

## **z/OS SAS® Deployment: This Isn't Your Father's Install Anymore!**

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### **ABSTRACT**

The SAS® Deployment Wizard is a portable dialog-based tool that drives a series of prompts to define a SAS® software installation. This tool provides a common approach that allows a site to follow a uniform methodology for installing SAS across all hosts in the enterprise.

### **Introduction**

In SAS® 9.2, the deployment process is very different from previous releases. Starting with SAS 9.2, the overall deployment process is now uniform across all host architectures. The purpose of this document is to give you a basic understanding of the new deployment process with an emphasis on deployment to z/OS, to help ensure that appropriate resources are in place in order to avoid potential problems during the install, and to help troubleshoot any problems that could be encountered. We will also distinguish between the two available installation types and outline the deployment process for each.

### **Overview**

The install process now consists of five major actions:

**1. Pre-installation actions**

Before installation begins, there are several things that must be in place. This is a very important step in the installation process. Failure to fully complete these actions could result in problems in subsequent steps.

**2. Building a SAS Software Depot**

A SAS Software Depot is a centralized copy of your installation media that is accessible in zFS space. (The term zFS throughout this document denotes the usage of the UNIX File System on z/OS, either using zFS or HFS.) The depot can physically reside in zFS space, or it can be network accessible from an NFS mount (preferred approach). Once created, the SAS Software Depot contains all of the z/OS installation media as well as any third-party software and client software that run on other hosts. The depot is used to install all of the licensed software in your order.

**3. Installing/deploying SAS software on z/OS from the depot**

The install of SAS 9.2 is now similar to the install on other hosts. The most notable difference is how the deployment tools are started. For z/OS deployments, REXX execs are used to launch the Java based deployment tools for downloading your depot, installing the SAS software, and performing configuration tasks. A REXX exec is also provided for SAS® Foundation only installs for sites that do not require Java.

**4. Performing post-installation and configuration actions**

As with previous versions of SAS, there are post-installation customization and configuration actions to be performed.

**5. Installing/deploying any software on other hosts**

Depending on your licensed products, there may not be any action needed for this step. If software other than z/OS needs to be installed, and the depot was built in zFS in a location that is network accessible, then the same depot built in Step 1 can be used to install this software. If not, then the depot on the destination host will need to be rebuilt before performing the install.

The Software Depot mentioned in Step 2 can be created either by downloading it or by copying it from a 3590 cartridge. The download process involves a small application based on Java called SAS® Download Manager, which runs under UNIX System Services. The first step in downloading the SAS software is to download and install SAS Download Manager. The Software Order E-mail (SOE) will provide a link denoting where to get the SAS Download Manager. Once installed, SAS Download Manager is executed and manages the download and creation of the depot. z/OS sites without Java can request the depot to be sent on a 3590 cartridge or DVD. If a cartridge is requested, the SOE will contain an attachment with customized JCL that can be run to copy the depot from the cartridge to zFS

space. If creating the depot in a network accessible location is available, the DVD can be used by creating the depot from a Windows or UNIX host, and then making it available on z/OS via an NFS mount. Note that Java is required for deploying the SAS® Intelligence Platform.

## Installation Types

Before installing the SAS software, the installation type needs to be determined. In SAS 9.2, two different types of installs are available: *planning* and *basic*. The SOE will contain a field called *ORDER TYPE*. This field denotes whether you have a planning install or a basic install.

### Planning

A planned install is required if there are licensed products in the SAS 9.2 Intelligence Platform that require a metadata server, and possibly other servers running on z/OS to make up the server tier. It involves a plan.xml file and usually will involve a SAS Installation Consultant.

### Basic

A basic install used is in all other situations, namely those installing SAS Foundation only.

The remainder of this document is divided into two sections detailing the deployment process for the planned and basic installs. If you have a planned install, then proceed to the **“Planning Install”** section of this document. If you have a basic install, then proceed to the **“Basic Install”** section.

## Planning Install

The planned install process is to be used by those sites that are utilizing the SAS Intelligence Platform. Planned installs use a REXX exec named `setup.rexx` to invoke the SAS Deployment Wizard, which will perform both the install and configuration aspects of deployment. The SAS Deployment Wizard is an application based on Java that gathers all of the installation and configuration parameters, submits batch jobs to the internal reader, monitors the jobs, and then performs the configuration of the various servers.

## Pre-installation Actions

As mentioned in the previous “Overview” section of this document, making sure that you have performed the appropriate pre-installation actions is very important. The success of the installation and deployment depends on getting this part right! The pre-installation actions that are required are dependent on various factors:

- creating the depot using a download, unloading a 3590 cartridge, or using DVD media
- executing the REXX exec from OMVS or from an rlogin

Each of the following pre-installation actions contains explicit circumstances under which these factors apply.

### Meet requirements documented in “System Requirements for SAS 9.2 Foundation for z/OS”

This is applicable to all situations. A link to the system requirements documentation can be found under the **“Helpful Links”** section of this document.

### Perform actions in “Pre-installation Checklist”

This is applicable to all planned installs. It is critical that all items in the pre-install checklist are in place before beginning the install. If your site is working with an Installation Consultant, then a customized pre-install checklist should be provided. If the site does not have an Installation Consultant, then the Quick Start Guide included in the installation package will direct you to any appropriate generic pre-install checklists. The pre-install checklist includes items like TCP port assignments, creation of required user IDs, and the setting up of any libraries that may need to be program controlled. These types of actions can take time, and they must all be in place before beginning your installation and deployment.

