SAS® Lineage: User's Guide

2024.02 - 2024.09

This document might apply to additional versions of the software. Open this document in SAS Help Center and click on the version in the banner to see all available versions.

About SAS Lineage

The main objective of SAS Lineage is to provide a business-level impact analysis view of the assets in SAS Information Catalog. This analysis flow view displays the assets in the context of their sources and outputs and the relationships between them.

The metadata displayed by SAS Lineage conforms to a schema defined by catalog type definitions, which have the following parts:

- Asset definition
- Relationship to other assets and how they should be displayed
- Search definition

Data lineage illustrates how data transforms and flows as it is transported from source to destination across its entire life cycle. SAS Lineage provides a visual representation of the five Ws of data:

- Who is using the data?
- What information does it contain?
- When was the data created or transformed?
- Where does the data come from?
- Why does the data exist?

Some of the asset types that can be included in a SAS Lineage diagram are listed in the following table:

Table 1 *Available Asset Types for SAS Lineage*

Asset Label	Asset Name	Originating SAS Viya Platform Application
Table	Specific to table type, such as CAS table, Hive table, and SAS table	Applications that work with tables
Data plan	dataPlan	SAS Data Preparation
Common rule set	commonRuleSet	SAS Intelligent Decisioning

Asset Label	Asset Name	Originating SAS Viya Platform Application
Decision	decision	SAS Intelligent Decisioning
SAS DS2 package file	decisionDS2CodeFile	SAS Intelligent Decisioning
SAS SQL code file	decisionSQLCodeFile	SAS Intelligent Decisioning
Query code file	decisionQryCodeFile	SAS Intelligent Decisioning
Treatment	decisionTreatment	SAS Intelligent Decisioning
Treatment Group	decisionTreatmentGrp	SAS Intelligent Decisioning
Score Definition	decisionScoreDefinition	SAS Intelligent Decisioning
Global variable	globalVariable	SAS Intelligent Decisioning
Python code file	pythonCodeFile	SAS Intelligent Decisioning
Query code file	queryCodeFile	SAS Intelligent Decisioning
Lookup table	referenceDataDomain	SAS Intelligent Decisioning
Rule set	ruleSet	SAS Intelligent Decisioning
SAS custom context DS2 code file	sasCustomContextDS2CodeFile	SAS Intelligent Decisioning
SAS DS2 package file	sasDS2PackageFile	SAS Intelligent Decisioning
Score definition	scoreDefinition	SAS Intelligent Decisioning
Score execution	scoreExecution	SAS Intelligent Decisioning
SQL query file	sqlQueryFile	SAS Intelligent Decisioning
Treatment definition	treatmentDefinition	SAS Intelligent Decisioning
Treatment group	treatmentGroup	SAS Intelligent Decisioning
Model	model	SAS Model Manager
Model project	modelProject	SAS Model Manager
Model Studio project	modelStudioProject	SAS Model Studio

Asset Label	Asset Name	Originating SAS Viya Platform Application
SAS Studio Flow	SAS Studio Flow	SAS Studio
Step column	stepColumn	SAS Studio
Step name	stepName	SAS Studio
Step type	stepType	SAS Studio
Report	report	SAS Visual Analytics
Report template	reportTemplate	SAS Visual Analytics
Report data view	reportDataView	SAS Visual Analytics
Report Object	reportObject	SAS Visual Analytics
Report snippet	reportSnippet	SAS Visual Analytics
Report page	reportPage	SAS Visual Analytics
Report query	reportQuery	SAS Visual Analytics
Report insight	reportInsight	SAS Visual Analytics
Flow	flow	SAS Visual Investigator
Published flow	publishedFlow	SAS Visual Investigator

Getting Started with SAS Lineage

You can open a lineage diagram in SAS Lineage in several ways:

- “Open a SAS Lineage Subject from Another Application” on page 17
- “Searching for a SAS Lineage Subject ” on page 18
- “Access SAS Lineage from the Browser URL” on page 33

Work with Analysis Flows

Each subject that you open in SAS Lineage is displayed in a separate tab as an analysis flow in a lineage diagram. These flows vary depending on the data type and originating application of the subject. For example, a report from SAS Visual Analytics generates a different set of relationships than a profile from SAS Data Explorer. This process also applies as you drill down by expanding nodes in the lineage diagram. The results are always limited to the primary relationships for the subject's data type and originating application.

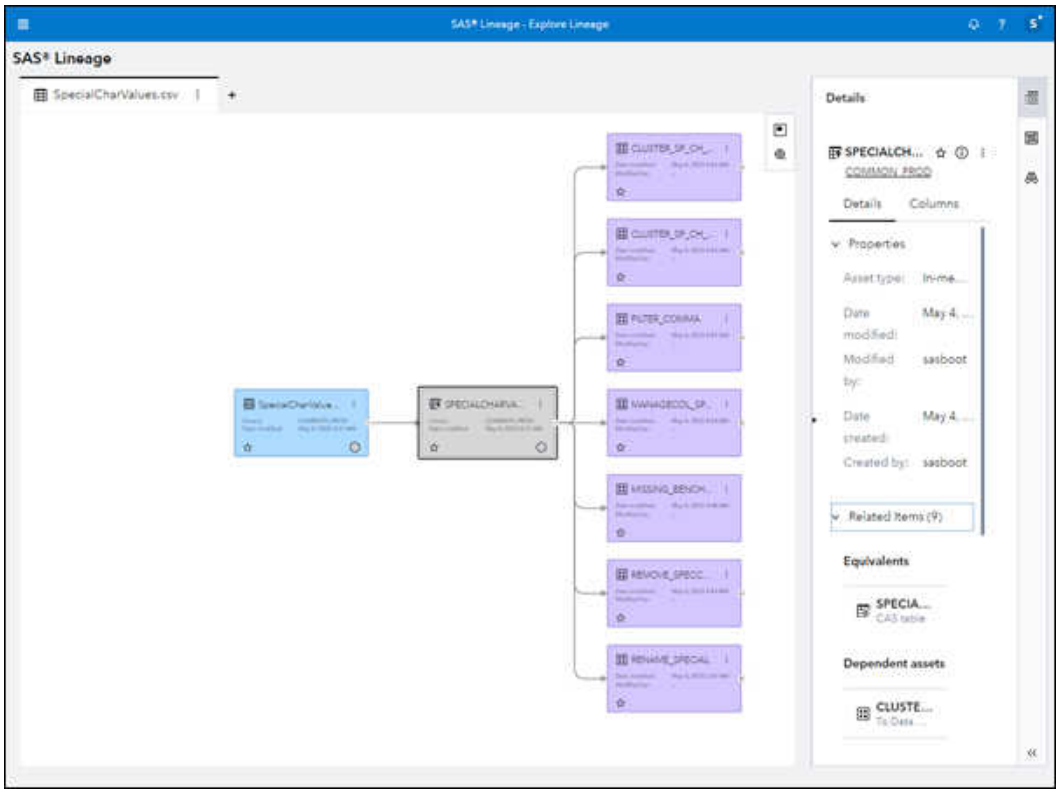
Note: When a SAS Lineage diagram is expanded to six or more levels, the information that is displayed in the diagram can be inaccurate.

The lineage diagram in the following example is centered around the primary relationships with the subject of the analysis flow.

1 Open one or more views from the Search for Subjects window or from objects in another application. Each of the views that you open is displayed in a separate lineage diagram.

