SAS 2820-2016

Helpful Hints for SAS® 9.4

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ABSTRACT

A group tasked with testing SAS® software from the customer perspective has gathered a number of helpful hints for SAS® 9.4 that will smooth the transition to its new features and products. These hints will help with the "Huh?" moments that crop up when you are getting oriented and will provide short, straightforward answers. We also share insights about changes in your order contents. Gleaned from extensive multi-tier deployments, SAS® Customer Experience Testing shares insiders' practical tips to ensure that you are ready to begin your transition to SAS® 9.4 and guidance for after you are at 9.4. The target audience for this paper is primarily system administrators who will be installing, configuring, and administering the SAS 9.4 environment. This paper was first published in 2012; it has been revised each year since with new information.

INTRODUCTION

New migration features? Environment management and monitoring? Clustering metadata and middle-tier servers for failover? SAS middle-tier servers? Backup and recovery?! How do I prepare for my transition to SAS 9.4? What do I need to know once I am at 9.4? The Customer Experience Testing group at SAS is tasked with testing SAS software from the customer perspective. This group has gathered a number of helpful hints that will smooth your transition to SAS 9.4. These hints will help with the "Huh?" moments that crop up when getting oriented and provide short upfront answers. This paper also shares insights about changes in your order contents. Gleaned from extensive multi-tier deployments, SAS Customer Experience Testing shares insiders' practical tips to ensure that you are ready to begin your transition to SAS 9.4.

The target audience for this paper is primarily system administrators who will be installing, configuring, and administering the SAS 9.4 environment. This paper does not cover all new features of SAS or address all SAS products; rather, its scope derives from the Customer Experience Testing team's scenarios.

WHAT'S NEW IN SAS 9.4?

There are many new features in SAS 9.4. For a quick, convenient overview of new functionality, enhanced features, and new products that you might use in SAS 9.4, see *What's New in SAS® 9.4* available at http://support.sas.com/documentation/whatsnew/.

This paper is not intended to cover all new features. Instead, it highlights some of the changes to assist with your transition to SAS 9.4. As of the publication of this paper, there have been three maintenance releases to SAS. Herein, to distinguish the scope of content, we refer to these as the first, second, and third maintenance releases. It is a best practice when migrating or updating to move to the latest maintenance release for your version of SAS 9.4 software.

SAS MIDDLE-TIER SERVERS

The middle-tier software includes the SAS® Web Server for use as an HTTP server and the SAS® Web Application Server for running SAS web applications. A third-party web application server is no longer needed. The SAS Web Server is an HTTP server and is based on the Pivotal Web Server, formerly known as the VMware vFabric Web Server. The SAS Web Application Server is a lightweight server that provides enterprise-class features for running SAS web applications. The SAS deployment tools configure these servers automatically. The tools simplify the configuration of vertical and horizontal clustering as well as HTTP load balancing.

The second maintenance release for SAS 9.4 includes a new estimated system size feature. The SAS® Deployment Wizard prompts for a size estimate (small, medium, and large) and then uses your sizing

selection as a tuning parameter for the Java Runtime Environment (JRE) during the configuration of the SAS Web Application Server. This option appears only during SAS® Metadata Server configuration and applies to all machines configured with this metadata server. For more information, see Appendix 1, "Initial Sizing and Tuning Configuration Options for Deployments," in *SAS 9.4® SAS Web Applications: Tuning for Performance and Scalability*.

The SAS Web Application Server stores its license file in the `/etc/opt/vmware/vfabric` folder on UNIX. This folder should be created with Write access prior to starting your deployment. If this folder is not created or the SAS Installer ID does not have the correct permissions, failure occurs while configuring the SAS Web Application Server. Although the error message is useful in providing steps to rectify the problem and resume the configuration process, this failure can be avoided. See your Pre-Installation Checklist for details.