### Install Java and set appropriate environment variables

This step is required for all planned installs, as well as the use of SAS Download Manager to create the depot. This is required because SAS Download Manager and the SAS Deployment Wizard are Java applications. Set the following environment variables:

- JAVA\_HOME – This variable should be set to the pathname of the currently installed Java. Note that the minimal version requirement for running SAS Download Manager or SAS Deployment Wizard is SDK 5 SR8a - 1. To set this environment variable from the USS shell, issue a command similar to:

```
export JAVA_HOME=<pathname to your site's installed java>
```

- PATH – Upon invocation, the respective REXX exec will look for Java in a location specified by the PATH environment variable. If Java is not found in any location denoted by PATH, the REXX exec will search for Java in the default SMPE install location (/usr/lpp/java). If Java is still not located, the REXX launcher will provide a prompt to specify the path to the Java location. To set this environment variable, issue the following command:

```
export PATH=$JAVA_HOME/bin:$PATH
```

### Have X11 server available

This step is required for all planned installs, as well as the use of SAS Download Manager to create the depot. Both the SAS Deployment Wizard and SAS Download Manager require an X11 server to provide a display. This X11 server can be running on a UNIX host, or on a Windows host using an X11 emulator such as Exceed. The DISPLAY environment variable should be set to the location of the X11 server. If DISPLAY is not set, it will be prompted for by the launcher REXX exec. To set the DISPLAY environment variable, issue the following command from the USS shell:

```
export DISPLAY=<X11 server hostname.domain>:0.0
```

### Install SAS SVC

This is applicable only if SAS Download Manager is used to create the depot or if the SAS Deployment Wizard is used to install and configure the software. These Java applications need the SAS SVC in order to function properly. If the site has the SVC in place from a previous SAS release, that will suffice. If an SVC from a prior release of SAS is not installed, then a SAS 9.2 SVC can be obtained by following the instructions in "Documentation for downloading and installing the SAS SVC (SASNote SN024677)" in the ["Helpful Links"](#) section at the end of this document.

### Ensure SAS Installer ID has appropriate resources

This is applicable to all situations. There are several things that must be in place for the SAS Installer ID:

- Memory requirements: Per the "System Requirements for SAS 9.2 Foundation for z/OS", the SAS Installer ID needs to have MAXASSIZE(or ASSIZEMAX in the RACF OMVS Segment) set to a minimum of 800 MB. If you plan to run the install under OMVS (as opposed to rlogging in from UNIX), then the SAS Installer ID will also need an 800 MB region.
- Requirements for the number of processes: The install itself could use 20-40 processes. For this reason, the SAS Installer ID needs to be able to accommodate this. The number of processes is controlled by the MAXPROCUSER in 'SYS1.PARMLIB(BPXPRMnn)', or PROCUSERMAX in the RACF OMVS Segment. The value specified for this parameter will depend on the number of processes running concurrent with the install. At a minimum, this value should be set to 50. `Basicins.rexx` does not have this requirement.
- Home directory requirements: The SAS Installer ID must have a USS home directory assigned. Since various logs will be written to this directory, the home directory has to exist, and the SAS Installer ID needs to be able to write to it.
- /tmp directory requirements: The install will write information to the /tmp directory, so it needs to exist and have a minimum of 50MB associated with it. The SAS Installer ID must be able to write to the /tmp directory.
- CPU time requirements: This is applicable only when using SAS Download Manager to download the software. A typical download takes 40 CPU minutes. However, the time could vary widely depending on the size of the order and the speed of the connection. The CPU time limits are set by MAXCPU (or CPUTIMEMAX in the RACF OMVS Segment). Should the download time out, the download can be resumed by invoking SAS Download Manager again. For more information about this, see the ["Troubleshooting"](#) section of this document.

### Ability to FTP from z/OS to z/OS and to run jobs with job names in the form of USERIDx

The SAS Deployment Wizard uses FTP only for the purposes of submitting batch jobs and monitoring the job output. In order to retrieve job output, the first characters of the job names must match the SAS Installer ID, followed by a single character "x" that represents the install action type. This is a requirement for planned installs because there are follow-on configuration steps that must be performed after the batch install jobs complete. The SAS Deployment Wizard must monitor the install jobs in order to know when they finish and to make sure that they finished correctly. If the site does not allow loopback ftp, please contact SAS Technical Support.

### **Find HTTP accessible location on zFS to which SAS Installer ID can write**

This step is optional. During a SAS Intelligence Platform configuration, the SAS Deployment Wizard creates a configuration directory that contains, among other things, HTML files that you will need to view. If the configuration directory is created in a location that is accessible with an HTTP browser, then the task of viewing the HTML files will be much easier. If the HTML files cannot be viewed from within the configuration directory, then the files will need to be manually copied to a location where they are accessible by an HTTP server.

### **Acquire adequate space**

This is applicable to all situations. As you would imagine, the amount of space needed completely depends on the mix of products being installed. The size of the depot itself will typically vary between 5 GB and 17 GB. The zFS content of the SAS image itself will be about 2 GB. As mentioned before, you will also need at least 50 MB in your /tmp directory. The MVS data sets could require as much as 3200 cylinders, depending on the licensed products.

### **Use correct naming convention when saving SID**

This is applicable only when using the SAS Deployment Wizard to install the SAS software. If you are using a SID other than the one that came with your depot, then you will need to save the SID on zFS using the SAS92\_\*\_ZOS.txt naming convention, where \* can represent any text. If this naming convention is not followed, the SAS Deployment Wizard will be unable to locate your SID. SAS is planning to lift this restriction in a future maintenance release for SAS 9.2.