2 Click one of the selected subject names listed at the top of the SAS Lineage window. (You can click these names to switch between views.) The following figure shows the analysis flow:

Figure 1 *Analysis Flow*

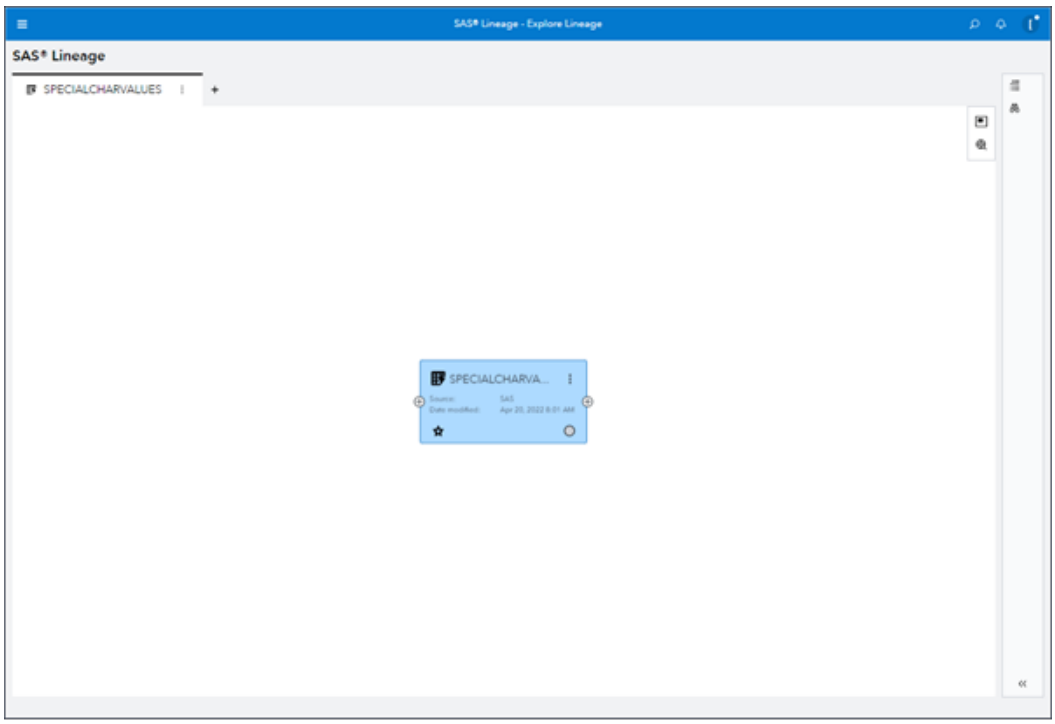


6

Review the contents of the lineage diagram. For example, this view consists of a subject, SPECIALCHARVALUES, and the items that have a relationship with it. The analysis flow for the subject is fully expanded. Note that the subject is given a distinct color, blue in this case. The color can vary, depending on your system settings.

3 Click ⊖ on the left and right sides of the subject to collapse the display of its inputs and outputs, as shown below:

Figure 2 *Collapsed Analytic Flow*



You can click ⊕ on both sides of the subjects if you need to add inputs or outputs back to the lineage diagram.

In either its expanded or collapsed state, the lineage diagram contains a set of menus and palettes:

- Application Toolbar
- Tab Options Contextual Menu
- Diagram Contextual Menu
- Object Contextual Menu
- Diagram Palette
- Properties Pane Palette

Items in the application toolbar affect SAS Lineage as a whole.

Table 2 *Application Toolbar*

Menu Item	Icon or Name	Description
Application menu	⋮⋮⋮	Provides access to SAS Viya platform applications

Menu Item	Icon or Name	Description
Diagram tabs	Name of the opened subject	Provides access to open lineage subjects
New view	+	Adds a new Search for Subjects window
Search	⌕	SAS Viya platform search
Notifications	🔔	Displays notifications for the current user
User options		Provides access to user resources: ■ What's New topic ■ SAS Lineage Help Center ■ Settings for general usage, region and language, and accessibility ■ Version topic with version, release, and site information ■ Sign out ■ Manage application features

Click ⋮ on a tab to access the tab options contextual menu. Items in the menu affect the selected tab. The Landmarks item provides direct links to the application bar, lineage views, lineage diagrams. and property panes.

Right-click in an empty space in a lineage diagram to see the lineage diagram contextual menu. The items in the lineage diagram contextual menu affect the lineage diagram. The items include functions to zoom in and out of the lineage diagram, reset the lineage diagram layout, and print the lineage diagram.

Right-click on an object or click ⋮ to access the object contextual menu. Items in an object contextual menu affect the selected object. Some of the menu items enable you to perform SAS Viya platform application actions such as Explore Lineage, Discover information assets, and Build model. The available actions depend on the type of the selected object.

The **Explore Lineage** menu item enables you to select an item in a lineage diagram and make it the subject of a new lineage diagram. Other items enable adding and removing assets from the list of favorites in the Search for Subjects window.

The items in the lineage diagram palette affect the display of objects in the lineage diagram.

Table 3 *Diagram Palette*

Name	Icon	Description
Overview window		Displays a small window that contains an overview of the analytical flow. You can pan a smaller window around this window to focus on a small section of the analytical flow. Useful for large flows.

Name	Icon	Description
Zoom		Zooms the analytical flow to the specified percentage of its default size

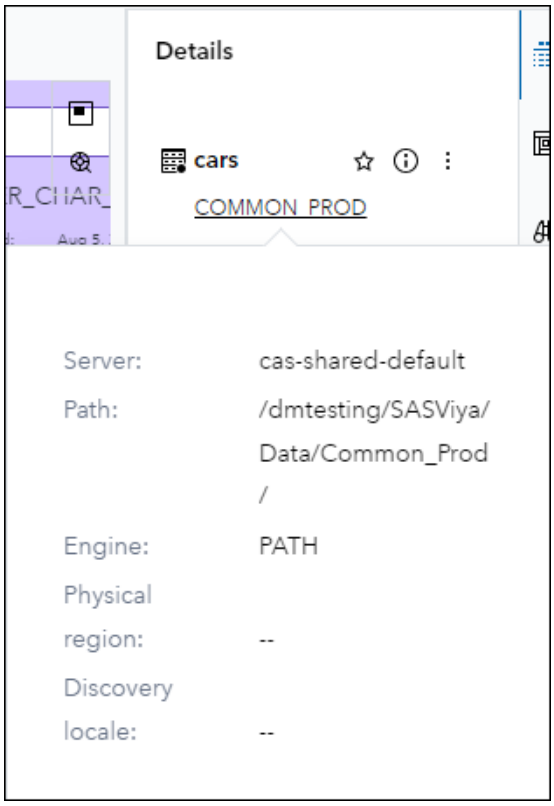
The items in the properties pane palette enable you examine objects in detail, change settings for the lineage diagram, and search for objects in an analytical flow.

Table 4 *Properties Pane Palette*

Name	Icon	Description
Details		Displays the Details pane for a selected object or relationship. See "Review Object or Relationship Details" on page 12 for more information.
View Settings		Starting in 2023.05, displays the View Settings pane for the view displayed in the lineage diagram. You can use it to change the level of expansion and the size of the nodes.
Find		Displays the Find pane, where you can enter a search string to find an object in the lineage diagram.

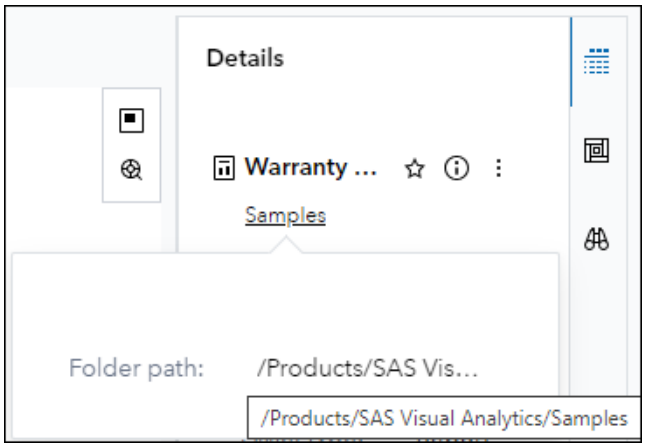
You can get more information about a selected item in the lineage diagram. Click the name of its library under the item name in the Details pane. If the item is a data set, a pop-up window is displayed that contains details about the server, engine, and location of the library that contains the item:

Figure 3 *Library Details*



If the item is a report, a different pop-up window is displayed:

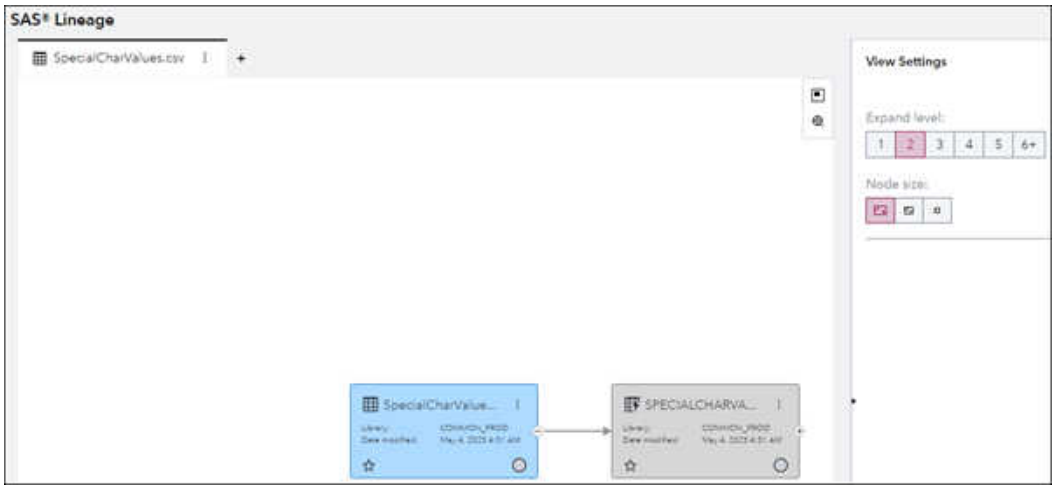
Figure 4 *Folder Details*



In this case, the folder path is displayed. The information that is displayed depends on the type of the item and the originating application. Some SAS Viya applications do not supply this information to SAS Information Catalog, so the folder links in the Details pane might not be present.

