Installation Instructions for SAS® 9.4 Electronic Software Delivery: Basic Installations on z/OS

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Overview

This document provides all the information related to downloading and installing a SAS 9.4 Electronic Software basic order on z/OS systems for which you have purchased licenses. Review this document before you begin your installation.

Because the SAS 9.4 Electronic Software Delivery download site limits the number of downloads per order, the process of downloading your software from SAS should not be used as a mechanism for distributing your software across your organization. To distribute the software image internally, download it to a networked location that is available to all systems where the software needs to be installed. Or create your own media from your downloaded image.

Complete or provide each of the following items **before** you start the SAS installation process:

- ☐ Verify System Requirements (pg. 1)
- ☐ Software Order Email (SOE) (pg. 1)
- ☐ Current SAS Installation Data Files (SID Files) (pg. 1)
- ☐ Review and Understand Terminology (pg. 2)
- ☐ Target Location for Initial Download of SAS Software Depot (pg. 2)
- ☐ Sufficient UNIX File System Space (pg. 3)
- ☐ User ID for the Installation that Meets Requirements (pg. 3)
- ☐ (Optional) X11 Server (pg. 4)
- ☐ Supported Version of Java (pg. 4)
- ☐ (Optional) Review SAS/IntrNet Installation Options (pg. 4)
- ☐ (Optional) Select the SAS/GRAPH Map Data Sets to Install (pg. 4)

Prerequisites

Verify System Requirements

Confirm that your system meets the minimum requirements by reviewing the *System Requirements for SAS 9.4 Foundation for z/OS*.

Software Order Email (SOE)

To install SAS 9.4 on z/OS, start with the Software Order Email (SOE) that you received from SAS. This email message contains details such as the order number and the type of installation: Basic or Planning. Basic orders are generally straightforward single-machine deployments.

Current SAS Installation Data Files (SID Files)

The SAS Software Depot includes one or more SAS installation data (SID) file or files as part of your software download. A SID file is valid for a limited time and consists of customized installation information and product authorization information. SAS Deployment Wizard uses the installation information in a SID file to install your licensed software and apply customized product authorization information to your system. SID files follow a naming convention in which the file name includes your order number, your setnumid (a unique identifier used by SAS Technical Support), and the operating system for which the order is licensed.

The SID files for your software order are stored in the `sid_files` directory at the root of your SAS Software Depot.

If your order is more than 90 days old, the SID file that was provided with the order might have expired. Check your SOE for the expiration date of the SID file in your order. If it has expired, contact your SAS site representative. That person might have received a Renewal Software Order Email that contains a more recent SID file.

Once you have created your SAS Software Depot, save the updated SID file in the `sid_files` directory in your SAS Software Depot. If your site cannot locate an updated SID file, open a case with SAS Technical Support at https://service.sas.com/csm.

Review and Understand Terminology

- `SASHOME` Location

  `SASHOME` is the UNIX directory location where the UNIX file system components of your SAS software are installed on your machine. `SASHOME` is specified when you install software through SAS Deployment Wizard for the first time, and that location becomes the default installation location for any other SAS software you install on the same machine. You will need about 3 GB of UNIX file system space for your `SASHOME` directory.

  Many sites prefer to have `SASHOME` in a separate UNIX file system than their SAS Software Depot. This allows you to easily archive the SAS Software Depot and reuse that disk space. The directory path for your `SASHOME` location cannot be a directory within your SAS software depot.

  Notes: *The length of the SASHOME path is limited to 54 characters.*

  *The SASHOME directory is an integral part of the SAS 9.4 installation and **MUST** be kept mounted on your z/OS system after the SAS installation to support some SAS functionality.*

- SAS Deployment Wizard

  SAS Deployment Wizard is the common interface used to install and deploy all SAS 9.4 software. Using SAS Deployment Wizard, you interact with the SAS Software Depot, the repository of files and data necessary to install your SAS 9.4 software. Invoke SAS Deployment Wizard on each system that is part of your SAS software deployment.

- SAS Software Depot

  The SAS Software Depot is a collection of SAS installation files that represents one or more SAS software orders. The depot is organized in a specific format for SAS Deployment Wizard, which is used to install and initially configure SAS. The SAS Software Depot contains the SAS Deployment Wizard executable, one or more deployment plans, a SID file, order data, and product data. *Your Software Order Email provides an estimate of the space required for the SAS Software Depot for your order*.

