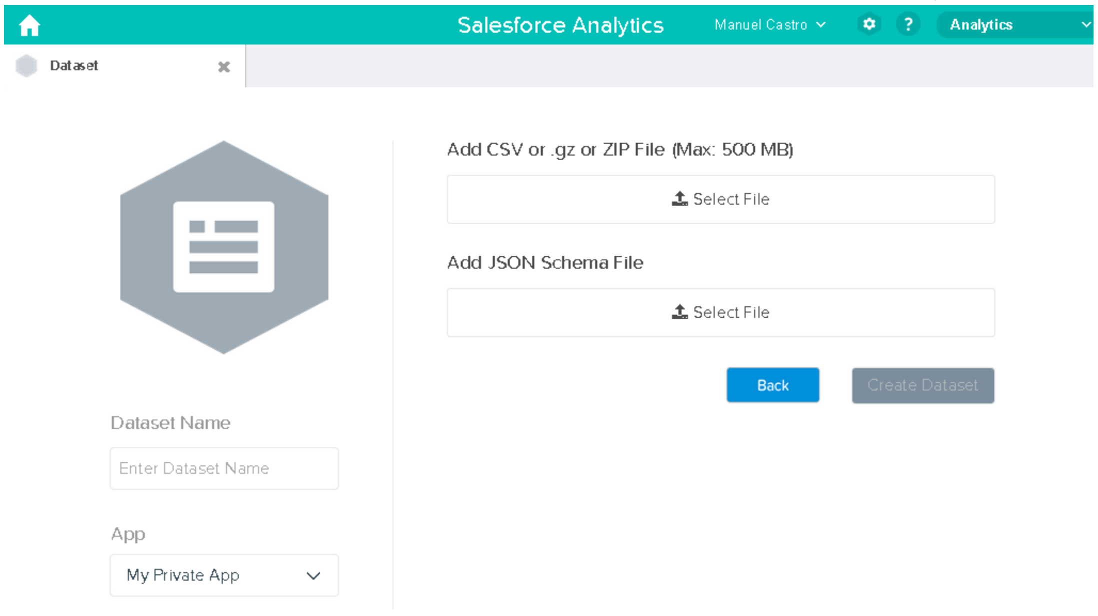
Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

To upload a CSV and metadata file:

- Upload External Data to Analytics



4. Select the CSV file and metadata (schema) file.
5. In the **Dataset Name** field, enter “SalesTarget” as the name of the dataset.
6. Optionally, choose a different app where you want to store the dataset.
7. Click **Create Dataset**.

   Analytics confirms that the upload is successful and then creates a job to create the dataset. You can view the SalesTarget dataset after the job completes successfully.

8. To verify that the job completes successfully, perform the following steps:

a. Click the gear icon ( ) and then select **Data Monitor** to open the data monitor.

   By default, the Jobs View of the data monitor appears. It shows the statuses of dataflow and external data upload jobs.

b. Click the Refresh Jobs button ( ) to view the latest statuses of the jobs.

Test Row-Level Security for the Dataset

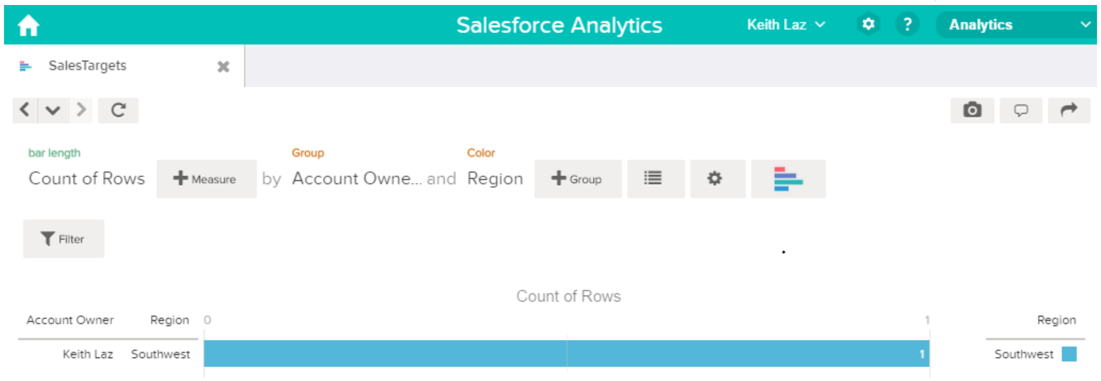
You must verify that the predicate is applied properly and that each user can see their own sales targets.

1. Log in to Analytics as Keith.
2. Open the SalesTargets dataset.
   As shown in the following lens, notice that Keith can see only his sales target.

EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.



Row-Level Security Example based on Opportunity Teams

Let's look at an example where you create a dataset based on Salesforce data and then implement row-level security based on an opportunity team. In this example, you will create a dataset that contains only opportunities associated with an opportunity team. To restrict access on each record in the dataset, you will create a security policy where only opportunity members can view their opportunity. This process requires multiple steps that are described in the sections that follow.

IN THIS SECTION:

1. Determine Which Data to Include in the Dataset

   First, determine what data you want to include in the dataset. For this example, you will create an OppTeamMember dataset that contains only opportunities associated with an opportunity team.

2. Design the Dataflow to Load the Data
   Now it's time to figure out how the dataflow will extract the Salesforce data and load it into a dataset. You start by creating this high-level design for the dataflow.
3. Determine Row-Level Security for the Dataset
   Now it's time to think about row-level security. How will you restrict access to each record in this dataset?
4. Modify the Dataflow Based on Row-Level Security
   It's now time to add the predicate in the dataflow definition file.
5. Create the Dataset
   Now that you have the final dataflow definition file, you can create the dataset.
6. Test Row-Level Security for the Dataset
   You must verify that the predicate is applied properly and that each user can see the appropriate opportunities.

Determine Which Data to Include in the Dataset

EDITIONS

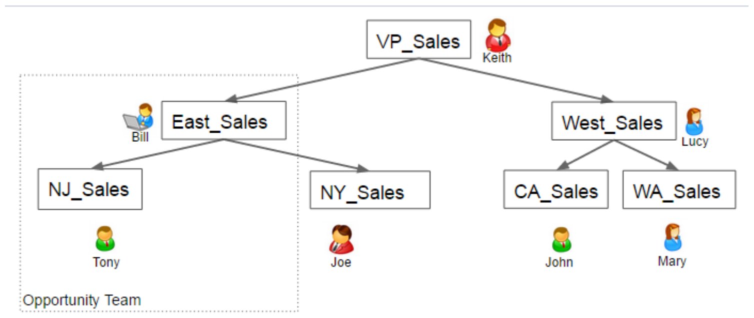
Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer Edition**.

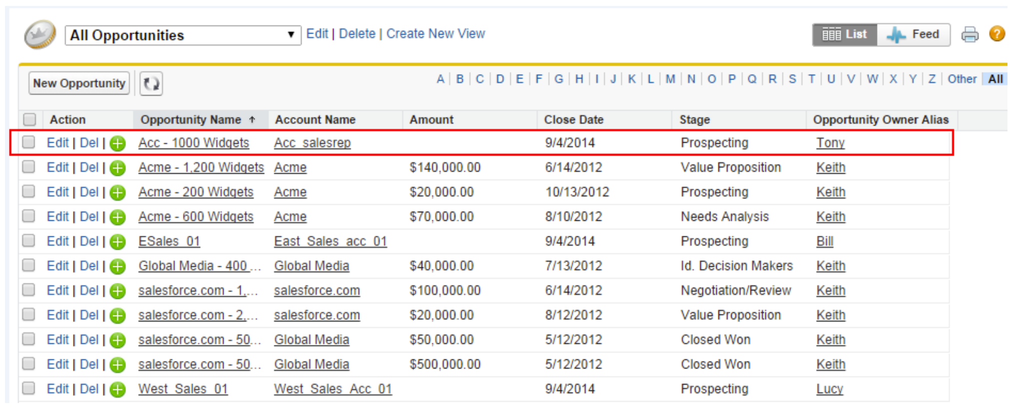
First, determine what data you want to include in the dataset. For this example, you will create an OppTeamMember dataset that contains only opportunities associated with an opportunity team.

You will obtain opportunities from the Opportunity object and the opportunity teams from the OpportunityTeamMember object. Both are Salesforce objects.

In this example, your Salesforce organization has the following opportunity team and users.



Your organization also contains the following opportunities, most of which are owned by Keith.