## **Building a SAS Software Depot**

As mentioned in the overview, a SAS Software Depot is a centralized copy of the installation media that resides in zFS space. Once created, the SAS Software Depot contains all installation media for z/OS, and any third-party software and clients that run on other hosts. The depot is subsequently used to install the SAS software and third-party software included in the order. It is advisable to build the depot in a location that is network accessible to all hosts in the deployment. By doing so, one copy of the depot can be used to install all of the software on all relevant hosts. If unable to build the depot in a network accessible location, a zFS based depot will need to be created for the z/OS part of the install, and a separate copy of the same depot will need to be created on the other hosts, in order to install software that runs on those hosts. Considering that the depot can be between 5 GB to 17 GB, creating one central copy of the depot is therefore advantageous. The depot can be downloaded electronically, delivered on DVD media, or delivered on 3590 cartridges.

Downloading a depot electronically is accomplished by using SAS Download Manager. The Software Order E-mail (SOE) will contain instructions for how to get SAS Download Manager and how to use it to download the depot. SAS Download Manager is a Java Swing application installed to zFS, so Java will need to be installed, and an X11 server will need to be available. In addition, before invoking SAS Download Manager, the DISPLAY environment variable should be set in order to specify where the dialog boxes in SAS Download Manager are to appear. Since the depot can be quite large, there is a chance that the download could time out. If this happens, simply invoke SAS Download Manager again, and it will resume the download from the point at which it failed. See the "[Troubleshooting](#)" section of this document for more information about download failures.

If DVD media is used to create the depot from a PC or UNIX host, the depot will need to be built in a location that is network accessible to z/OS in order to perform the z/OS installs. Once the depot is built, the install can be performed on the z/OS host from OMVS or by rlogging into z/OS.

If cartridge media is used to create the depot, both a cartridge(s) and a DVD(s) will be provided. The SOE will contain customized JCL that should be run to copy the depot from cartridge to zFS. When the job is complete, the depot is built. The DVD media is provided in the event the depot is not able to be built on a network accessible drive. In this case, use the DVD(s) to build a duplicate copy of the depot on hosts other than z/OS in order to install the required software.

## **Installing and configuring software on z/OS**

The SAS Deployment Wizard collects all of the information that is required to perform the install, submits batch jobs to the internal reader, monitors them for completion, and then configures the servers with the series of Java ANT scripts. Although the batch jobs all have job names in the form of USERIDx, where USERID is the SAS Installer ID and x is the installation action, the jobs themselves are basically the same batch jobs that were used to install previous versions of SAS. The old-style job names are included in the accounting information of the JOB card. The jobs are also stored in the <prefix>.V\*.CNTL data set, in members that correspond to the old-style job names. All of these jobs are submitted with the exception of the Six1USSN job, where x represents the installation action you are performing. This job was formerly known as the USSUNTAR job. Instead of running this as a batch job, its content is

stripped out, and it is run as a shell script by the SAS Deployment Wizard. After all of the batch jobs are complete, the SAS Deployment Wizard then proceeds to configure the servers associated with the SAS Intelligence Platform environment.

Before running the SAS Deployment Wizard, the DISPLAY environment variable must be set to specify where the dialog boxes are to be displayed. Unlike `basicins.rexx`, the SAS Deployment Wizard does not automatically remember all of your responses to the prompts from the previous run. However, a response file can be created to capture all of the responses to the various dialog box prompts. This response file can then be specified on subsequent runs of the SAS Deployment Wizard to populate field defaults with the entries from the last run. It is also useful to capture your responses should SAS Technical Support require it for debugging purposes. SAS highly recommends utilization of a response file. To capture and store responses in a response file, specify the `record` parameter and the `responsefile` parameter when invoking the SAS Deployment Wizard as follows:

```
setup.rexx -record -responsefile <full path to ASCII response.properties file>
```

To capture a response file and initiate the install during the same SAS Deployment Wizard session, add the `-deploy` parameter to the SAS Deployment Wizard as follows:

```
setup.rexx -record -responsefile <full path to ASCII response.properties file>  
-deploy
```

The installer can determine the location where the response.properties file is stored. To invoke the SAS Deployment Wizard again making use of the response.properties file, specify the `-responsefile` parameter without the `-record` parameter when invoking `setup.rexx` as follows:

```
setup.rexx -responsefile <full path to ASCII response.properties file>
```

The SAS Deployment Wizard begins by prompting for installation parameters. Many of the parameters will be recognized as those from the SAS EDITP member from the previous install process. A help button is available on each dialog box for assistance with field entry.

Configuration parameters are collected immediately following the installation parameters if both installation and configuration tasks were selected in the SAS Deployment Wizard dialog boxes.

One of the configuration prompts will ask which level of configuration prompting is desired: express, typical, or custom. The express level prompting assumes the defaults for all configuration values for which defaults are available. The only prompts received are for things for which there could not be a default, such as user IDs and passwords. The typical level contains the express prompts, and adds those prompts that are likely to contain site-specific values. Some examples would be port numbers and started task names. The custom level prompting is for advanced users and contains all available configuration prompts.

One of the earlier SAS Deployment Wizard prompts from the SAS Deployment Wizard is for the Configuration Directory. The Configuration Directory is not the same as the SAS Home directory. SAS Home contains the SAS image's zFS content, whereas the Configuration Directory contains the SAS Intelligence Platform's server configuration information. The same directory should not be specified for both the SAS Home directory and the Configuration Directory. As mentioned in the pre-installation actions, it is advisable to specify an HTTP accessible directory for the Configuration Directory to make the viewing of customized deployment HTML files easier.