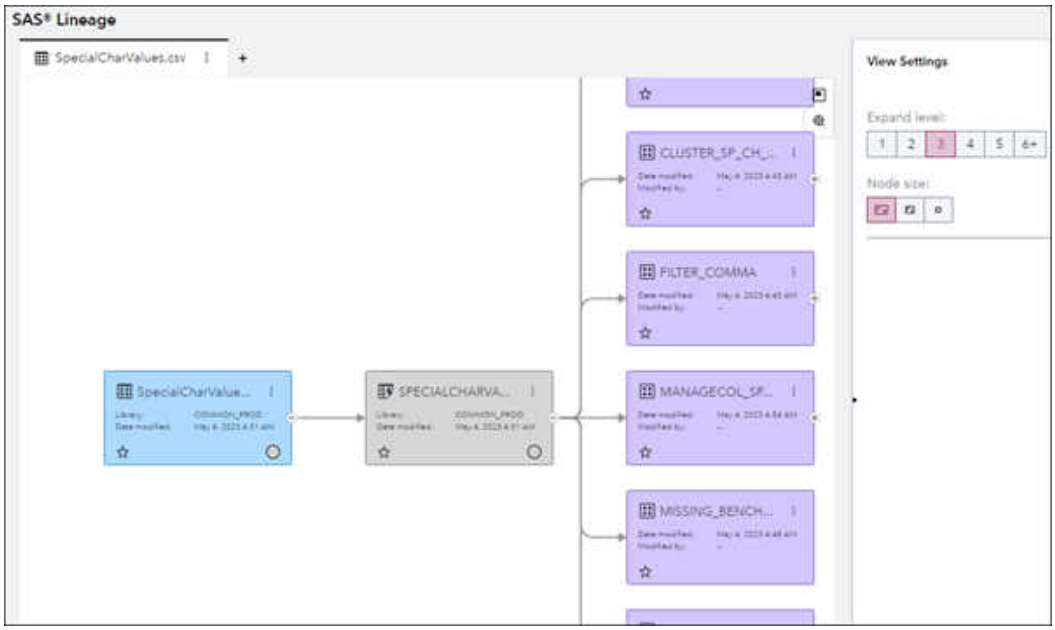
The following lineage diagram is displayed at expansion level *2*.

Figure 5 *Expansion Level 2*



To change the expansion level, click a number in the **Expand level** control, such as *3*. After you click **Yes** in the Expand Level window, the lineage diagram is displayed at expansion level *3*.

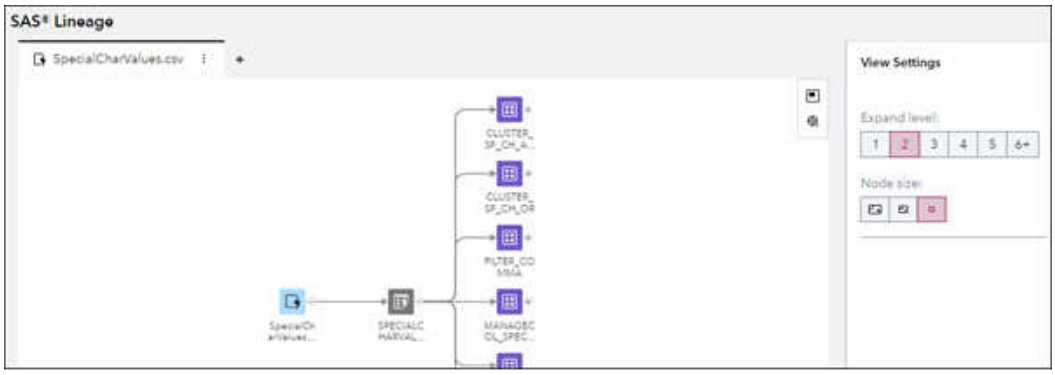
Figure 6 *Expansion Level 3*



Lower levels contract the diagram to show fewer objects, and higher levels expand it to show more objects.

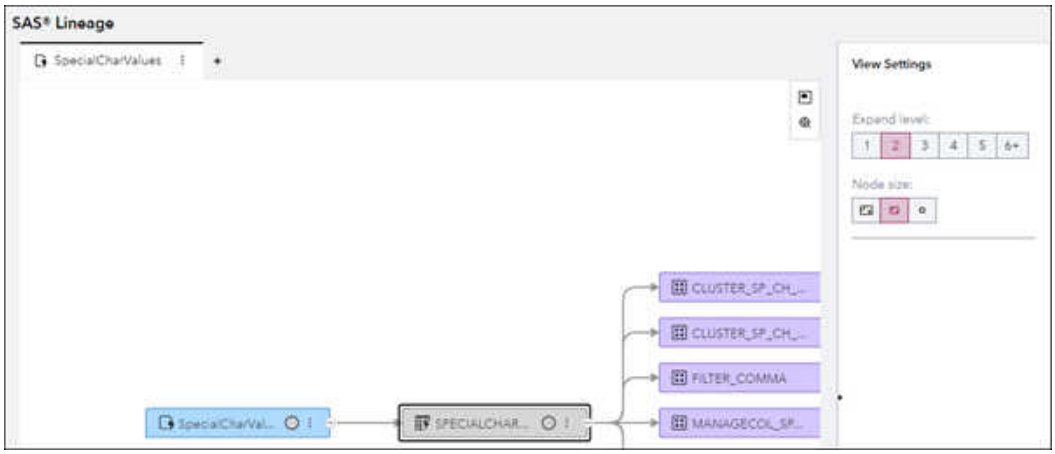
You can select between small, medium, and full-sized nodes with the **Node size** selector. You can see more of the items in the analysis flow in the lineage diagram when you use the small size. However, the only information displayed for each node is the node name and an icon and colored background for the node type.

Figure 7 *Small Nodes*



Medium nodes add information to the node, such as the status indicator and **Options** button displayed on the data sets in the following figure.

Figure 8 *Medium Nodes*

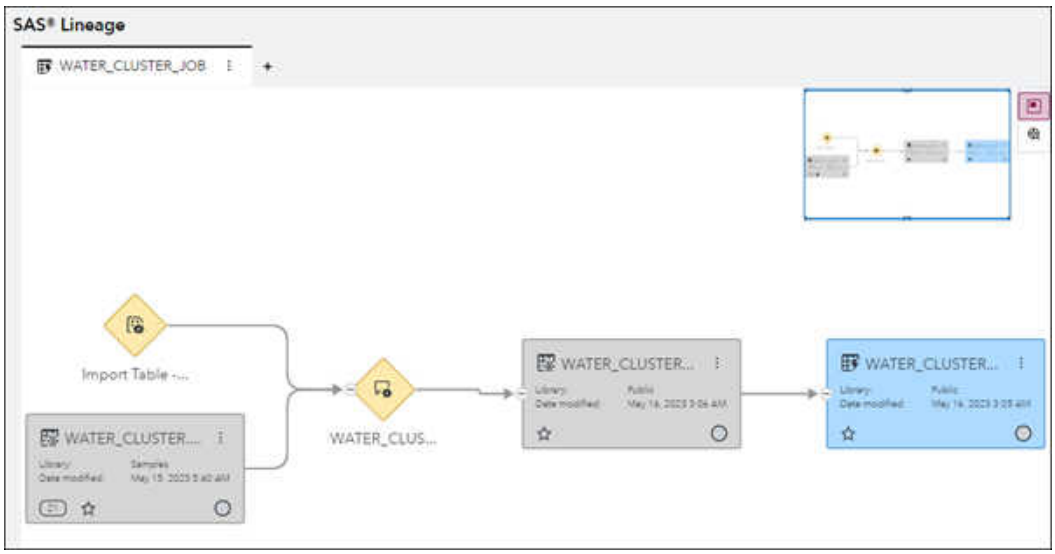


Full-size nodes add still more information. The data sets below display a Favorites indicator, the library name, and the date on which the node was last modified.

