Quick Start

About the SAS Viya Programming Documentation

This collection of documents provides task-based programming examples, syntax, and concepts for products in SAS Viya, such as:

- SAS Visual Analytics programming
- SAS Visual Statistics programming
- SAS Visual Data Mining and Machine Learning programming

Note: On most hosts, SAS 9.4M5 and later releases are tightly integrated with SAS Viya. See SAS 9.4M5 Integration with SAS Viya in What’s New in Base SAS: Details. (The exceptions are z/OS and 32–bit Windows.)

To search this collection, click Q. For search tips, click ? and select Help Tips.

**TIP** If you are viewing this document in a stand-alone context, access the collection before you use the preceding information.

Note: Your site must license and install one or more SAS Viya products to access this functionality.

Orientation

This software supports analytical data preparation, variable transformations, exploratory analysis, analytical modeling, integrated model comparison, and scoring. Here are the main components:
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<th>Component</th>
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<tr>
<td>SAS 9.4M6</td>
<td>SAS 9.4M6 is integrated with SAS Viya. SAS programs submitted from SAS 9.4M6 clients can call procedures that are unique to SAS Viya, as well as CAS-enabled DATA step code and procedures that have been modified to leverage a CAS server and its tables.</td>
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<tr>
<td>SAS Viya</td>
<td>The third generation of high-performance in-memory analytics.</td>
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<tr>
<td>SAS Studio</td>
<td>The integrated SAS programming environment.</td>
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<tr>
<td>SAS Cloud Analytic Services (CAS)</td>
<td>The analytic engine. CAS uses high-performance, multithreaded analytic code to rapidly process requests against data of any size.</td>
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| SAS Visual Analytics | Programming tools that provide baseline functionality, including reporting and basic analytics, such as:  
  - analytical data preparation  
  - variable transformations  
  - exploratory analysis  
  - descriptive statistics |
| SAS Visual Statistics | An additional set of advanced analytic functionality that builds on SAS Visual Analytics, such as:  
  - building predictive models  
  - integrated model comparison |
| SAS Visual Data Mining and Machine Learning | An additional set of advanced analytic functionality that builds on SAS Visual Statistics, such as:  
  - tune machine learning algorithm hyperparameters  
  - advanced statistical operations  
  - analyzing complex data |
| SAS Econometrics | A set of functionality that provides techniques to model complex business and economic scenarios and to analyze the dynamic impact that specific events might have over time. |
| SAS Visual Forecasting | Provides automatic variable, event, and model selection. It then automatically generates your forecasts. |
| SAS Visual Text Analytics | A text analytics framework combining text mining, contextual extraction, categorization, sentiment analysis and search. |
| SAS Optimization | A set of procedures for exploring models of distribution networks, production systems, resource allocation problems, and scheduling problems using the tools of operations research. |

CAS-based procedures run against data that is in CAS. For example, before you can use CAS to work with a SAS data set, you must load that data set into CAS. The following instructions demonstrate basic mechanics.

**TIP** If you cannot securely sign in and start a CAS session, contact your administrator or see the troubleshooting topic in *SAS Viya Administration: Identity Management.*
Demonstration: Load Personal Data

1  Sign in to SAS Studio.
   a  Open SAS Studio from a URL that is provided by your SAS administrator. For example, you might enter either of the following URLs:
      https://webserver-host-name/SASStudioV (for SAS Studio 5.1, which is available in full deployments)
      https://webserver-host-name/SASStudio (for SAS Studio 4.4, which is available in all deployments)
   b  If you are prompted for credentials, sign in.

2  Start a CAS session.
   a  In the Snippets section of the navigation pane, expand (SAS) Snippets ⇒ SAS Viya Cloud Analytic Services.
   b  Right-click New CAS Session and select Open. The snippet opens in the code editor.
   c  In the toolbar, click to run the New CAS Session code.

3  Load a table.
   a  In the navigation pane, right-click Load data to caslib and select Open.
   b  In the code editor, edit the SAS data set section so that it looks like this:
      
      ```sas
      PROC CASUTIL;
      LOAD DATA=sashelp.cars OUTCASLIB=“CASUSER”
      CASOUT=“demoTable” PROMOTE;
      RUN;
      ```
      
      **TIP** CASUSER is your personal caslib. It is available across your sessions. You cannot enable other users to access it.
   c  Select the preceding code. In the toolbar, click to run only the four lines of selected code.