All Opportunities
Edit | Delete | Create New View
List
Feed
New Opportunity
A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | Other | All

Action	Opportunity Name ↑	Account Name	Amount	Close Date	Stage	Opportunity Owner Alias
Edit | Del |	Acc - 1000 Widgets	Acc_salesrep		9/4/2014	Prospecting	Tony
Edit | Del |	Acme - 1,200 Widgets	Acme	$140,000.00	6/14/2012	Value Proposition	Keith
Edit | Del |	Acme - 200 Widgets	Acme	$20,000.00	10/13/2012	Prospecting	Keith
Edit | Del |	Acme - 600 Widgets	Acme	$70,000.00	8/10/2012	Needs Analysis	Keith
Edit | Del |	ESales_01	East_Sales_acc_01		9/4/2014	Prospecting	Bill
Edit | Del |	Global Media - 400 ...	Global Media	$40,000.00	7/13/2012	Id. Decision Makers	Keith
Edit | Del |	salesforce.com - 1,...	salesforce.com	$100,000.00	6/14/2012	Negotiation/Review	Keith
Edit | Del |	salesforce.com - 2,...	salesforce.com	$20,000.00	8/12/2012	Value Proposition	Keith
Edit | Del |	salesforce.com - 50...	Global Media	$50,000.00	5/12/2012	Closed Won	Keith
Edit | Del |	salesforce.com - 50...	Global Media	$500,000.00	5/12/2012	Closed Won	Keith
Edit | Del |	West_Sales_01	West_Sales_Acc_01		9/4/2014	Prospecting	Lucy

Acc - 1000 Widgets is the only opportunity shared by an opportunity team. Bill is the Sales Manager for this opportunity. Tony is the opportunity owner.

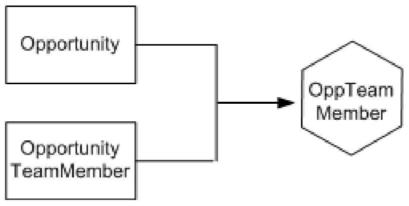
Design the Dataflow to Load the Data

EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

Now it's time to figure out how the dataflow will extract the Salesforce data and load it into a dataset. You start by creating this high-level design for the dataflow.



The dataflow will extract data from the Opportunity and OpportunityTeamMember objects, join the data, and then load it into the OppTeamMember dataset.

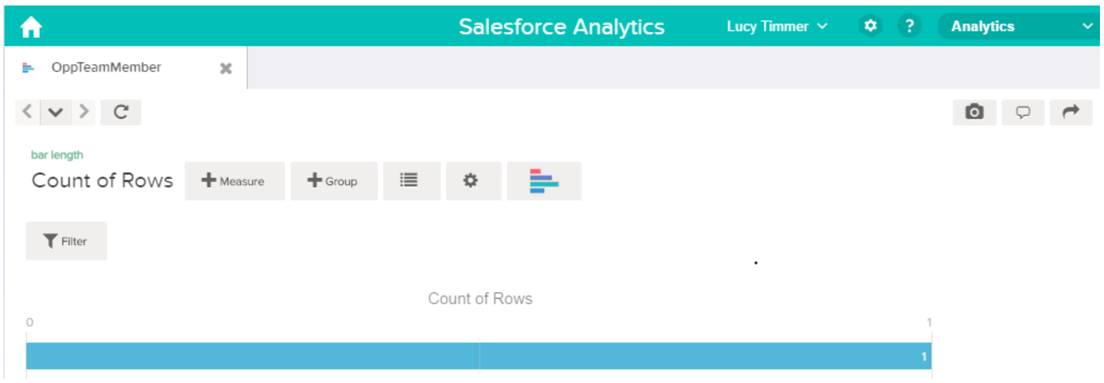
Now let's implement that design in JSON, which is the format of the dataflow definition file. A dataflow definition file contains transformations that extract, transform, and load data into a dataset.

Based on the design, you create the JSON shown below.

```
{
   "Extract_OpportunityTeamMember": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "OpportunityTeamMember",
         "fields": [
            { "name": "Name" },
            { "name": "OpportunityId" },
            { "name": "UserId" }
         ]
      }
   },
   "Extract_Opportunity": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "AccountId" },
            { "name": "OwnerId" }
         ]
      }
   },
   "Augment_OpportunityTeamMember_Opportunity": {
      "action": "augment",
      "parameters": {
         "left": "Extract_OpportunityTeamMember",
         "left_key": [
            "OpportunityId"
         ],
         "relationship": "TeamMember",
         "right": "Extract_Opportunity",
         "right_key": [
            "Id"
         ],
         "right_select": [
            "Name","Amount"
         ]
      }
   },
   "Register_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "OppTeamMember",
         "name": "OppTeamMember",
         "source": "Augment_OpportunityTeamMember_Opportunity",
         "rowLevelSecurityFilter": ""
      }
   }
}
```

If you were to run this dataflow, Analytics would generate a dataset with no row-level security. As a result, any user that has access to the dataset would be able to see the opportunity shared by the opportunity team.

For example, as shown below, Lucy would be able to view the opportunity that belongs to an opportunity team of which she is not a member.



You need to apply row-level security to restrict access to records in this dataset.

Determine Row-Level Security for the Dataset

Now it’s time to think about row-level security. How will you restrict access to each record in this dataset?

You decide to implement the following predicate on the dataset.

EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

```
'UserId' == "$User.Id"
```

This predicate compares the UserId column in the dataset against the ID of the user running a query against the dataset. The UserId column in the dataset contains the user ID of the team member associated with each opportunity. To determine the ID of the user running the query, Analytics looks up the ID of the user making the query in the User object.

For each match, Analytics returns the record to the user.

Modify the Dataflow Based on Row-Level Security

It’s now time to add the predicate in the dataflow definition file.

You add the predicate to the Register transformation that registers the OppTeamMember dataset as shown below.

EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

```
{
   "Extract_OpportunityTeamMember": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "OpportunityTeamMember",
         "fields": [
            { "name": "Name" },
            { "name": "OpportunityId" },
            { "name": "UserId" }
         ]
      }
   },
   "Extract_Opportunity": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "AccountId" },
            { "name": "OwnerId" }
         ]
      }
   },
   "Augment_OpportunityTeamMember_Opportunity": {
      "action": "augment",
      "parameters": {
         "left": "Extract_OpportunityTeamMember",
         "left_key": [
            "OpportunityId"
         ],
         "relationship": "TeamMember",
         "right": "Extract_Opportunity",
         "right_key": [
            "Id"
         ],
         "right_select": [
            "Name","Amount"
         ]
      }
   },
   "Register_Dataset": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "OppTeamMember",
         "name": "OppTeamMember",
         "source": "105_Augment_OpportunityTeamMember_Opportunity",
         "rowLevelSecurityFilter": "'UserId' == \"$User.Id\""
      }
   }
}
```

Create the Dataset

Now that you have the final dataflow definition file, you can create the dataset.

Warning: If you wish to perform the steps in this sample implementation, verify that you have all required Salesforce objects and fields, and perform the steps in a non-production environment. Ensure that these changes do not impact other datasets that you already created. Also, always make a backup of the existing dataflow definition file before you make changes because you cannot retrieve old versions of the file.

To create the dataset, perform the following steps.

1. In Analytics, click the gear icon ( ) and then select **Monitor** to open the monitor.
   The Jobs view of the monitor appears by default.
2. Select **Dataflow View**.
3. Click the actions list (1) for the dataflow and then select **Download** to download the existing dataflow definition file.

EDITIONS

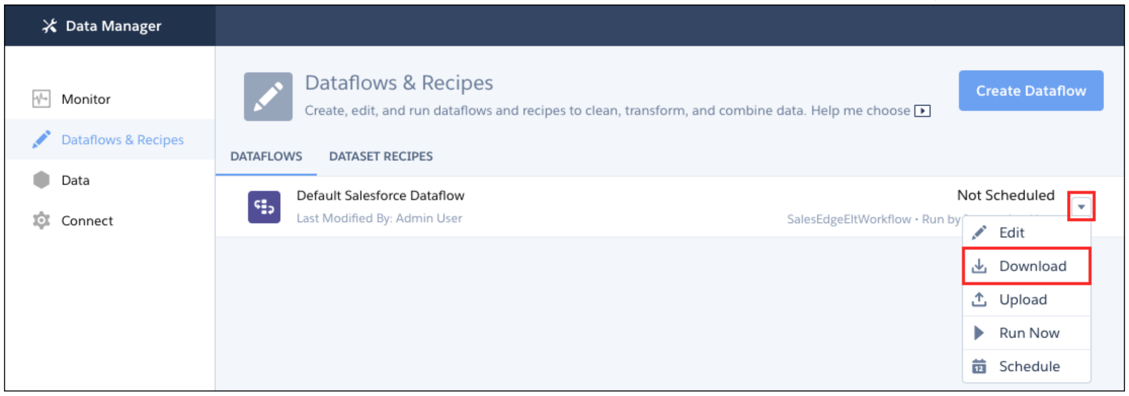
Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

To download, upload, run, and monitor a dataflow:

- Edit Analytics Dataflows


Data Manager
Monitor
Dataflows & Recipes
Data
Connect
Dataflows & Recipes
Create, edit, and run dataflows and recipes to clean, transform, and combine data. Help me choose
Create Dataflow
DATAFLOWS
DATASET RECIPES
Default Salesforce Dataflow
Last Modified By: Admin User
Not Scheduled
SalesEdgeEltWorkflow • Run by
Edit
Download
Upload
Run Now
Schedule

4. Open the dataflow definition file in a JSON or text editor.
5. Add the JSON determined in the previous step.
6. Before you save the dataflow definition file, use a JSON validation tool to verify that the JSON is valid.

   An error occurs if you try to upload the dataflow definition file with invalid JSON. You can find JSON validation tool on the internet.
7. Save and close the dataflow definition file.
8. In the Dataflow View of the monitor, click the actions list for the dataflow and then select **Upload**.
9. Select the updated dataflow definition file and click **Upload**.
10. In the Dataflow View of the monitor, click the actions list for the dataflow and then select **Run** to run the dataflow job.
11. Click the **Refresh Jobs** button ( ) to view the latest status of the dataflow job.
    You can view the OppTeamMember dataset after the dataflow job completes successfully.