Figure 9 *Full-Size Nodes*

Note: Large-size nodes can also display analytical information, such column counts, information privacy status, and recurrence status, when this information is available. Reference nodes are displayed with a diamond shape, as in the following figure.

Figure 10 *Reference Nodes*

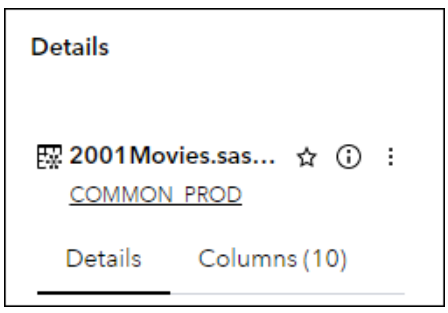


Review Object or Relationship Details

Overview

You can see more details about an object or the line between two objects in a lineage diagram. You can also see detailed information about the columns in a table object:

Figure 11 *Detail Pane Tabs*

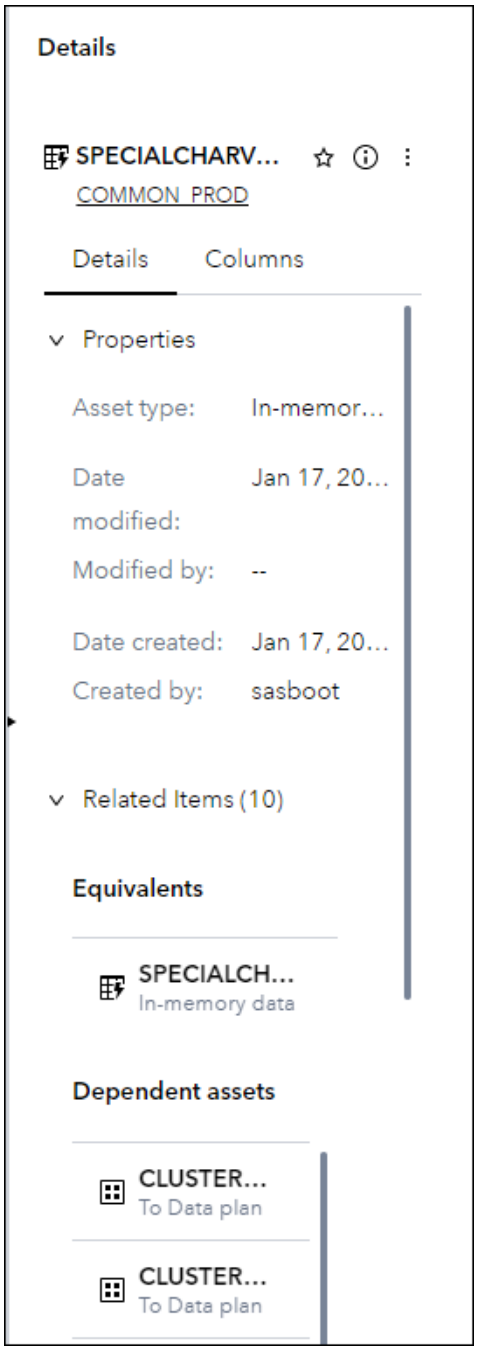


Select either the **Details** or the **Columns** tab to view the type of information that you need.

Details Tab

For example, you could select the SPECIALCHARVALUE object and click in the Properties Pane palette. Click **Details** to open the **Details** tab for the selected item.

Figure 12 *Details Pane for an Asset*



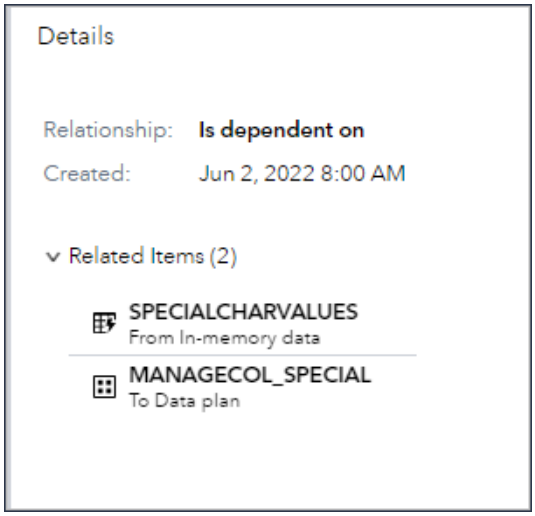
The Details pane for assets contains the following components:

Table 5 *Details Pane Component for Assets*

Component	Icon or Name	Notes
Item name	The name of the selected asset	The icon adjacent to the name indicates its type
Library	Information about the library that contains the selected item	Click the library name to see any available information about the server, path, engine, physical region, and discovery locale
Add to favorites	☆	Adds a selected object to the list of favorites in the Search for Subjects window
Remove from favorites	★	Removes a selected object from the list of favorites in the Search for Subjects window
Technical information	ⓘ	Displays the URI back to the objects storage location
Options	⋮	Enables you to open the asset in a new analytical flow or in a related SAS Viya platform application that supports its object type
Properties	Properties	Displays properties for a selected asset
Related Items	Related Items	Lists all the assets that are related to the selected asset. Grouped into categories for equivalents and each supported relationship type

The Details pane for a relationship is slightly different:

Figure 13 *Details Pane for a Relationship*



The Details pane for relationships contains the following components:

Table 6 *Details Pane Component for Relationships*

Component	Icon or Name	Notes
Name of the relationship	Relationship	None
The date on which the relationship was established	Creation	None
List of related items	Related Items	The assets that are connected by the relationship

The following relationship types are displayed in SAS Lineage:

Table 7 *Relationships Types in SAS Lineage*

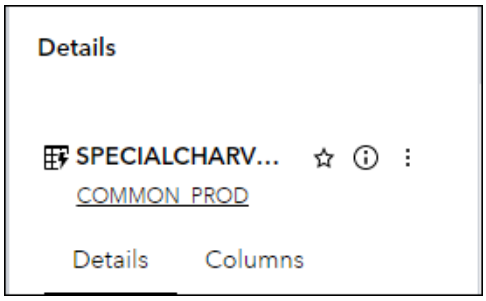
Relationship Type	Description
Is dependent on (displayed by default)	Any applications modeling depends on the elationship between entities. An object depends on an object when it cannot function or be defined without that related object being present. Example: Job to Table
Contains	Any applications modeling the inner workings of a top-level entity. An object contains another object when the included object does not make sense or exist without the object that contains it. Example: Model Manager Projects to Model
Is parent of	Applications modeling derived object hierarchy. An object is the parent of any object who cannot be located or found within a hierarchy without the parent object.

Equivalent objects contain the same data, but they are contained in different formats. The equivalent relationship is used between two objects that are the same object but have different access URIs. Equivalency is not displayed in SAS Lineage diagrams. Instead, equivalent objects are listed in the Related Items section of the Details panel for the assets that have them.