During prompting for user IDs, the SAS Deployment Wizard will inquire about the use of internal user IDs when appropriate. This is a new feature in the SAS 9.2 Intelligence Platform. Some user IDs can be created and maintained in SAS metadata and are not required to be tied to a TSO user ID. When a user ID is defined in metadata and not defined to the operating system, it is called an *internal* ID. Please refer to the "SAS Intelligence Platform: Installation and Configuration Guide" referenced in the "[Helpful Links](#)" section of this document for a complete description of internal user IDs. The syntactical form for internal IDs is `userid@saspw`. The SAS Administrator user ID and the SAS Trusted User ID are available as internal user IDs (`sasadm@saspw` and `sastrust@saspw` respectively). User IDs that are defined both in metadata and to the operating system are called *external* IDs. The Spawned Server Account and the SAS Installer ID must be external user IDs. If the optional SAS Demo account is selected, it must be external.

At the end of the configuration process, all SAS Intelligence Platform servers are up and running as processes under `/bin/tso`, and all metadata associated with the servers is in place. The `sas.servers` script located in the `<Configuration Directory>/Lev1/` directory allows for an easy method for bringing up and shutting down all of the

servers under `/bin/tso`. The `start` and `stop` parameters can be passed to this script to operate on the servers collectively. It is common in a production environment to run the servers as started tasks. Default started task definitions are created during the configuration process and are denoted in the generated `Instructions.html` referenced in the next section. Note that the `sas.servers` script does not have any control of servers running as started tasks. An attempt to simultaneously run a specific server under `/bin/tso` and as a started task is not supported and will result in errors. Port contention errors are often the result of attempting to run two copies of the same server, one as a started task and one as a `/bin/tso` process. To prevent this situation, run `sas.servers stop` before bringing up the started tasks, and before running `sas.servers start`, ensure that the started tasks are not running.

## Post-Installation Actions

The final dialog box of the SAS Deployment Wizard provides instructions for further actions in the `Instructions.html` document. This document is located in `<Configuration Directory>/Levl/Documents/Instructions.html`. The `Instructions.html` document will contain complete information about the SAS Intelligence Platform server deployment, including started task JCL locations, server validation steps, and any additional actions that need to be taken. View this document with a Web browser and follow any instructions stated within. Upon the completion of the steps in `Instructions.html`, continue the SAS Foundation configuration by proceeding to the "SAS Configuration Guide for SAS 9.2 Foundation for z/OS". A link to this document can be found in the "[Helpful Links](#)" section below.

The installed SAS image was created with a short-term license. After the installation and configuration is complete, consider applying a current full term SID to the new image. A current SID can be obtained from SAS Customer Service at 1-800-727-0025 (select option 2). Be sure to provide the correct site number associated with your SAS 9.2 image. The correct site number is located in the `<prefix>.CNTL.RENEW(RENEWPRM)` member. Look for the `SITE=` parameter. See the "[Helpful Links](#)" section of this document for a link to the "Software License Renewal Instructions: SAS 9.2 for z/OS".

After the configuration is complete, certain files on zFS may appear to not be readable. This is normal. These files are encoded in the depot as either ASCII or UTF-8. The SAS Deployment Wizard uses these files as input, and utilizes the files in the current format. Files that may need to be user modified are already converted to EBCDIC. Please contact SAS Technical Support before modifying any files that are not already in EBCDIC encoding.

After the configuration is complete, use SAS® Deployment Manager to perform post-installation and post-configuration tasks. SAS Deployment Manager is a Java application that allows users to unconfigure products and change passwords for the various user IDs within the SAS Intelligence Platform environment. Invoke SAS Deployment Manager by running `<SAS Home Directory>/SASDeploymentManager/9.2/config.rexx`. With this Java application, as with the SAS Deployment Wizard and SAS Download Manager, an X11 server and Java are necessary to invoke SAS Deployment Manager.

## Installing software on other hosts

If the depot was built on a network accessible drive, simply access the existing depot from the other hosts and run either `setup.exe` (for windows) or `setup.sh` (for UNIX) to start the SAS Deployment Wizard.

If the depot was not built on a network accessible drive, it will be necessary to recreate the depot on the other hosts. If a DVD came with the order, then it can be used to build the depot; otherwise, it will need to be downloaded. When using a DVD, insert the DVD and run `setup.exe` or `setup.sh` as appropriate. Follow the instructions to build the depot and then install any client and/or any third-party software that came with the order. If the depot must be downloaded, first install SAS Download Manager for the target operating system (Windows or UNIX). Follow the instructions in the Software Order E-mail to install SAS Download Manager, and then download your depot. Once the depot is built, run `setup.exe` or `setup.sh` to install your software.

## Basic Install

The basic install is used by customers installing SAS Foundation only. The installation and deployment of SAS software is now initiated with REXX. There are two REXX execs available for use in a basic install, one that requires JAVA and an X11 server and one that does not. The first REXX exec is `setup.rexx`, which invokes the SAS Deployment Wizard. The SAS Deployment Wizard is an application based on Java that gathers all installation parameters, submits batch jobs to the internal reader, monitors the jobs, and updates a local SAS deployment registry with the installed products. The second REXX exec provides a method of performing the install that is not based on Java. This REXX exec is called `basicins.rexx` and is intended for sites that do not have Java available or have no access to an X11 display server. `Basicins.rexx` gathers the installation parameters in line mode, submits installation jobs to the internal reader, and monitors the jobs. Both REXX execs, `setup.rexx` and `basicins.rexx`, are located at the top-most directory in the SAS Software Depot. No post-processing or registry updates are performed with `basicins.rexx`. Additionally, `basicins.rexx` cannot be used for installations of the SAS Intelligence Platform environment.