Note: If you are adding a predicate to a dataset that was previously created, each user must log out and log back in for the predicate to take effect.

Test Row-Level Security for the Dataset

You must verify that the predicate is applied properly and that each user can see the appropriate opportunities.

EDITIONS

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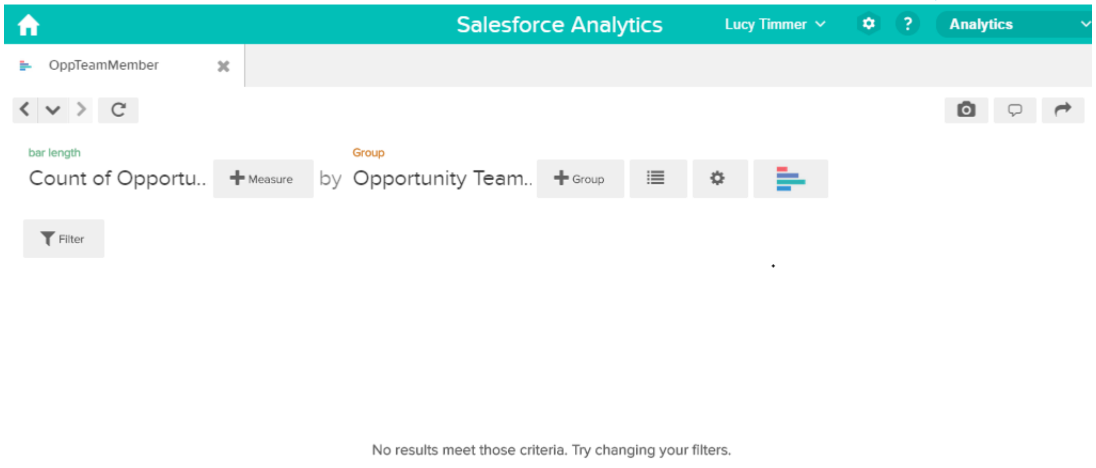
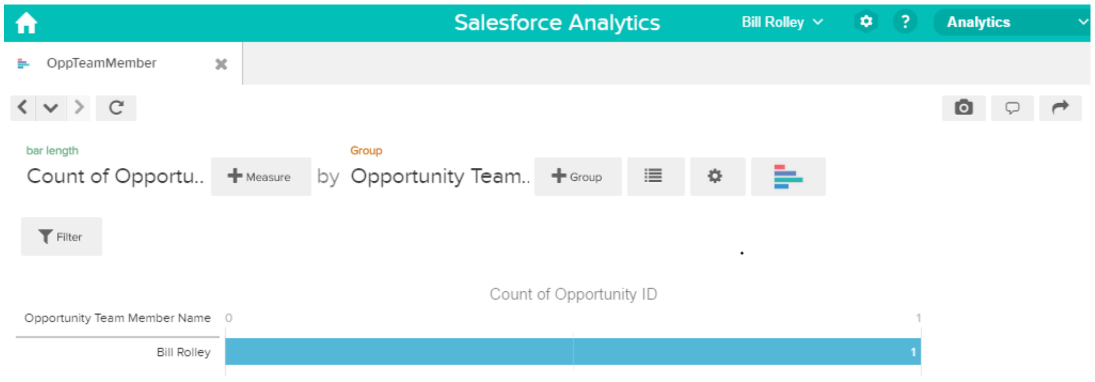
Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

1. Log in to Analytics as Lucy.
2. Open the OppTeamMember opportunity.
   Notice that Lucy can't view the opportunity associated with the opportunity team anymore because she is not a member of the team.



No results meet those criteria. Try changing your filters.

3. Log out and now log in as Bill.
   Bill can view the opportunity that is shared by the opportunity team of which he is a member.



Row-Level Security Example based on Role Hierarchy and Record Ownership

Let's look at an example where you create a dataset based on Salesforce data and then implement row-level security based on the Salesforce role hierarchy and record ownership. In this example, you will create a dataset that contains all opportunities. To restrict access on each record in the dataset, you will create a security policy where each user can view only opportunities that they own or that are owned by their subordinates based on the Salesforce role hierarchy. This process requires multiple steps that are described in the sections that follow.

IN THIS SECTION:

SEE ALSO:

flatten Parameters

Determine Which Data to Include in the Dataset

First, determine what data you want to include in the dataset. For this example, you will create the OppRoles dataset that contains all opportunities as well as user details about each opportunity owner, such as their full name, division, and title.

You will obtain opportunities from the Opportunity object and user details from the User object. Both are objects in Salesforce.

In this example, your Salesforce organization has the following role hierarchy and users.

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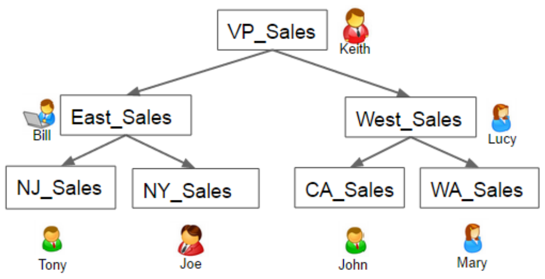
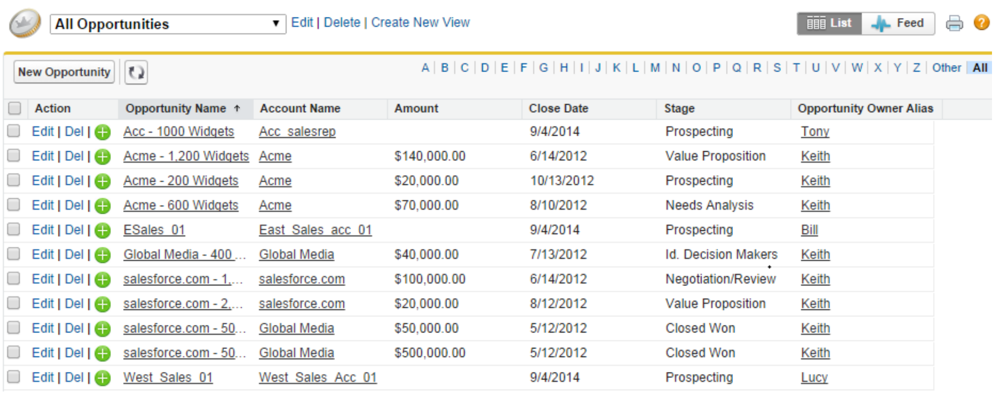
Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.



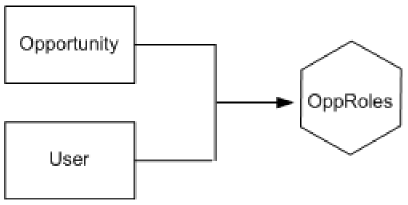
Also, your organization contains the following opportunities, most of which are owned by Keith.


All Opportunities
Edit | Delete | Create New View
List
Feed
New Opportunity
A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | Other | All

Action	Opportunity Name ↑	Account Name	Amount	Close Date	Stage	Opportunity Owner Alias
Edit | Del |	Acc - 1000 Widgets	Acc_salesrep		9/4/2014	Prospecting	Tony
Edit | Del |	Acme - 1,200 Widgets	Acme	$140,000.00	6/14/2012	Value Proposition	Keith
Edit | Del |	Acme - 200 Widgets	Acme	$20,000.00	10/13/2012	Prospecting	Keith
Edit | Del |	Acme - 600 Widgets	Acme	$70,000.00	8/10/2012	Needs Analysis	Keith
Edit | Del |	ESales_01	East_Sales_acc_01		9/4/2014	Prospecting	Bill
Edit | Del |	Global Media - 400 ...	Global Media	$40,000.00	7/13/2012	Id. Decision Makers	Keith
Edit | Del |	salesforce.com - 1,...	salesforce.com	$100,000.00	6/14/2012	Negotiation/Review	Keith
Edit | Del |	salesforce.com - 2,...	salesforce.com	$20,000.00	8/12/2012	Value Proposition	Keith
Edit | Del |	salesforce.com - 50...	Global Media	$50,000.00	5/12/2012	Closed Won	Keith
Edit | Del |	salesforce.com - 50...	Global Media	$500,000.00	5/12/2012	Closed Won	Keith
Edit | Del |	West_Sales_01	West_Sales_Acc_01		9/4/2014	Prospecting	Lucy

Design the Dataflow to Load the Data

Now it's time to figure out how the dataflow will extract the data and load it into a dataset. You start by creating this high-level design for the dataflow.



The dataflow will extract data from the Opportunity and User objects, join the data, and then load it into the OppRoles dataset.