Target Location for Initial Download of SAS Software Depot

Before you download the SAS Download Manager, you must first determine a location where you will store your SAS Software Depot. This location can be one of the following:

- A directory on a Windows or UNIX machine from which you can FTP to a UNIX File System directory on z/OS.
- A UNIX file system directory on the z/OS machine.
- A UNIX file system remote directory that is accessible to the z/OS machine by means of an NFS mount.

Sufficient UNIX File System Space

Your SAS installation requires the following space defined in UNIX file system directories:

- SAS Software Depot
  The SAS Software Depot is a collection of SAS installation files that represents one or more orders. The SAS Software Depot is organized in a specific format that is meaningful to SAS Deployment Wizard, which is the tool that is used to install and initially configure SAS. The depot contains the SAS Deployment Wizard executable, one or more deployment plans, a SID file, order data, and product data. *Your Software Order Email provides an estimate of the space required for the SAS Software Depot for your order*.
  This directory must be available to z/OS. It can be either of the following:
  - A UNIX file system directory on the z/OS machine.
  - A UNIX file system or Windows remote directory that is accessible to the z/OS machine via an NFS mount.

  After you have completed installing and configuring your SAS software, you can archive your SAS Software Depot to tape following the process that is documented in SAS Note 37119.
- `SASHOME` directory
  The `SASHOME` directory is an integral part of the SAS 9.4 installation. You might want to have your SAS Software Depot and `SASHOME` directory in separate UNIX file system spaces so that you can easily recover the space from your Depot after installation. For a SAS Foundation-only installation, 3 GB should be provided for the `SASHOME` directory.

User ID for the Installation that Meets Requirements

The user ID that is used for downloading your software or for installing SAS 9.4 must meet specific requirements:

- Must have a home directory that is not root.
- Must have a default program shell defined.
- Must not be a superuser.
- Must not share a UID with other user IDs.

The user IDs that will be running either the SAS Download Manager or SAS Deployment Wizard to install SAS 9.4 Foundation for z/OS require a larger region setting:

- If running under OMVS, a TSO region size and `ASSIZEMAX` setting of at least 1 GB.
- If running UNIX-style commands using rlogin, putty, or telnet, an `ASSIZEMAX` setting of at least 1 GB.

Note: *When the SAS Software Depot is downloaded directly to a z/OS UNIX File System directory, additional configuration is required.*
To increase the amount of CPU time available to the SAS Download Manager download process, set the CPUTIMEMAX value in the user ID's OMVS segment to at least 5000. The amount of CPU time required to download the software varies depending on the size and number of products in the order. If the SAS Download Manager receives a SIGXCPU error, you can restart the SAS Download Manager to continue a download that was already in progress.

(Optional) X11 Server

The SAS Download Manager for z/OS and SAS Deployment Wizard have graphical user interfaces that require the use of an X11 server, if available. At many sites, this software is already available and is running on a UNIX or Windows system.

If you do not have access to an X11 server, you might be able to use the SAS Download Manager and SAS Deployment Wizard in Console mode to configure your server. If you use Console mode, each dialog box that is required for the deployment of your SAS software is represented in text. Console mode cannot be used on your SAS Middle Tier.

For more information about X11 server minimum version requirements, see the SAS 9.4 Support for Other Third-Party Software Products page.

Supported Version of Java

An IBM Java Software Development Kit (JDK) is required. Obtain and install it before you perform the SAS installation.

With SAS 9.4M9 on z/OS, IBM Java 21.0.4 or later (64-bit) is required. The following SAS hot fixes must be downloaded along with your SAS 9.4M9 order, and they must be applied with the initial installation in order to support this change to the Java requirement:

- **P6Z001** for Threaded Kernel Java 9.4_M9
- **P7N001** for Base SAS JAR Files for z/OS 9.4
- **P7P001** for SAS Integration Technologies JAR Files for z/OS 9.4

The SAS 9.4 Support for Java page on the SAS Technical Support site describes the Java requirements for each maintenance release of SAS 9.4 Foundation.