Columns Tab

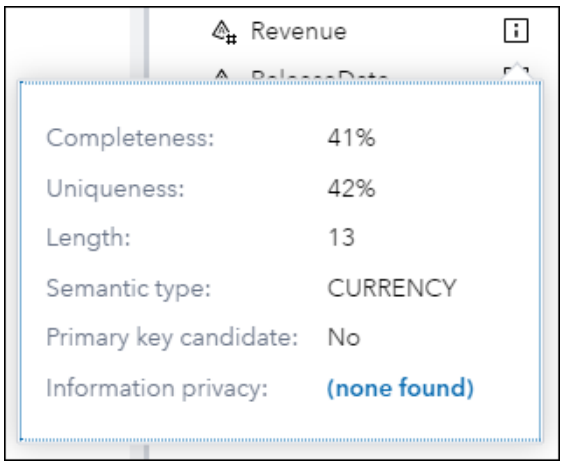
Click **Columns** to see information about the columns in a table:

Figure 14 *Columns List for a Table*



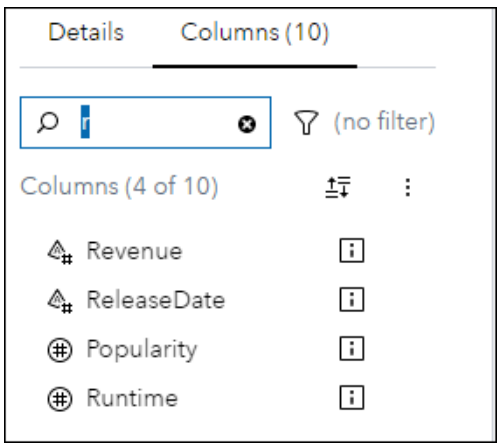
The columns contained in the selected table are displayed. (Column information is available only when the selected table has been analyzed in SAS Information Catalog). Click ⓘ next to a column to see detailed information about it:

Figure 15 *Column Information*

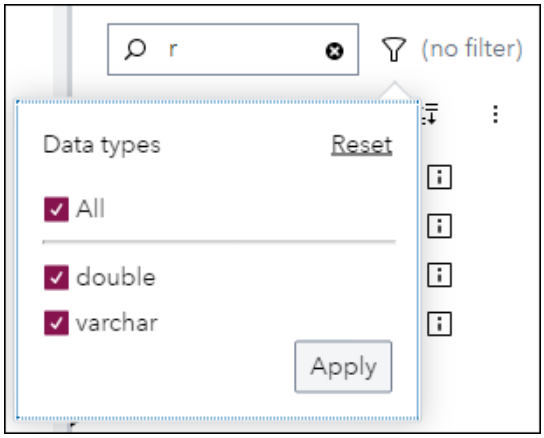


You can use the **Filter** field to limit the number of columns displayed. If you enter the character *r*, only columns that contain that character are displayed:

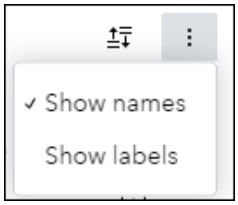
Figure 16 *Filter Field*



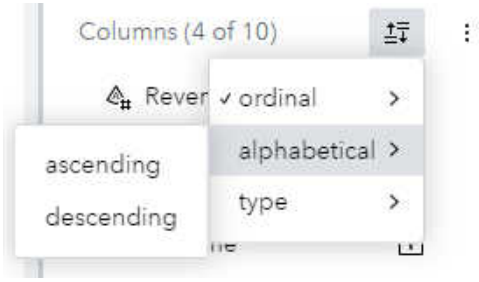
You can also click ▽ to constrain your filter to specific data types:



Click ⋮ to display the columns by names or labels.



Click ↑ or ↓ to configure sorting options.



Open a SAS Lineage Subject from Another Application

You might see an object in another SAS Viya platform application and want to see it in the context of its relationships with other objects. If that SAS Viya platform application supports the Relationship Service, you can select the object and bring it up directly in a SAS Lineage diagram. For example, you can follow these steps in SAS Information Catalog:

1 Select an asset in SAS Information Catalog. For example, you could select the asset from the Search Results window or in the **Recent** or **Favorites** collection in the Catalog Home window.

2 Right-click the item, and click the **Explore lineage** menu item. You can also select an asset and choose **Explore lineage** from the **Action** menu in some windows.

If the selected item is contained in the Relationship Service, it is displayed in SAS Lineage.

Searching for a SAS Lineage Subject

Overview

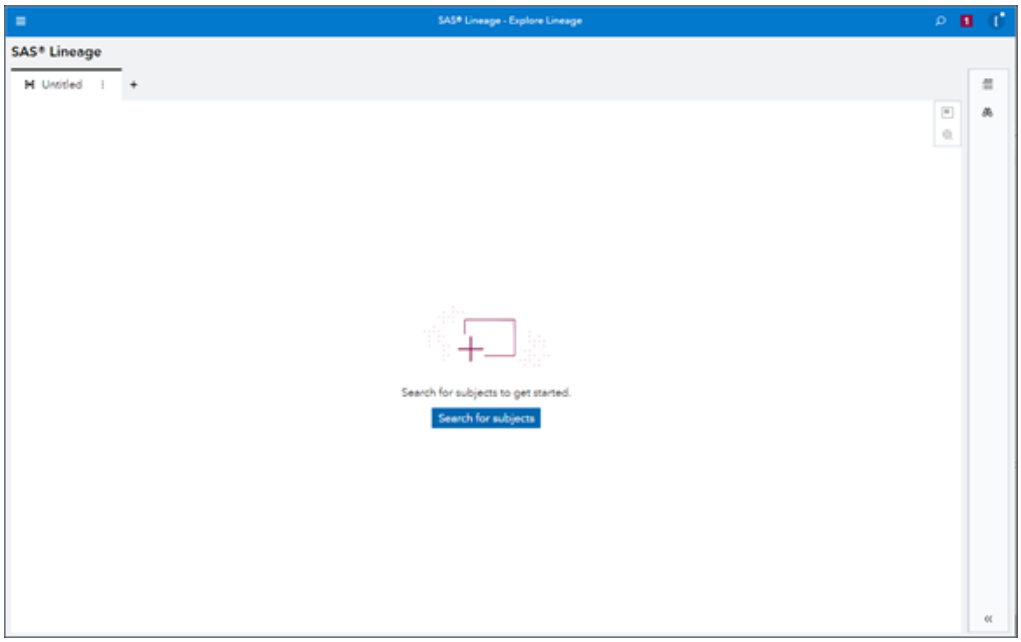
SAS Lineage uses the **Search for Subjects** window to find the subjects for lineage diagrams. This window uses the SAS Viya platform search component. The administrator for your application can configure the range of data subjects that the window can access.

Search for Subjects in SAS Lineage

If you have not opened a subject in SAS Lineage from another application, click **Search for subjects** in the SAS Lineage window. Search supports two types of searches, keyword and faceted, which you can mix and match in a single query.

Catalog search is an “OR” search by default when you enter multiple keywords or faceted criteria. Assets that match all the entered criteria appear at the top of the results. However, assets that match ANY of the criteria entered are also returned.

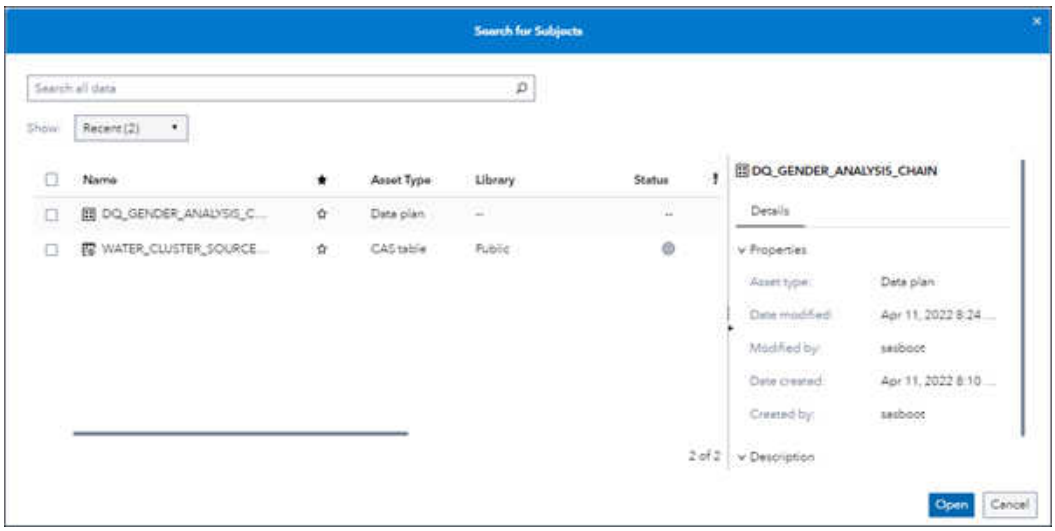
Figure 17 *Search for Subjects*



The initial view of the Search for Subjects window contains several components. The collections table in the main pane lists recently added subjects or favorite subjects. Select the check box next to a subject to display its properties or to mark it for opening. For some applications, you can mark more than one subject for opening.