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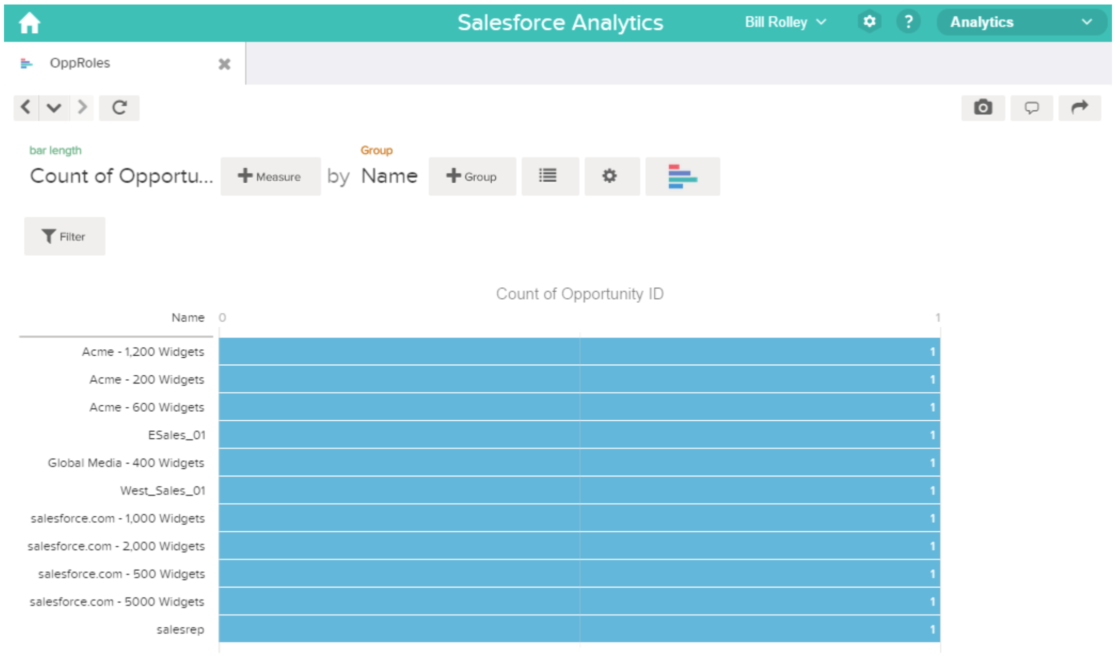
Now let's implement that design in JSON, which is the format of the dataflow definition file. A dataflow definition file contains transformations that extract, transform, and load data into a dataset.

Based on the design, you create the JSON shown below.

```
{
   "Extract_Opportunity": {
      "action": "sfdcDigest",
      "parameters": {
      "object": "Opportunity",
      "fields": [
         { "name": "Id" },
         { "name": "Name" },
         { "name": "Amount" },
         { "name": "StageName" },
         { "name": "AccountId" },
         { "name": "OwnerId" }
        ]
      }
   },
   "Extract_User": {
      "action": "sfdcDigest",
      "parameters": {
      "object": "User",
      "fields": [
         { "name": "Id" },
         { "name": "Username" },
         { "name": "LastName" },
         { "name": "FirstName" },
         { "name": "Name" },
         { "name": "CompanyName" },
         { "name": "Division" },
         { "name": "Department" },
         { "name": "Title" },
         { "name": "Alias" },
         { "name": "CommunityNickname" },
         { "name": "UserType" },
         { "name": "UserRoleId" }
         ]
      }
   },
   "Augment_Opportunity_User": {
      "action": "augment",
      "parameters": {
         "left": "Extract_Opportunity",
         "left_key": [
            "OwnerId"
         ],
         "right": "Extract_User",
         "relationship": "Owner",
         "right_select": [
            "Name"
         ],
         "right_key": [
            "Id"
         ]
      }
   },
   "Register": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "OppRoles",
            "name": "OppRoles",
            "source": "Augment_Opportunity_User",
            "rowLevelSecurityFilter": ""
        }
    }
}
```

If you were to run this dataflow, Analytics would generate a dataset with no row-level security. As a result, any user that has access to the dataset would be able to view all opportunities. For example, as shown below, Bill would be able to view all opportunities, including those owned by his manager Keith.



You need to apply row-level security to restrict access to records in this dataset.

Determine Row-Level Security for the Dataset

Now it's time to think about row-level security. How will you restrict access to each record in this dataset?

You decide to implement the following predicate on the dataset.

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```
'ParentRoleIDs' == "$User.UserRoleId" || 'OwnerId' == "$User.Id"
```

Note: The current dataflow doesn't contain logic to create a dataset column named "ParentRoleIDs." ParentRoleIDs is a placeholder for the name of a column that will contain this information. In the next step, you will modify the dataflow to add this column to the dataset. This column name will change based on how you configure the dataflow.

Based on the predicate, Analytics returns an opportunity record if:

- The user who submits the query is a parent of the opportunity owner based on the Salesforce role hierarchy. Analytics determines this based on their role IDs and the role hierarchy.
- Or, the user who submits the query on the dataset is the opportunity owner.

Let's examine both parts of this predicate.

Predicate Part	Description
'ParentRoleIDs' == "$User.UserRoleId"	• ParentRoleIDs refers to a dataset column that contains a comma-separated list of role IDs of all users above the opportunity owner based on the role hierarchy. You will create this dataset column in the next section. • $User.UserRoleId refers to the UserRoleId column of the User object. Analytics looks up the user role ID of the user who submits the query from the User object.
'OwnerId' == "$User.Id"	• OwnerId refers to the dataset column that contains the user ID of the owner of each opportunity. • $User.Id refers to the Id column of the User object. Analytics looks up the user ID of the user who submits the query from the User object.

Modify the Dataflow Based on Row-Level Security

EDITIONS

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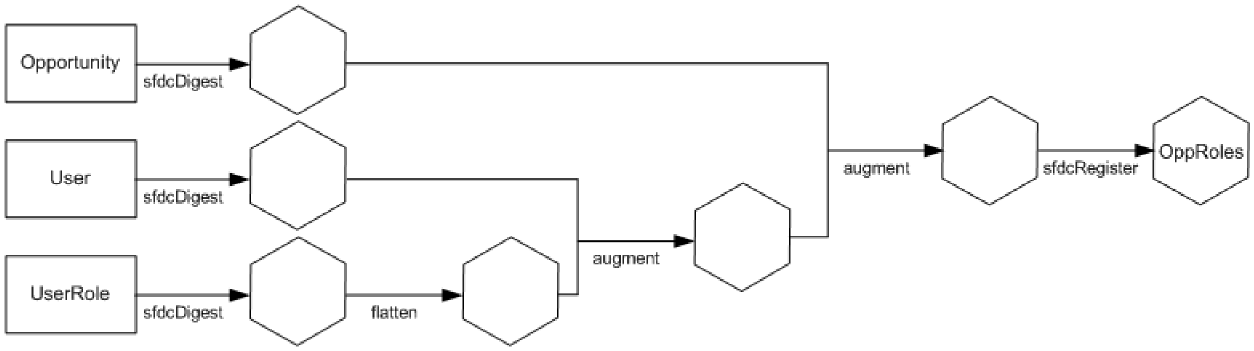
Now it's time to modify the dataflow definition file to account for the predicate.

In this scenario, you have to make changes to the dataflow based on the predicate.

- Add a column in the dataset that stores a comma-separated list of the role IDs of all parents for each opportunity owner. When you defined the predicate in the previous step, you temporarily referred to this column as "ParentRoleIDs." To add the column, you redesign the dataflow as shown in the following diagram:



The new dataflow design contains the following changes:

- Extracts the role IDs from the UserRole object.
- Uses the Flatten transformation to generate a column that stores a comma-separated list of the role IDs of all parents of each user. When you determined the predicate in the previous step, you temporarily referred to this column as “ParentRoleIDs.”
- Link the new column to the OppRoles dataset.

- Add the predicate to the Register transformation that registers the OppRoles dataset.

You modify the dataflow as shown below.