When you deploy SAS software on multiple machines, it is possible to choose to configure a single server or multiple managed servers for the middle tier. Starting with the second maintenance release for SAS 9.4, the same selection is enforced across each middle tier during software updates.

For additional details, see *SAS 9.4® Intelligence Platform: Middle-Tier Administration Guide*.

SAS® WEB INFRASTRUCTURE PLATFORM DATA SERVER

The SAS® Web Infrastructure Platform Data Server is included in your deployment for use as transactional storage by SAS middle-tier software and some SAS solutions software. The SAS Web Infrastructure Platform Data Server is a repackaged PostgreSQL database management system that is provided and deployed by SAS. For guidance see "Tuning the PostgreSQL Data Server" in the document, *SAS 9.4® Web Applications: Tuning for Performance and Scalability*.

The SAS Web Infrastructure Platform Data Server is the default database server for the SAS® Web Infrastructure Platform Services Database. The SAS Web Infrastructure Platform Data Server replaces the SAS® Framework Data Server from SAS 9.3 and the SAS® Table Server from SAS 9.2.

During configuration, only one port is required to configure the default SAS Web Infrastructure Platform Data Server. However, there could be 40 to 90 or more "postgres" processes running, each requiring additional ports. These additional processes are created when the original Postgres process (through which all connections are first established) forks (or spawns) a new PostgreSQL process to handle an individual client connection. For more information, see the PostgreSQL 9.3.1 documentation.

Some products and solutions might create a separate database instance in the embedded PostgreSQL database. Each database instance runs on a separately defined port. In the SAS documentation, these separate databases are referred to as Data Servers. Consult the system requirements for guidance on tuning the data servers.

Use caution when using special characters in the password for any users that are defined for the databases, such as the SAS Web Infrastructure Platform Data Server, SAS® Data Management Data Server, and so on. A password with special characters might result in failures, and the product will not be usable. Additional information about the supported special characters is available in the PostgreSQL documentation. (See Recommended Reading.)

While the SAS Web Infrastructure Platform Data Server is always included, you can choose an alternative database for the SAS Web Infrastructure Platform Services Database. For detail s about the alternative databases supported for the SAS Web Infrastructure Platform Services Database, see "Configuring an Alternative Database for SAS Web Infrastructure Platform Services" in the *SAS® 9.4 Intelligence Platform: Installation and Configuration Guide*.

For more information about SAS Web Infrastructure Platform Data Server, see *SAS® 9.4 Intelligence Platform: Middle-Tier Administration Guide*.

SAS® ENVIRONMENT MANAGER

SAS® Environment Manager is a new monitoring and management system for SAS deployments. SAS Environment Manager provides a web-based monitoring solution. Features include automatic resource

discovery, monitoring of remote systems, personal and role-based dashboards, alerting, and visualization. The application provides web-based management, operation, and proactive monitoring of servers on both the middle tier and the SAS server tier. SAS Environment Manager incorporates some features of VMware Hyperic technology that offers enterprise-class operational features.

The SAS® Environment Manager Agent is a process that runs on each machine to perform various functions, such as gathering resource metrics and auto-discovery of software components that run on its platform. This process returns the information to the SAS Environment Manager Server. An agent must be installed and configured on a tier before SAS Environment Manager can monitor it. The agent location is driven by the deployment plan (also called the `plan.xml` file). Check your plan file to ensure that the SAS Environment Manager Agent is deployed on each machine that you intend to monitor with SAS Environment Manager.

SAS Environment Manager can also provide information about SAS servers and instances that are discovered by an agent, including services or processes that are not part of your environment. This behavior can occur when more than one SAS deployment is running on a given machine.

In addition to the agents, the SAS Web Application Server and the SAS Environment Manager Server must be running before you can use SAS Environment Manager. The SAS Environment Manager Server is actually a separate process from any of the `SASServer[n]` managed servers. It is started by using `$levconfig/Web/SASEnvironmentManager/server-5.n.n-EE/bin/hq-server.sh` (`hq-server.bat` for Windows). Also, for the SAS plug-ins to work on the Administration page, `SASServer2` must be running.