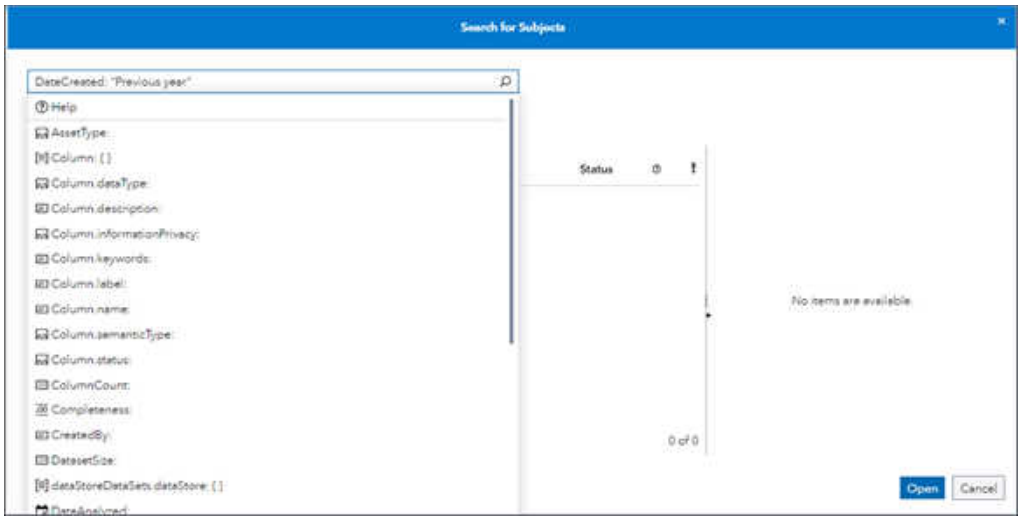
In the right pane, properties are displayed for the subject selected in the collections table.

Figure 18 *Initial Search for Subjects Window*



Enter a search query in the **Search** field. Click ⌕ to run your query. Starting with the 2024.01 release, you can click ⊗ to clear your query from the **Search** field.

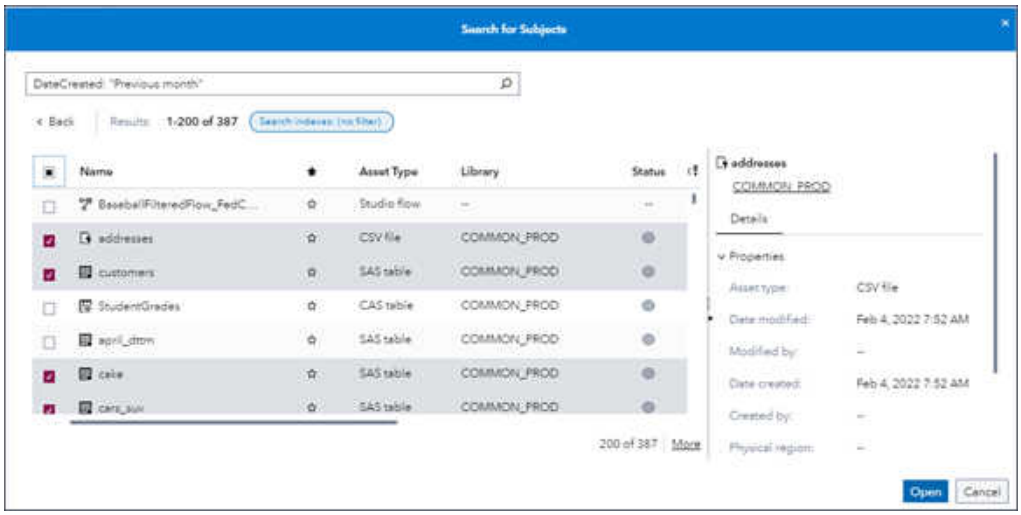
Figure 19 *Search Query*



When you click into the search field, you see search suggestions. Suggestions include contextual help, your previous search history, and commonly used search facets such as “Name:” and “DateModified:” For more information about using facets, see the Faceted Search section in this topic.

In the search results, select the check boxes to the left of the subjects that you need to open and click **Open**.

Figure 20 *Search Results Window*



Each subject is displayed in a lineage diagram in SAS Lineage. A separate tab is provided for each opened subject.

Keyword Search

When you enter words into the search field without any special syntax, a keyword search is used. Keyword searches look for matches in specific catalog metadata. However, not all asset metadata is included in this type of search. For more precise searching of asset properties, use faceted search.

Note: Spaces separate values in catalog search. Each value is searched independently of the other.

Entering values for Keyword search:

```
Cars
```

```
Cars Trucks Boats
```

The second example above submits each of the three keywords as separate values.

> **TIP** If you want to search on a phrase that includes spaces, add quotation marks to encapsulate the string into a single value.

```
"Vehicle Inventory"
```

```
Cars "Vehicle Inventory" Trucks
```

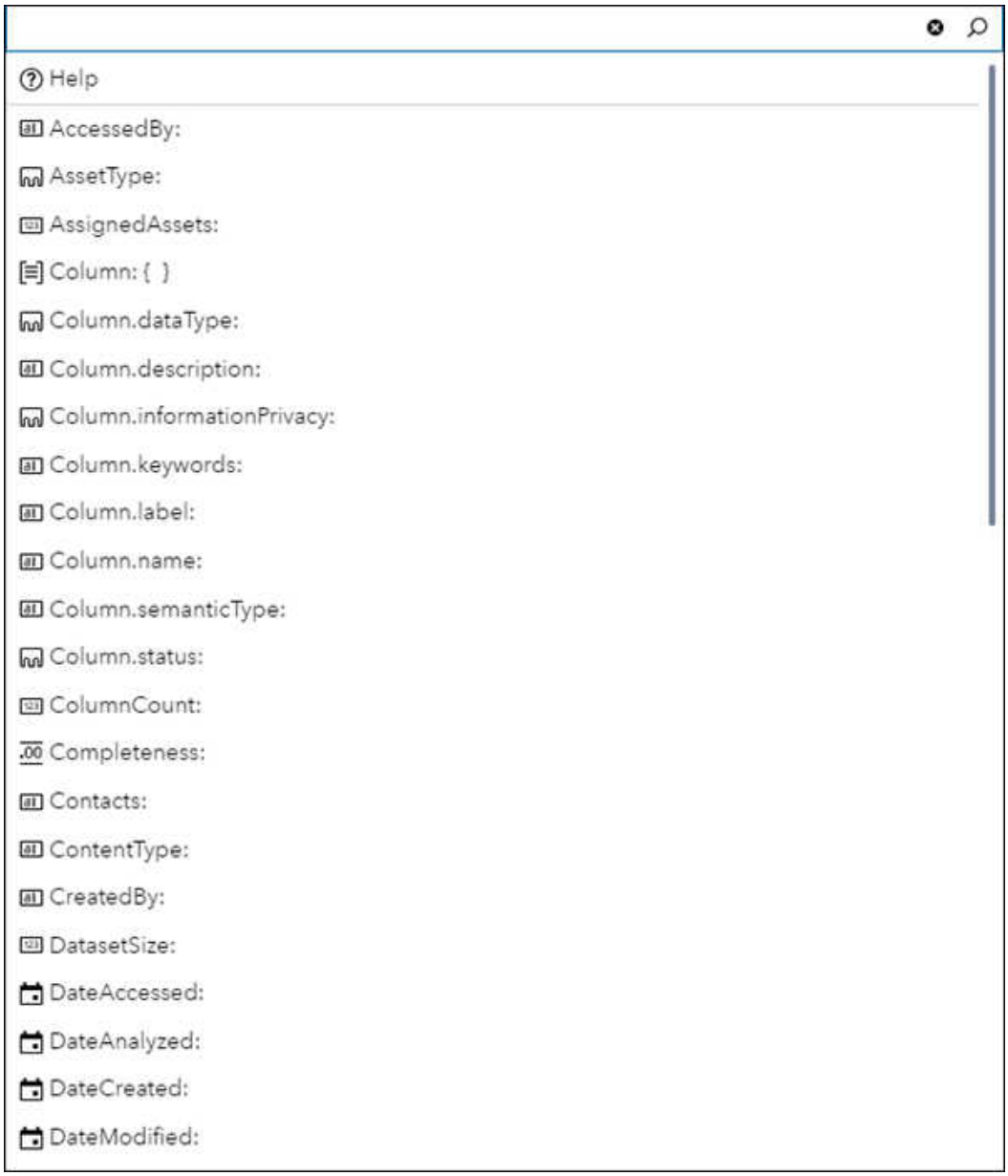
The second example above submits three separate values; “Vehicle Inventory” is seen as a single value because it has quotation marks around it.