```
{
   "Extract_Opportunity": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "Opportunity",
         "fields": [
            { "name": "Id" },
            { "name": "Name" },
            { "name": "Amount" },
            { "name": "StageName" },
            { "name": "AccountId" },
            { "name": "OwnerId" }
         ]
      }
   },
   "Extract_User": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "User",
         "fields": [
            { "name": "Id" },
            { "name": "Username" },
            { "name": "LastName" },
            { "name": "FirstName" },
            { "name": "Name" },
            { "name": "CompanyName" },
            { "name": "Division" },
            { "name": "Department" },
            { "name": "Title" },
            { "name": "Alias" },
            { "name": "CommunityNickname" },
            { "name": "UserType" },
            { "name": "UserRoleId" }
         ]
      }
   },
   "Extract_UserRole": {
      "action": "sfdcDigest",
      "parameters": {
         "object": "UserRole",
         "fields": [
            { "name": "Id" },
            { "name": "ParentRoleId" },
            { "name": "RollupDescription" },
            { "name": "OpportunityAccessForAccountOwner" },
            { "name": "CaseAccessForAccountOwner" },
            { "name": "ContactAccessForAccountOwner" },
            { "name": "ForecastUserId" },
            { "name": "MayForecastManagerShare" },
            { "name": "LastModifiedDate" },
            { "name": "LastModifiedById" },
            { "name": "SystemModstamp" },
            { "name": "DeveloperName" },
            { "name": "PortalAccountId" },
            { "name": "PortalType" },
            { "name": "PortalAccountOwnerId" }
         ]
      }
   },
   "Flatten_UserRole": {
      "action": "flatten",
      "parameters": {
         "multi_field": "Roles",
         "parent_field": "ParentRoleId",
         "path_field": "RolePath",
         "self_field": "Id",
         "source": "Extract_UserRole"
      }
   },
   "Augment_User_FlattenUserRole": {
      "action": "augment",
      "parameters": {
         "left": "Extract_User",
         "left_key": [
            "UserRoleId"
         ],
         "relationship": "Role",
         "right": "Flatten_UserRole",
         "right_key": [
            "Id"
         ],
         "right_select": [
            "Roles",
            "RolePath"
         ]
      }
   },
   "Augment_Opportunity_UserWithRoles": {
      "action": "augment",
      "parameters": {
         "left": "Extract_Opportunity",
         "left_key": [
            "OwnerId"
         ],
         "right": "Augment_User_FlattenUserRole",
         "relationship": "Owner",
         "right_select": [
            "Name",
            "Role.Roles",
            "Role.RolePath"
         ],
         "right_key": [
            "Id"
         ]
      }
   },
   "Register": {
      "action": "sfdcRegister",
      "parameters": {
         "alias": "OppRoles",
         "name": "OppRoles",
         "source": "Augment_Opportunity_UserWithRoles",
        "rowLevelSecurityFilter": "'Owner.Role.Roles' == \"$User.UserRoleId\" || 'OwnerId'
 == \"$User.Id\""
      }
   }
}
```

Note: In this example, the dataset has columns Owner.Role.Roles and OwnerId. A user can view the values of these columns for each record to which they have access.

Create the Dataset

Now that you have the final dataflow definition file, you can create the dataset.

Warning: If you wish to perform the steps in this sample implementation, verify that you have all required Salesforce objects and fields, and perform the steps in a non-production environment. Ensure that these changes do not impact other datasets that you already created. Also, always make a backup of the existing dataflow definition file before you make changes because you cannot retrieve old versions of the file.

To create the dataset, perform the following steps.

1. In Analytics, click the gear icon ( ) and then select **Data Monitor** to open the data monitor. The Jobs View of the data monitor appears by default.
2. Select **Dataflow View**.
3. Click the actions list (1) for the dataflow and then select **Download** to download the existing dataflow definition file.

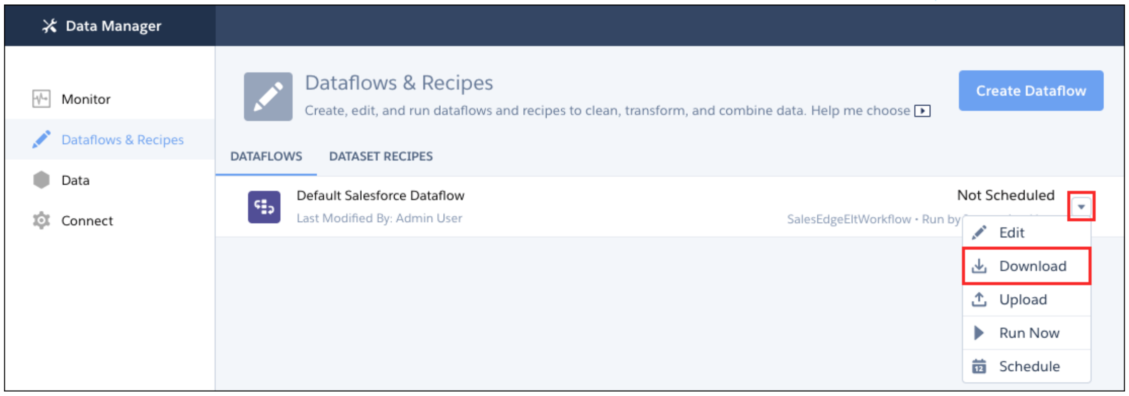
EDITIONS

Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

To download, upload, run, and monitor a dataflow:
- Edit Analytics Dataflows


Data Manager
Monitor
Dataflows & Recipes
Data
Connect
Dataflows & Recipes
Create, edit, and run dataflows and recipes to clean, transform, and combine data. Help me choose
Create Dataflow
DATAFLOWS
DATASET RECIPES
Default Salesforce Dataflow
Last Modified By: Admin User
Not Scheduled
SalesEdgeEltWorkflow • Run by
Edit
Download
Upload
Run Now
Schedule

4. Open the dataflow definition file in a JSON or text editor.
5. Add the JSON determined in the previous step.
6. Before you save the dataflow definition file, use a JSON validation tool to verify that the JSON is valid.

   An error occurs if you try to upload the dataflow definition file with invalid JSON. You can find JSON validation tool on the internet.
7. Save and close the dataflow definition file.
8. In the Dataflow View of the data monitor, click the actions list for the dataflow and then select **Upload**.
9. Select the updated dataflow definition file and click **Upload**.
10. In the Dataflow View of the data monitor, click the actions list for the dataflow and then select **Run** to run the dataflow job.
11. Click the **Refresh Jobs** button ( ) to view the latest status of the dataflow job.

    You can view the OppRoles dataset after the dataflow job completes successfully.

Note: If you are adding a predicate to a dataset that was previously created, each user must log out and log back in for the predicate to take effect.

Test Row-Level Security for the Dataset

You must verify that the predicate is applied properly and that each user can see the appropriate opportunities.

EDITIONS

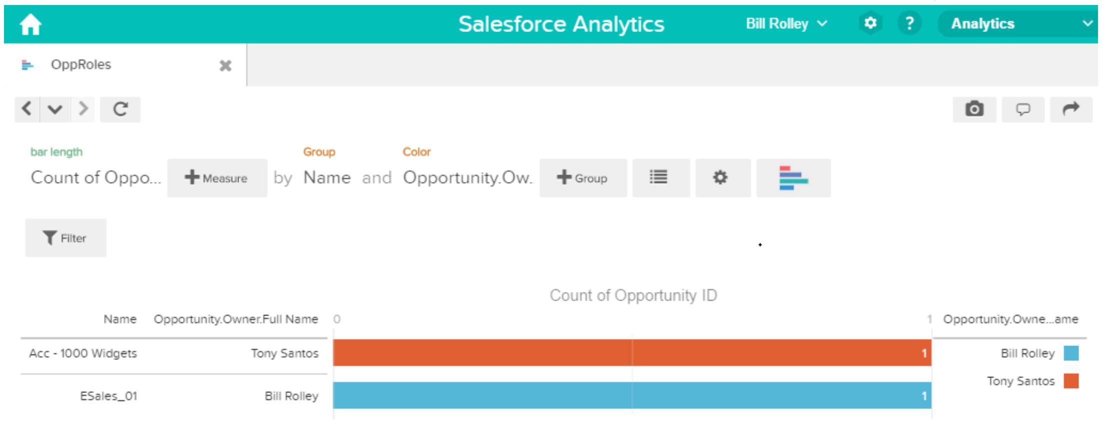
Available in Salesforce Classic and Lightning Experience.

Available for an extra cost in **Enterprise**, **Performance**, and **Unlimited** Editions. Also available in **Developer** Edition.

USER PERMISSIONS

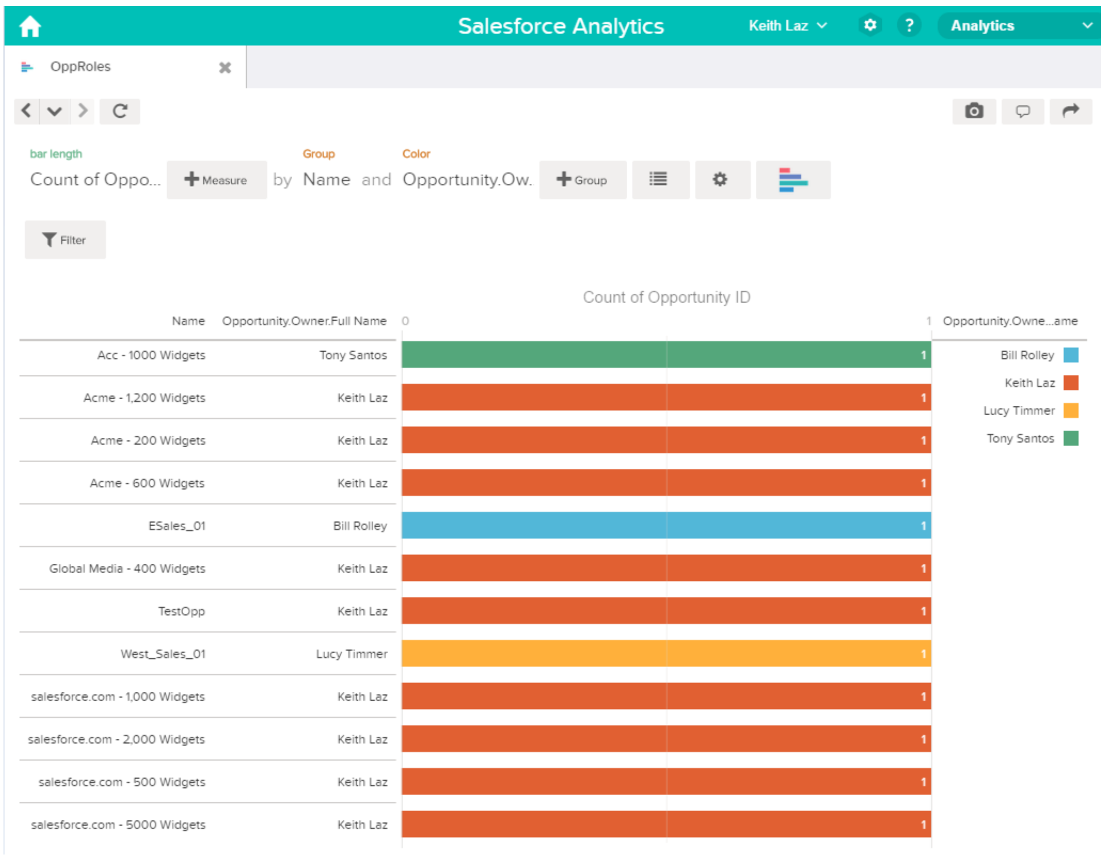
-
-

1. Log in to Analytics as Bill.
2. Open the OppRoles opportunity.
   Notice that Bill can't see his manager Keith's opportunities anymore. Now, he can see only his opportunity and his subordinate Tony's opportunity.



3. Log out and now log in as Keith.

   As expected, Keith can still see all opportunities.



Name	Opportunity.Owner.Full Name	Count of Opportunity ID
Acc - 1000 Widgets	Tony Santos	1
Acme - 1,200 Widgets	Keith Laz	1
Acme - 200 Widgets	Keith Laz	1
Acme - 600 Widgets	Keith Laz	1
ESales_01	Bill Rolley	1
Global Media - 400 Widgets	Keith Laz	1
TestOpp	Keith Laz	1
West_Sales_01	Lucy Timmer	1
salesforce.com - 1,000 Widgets	Keith Laz	1
salesforce.com - 2,000 Widgets	Keith Laz	1
salesforce.com - 500 Widgets	Keith Laz	1
salesforce.com - 5000 Widgets	Keith Laz	1

Opportunity.Owne...ame	
Bill Rolley	🟦
Keith Laz	🟥
Lucy Timmer	🟧
Tony Santos	🟩

Row-Level Security Example Based on Territory Management

Let’s look at an example where you create a dataset based on Salesforce data and then implement row-level security based on your defined territories. In this example, you determine what model you use for territory management, so you can later review sample JSON for that dataset. To restrict access on each record in the dataset, you will create a security predicate where each user can view only data appropriate for the territory to which they belong.

Territory management is an account sharing system that grants access to accounts based on the characteristics of the accounts. It enables your company to structure your Salesforce data and users the same way you structure your sales territories.

If your organization has a private sharing model, you might have granted users access to accounts based on criteria such as postal code, industry, revenue, or a custom field that is relevant to your business. Perhaps you also need to generate forecasts for these diverse categories of accounts. Territory management solves these business needs and provides a powerful solution for structuring your users, accounts, and their associated contacts, opportunities, and cases.

IN THIS SECTION:

1. Determine How You Use Territory Management

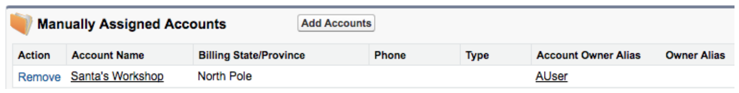
   When working with security related to territory management, it helps to know how your organization implements territory management. Usually, one of 2 methods are used. Either accounts are assigned to regions manually, following some organization-specific precedence, or the organization use’s Salesforce's territory hierarchy feature.

2. Create the DataSet
   Now we look at sample JSON code that describes territory management in a dataset.
3. Create the Security Predicate
   Now we can apply a security predicate to filter the dataset.

Determine How You Use Territory Management

When working with security related to territory management, it helps to know how your organization implements territory management. Usually, one of 2 methods are used. Either accounts are assigned to regions manually, following some organization-specific precedence, or the organization use's Salesforce's territory hierarchy feature.

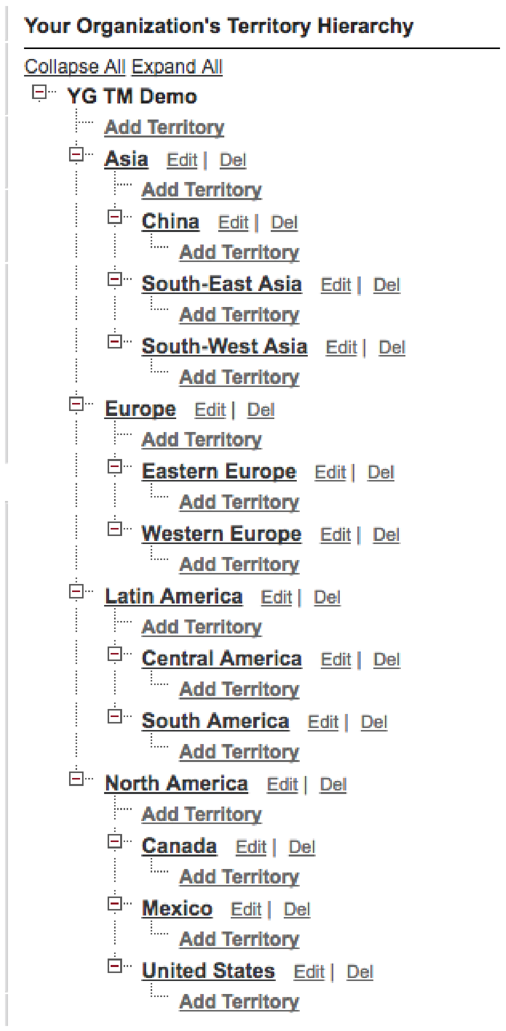
The manual process



Action	Account Name	Billing State/Province	Phone	Type	Account Owner Alias	Owner Alias
Remove	Santa's Workshop	North Pole			AUser	

For this example, any account with a Billing State or Province that is North Pole is manually assigned to the Canada region.

Territory Management hierarchies



Your Organization's Territory Hierarchy

Collapse All Expand All

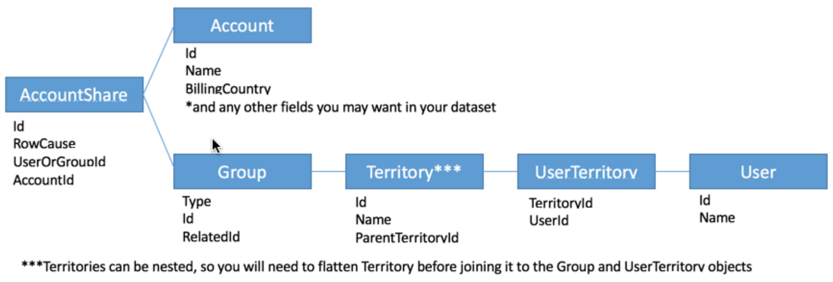
- YG TM Demo
  - Add Territory
  - Asia Edit | Del
    - Add Territory
    - China Edit | Del
      - Add Territory
    - South-East Asia Edit | Del
      - Add Territory
    - South-West Asia Edit | Del
      - Add Territory
  - Europe Edit | Del
    - Add Territory
    - Eastern Europe Edit | Del
      - Add Territory
    - Western Europe Edit | Del
      - Add Territory
  - Latin America Edit | Del
    - Add Territory
    - Central America Edit | Del
      - Add Territory
    - South America Edit | Del
      - Add Territory
  - North America Edit | Del
    - Add Territory
    - Canada Edit | Del
      - Add Territory
    - Mexico Edit | Del
      - Add Territory
    - United States Edit | Del
      - Add Territory

For this example, we have a user called North America VP who needs access to all accounts in the Canada, Mexico, and US territories. We also have a user called Rep1 Canada who should only have access to the accounts in the Canada territory, not Mexico or US, and nowhere above in the hierarchy.

Create the DataSet

Now we look at sample JSON code that describes territory management in a dataset.

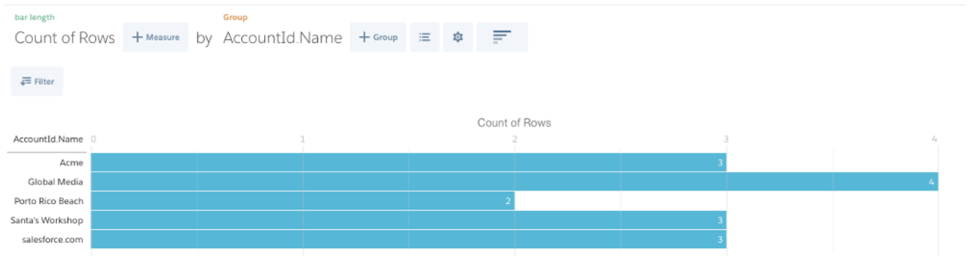
In this example, territory management data is stored on the following objects and fields.


Account
Id
Name
BillingCountry
*and any other fields you may want in your dataset
AccountShare
Id
RowCause
UserOrGroupId
AccountId
Group
Type
Id
RelatedId
Territory***
Id
Name
ParentTerritoryId
UserTerritory
TerritoryId
UserId
User
Id
Name
***Territories can be nested, so you will need to flatten Territory before joining it to the Group and UserTerritory objects

Here is an example JSON file for this dataset.