4  Verify that you can access the loaded data.
   a  In the navigation pane, right-click Generate SAS librefs for caslibs and select Open.
   b  In the toolbar, click to run the code.
   c  In the Libraries section of the navigation pane, expand (My) Libraries ⇒ CASUSER.
   d  Double-click demoTable to open it.

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Demonstration: Provide Shared Data

1  Sign in to SAS Studio and start a CAS session, if you have not already done so.
TIP For details, see the first two steps in the preceding demonstration.

2 Create a container for shared CAS data.
   a In the Snippets section of the navigation pane, expand (SAS) Snippets → SAS Viya Cloud Analytic Services.
   b Right-click New caslib for Path and select Open.
   c In the code editor, edit the snippet so that it looks like this:

   ```
   CASLIB demoCas PATH="/filePath/" DATASOURCE=(SRCTYPE="path") GLOBAL;
   ```

   Note: Enter a path that is relative to and accessible from your CAS server. You can reference an empty directory.
   d Click to run the code.

   Note: If an error indicates that you do not have permission to create global caslibs, see “Caslib Management Privileges” in SAS Viya Administration: SAS Cloud Analytic Services. Initially, only administrators can add global caslibs. An administrator can enable non-administrators to add global caslibs.

3 Give all users Read access to the new caslib.

In a full deployment, complete these steps:
   a Access the Data page in SAS Environment Manager.
      i If you are using SAS Studio 5.1, select Manage Environment from the applications menu (Ξ) and then click in the vertical navigation bar.
      ii If you are using SAS Studio 4.4, open SAS Environment Manager at a URL that is provided by your SAS Administrator. For example, you might enter: https://webserver-host-name/SASEnvironmentManager. Sign in, and then click in the vertical navigation bar.
   b On the Data page, select the Data Sources tab. Right-click the new caslib, and select Edit authorization.

   TIP Data page functionality is also available in other contexts. See Data Selection Windows and SAS Data Explorer in SAS Data Explorer: User’s Guide.
   c In the Edit Authorization window, adjust the gauge in the Access Level column to increase access for Authenticated Users from No access to Read.
   d Click Save.
   e Go back to SAS Studio.
      i If you are using SAS Studio 5.1, select Develop SAS Code from the applications menu (Ξ).
      ii If you are using SAS Studio 4.4, switch back to the browser tab or window in which that application is running.

In a programming-only deployment, complete these steps:
   a In the banner of SAS Studio 4.4, click and select CAS Administration.
   b In the sign-in window, enter your operating system credentials.
   c In CAS Server Monitor, beneath the SAS Cloud Analytic Services banner, click .
d. On the **Configuration** page, select **Access Controls**.

e. In the **Caslibs** list, select the caslib.

f. In the upper right, click **Edit**.

g. In the **Edit Access Controls** window, adjust settings as follows:
   - In the **Read Info** row for Authenticated Users, select the **Grant** radio button.
   - Click **Add Row**. In the new row at the end of the page, select **Authenticated Users**, the **Grant** radio button, and the **Select** activity.

h. Click **OK** to save your changes.

i. Under **Access Controls**, review the results of your changes.

j. At the right edge of the banner, click your user name, and select **Sign Out**.

4 Load data to the new caslib.

a. In the navigation pane of SAS Studio, right-click the snippet **Load data to caslib** and select **Open**.

b. In the code editor, edit the SAS data set section so that it looks like this:

   ```sas
   PROC CASUTIL;
   LOAD DATA=sashelp.cars OUTCASLIB="demoCas"
   CASOUT="demoTable" PROMOTE;
   RUN;
   ```

   c. Select the preceding code. In the toolbar, click to run only the four lines of selected code.

5 Verify that other users can see the data. For example, ask them to complete these steps:

a. Sign in to SAS Studio, start a CAS session, and run the **Generate SAS librefs for caslibs** snippet.

b. In the **Libraries** section of the navigation pane, expand (My) Libraries ⇒ demoCas.

c. Double-click **demoTable** to open it.

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**Tip: Automatically Connect and Generate Librefs**

For convenience, you can configure SAS Studio to perform the following tasks each time that you sign in:

- Start a CAS session.
- Generate SAS librefs for existing caslibs that have names that are no more than eight characters long.

Complete the following steps:

1. In the SAS Studio 4.4 banner, click and select **Edit Autoexec File**.
   - In SAS Studio 5.1, click **Options** and select **Autoexec file**.

2. On the **Autoexec.sas** tab of the (Edit) Autoexec File window, paste the following code:
cas casauto;
caslib _all_ assign;

3 Run the code.
4 Save the code.

Documentation: References by Task

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