(Optional) Review SAS/IntrNet Installation Options

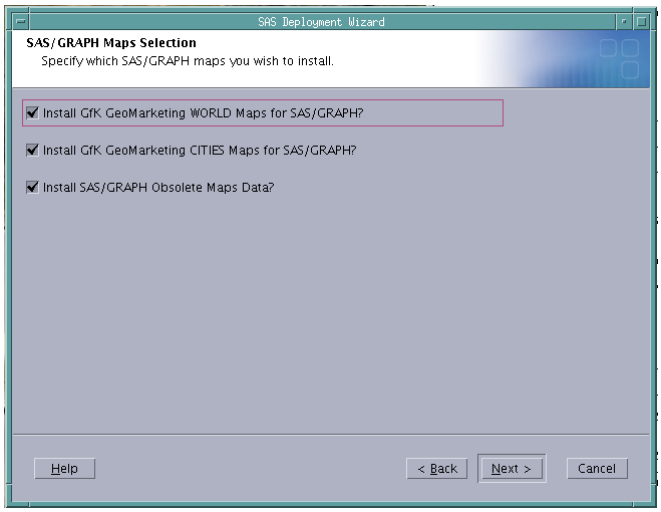
If your order includes SAS/IntrNet, review the section on SAS/IntrNet in the *Configuration Guide for SAS 9.4 Foundation for z/OS* so that you are prepared to specify the appropriate values for your web server directory paths and URL values.

(Optional) Select the SAS/GRAPH Map Data Sets to Install

Starting with SAS 9.4M3, if your site is licensed for SAS/GRAPH, you have the option to select which SAS/GRAPH Map products to install. SAS has split out the Map data sets that were included in SAS/GRAPH in order to help users save space by choosing Map data sets to install. These options enable you to select SAS/GRAPH Maps products to install.

For information about Maps data set space, refer to the *System Requirements for SAS 9.4 Foundation for z/OS*.

If your site is licensed for SAS/GRAPH, when you run SAS Deployment Wizard, the **SAS/GRAPH Maps Selection** dialog box displays:



The Map products can be selected in any combination.

- **GfK GeoMarketing WORLD Maps for SAS/GRAPH** contains the new Map data sets which replace SAS/GRAPH Obsolete Maps Data. In order to use PROC GMAP, you must install either GfK GeoMarketing WORLD Maps for SAS/GRAPH or SAS/GRAPH Obsolete Maps Data, or both
- **GfK GeoMarketing CITIES Maps for SAS/GRAPH** contains the Map data sets that are used by PROC GEOCODE. If these maps are not installed, then some of PROC GEOCODE will work (such as ZIP code support) but cities support will not work
- **SAS/GRAPH Obsolete Maps Data**

Note: *If you install all SAS/GRAPH Map data sets, additional space is used. For more information on the required space for SAS/GRAPH Map data sets, refer to the System Requirements for SAS 9.4 Foundation for z/OS.*

Note: *To remove or reinstall SAS/GRAPH Maps, see SAS Note SN 55984.*

Installation Process

The installation process consists of the following steps:

Step 1. Creating the SAS Software Depot

Step 2. Installing and Maintaining Your Software

Step 3. Validate Installation and Post-Installation Configuration

Step 4. Archiving Your SAS Software Depot

Follow the steps described below in order to install your SAS software.

Step 1. Creating the SAS Software Depot

SAS Download Manager

You must use SAS Download Manager to download your software from the SAS 9.4 Electronic Software Delivery download site and create your SAS Software Depot. It is a Java-based client that, once installed, can download selected SAS orders to your SAS Software Depot location. You **must** download the latest version of the SAS Download Manager for this order, and not use any previous version you may have installed.

Important:

- You should download the SAS Download Manager for the operating system to which you plan to initially download the SAS Software Depot.
- You can download your SAS Software Depot to a Windows or UNIX machine instead of to z/OS **ONLY IF**
  - you can use a UNIX file system directory on the z/OS system (for example, via NFS mount)

    or
  - you can FTP your SAS Software Depot to z/OS, using either a third-party utility that can transfer a complete directory tree, or the SAS Software Depot Copy Utility, which is included in your SAS Software Depot

You can find instructions for using the SAS Software Depot Copy Utility in the *SAS Deployment Wizard and SAS Deployment Manager 9.4: User's Guide*.