```
{
  "Extract_AccountShare": {
    "action": "sfdcDigest",
    "parameters": {
      "object": "AccountShare",
      "fields": [
        { "name": "Id"},
        { "name": "RowCause"},
        { "name": "UserOrGroupId"},
        { "name": "AccountId"}
      ]
    }
  },
  "Extract_Group": {
    "action": "sfdcDigest",
    "parameters": {
      "object": "Group",
      "fields": [
        { "name": "Name"},
        { "name": "Type"},
        { "name": "Id"},
        { "name": "RelatedId"}
      ]
    }
  },
  "Extract_Territory": {
    "action": "sfdcDigest",
    "parameters": {
      "object": "Territory",
      "fields": [
        { "name": "Id"},
        { "name": "Name"},
        { "name": "ParentTerritoryId"}
      ]
    }
  },
  "Extract_User_Territory": {
    "action": "sfdcDigest",
    "parameters": {
      "object": "UserTerritory",
      "fields": [
        { "name": "TerritoryId"},
        { "name": "UserId"}
      ]
    }
  },
  "Extract_User": {
    "action": "sfdcDigest",
    "parameters": {
      "object": "User",
      "fields": [
        { "name": "Id"},
        { "name": "Name"}
      ]
    }
  },
  "Extract_Account": {
    "action": "sfdcDigest",
    "parameters": {
      "object": "Account",
      "fields": [
        { "name": "Id"},
        { "name": "Name"},
        { "name": "BillingCountry"}
      ]
    }
  },
  "Augment_TerritoryUsers": {
    "action": "augment",
    "parameters": {
      "left": "Extract_Territory",
      "left_key": [
        "Id"
      ],
      "relationship": "TerritoryId",
      "right": "Extract_User_Territory",
      "right_key": [
        "TerritoryId"
      ],
      "right_select": [
        "UserId"
      ],
      "operation": "LookupMultiValue"
    }
  },
  "Augment_AccountShare_To_Territory_Groups": {
    "action": "augment",
    "parameters": {
      "left": "Augment_AccountShare_To_Account",
      "left_key": [
        "UserOrGroupId"
      ],
      "relationship": "UserOrGroupId",
      "right": "Extract_Group",
      "right_key": [
        "Id"
      ],
      "right_select": [
        "Name",
        "RelatedId"
      ]
    }
  },
  "Augment_AccountShare_To_Territory": {
    "action": "augment",
    "parameters": {
      "left": "Augment_AccountShare_To_Territory_Groups",
      "left_key": [
        "UserOrGroupId.RelatedId"
      ],
      "relationship": "Territory",
      "right": "Augment_TerritoryUsers",
      "right_key": [
        "Id"
      ],
      "right_select": [
        "TerritoryId.UserId"
      ],
      "operation": "LookupMultiValue"
    }
  },
  "Augment_AccountShare_To_Account": {
    "action": "augment",
    "parameters": {
      "left": "Extract_AccountShare",
      "left_key": [
        "AccountId"
      ],
      "relationship": "AccountId",
      "right": "Extract_Account",
      "right_key": [
        "Id"
      ],
      "right_select": [
        "Name"
      ]
    }
  },
  "Register_Territory_GroupUsers": {
    "action": "sfdcRegister",
     "parameters": {
       "alias": "Register_Territory_GroupUsers",
       "name": "Register_Territory_GroupUsers",
       "source": "Augment_AccountShare_To_Territory"
     }
   }
}
```

When run, this JSON file results in a list of accounts. In this example, a list of 5:



Create the Security Predicate

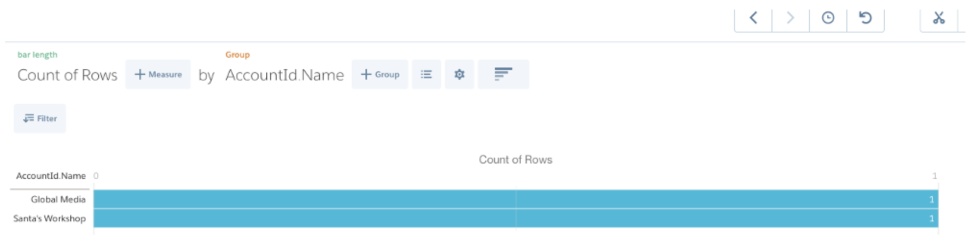
Now we can apply a security predicate to filter the dataset.

Using this example, the following security predicate on the dataset enforces the territory management security rules.