## Pre-installation Actions

As mentioned in the previous “Overview” section of this document, the correct completion of the appropriate pre-installation actions is critical, and the follow-on installation depends on this. The pre-installation actions that are required are dependent on various factors:

- installation using the SAS Deployment Wizard or using `basicins.rexx`
- creation of the depot using a download, DVD, or unloading a 3590 cartridge
- execution of the REXX exec from OMVS or from an rlogin to UNIX System Services shell

Each of the following pre-installation actions will explicitly list the circumstances under which they apply.

### Meet the requirements documented in “System Requirements for SAS 9.2 Foundation for z/OS”

This is applicable to all situations. A link to the system requirements documentation can be found under the [“Helpful Links”](#) section of this document.

### Install Java and set appropriate environment variables

This step is not required if performing a basic install using the `basicins.rexx` REXX exec. This is applicable only when running SAS Download Manager to download the software or when using the SAS Deployment Wizard to install the software. Set the following environment variable when using SAS Download Manager or SAS Deployment Wizard for deployment:

- `JAVA_HOME` – This variable should be set to the pathname of the currently installed Java. Note the minimal version requirement for running SAS Download Manager or SAS Deployment Wizard is SDK 5 SR8a - 1. To set this environment variable from the USS shell, issue a command similar to:

```
export JAVA_HOME=<pathname to your site's installed java>
```

- `PATH` – Upon invocation, the respective REXX exec will look for Java in a location specified by the `PATH` environment variable. If Java is not found in any location denoted by `PATH`, the REXX exec will search for Java in the default SMPE install location (`/usr/lpp/java`). If Java is still not located, the REXX launcher will provide a prompt to specify the path to the Java location. To set this environment variable, issue the following command:

```
export PATH=$JAVA_HOME/bin:$PATH
```

### Have X11 server available

Both the SAS Deployment Wizard and the SAS Download Manager require an X11 server to provide a display. This X11 server can be running on a UNIX host, or on a Windows host using an X11 emulator such as Exceed. The `DISPLAY` environment variable should be set to the location of your X11 server. If `DISPLAY` is not set, it will be prompted for. To set the `DISPLAY` environment variable, issue the following command from the USS shell:

```
export DISPLAY=<X11 server hostname.domain>:0.0
```

### **Install SAS SVC**

This is applicable only if running SAS Download Manager to download the software or when using the SAS Deployment Wizard to install the software. These Java applications need the SAS SVC in order to function properly. An SVC already in place from a previous SAS release will suffice. Sites without an SVC in place from a prior release of SAS can obtain the SAS 9.2 SVC by following the instructions in "Documentation for downloading and installing the SAS SVC (SASNote SN024677)" in the ["Helpful Links"](#) section at the end of this document.

### **Ensure SAS Installer ID has appropriate resources**

This is applicable to all situations. There are several items that must be in place for the SAS Installer ID:

- Memory requirements: When using the SAS Deployment Wizard to install or SAS Download Manager to download the software, according to the "System Requirements for SAS 9.2 Foundation for z/OS", the SAS Installer ID should have MAXASSIZE (or ASSIZEMAX in the RACF OMVS Segment) set to a minimum of 800 MB. When starting the install under OMVS (as opposed to rlogging in from UNIX), the SAS Installer ID will also need an 800 MB region. `Basicins.rexx` does not have this memory requirement.
- Requirements for the number of processes: The install itself could use 20-40 processes. For this reason, the SAS Installer ID needs to be able to accommodate this. The number of processes is controlled by the MAXPROCUSER in 'SYS1.PARMLIB(BPXPRMnn)', or PROCUSERMAX in the RACF OMVS Segment. The value specified for this parameter will depend on the number of processes running concurrent with the install. At a minimum, this value should be set to 50. `Basicins.rexx` does not have this requirement.
- Home directory requirements: The SAS Installer ID must have a USS home directory assigned. Since various logs will be written to this directory, the home directory has to exist, and the SAS Installer ID needs to be able to write to it.
- /tmp directory requirements: The install will write information to the /tmp directory, so it needs to exist and have a minimum of 50 MB associated with it. The SAS Installer ID must be able to write to the /tmp directory.
- CPU time requirements: This is applicable only when using SAS Download Manager to download the software. A typical download takes 40 CPU minutes, however the time could vary widely depending on the size of the order and the speed of the connection. The CPU time limits are set by MAXCPUPTIME (or CPUPTIMEMAX in the RACF OMVS Segment). Should the download time out, the download can be resumed by invoking SAS Download Manager again. For more information about this, see the ["Troubleshooting"](#) section of this document.

### **Ability to FTP loopback and to run jobs with job names in the form of USERIDx**

This is applicable to all situations with certain caveats. The SAS Deployment Wizard and `basicins.rexx` both use FTP only for the purposes of submitting batch jobs and monitoring job output. In order to retrieve job output through FTP, the first characters of the job names must match the SAS Installer ID. The SAS Deployment Wizard does some post-processing after the jobs complete, and it needs to be able to monitor the install jobs to detect completion. `Basicins.rexx` submits jobs directly to the internal reader; however it also uses FTP to monitor job completion. `Basicins.rexx` provides an opportunity to enter a different job name for the install jobs while entering the information for the first JOB card. Sites with job name restrictions that are unable to run jobs with job names in the form of USERIDx can use `basicins.rexx` and change the job name; however, this will prevent `basicins.rexx` from monitoring the progress of the batch jobs. In this situation, the site will be responsible for monitoring the installation jobs. This allows sites with job name restrictions to complete the install. If the SAS Deployment Wizard is used and the site does not conform to the USERIDx job name convention, the install will not complete successfully.