Faceted Search

Faceted search runs queries on specific metadata fields such as “Name:” or “DateModified:” A facet represents a specific asset property that has been indexed into catalog search. Note that some facets like “Column.name:” are specific to their respective asset types. Others, such as “DateModified:,” are shared by all asset types.

TIP Adding a space into an empty catalog search field displays a list of all available search facets for all asset types.

Figure 21 *Search Facets*



Facets must be entered as one word (no spaces) with a colon at the end. Some facets have capital letters or periods within the facet name. Selecting a facet from the suggestions list enters it correctly into the search field. The facet does not work if the syntax is not entered correctly:

```
AssetType:
```

```
Name:
```

```
DateModified:
```

```
Library.name:
```

```
Column.name:
```

When you have selected a search facet, the suggestions switch to available values for that facet. (A space after the colon triggers value suggestions.) As you type, matching values for the facet are suggested.

Figure 22 *Facet Suggestions*

If the facet value contains spaces, enclose the string in quotation marks to indicate it is a single value.

```
AssetType: "Data Flow"
```

```
Name: "Vehicle Inventory"
```

```
Library.name: "Dev *"
```

TIP When not enclosed in parentheses, the space after the first facet value ("Vehicle Inventory" in example below) is interpreted as a new search criteria: a keyword search for "Cars" in this case. The suggestions reset back to displaying facets after any space that is not enclosed in parentheses.

Figure 23 *Search Behavior Without Parentheses*

Table 8 *Available Search Facets*

Use the facet	To find a	Type	Sample query	Sample suggestions (including previous values)
AccessedBy	the principal who most recently accessed the data set.	Text	AccessedBy: "sas.admin-content-loader"	user ID, sas.audit
AssetType:	assets of a specified type	Keyword	AssetType: "dataflow"	castable, reference, sastable

Use the facet	To find a	Type	Sample query	Sample suggestions (including previous values)
AssignedAssets	assets assigned to a glossary term	Numeric	AssignedAssets: 1	previous searched queries
Column:{}	columns with a specified nested attribute	Nested	Column: {name:orders}	orders
Column.dataType:	columns of a specified data type	Keyword	Column.dataType: “num”	char, num
Column.informationPrivacy:	columns with a specified information privacy value	Keyword	Column.informationPrivacy: private	private, candidate, sensitive
Column.keywords:	terms used to search and describe the data set	Text	Column.keywords: address name street	previous queries
Column.label:	label associated with a column	Text	Column.label: "cake flavor"	previously searched labels
Column.name:	name associated with a column	Text	Column.name: “flavor”	previously searched column names such price and date
Column.notes:	columns that contain the specified text found in attached notes	Text	Column.notes: "customer"	suggestions not provided for the Column.notes facet
Column.semanticType:	columns with a specified semantic type used in SAS Information Governance	Keyword	Column.semanticType: "AGE"	semantic types such as date, gender, country

Use the facet	To find a	Type	Sample query	Sample suggestions (including previous values)
Column.status:	review status assigned by a data steward	Keyword	Column.status: "review"	none review approved flagged warning
Column.term	assets that have column to term relationships	Text	Column.term: "logistics"	glossary terms such as accountability, biometrics, best available techniques
ColumnCount.	assets with specified numbers of columns	Numeric	ColumnCount: (10 50 100)	no suggestions
Completeness:	assets with specified percentages of completenes s	Numeric	Completeness: [94 to 100]	no suggestions
Contacts:	contacts associated with an asset	Text	Contacts: "DQ_CONTACTS"	previous queries
ContentType:	type of content such as application/ pdf, text/ plain, or text/xml,	Text	ContentType: "text/ plain"	text/csv, application/octet-stream
CreatedBy:	assets with specific CreatedBy values	Text	CreatedBy: “sas”	UserID, SAS, sas supplied, sas.dataplans
DateAccessed:	date on which the data set was most recently accessed	Date	DateAccessed: [2021-01-01 TO 2021-09-28]	Previous week, Previous quarter
DateAnalyzed:	assets analyzed on	Date	DateAnalyzed: [2021-01-01 TO 2021-09-28]	Previous week, Previous quarter

Use the facet	To find a	Type	Sample query	Sample suggestions (including previous values)
	specified dates			
DateCreated:	assets created on specified dates	Date	DateCreated: “Previous day”	Previous month
DateModified:	assets modified on specified dates	Date	DateModified: "Previous month"	Previous day, Date Range
DatasetSize	data sets of specified sizes (in bytes)	Numeric	DatasetSize:1000	no suggestions
Definition	term assets with specified strings in the Description fields	Text	Definition:storage	previous queries
Description:	assets with specified strings in descriptions	Text	Description: num*	suggestions not provided for the Description facet
FileExtension:	assets with specified file extensions	Keyword	FileExtension: “csv”	csv, sas7bdat, sashbdat
Folder: {}	columns with a specified nested attribute	Nested	Folder: {Name:sasuser}	previous queries
Folder.name	names of folder assets	Text	Folder.name: "images"	previous queries
InformationPrivacy:	assets that contain specified information privacy value	Keyword	InformationPrivacy: ‘private”	private, candidate, sensitive

Use the facet	To find a	Type	Sample query	Sample suggestions (including previous values)
Keywords:	assets that contain specified keywords	Text	Keywords: “coffee”	changed, new, none
Label:	label associated with an asset	Text	Label:type	type of order, type of vehicle
Languages	languages detected in the dataset	Text	Language: "English"	Spanish, Chinese, French
Library: {}	assets from specified libraries	Nested	Library: [name=Public]	samples, public
Library.name	assets from libraries that have the specified name	Text	Library.name: Public	samples, Census
Library.region:	assets from libraries that have the specified region value	Text	Library.region:texas	cas bot region
Locale:	assets associated specified locales	Keyword	Locale: “enusa”	dedeu
ModifiedBy:	assets modified by specified entities	Text	ModifiedBy: "sas supplied”	sasboot, jmjones
Name:	name associated with an asset	Text	Name:cust	customers_us.csv, customers_order_summary.sashdat
ParentID	term asset with a parent term that has the specified UUID (universally	Text	ParentID: "1e7b7353-3b04-4d53-9d57-125ca0772ae6”	previous queries

Use the facet	To find a	Type	Sample query	Sample suggestions (including previous values)
	unique identifier).			
ReportData	tables used by a report	Text	ReportData: "CustomerRisk"	previous queries
ReportDataItem	report data items such as table columns	Text	ReportDataItem: "status"	previous queries
ReportObjectType	report object types such as BarChart, geo, and WordCloud, ...	Text	ReportObjectType: BarChart	previous queries
ReportText	text in a report	Text	ReportText: "month"	previous queries
RowCount:	assets with a specified row count	Numeric	RowCount: (10 50 100)	no suggestions
Status:	assets with a specified status	Keyword	Status: "none"	approved, none
StepColumn	assets with a specified step column for data flows in SAS Studio	Text	StepColumn: "name"	div, division
StepCount:	assets with a specified step count for data flows in SAS Studio	Numeric	StepCount:10	no suggestions
StepName	assets with a specified step name for data flows in SAS Studio	Text	StepName: "query"	import, filter rows, sas program, sort

Use the facet	To find a	Type	Sample query	Sample suggestions (including previous values)
StepType	assets with a specified step type for data flows in SAS Studio	Text	StepType: "filter rows"	import, query, sas program, sort
Tags	tags associated with assets	Text	Tags: "account"	previous queries
Topic	topic identified in an asset summary	keyword	Topic: "article"	no suggestions
TopicKeywords	topic keyword identified in an asset summary	text	TopicKeywords: "brand"	presents, flavor, profile
TopicParent	topic keyword identified in an asset summary	keyword	TopicParent: "audience"	place, person, product

Special Value Syntax

Some facets require special syntax for the values:

```
DateModified: "Previous day"
```

```
DateModified: "Previous month"
```

TIP The DateModified: facet supports preset values:

- *Previous day (24 hours)*
- *Previous week (7 days)*
- *Previous month (30 days)*
- *Previous quarter (90 days)*
- *Previous year (12 months)*

Use square brackets, *"[value TO value]"* to define ranges for date and numerical facets.

```
DateCreated: [2023-09-01 TO 2023-09-15]
DateModified: [2023-01-01 TO 2023-06-30]
ColumnCount: [500 TO 900]
Completeness: [80 TO 100]
RowCount: [1000 TO 2000]
StepCount: [8 TO 12]
```

TIP Numerical values support these operators alone or in combination: >, <, and =. The equal sign must come after the greater than or lesser than symbols:

- *ColumnCount: <2500*
- *RowCount: >=50000*
- *Completeness: >95*
- *StepCount: >=20*

Using Wildcard Values and the MUST Operator

Search supports wildcards. The wildcard symbol (*) can replace unknown characters in a search term. It can be used in the following ways:

```
cars*
*cars*
*cars
Fin*
```

In each example, the wildcard character expands the search to include any unknown characters following or proceeding the entered characters.