```
'Territory.TerritoryId.UserId' == "$User.Id" || 'UserOrGroupId' == "$User.Id"
```

Note: Update the dataset, and then log out of and back in to the org so you see the changes.

Now you see only 2 accounts - Global Media because it is in the Canada territory, and Santa's Workshop because of the manual rule.



Salesforce Sharing Inheritance for Datasets

Use sharing inheritance to let Analytics use the same sharing rules for your datasets as Salesforce uses for your objects.

As a Salesforce administrator, you likely use sharing rules so that users have access to data appropriate to their roles. These sharing rules include rules for Apex or custom sharing and manual, hierarchy, role, group, and team-based sharing. For more information, see Sharing Settings.

For supported objects, administrators can enable sharing inheritance in Analytics to use the Salesforce sharing settings in Analytics. When creating your datasets during the ELT (extract, load, and transform) process, or when editing existing datasets, specify the objects that use sharing.

Limitations

These limitations could result in leaking information when using sharing inheritance.

- You can inherit sharing settings only from one object, regardless of how many source objects are used in creating a dataset. Because the dataset can be constructed from many objects, each object could be using a different security model.
- The computeRelative and delta dataflow transformations could merge information from records with different security, which can result in leaking information when using sharing inheritance.
- Calculated fields are treated as normal fields. Row-level security applied during the calculation in Salesforce is ignored.

Important: If your dataflow doesn't do a full extraction each time it runs, be sure to evaluate whether security drift is a risk for the datasets you bring into Analytics. Consider whether to use periodic full sync. For more information, see Security Metadata Drift.

Here are some other limitations of the Analytics sharing inheritance feature.

- A dataset using sharing must also have a security predicate defined.
- If a user can see more than 3,000 records on the object in Salesforce but the user does not have the "View All Data" permission, sharing inheritance is not used. The backup security predicate takes effect. This limitation does not apply to the Opportunity object if the critical update "Increase Coverage of Einstein Analytics Sharing Inheritance for Opportunity" is enabled.
- If an opportunity has more than 150 sharing rules, you can't use the Opportunity object as a sharing source for a dataflow.
- Sharing inheritance might not be used when many sharing settings or rules control access to an opportunity, such as in the following situations:
  - A user has membership in many public groups, each of which grants access to the opportunity.
  - A user is near (or at) the top of role or territory hierarchies in an org that has a complex role or territory configuration.

  In this situation, the backup security predicate takes effect.
- Sharing isn't automatically applied to datasets. You apply sharing to each dataset manually.
- Changes to the rowLevelSharingSource or rowLevelSecurityFilter security settings in a dataflow have no effect on datasets that exist. Change those settings on the edit dataset page.
- For an object to appear in the security-sharing source list, the primary key of the custom object must be a field in the dataset. A foreign key doesn't satisfy this requirement. For example, if you have Opportunity.AccountId in your dataset but not Account.Id, you can't inherit sharing from the Account object.

Note: Sharing inheritance can affect the performance of queries and dataflows. If your requirements include best-possible performance, use security predicates instead of sharing inheritance. If not, enjoy the convenience of sharing inheritance.

IN THIS SECTION:

Set Up Sharing Inheritance

To enable sharing inheritance in Analytics, specify which datasets inherit sharing rules, and set a default security predicate.

Note: We recommend testing in a sandbox environment before rolling out sharing inheritance to production. Test your particular use cases against your org's security model and data to make sure that sharing inheritance works for you.

Enable or Disable Sharing Inheritance

Sharing inheritance is turned on by default in new orgs.

1. From Setup, in the Quick Find box, enter `Analytics`, and then click **Settings**.
2. Select **Inherit sharing from Salesforce**, and click **Save**.

Enable Sharing Inheritance When Using Data Sync

If your org has data sync enabled, enable sharing inheritance for each object you want to use as a sharing source.

1. In Analytics Studio, click **Data Manager**.
2. In Data Manager, click **Connect**.
3. On the right end of the row for the object you want to enable, click the dropdown list.
4. Click **Row Level Sharing**.
5. Click **Sharing inheritance on**.
6. Click **Save**.

Enhance Sharing Inheritance for the Opportunity Object

Sharing inheritance does have limitations. (See “Limitations” in Salesforce Sharing Inheritance for Datasets.) You can increase availability of sharing inheritance for the Opportunity object by enabling the critical update “Increase Coverage of Einstein Analytics Sharing Inheritance for Opportunity”.

To get the enhanced coverage, the Opportunity object must be the sharing source for both your dataflow and your dataset.

Configure Dataflows

For each dataset that you want to inherit sharing, modify the dataflow.

1. Specify the source object and a default security predicate. For more information, see Configure the Dataflow.
2. Add the `rowLevelSharingSource` parameter to the `sfdcRegister` node parameters for the dataset. For more information, see sfdcRegister. The `rowLevelSharingSource` parameter takes a string, which is the API name for the object from which to inherit sharing. In this example, the parameter specifies that the Salesforce sharing rules on the Opportunity object should be inherited.