### **Acquire adequate space**

This is applicable to all situations. The space needed completely depends on the product mix to be installed. The size of the depot alone will vary between 5 GB and 17 GB. The zFS content of the SAS image is about 2 GB. The MVS data sets could require up to 3200 cylinders depending on the licensed products. As mentioned before, at least 50 MB is needed in the /tmp directory.

### **Use correct naming convention when saving SID**

When using a SID other than the one provided in the depot and using the SAS Deployment Wizard to install the SAS software, save the SID in zFS using the SAS92\_\*\_ZOS.txt naming convention, where \* can be any text. This naming convention will allow the SAS Deployment Wizard the ability to locate your SID. This restriction does not apply when using `basicins.rexx`.

## Building a SAS Software Depot

As mentioned in the overview, a SAS Software Depot is a centralized copy of the installation media that resides in zFS space. Once created, the SAS Software Depot contains all of the installation media for z/OS and the other hosts. The depot is subsequently used to install this software.

Basic orders do contain some software other than z/OS; however, all other software is selectable for optional installation, and none will affect the functioning of SAS for z/OS. This software provides functionality such as ODBC and JDBC drivers, online documentation, fonts, viewers, and so on.

If installing software other than z/OS, it is advisable to build the depot in a location that is network accessible to zFS and the PC (and UNIX if applicable). In doing so, one copy of the depot can be used to install all of the software on all hosts. If unable to build the depot in a network accessible location, a zFS based depot will need to be created for the z/OS part of the install, and a separate copy of the same depot will need to be created on the other hosts, in order to install software that runs on those hosts. Considering that the depot can be between 5 GB to 17 GB, creating one central copy of the depot is therefore advantageous. The depot can be downloaded electronically, delivered on DVD media, or delivered on 3590 cartridges.

Downloading a depot electronically is accomplished by using the SAS Download Manager. The Software Order E-mail (SOE) will contain instructions for how to get SAS Download Manager and how to use it to download the depot. SAS Download Manager is a Java Swing application installed to zFS, so Java will need to be installed, and an X11 server will need to be available. In addition, before invoking SAS Download Manager, the DISPLAY environment variable should be set in order to specify where the dialog boxes in SAS Download Manager are to appear. Since the depot can be quite large, there is a chance that the download could time out. If this, simply invoke SAS Download Manager again, and it will resume the download from the point at which it failed. See the "[Troubleshooting](#)" section of this document for more information about download failures.

If DVD media is used to create the depot from a PC or UNIX host, the depot will need to be built in a location that is network accessible to z/OS in order to perform the z/OS installs. Once the depot is built, the install can be performed on the z/OS host from OMVS or by rlogging into z/OS.

If cartridge media is used to create the depot, you will receive both a cartridge(s) and a DVD(s). The SOE will contain customized JCL that should be run to copy the depot from cartridge to zFS. When the job is complete, the depot is built. The DVD media is provided in the event the depot is not able to be built on a network accessible drive. In this case, use the DVD(s) to build a duplicate copy of the depot on hosts other than z/OS in order to install the required software.

## Installing software on z/OS

With a basic install, the person performing the install can use the SAS Deployment Wizard (using `setup.rexx`) that is based on Java or the `basicins.rexx` REXX exec. Both methods first collect all of the information that is required to perform the install. Next, both submit batch jobs to the internal reader and monitor them for completion. Although the batch jobs all have job names in the form of USERIDx where USERID is the SAS Installer ID and x is a letter or digit, the jobs are basically the same batch jobs that were used to install previous versions of SAS. The old-style job names are included in the accounting information of the JOB card. The jobs are also stored in the `<&prefix>.V*.CNTL` data set in members that correspond to the old-style job names. All of these jobs are submitted by both the SAS Deployment Wizard and `basicins.rexx` except that the SAS Deployment Wizard executes the contents of the `Slx1USSN` job as a shell script, unlike `basicins.rexx`, which runs it as a batch job. In the name `Slx1USSN`, x represents the installation action being performed. This job was formerly known as the `USSUNTAR` job. If the need arises to rerun the job or change the directory to which its zFS content will be written, use the `Slx1USSN` job.

### Running `basicins.rexx`

`Basicins.rexx` can be run from OMVS, from a UNIX shell rlogged in to z/OS, or from a PDS. To run it from a PDS, download it from zFS and execute it. When `basicins.rexx` starts, it prompts for the installation parameters. Many of the parameters are recognizable as those from the `SASEDITP` member from the previous install process. When `basicins.rexx` is executed, it automatically stores the responses to prompts and uses them as the defaults during the next invocation. This is helpful if subsequent reruns are necessary.