Download and Install SAS Download Manager

Download the **SAS Download Manager** utility for the target system.

Note: *To download directly to z/OS, you must download the z/OS SAS Download Manager. This utility can be used interactively with an X11 server, or in headless mode.*

Note *Java must be installed on the system where the SAS Download Manager runs.*

You can obtain SAS Download Manager from http://support.sas.com/downloadmgr. Click **Request Download** for the appropriate platform to see the license terms and download the SAS Download Manager. You are required to register with the SAS support site if you are not registered already. Then log in to the site to begin the download process.

A README file contains instructions for executing this application on your operating system.

Create Your SAS Software Depot Using SAS Download Manager

When you are ready to start the download to your SAS Software Depot, follow the instructions in the **readme** file to start SAS Download Manager. When prompted, provide the order number and SAS installation key from your SAS Software Order Email.

When SAS Download Manager has completed, it has created a SAS Software Depot in the specified location. In addition, the installation process creates a **depotsummary.html** document at the root directory of your SAS Software Depot. This document describes the contents of the depot.

Make Your SAS Software Depot Accessible to z/OS

If you did not download directly to z/OS, you must make the SAS Software Depot accessible to z/OS using one of the following methods:

- NFS mount the directory on z/OS, **or**
- Use the SAS Software Depot Copy Utility, **or**
- Transfer the SAS Software Depot to z/OS using a third-party utility such as Filezilla, WS-FTP, or Blue Zone, that can move a complete directory tree. Take the following steps on Windows:

  1. FTP the entire directory tree, ensuring that all files are transferred in binary to a z/OS UNIX File System directory, and the case of all file names is preserved.
  2. Set the Execute bits after moving from Windows. Execute the following command:
     `chmod -R a+r+x <SAS Software Depot Location>`

- Or, if the SAS Software Depot is stored on UNIX, take the following steps:
  1. Create a tar file of your existing SAS Software Depot on your UNIX machine. Execute the following command:
     `tar -cvf <SAS Software Depot Location> <tar file name>`
  2. FTP the tar file created in the previous step to z/OS in binary format.
  3. Extract the SAS Software Depot on z/OS in the zFS directory where you want the SAS Software Depot created. Execute the following command from OMVS or rlogin:
     `tar -xvf  <tar file name>`

Step 2. Installing and Maintaining Your Software

The remainder of this document describes the installation and maintenance (where applicable) process in detail. At this point you should have reviewed and completed all of the prerequisites for this installation.

Installation Action—Action A, Action B, or Action C

The installation process prompts you to select an installation action.

- **Action A** is taken for a new installation—meaning that you do not currently have SAS 9.4 installed on your system at all.
  When you perform Action A, SAS Deployment Wizard also installs any hot fixes included in the software order.
  Orders that are downloaded include appropriate hot fixes.
  Note: *Orders received on DVD do not initially include hot fixes.*
- **Action B** installs maintenance or new products directly into your existing production SAS 9.4 libraries and directories. If you are applying maintenance and installing new products, you **must** invoke SAS Deployment Wizard **twice**.

  Important: *With Action B, some additional configuration is required for the TKMVSENV file. For an upgrade to SAS 9.4M9, a new location for the Java Runtime Environment (JRE) must be specified. For more information, see SAS Note 60246.*
- **Action C** is taken when adding maintenance or new software products to an existing installation. This action installs the updates in staged libraries, enabling you to test before copying the updates to production. If you are applying maintenance and installing new products, you **must** invoke SAS Deployment Wizard **twice**.

Important Notes

- Do **not** log in to z/OS as a superuser (sometimes called "root" or "UID(0)").
- The user ID that will be running SAS Deployment Wizard to install SAS 9.4 Foundation for z/OS must have the same requirements as noted in "User ID for the Installation that Meets Requirements" on page 3.
- If you are applying maintenance or adding software to an existing installation, you must stop all SAS servers and processes before updating your installation.
- If you select **Action B** or **Action C**, you **must** use the same high-level qualifier that you specified with the original installation.
- If you select **Action B** or **Action C**, additional temporary cylinder space is required. Refer to the *System Requirements for SAS 9.4 Foundation for z/OS*. After the installation is finished, this space is released back to the system.