```
"reg": {
  "action": "sfdcRegister",
  "parameters": {
    "source": "Opportunity_final",
    "name": "Opportunity w/ Account",
    "alias": "Oppty_w_Acct",
    "rowLevelSharingSource": "Opportunity",
    "rowLevelSecurityFilter": "'OwnerId' == \"$User.Id\""
  }
},
```

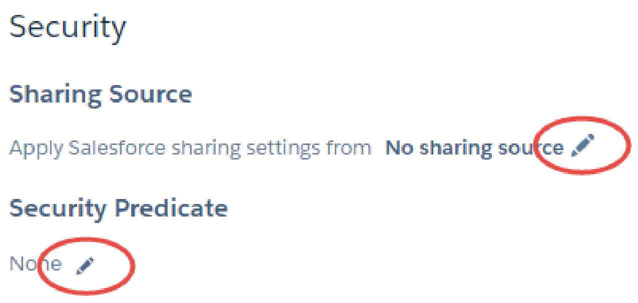
3. When setting `rowLevelSharingSource`, you must also set the security predicate (`rowLevelSecurityFilter`). In the example, when sharing limits are exceeded, users see only the opportunities that they own. Set the security predicate to `false` to block all users not covered by sharing.

Configure Datasets

On datasets that exist, changes to security settings in a dataflow have no effect. You must also change those settings on the edit dataset page.

Note: If the settings in the dataset and dataflow don’t match, you see a warning that says, "The sharing source and security predicate in this dataset version must be the same as in the dataflow".

1. Edit the dataset. For more information, see Edit a Dataset on page 102.
2. For Sharing Source, select the API name for the object. Only valid objects are displayed in the list. For example, the primary key of the object must be a field in the dataset.
3. For Security Predicate, enter the default security predicate. If you use sharing inheritance, you must also specify a default predicate. Set the security predicate to `false` to block all users not covered by sharing. This security predicate is the default when sharing is enabled on existing datasets.


Security

Sharing Source

Apply Salesforce sharing settings from **No sharing source**

Security Predicate

None

SECURITY PREDICATE REFERENCE

Predicate Expression Syntax for Datasets

You must use valid syntax when defining the predicate expression.

The predicate expression must have the following syntax:

`<dataset column> <operator> <value>`

For example, you can define the following predicate expression for a dataset:

```
'UserId' == "$User.Id"
```

You can create more complex predicate expressions such as:

```
('Expected_Revenue' > 4000 || 'Stage Name' == "Closed Won") && 'isDeleted' != "False"
```

Consider the following requirements for the predicate expression:

- The expression is case-sensitive.
- The expression cannot exceed 1,000 characters.
- There must be at least one space between the dataset column and the operator, between the operator and the value, and before and after logical operators. This expression is not valid: `'Revenue'>100`. It must have spaces like this: `'Revenue' > 100`.

If you try to apply a predicate to a dataset and the predicate is not valid, an error appears when any user tries to query the dataset.

IN THIS SECTION:

Dataset Columns in a Predicate Expression

You include at least one dataset column as part of the predicate expression.

Consider the following requirements for dataset columns in a predicate expression:

- Column names are case-sensitive.
- Column names must be enclosed in single quotes ('). For example, `'Region' == "South"`

  Note: A set of characters in double quotes is treated as a string rather than a column name.

- Single quotes in column names must be escaped. For example, `'Team\'s Name' == "West Region Accounts"`

Values in a Predicate Expression

The value in the predicate expression can be a string literal or number literal. It can also be a field value from the User object in Salesforce.

Consider the following requirements for each value type.

Value Type	Requirements	Predicate Expression Examples
string literal	Enclose in double quotes and escape the double quotes.	• `'Owner' == "Amber"` • `'Stage Name' == "Closed Won"`
number literal	Can be a float or long datatype. Do not enclose in quotes.	• `'Expected_Revenue' >= 2000.00` • `'NetLoss' < -10000`
field value	When referencing a field from the User object, use the $User.[field] syntax. Use the API name for the field. You can specify standard or custom fields of type string, number, or multi-value picklist. When you define a predicate for a dataset, you must have read access on all User object fields used to create the predicate expression. However, when a user queries a dataset that has a predicate based on the User object, Analytics uses the access permissions of the Insights Security User to evaluate the predicate expression based on the User object.	• `'Owner.Role' == "$User.UserRoleId"` • `'GroupID' == "$User.UserGroupId__c"` **Note:** Supported User object field value types are string, number, and multi-value picklist. Other types (for example, boolean) are not supported.

Value Type	Requirements	Predicate Expression Examples
	Note: By default, the Security User does not have access permission on custom fields of the User object. To grant the Security User read access on a field, set field-level security on the field in the user profile of the Security User.	

Escape Sequences

You can use the backslash character (\) to escape characters in column names and string values in a predicate expression.

You can use the \' escape sequence to escape a single quote in a column name. For example:

```
'Team\'s Name' == "West Region Accounts"
```

You can use the following escape sequences for special characters in string values.

Sequence	Meaning
\b	One backspace character
\n	New line
\r	Carriage return
\t	Tab
\Z	CTRL+Z (ASCII 26)
\"	One double-quote character
\\\\	One backslash character
\0	One ASCII null character

Character Set Support

Analytics supports UTF-8 characters in dataset column names and values in a predicate expression. Analytics replaces non-UTF-8 characters with the UTF-8 symbol (�). If Analytics has to replace a non-UTF-8 character in a predicate expression, users may experience unexpected query results.

Special Characters

Certain characters have a special meaning in Analytics.

Character	Name	Description
'	Single quote	Encloses a dataset column name in a predicate expression. Example predicate expression: `'Expected_Revenue' >= 2000.00`
"	Double quote	Encloses a string value or field value in a predicate expression. Example predicate expression: `'OpportunityOwner' == "Michael Vesti"`
( )	Parentheses	Enforces the order in which to evaluate a predicate expression. Example predicate expression: `('Expected_Revenue' > 4000 || 'Stage Name' == "Closed Won") && 'isDeleted' != "False"`
$	Dollar sign	Identifies the Salesforce object in a predicate expression. Note: You can only use the User object in a predicate expression. Example predicate expression: `'Owner.Role' == "$User.UserRoleId"`
.	Period	Separates the object name and field name in a predicate expression. Example predicate expression: `'Owner' == "$User.UserId"`

Operators

You can use comparison operators and logical operators in predicate expressions.

IN THIS SECTION:

Logical Operators
Logical operators return true or false.

Comparison Operators

Comparison operators return true or false.

Analytics supports the following comparison operators.

Operator	Name	Description
==	Equals	True if the operands are equal. String comparisons that use the equals operator are case-sensitive. Example predicate expressions: `'Stage Name' == "Closed Won"`
!=	Not equals	True if the operands are not equal. String comparisons that use the not equals operator are case-sensitive. Example predicate expression: `'isDeleted' != "False"`
<	Less than	True if the left operand is less than the right operand. Example predicate expression: `'Revenue' < 100`
<=	Less or equal	True if the left operand is less than or equal to the right operand.
>	Greater than	True if the left operand is greater than the right operand.
>=	Greater or equal	True if the left operand is greater than or equal to the right operand.
in	Multi-value list filter	True if the left operand exists in the list of strings substituted for a multi-value picklist (field value). Example predicate expression: `'Demog' in ["$User.Demographic__c"]` In this example, `Demographic__c` is of type `multiPicklistField`. During evaluation, the multi-value picklist field is substituted by a list of strings, with 1 string per user-selected item. Note: Comma-separated lists are not supported within the square-bracket construct.

You can use the <, <=, >, and >= operators with measure columns only.

Logical Operators

Logical operators return true or false.

Analytics supports the following logical operators.

Operator	Name	Description
&&	Logical AND	True if both operands are true. Example predicate expression: 'Stage Name' == "Closed Won" && 'isDeleted' != "False"
||	Logical OR	True if either operand is true. Example predicate expression: 'Expected_Revenue' > 4000 || 'Stage Name' == "Closed Won"

Sample Predicate Expressions for Datasets

Review the samples to see how to structure a predicate expression.

The samples are based on the following Opportunity dataset.

Opportunity	Expected_Rev	Owner	OwnerRoleID	Stage_Name	IsDeleted
OppA	2000.00	Bill	20	Prospecting	True
OppB	3000.00	Joe	22	Closed Won	False
OppC	1000.00	可爱的花	36	Closed Won	False
OppD	5000.00	O'Fallon	18	Prospecting	True
OppE		Joe	22	Closed Won	True

Let's take a look at some examples to understand how to construct a predicate expression.

Predicate Expression	Details
`'OwnerRoleID' == "$User.UserRoleId"`	Checks column values in the User object.
`'Expected_Rev' > 1000 && 'Expected_Rev' <= 3000`	
`'Owner' = "Joe" || 'Owner' = "Bill"`	
`('Expected_Rev' > 4000 || 'Stage Name' == "Closed Won") && 'isDeleted' != "False"`	Parentheses specify the order of operations.
`'Stage Name' == "Closed Won" && 'Expected_Rev' > 70000`	
`'Owner' == "可爱的花"`	String contains Unicode characters.
`'Owner' == "O\'Fallon"`	Single quote in a string requires the escape character.

Predicate Expression	Details
`'Stage Name' == ""`	Checks for an empty string.