### Running the SAS Deployment Wizard (`setup.rexx`)

Before running the SAS Deployment Wizard, the DISPLAY environment variable should be set to denote where the dialog boxes are to be displayed. Unlike `basicins.rexx` the SAS Deployment Wizard does not automatically

remember all of your responses to the prompts from the previous run by default; however, the SAS Deployment Wizard can create a response file by capturing the responses to the prompting dialog boxes. This response file can then be specified on subsequent runs of the SAS Deployment Wizard to populate field defaults with the entries from last invocation. It also is useful to capture the responses should SAS Technical Support require it for debugging purposes. To capture and store responses in a response file, specify the `record` parameter and the `responsefile` parameter when invoking the SAS Deployment Wizard as follows:

```
setup.rexx -record -responsefile <full path to ASCII response.properties file>
```

To capture a response file and initiate the install during the same SAS Deployment Wizard session, add the `-deploy` parameter to the SAS Deployment Wizard as follows:

```
setup.rexx -record -responsefile <full path to ASCII response.properties file>  
-deploy
```

The installer can determine the location where the `response.properties` file is stored. To invoke the SAS Deployment Wizard again making use of the `response.properties` file, specify the `-responsefile` parameter without the `-record` parameter when invoking `setup.rexx` as follows:

```
setup.rexx -responsefile <full path to ASCII response.properties file>
```

The SAS Deployment Wizard begins by prompting for installation parameters. Many of the parameters will be recognized as those from the `SASEDITP` member from the previous install process. A help button is available on each dialog box for assistance with field entry.

After the prompting is complete, a series of batch install jobs are run. Upon completion, some additional post-processing will occur.

## Post-Installation Actions

As with prior releases of SAS, after completing the install, run the validation job in `<prefix>.V*.CNTL(VVALID)`, and ensure that it runs correctly. `Basicins.rexx` runs this job automatically as part of the install, but SAS Deployment Wizard does not. Next, proceed to the “SAS Configuration Guide for SAS 9.2 Foundation for z/OS” to perform the configuration of your various products. A link to this document is provided in the “[Helpful Links](#)” section below.

The installed SAS image was created with a short-term license. After the installation and configuration is complete, consider applying a current full term SID to the new image. A current SID can be obtained from SAS Customer Service at 1-800-727-0025 (select option 2). Be sure to provide the correct site number associated with your SAS 9.2 image. The correct site number is located in the `<prefix>.CNTL.RENEW(RENEWPRM)` member. Look for the `SITE=` parameter. See the “[Helpful Links](#)” section of this document for a link to the “Software License Renewal Instructions: SAS 9.2 for z/OS”.

## Installing software on other hosts

Basic orders do contain some software other than z/OS; however, all of it can be optionally installed, and should have no direct affect on the functioning of SAS for z/OS. This software provides things such as ODBC and JDBC drivers, online documentation, fonts, viewers, and things of that nature. For this reason, this step can be skipped or can be done at any time.

If you built your depot on a network accessible drive, then to install software other than z/OS you can simply access your existing depot from the other hosts and run either `setup.exe` (for windows) or `setup.sh` (for UNIX) to start the SAS Deployment Wizard.

If the depot was not built on a network accessible drive, it will be necessary to recreate the depot on the other hosts. If a DVD came with the order, then it can be used to build the depot; otherwise, the depot will need to be downloaded. When using a DVD, insert the DVD and run `setup.exe` or `setup.sh` as appropriate. Follow the instructions to build the depot and then install any client and/or any third-party software that came with the order. If the depot must be downloaded, first install SAS Download Manager for the target operating system (Windows or UNIX). Follow the instructions in the Software Order E-mail to install SAS Download Manager, and then download your depot. Once the depot is built, run `setup.exe` or `setup.sh` to install your software.

## Troubleshooting

### Differences between SAS 9.2 and prior releases of SAS

Differences in the CLISTS and cataloged procedure:

- The STEPLIB/TASKLIB concatenation now contains a PDSE called <&prefix>.LIBE. When running SAS with a double byte character set, you may also see <&prefix>.LDBE. Depending on the product mix, these PDSEs may or may not be populated.
- The allocation for the CONFIG file is different. In SAS 9.2, the CONFIG allocation is now a concatenation of several files. This provides common configuration options that can be shared, and protects user-modified options for future installs and updates. For more information about the changes to the configuration files, see the “SAS Configuration Guide for SAS 9.2 Foundation for z/OS”. A link to this document can be found in the “[Helpful Links](#)” section below.
- There is no SASHELP allocation. Instead of a SASHELP allocation in the CLIST and cataloged procedure, the SASHELP library is now specified with a system option called SASHELP=. This option is specified in the localized member of the config file (for example, ENW0 for English).

Differences in the data sets that are created during the install:

- Unlike previous releases of SAS, zFS content is no longer optional. The zFS content is required because several components of SAS were moved to zFS.
- True type fonts are now included in the zFS content. In prior releases, these files were in MVS data sets and called <&prefix>.\*.TTF.
- Online Help is now part of the zFS content created by the install and no longer requires that the product documentation be installed on a windows client running a Java Application server. It does, however, still require a thin client that runs on the users' PC.
- The SAS/C transient library is no longer shipped. SAS now uses the IBM resolver, so the transient library is no longer needed.

Differences in the SAS Intelligence Platform configuration directory:

- The layout of the configuration directory has changed considerably from SAS® 9.1.3.
- SAS Intelligence Platform servers are now started “Out of the Box” under /bin/tso in addition to the provided started task definitions.
- The <Configuration Directory>/Lev1/sas.servers script has been created to operate in a group fashion on the servers running under /bin/tso.
- Each individual server now has “usermods” files within its own server directory that are to be used for user modifications for SAS options, TKMVSENV options, SAS autoexec files, and so on.
- All SAS Intelligence Platform server configuration information is now located in the configuration directory. Only the generated started tasks can be found in the <SAS Install Location>.W0.SRVPROC partitioned data set.