Search also supports the MUST operator (+). Using the plus symbol in front of any faceted search makes that criteria mandatory in all results. The MUST operator on multiple faceted search criteria means all the results MUST match ALL the criteria that have the MUST operator.

In this example, all results MUST match the name value.

```
+Name: Patient* Description: "Medical Record"
```

In this example, all results MUST match the InformationPrivacy value AND the Column.name value. The MUST operator ONLY works with faceted search.

```
+InformationPrivacy: +Private Column.name: "Patient ID"
```

How to Enter Nested Facets

SAS Information Catalog supports nested facets for Column properties and Library properties. Nested facets are additional properties of column and library that you can define inside the parent facet (as shown in the syntax examples below). Nested facets appear in the suggestions list with the parent facet name followed by braces:

```
Column: { }
```

```
Library: { }
```

When you select a nested facet, additional facet syntax is required inside the braces. This is where you enter search criteria on multiple properties of a column or library. For example:

```
Column: {Name: ADDR* semanticType: Address dataType: varchar}
```

```
Library: {Name: Public* region:("US EAST*" "US WEST*")}
```

Nested syntax has the following form:

```
Parent: {nestedFacet: Value nestedFacet:("Value 1" "Value 2")}
```

> **TIP** You can still enter wildcards and multiple values for nested facets.

You can also enter a nested facet without using the braces. You first enter the parent facet name, followed by a period, and then specify the nested facet name followed by a colon:

```
Column.name: ADDR*
```

```
Column.semanticType: ("post code" Address)
```

```
Column.dataType: Char
```

```
Column.informationPrivacy: (Private Sensitive)
```

```
Column.description: Manufacturer
```

```
Library.name: *Test*
```

```
Library.region: "US WEST*"
```

> **TIP** When you define a nested facet inside a parent with braces, you do not include the parent name. The two syntax forms that nested facets support are listed below:

```
Parent: {nestedFacet: Value nestedFacet: Value}
```

```
Parent.nestedFacet: value
```

How to Combine Keyword and Faceted Search Queries

You can mix keyword and faceted search into a single query. This flexibility enables you to combine search strategies to find exactly what you are looking for. For example, you could enter:

```
"Sales Report" DateModified: "Previous month" AssetType: Report
```

The order of the query elements does not matter. You can also add multiple values, use operators, specify ranges, and mix in nested syntax.

```
Finance Q1 DateModified:"Previous month" AssetType:(CSV CAS) +Column.name:(Profit Loss)
```

Note: "Finance" and "Q1" are two separate keyword queries. Two values are specified for AssetType: "CSV" and "CAS" tables. All returned assets MUST have columns named "Profit" and "Loss." A search query with this many criteria might not return any matches. You can always remove criteria to broaden the search.

Usage for Spaces

Spaces are delimiters between search criteria. They separate distinct keyword and faceted search criteria.

```
Keyword<space> FacetName: Value<space> Keyword2<space> FacetName: Value
```

There are several exceptions:

- When a space is entered a colon at the end of a valid facet name, it is ignored. A value is expected after the space after the colon:

  ```
  FacetName: Value
  ```

- Quotation marks include the space as part of the value string. For example: "Vehicle Inventory":

  ```
  "Vehicle Inventory"
  ```

- Inside parentheses, a space is a delimiter between multiple values:

  (Value "Value 2" "Value 3")

- Inside square brackets, spaces are delimiters between values and required syntax:

  [Value TO Value]

Access SAS Lineage from the Browser URL

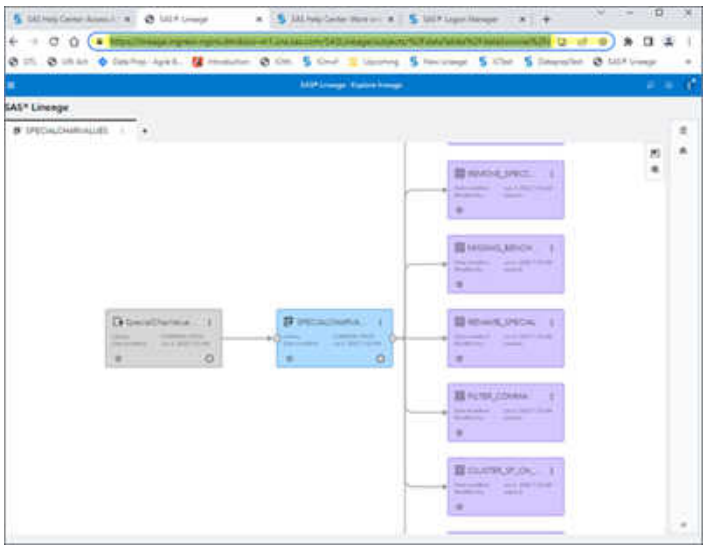
You can use the Uniform Resource Locator (URL) in the lineage diagram for a selected SAS Lineage subject as a deep link that can access that window directly. For example, you might want to copy and paste the deep link to the lineage diagram into an application or into another browser window.

To copy and paste the link, perform the following steps:

1 Navigate to window that you want to access from a browser URL. This window can be either the Search for Subjects window or a diagram window for a SAS Lineage subject.

2 Highlight the URL that is displayed in the **Address** field at the top of your browser, as shown in the highlighted area below.

Figure 24 *Highlighted URL*



3 Right-click in the highlighted area to access the pop-up menu and select the **Copy** menu item. Make sure that you highlight and copy the complete URL.

4 Paste the copied URL into the **Address** field in a browser. Then you can open this deep link to display the window that you need to see in SAS Lineage.

Note: You are prompted to log in to SAS Lineage if you have not previously logged in. Also note that if you do not have the permissions needed to access a lineage diagram in a deep link, you will be unable to display the linked SAS Lineage page. An error is displayed and the linked page is not opened.

The URL is tied directly to the subject asset in the selected tab in SAS Lineage. Each time that you open the URL, the current relationships for that subject are displayed. If the metadata details for the

subject change over time, the changes are shown in SAS Lineage. If the asset is removed from SAS Information Catalog, the asset is not available in SAS Lineage.

Installing SAS Lineage as a Progressive Web Application

As of 2021.1.2, you can install SAS Lineage as a Progressive Web Application (PWA). The benefits of using SAS Lineage as a PWA include the following:

- Application persistence – By default, your session will never time out, so you can restart your work more quickly. Your administrator can enable a time-out for the PWA using a configuration property in SAS Environment Manager. For more information, see "sas.htmlcommons" in *SAS Viya: Configuration Reference* in *SAS Viya Platform: Configuration Properties*.
- Performance – When installed as a PWA, SAS Lineage typically starts faster than when accessed in the browser.
- Desktop experience – Installing SAS Lineage as a PWA confers all the benefits of a traditional installation. You can launch SAS Lineage from the **Start** menu or Taskbar, and you do not need to sort through countless tabs to find the correct instance of SAS Lineage.
- Renaming – You can rename each PWA instance to quickly access different environments, such as development, test, or production servers.

To install SAS Lineage as a PWA:

1. Open SAS Lineage in a Chromium-based web browser.
2. Open the web browser's menu and select **Install SAS**.

SAS Lineage is now installed as a desktop program named SAS. After one web application has been installed as a PWA, all other SAS applications are accessible in the PWA.