Installation Steps

By default, SAS Deployment Wizard uses a text-based interface and creates the installation batch jobs for you but does not execute them. Consider your options before you start SAS Deployment Wizard.

1. Decide whether you will use a graphical user interface or a text-based interface.
   - **Graphical interface**: If you want to use a graphical user interface in SAS Deployment Wizard, you must use an X11 server.

     If you are using an X11 server, set the `DISPLAY` environment variable to point to your X11 server. Issue the following case-sensitive command from the z/OS UNIX shell on your z/OS system before starting SAS Deployment Wizard:

     ```
     export DISPLAY=<your X11 server name>:0.0
     /<SAS Software Depot>/setup.rexx –x11
     ```

     ***Note**: If you do not issue this command, setup.rexx will prompt you for the server name. Make sure that the X11 server is started on your workstation before starting the installation.*
   - **Text-based interface:** If you do not use the x11 interface, the wizard dialog boxes are represented in text.

     When you run SAS Deployment Wizard in the default text-based or console mode to perform a deployment without a graphical display, ensure that the `DISPLAY` environment variable is unset, as opposed to being set to a blank value (that is, `DISPLAY=`).
     Here is an example:

     ```
     unset DISPLAY
     /<SAS Software Depot>/setup.rexx
     ```

     ***Note:** During execution in text or console mode, if you are instructed to enter a sequence that includes angle brackets, such as "Enter <q> to quit," you must include those symbols.*
2. Decide whether SAS Deployment Wizard will run the installation batch jobs for you. Batch jobs can be submitted manually or by SAS Deployment Wizard. By default, SAS Deployment Wizard creates the installation batch jobs for you but does not submit them.

   Also by default, SAS installation jobs are chained. To force each job to be submitted manually, use the `-nojobchain` option. The `-nojobchain` option is ignored if `-jobsubmit` is specified.

   If you use the `-jobsubmit` option, SAS Deployment Wizard will:
   - Assign the same job name xxxxxxA to each job it automatically submits, where: xxxxxxx is assigned the installer user ID "A" – suffix assigned to the installer user.
   - Use the FTP JES interface to track the progress of each job, and determine when they have completed.

     If any of the following conditions are true, you cannot use the `-jobsubmit` option, and you must submit the installation batch jobs manually:
     - Your site uses JES3 (not JES2)
     - Your FTP server is configured for JESINTERFACELEVEL=2
     - The SAS installer ID is not authorized to use FTP
     - You need to make site-specific changes to the JCL or want to review the JCL before submission
     - The FTP JES interface's requirement that the job name be the user ID performing the install suffixed with a single letter or digit is incompatible with your site's requirements.

Starting in SAS 9.4M4, if you use the `-jobsubmit` option, SAS Deployment Wizard will:

- No longer prompt for the host name, user ID and password.
- Allow you to use the `-jobsubmit` option with both JES2 and JES3
- Use the JES SYSOUT API (SAPI) to track the progress of each job, and determine when jobs have completed.

Examples:

Instruct SAS Deployment Wizard to submit and monitor the installation batch jobs:
```
/<SAS Software Depot>/setup.rexx [-x11]  -jobsubmit
```

Submit the jobs manually after SAS Deployment Wizard completes:
```
/<SAS Software Depot>/setup.rexx [-x11]
```

Submit the jobs manually and specify that they are not chained after SAS Deployment Wizard completes :
```
/<SAS Software Depot>/setup.rexx [-x11] -nojobchain
```

3. Invoke SAS Deployment Wizard on your z/OS system, from OMVS, rlogin, or putty. You cannot execute it from ISHELL.
   ```
   /<SAS Software Depot>/setup.rexx [-x11] [-jobsubmit]
   ```
   Note: *Use the **Help** button or `<h>` command for more information about each dialog.*
   For more information, see the *SAS Deployment Wizard and SAS Deployment Manager 9.4: User's Guide*.
4. Proceed through each dialog or prompt until SAS Deployment Wizard completes.
5. If you installed without specifying `-jobsubmit`, after SAS Deployment Wizard has completed successfully, run the series of jobs indicated in the JOBINDEX member of the *<HLQ>*`.INSTALL.CNTL` data set.