### Problems with SAS Download Manager timing out

As mentioned in the “Pre-Installation Actions” section of this document, it is possible for SAS Download Manager to exceed CPU time limits and fail. A typical download takes 40 CPU minutes; however, that number could vary widely depending on the size of your order and the speed of your connection. When the download fails due to a timeout, the USS shell will report an Exit code of 255 I, and in the `esdclient.log` file, you will see something similar to the following:

```
CEE5230S The signal SIGXCPU was received.  
Exit code is -1029
```

For more information about where to locate the `esdclient.log` file, see the “[Log files](#)” section below.

If SAS Download Manager fails due to a timeout, you can circumvent the problem by simply executing SAS Download Manager again. SAS Download Manager will detect that it was previously downloading a depot, and give you the opportunity to resume the download. You may also consider modifying the value of the MAXCPU TIME in ‘SYS1.PARMLIB(BPXPRMnn)’, or CPUTIMEMAX in the RACF OMVS Segment for the SAS Installer ID if this occurs an inordinate number of times.

## Log files

Log files in the SAS 9.2 install are cumulative. All information from all attempted installs will appear in the logs. If problems occur with an install, log files can be deleted or renamed before attempting to run the install again. This will help minimize confusion by eliminating log information from prior runs.

Locations of log files:

- SAS Download Manager and SAS Deployment Wizard log files are located in the following directory:
  - <SAS Installer ID home directory>
  - /.SASAppData/SASDeploymentWizard/9.2/ (note the '.' before SASAppData).
  - o esdclient.log: The log from SAS Download Manager
  - o SDW.log: The stdout file from the SAS Deployment Wizard
  - o deploywiz.log: The stderr file from the SAS Deployment Wizard
  - o setup.log: The stdout file from setup.rexx
- SAS Foundation install log files are located in the <SAS Home Directory>/SASFoundation/9.2/ directory. The log files are stored in the form of sasinstall\_install\_<datestamp>.log. Every individual SAS Foundation install attempt creates a new log file. In addition, the JES output from the underlying install batch jobs should be reviewed.
- Log files generated during the configuration of the SAS Intelligence Platform servers are located in the configuration directory in the following location:
  - o <Configuration Directory>/Levl/Logs/Configure/
- If any errors are encountered during the configuration of the SAS Intelligence Platform servers, the SAS Deployment Wizard may direct the installer to the ConfigurationErrors.html file located within the configuration directory:
  - o <Configuration Directory>/Levl/Documents/ConfigurationErrors.html

Log files to be reviewed:

- Failure of SAS Download Manager: check esdclient.log.
- SAS Deployment Wizard doesn't start when setup.rexx is run: review setup.log.
- Problems occur while using the SAS Deployment Wizard: review SDW.log, deploywiz.log, and setup.log.
- Failure of SAS Foundation install: check the sasinstall\_install\_<timestamp>.log file(s). Subsequently, check the JES logs from the batch jobs.
- Configuration failures: the SAS Deployment Wizard will display a dialog box directing the installer to the appropriate log for inspection.

To get more debugging information in the logs when using the SAS Deployment Wizard:

- To enable startup tracing, set the following environment variable before invoking any provided REXX exec: SETUP\_DEBUG=X.
- To enable the maximum debug level, specify a log level of 2 when invoking setup.rexx as follows:  
setup.rexx -loglevel 2
- Do not send trace or additional debugging information to SAS unless instructed to do so by SAS Technical Support.

## CONCLUSION

The SAS 9.2 deployment experience has dramatically changed in this release compared to previous releases. The SAS Deployment Wizard provided in SAS 9.2 marks a revolutionary milestone for z/OS customers. As a cross-host deployment tool, it promises to provide a much smoother installation and configuration experience, by removing the manually intensive processes of the past. We hope you enjoy this new deployment experience, and welcome your feedback for future enhancements!

## Helpful Links

Documentation for downloading and installing the SAS SVC (SASNote SN024677)

- <http://support.sas.com/kb/34677>

SAS Intelligence Platform: Installation and Configuration Guide

- <http://support.sas.com/documentation/cdl/en/biig/60946/PDF/default/biig.pdf>

System Requirements for SAS 9.2 Foundation for z/OS

- <http://support.sas.com/documentation/installcenter/en/ikfdtnmvssr/62179/PDF/default/sreq.pdf>

Pre-installation Checklists

- <http://support.sas.com/documentation/cdl/en/biicl/61235/PDF/default/biicl.pdf>

SAS Configuration Guide for SAS 9.2 Foundation for z/OS

- <http://support.sas.com/documentation/installcenter/en/ikfdtnmvscg/62180/PDF/default/config.pdf>

Install Center (all installation documentation is available here)

- <http://support.sas.com/documentation/installcenter/index.html>

Software License Renewal Instructions: SAS 9.2 for z/OS

- <http://support.sas.com/documentation/installcenter/en/ikmvsri/62155/PDF/default/setinit.pdf>

Basic Installation for z/OS® Using the basicins.rexx Command

- [http://support.sas.com/documentation/installcenter/en/ikmvbasic/62388/PDF/default/zos\\_basic.pdf](http://support.sas.com/documentation/installcenter/en/ikmvbasic/62388/PDF/default/zos_basic.pdf)

Unloading and Installing SAS® 9.2 from z/OS® Cartridges

- [http://support.sas.com/documentation/installcenter/en/ikmvscart/62384/PDF/default/unloading\\_cartridges.pdf](http://support.sas.com/documentation/installcenter/en/ikmvscart/62384/PDF/default/unloading_cartridges.pdf)

SAS® Deployment Wizard User's Guide

- <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/62130/PDF/default/user.pdf>

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