   The number of batch jobs is based on the content of your software order. The member JOBINDEX in the *<HLQ>*`.INSTALL.CNTL` data set will contain the list of jobs that must be executed.

   - You might want to edit each of the jobs listed in the JOBINDEX member of the INSTALL.CNTL data set to provide any required site-specific accounting information, etc. You might also want to edit the user-defined fields in the JCL statements (such as UNIT values, SMS classes, etc.), to conform to standards used at your site.
   - Submit the first job. Each job will submit the subsequent job as its final step.
   - If you want to submit each job individually, edit the last step that submits the next job through the internal reader. Delete the IEBGENER step at the end.

     ***Note**: After submitting an install job, the `<HLQ>.INSTALL.CNTL` library cannot be open in edit mode. The job will wait until it can get exclusive access (`DISP=OLD`) to the `<HLQ>.INSTALL.CNTL` library.*
   - A separate job named INSTHELP is written to *<HLQ>*`.INSTALL.CNTL` and is an **optional** job to run. This job represents the online Help and, depending on your system and other jobs running, could take an hour or more to complete. If you want to run this job, SAS recommends running it **after** the initial installation has completed.

Updating an Existing Installation

If you are adding a new order to an existing installation, and the jobs listed in the JOBINDEX member were named MAINT01 through MAINTnn and MANTHELP (update to the Help system), then SAS Deployment Wizard went into update mode and updated your installed SAS products to the most current level.

If your order contained new SAS products, you must invoke SAS Deployment Wizard again to install those products. Follow the same instructions that were described previously, starting with Step 3 under "Installation Steps."

Step 3. Validate Installation and Post-Installation Configuration

1. After all installation jobs have finished, submit the VALID job in the `<HLQ>.INSTALL.CNTL` data set and ensure that all steps complete with a return code of 0.
2. Consult the product-specific post-installation configuration instructions for your operating system.

Notes:

- ***Starting with** Rev. 940_13w36, the PROMOTE job will be represented as `PROMOTn`. If you performed Action C, use the CLISTs, REXX EXECs, and JCL procedures in the `<HLQ>.SL.` data sets to test the additional products. When your testing is complete, submit the `PROMOT1` job to copy the updates to your production libraries. `PROMOT1` will launch the rest of the `PROMOTn` jobs. You **must** exit the `<HLQ>.INSTALL.CNTL` dataset after submitting the `PROMOTn` job suite.*
- *Before copying an installation to another system, contact SAS Technical Support.*

Step 4. Archiving Your SAS Software Depot

For future maintenance or installation of additional SAS software products, you will need your SAS Software Depot. It can be recreated, but you might find it easier to keep a backup of your SAS Software Depot so that only updates must be downloaded in the future. SAS Note 37119 contains sample jobs to back up and restore your SAS Software Depot.

Tips and Additional Information

Visit these sites for tips and additional information that might not be in your official product documentation:

Technical Support SAS 9.4 Hot Fix downloads:

`https://tshf.sas.com/techsup/download/hotfix/hotfix.html`

General Information and Troubleshooting for Electronic Software Delivery:

`https://sas.service-now.com/csm?id=kb_article_view&sysparm_article=KB0036210`

Locating the log files for SAS 9.4 installations:

`https://support.sas.com/kb/49/756.html`

Configuration Guide for SAS 9.4 Foundation for z/OS:

`https://support.sas.com/documentation/installcenter/en/ikfdtnmvscg/66194/PDF/default/config.pdf`

Documentation for a SAS 9.4 installation on z/OS:

`https://support.sas.com/en/documentation/install-center/94/guide-for-z-os.html`

SAS Technical Support

Technical support is available to all customers who license SAS software. However, you are encouraged to engage your designated on-site SAS support personnel as your first support contact. If your on-site SAS support personnel cannot resolve your issue, they can contact SAS Technical Support to report your problem.

Before you contact SAS Technical Support, explore the SAS Support website at https://support.sas.com/en/technical-support.html. This site offers access to the SAS Knowledge Base, SAS communities, and other materials that might answer your questions.

When you contact SAS Technical Support, you are required to provide information, such as your SAS site number, company name, email address, and phone number, that identifies you as a licensed SAS software customer.

If you encounter problems with your installation, create a case at the Customer Service Portal: https://service.sas.com/csm.

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