As of the third maintenance release of SAS 9.4, log collection and discovery has been improved. Rather than relying on log locations that are stored in metadata, ETL processes look through the directory structure of a SAS deployment to find and collect logs, parse their contents, and produce a data mart for analysis and reporting. For more information, see the "Operations Integration, Audits, and Performance Analysis" section of the *SAS® Environment Manager: User's Guide*.

The SAS Environment Manager Server and Agent are not supported on the z/OS platform. SAS services running on z/OS cannot be monitored by SAS Environment Manager. This restriction is documented in the *System Requirements—SAS® Environment Manager 2.1*.

For more information about SAS Environment Manager, see the *SAS® Environment Manager: User's Guide*.

SAS® DEPLOYMENT AGENT

The SAS® Deployment Agent is required for deployments that run remote processes. SAS uses the agent to copy content and to perform configuration management operations and administration activities such as creating new servers and clustering. The SAS Deployment Agent is required for some administration activities such as creating new servers, configuring middle tier clustering, and using the SAS Deployment Backup and Recovery Tool. Keep in mind these aspects about the SAS Deployment Agent:

- Do not remove the SAS Deployment Agent when unconfiguring a SAS deployment. The SAS Deployment Agent runs outside the context of the SAS configuration and should not be removed unless you intend to uninstall all of your SAS deployment. For example, if you remove the SAS Deployment Agent Service on a Windows server, the SAS Deployment Agent Service fails to start during the subsequent configuration steps in the SAS Deployment Wizard because the service does not exist.

- Before uninstalling SAS or deleting the SAS installation directory, run the SAS® Deployment Manager task to stop the SAS Deployment Agent service or process. You can also stop the agent on Windows by stopping the service or on UNIX with the `agent.sh` script.

- When upgrading your deployment, make sure that the SAS Deployment Agent is running on all SAS machines in your environment.

- Note that the SAS Deployment Agent and the SAS Environment Manager Agent are separate entities. These agents serve different purposes and are unrelated.

For more information, see "SAS Deployment Agents" in *SAS 9.4 Intelligence Platform: Installation and Configuration Guide.*

DEPLOYMENT BACKUP AND RECOVERY

The SAS® Deployment Backup and Recovery Tool provides an integrated and automated method for synchronized backup and recovery of SAS content across multiple tiers and machines. It includes administrative commands that can display the current backup configuration, alter the backup configuration, and run backups manually. The SAS Deployment Agent is required for using this tool.

Despite its name, the SAS Deployment Backup and Recovery Tool does not create a backup of an entire deployment. Instead, the primary focus is to backup content and customizations in the configuration folder. The tool makes copies of these items:

- configuration files and repositories for the SAS Metadata Server

- context configuration directories (for example, SASApp) for the SAS® Application Server

- SAS® Content Server repository

- SAS Web Infrastructure Platform Data Server databases

- additional directories under the configuration directory if custom directories are configured

For details, see "What is Not Backed Up?*"* in *SAS® 9.4 Intelligence Platform: System Administration Guide.*

Make sure that the user who is designated to perform backups has permissions to create the backup folder. On UNIX, this user is the SAS Installer user for each server and middle-tier machine. The first time a backup is run, the SAS Deployment Backup and Recovery Tool creates a `Backup` subfolder in the `Lev[n]` location. If the user designated to perform backups does not have the permissions to create this subfolder, errors can occur.

The SAS Deployment Backup and Recovery Tool includes a middle tier component. In deployments with multiple middle tier machines, in the first maintenance release of SAS 9.4, this component is deployed to each middle tier machine by default. It should only be deployed once, as it is in the later maintenance releases. If you are upgrading to the first maintenance release of SAS 9.4, before upgrading, you should unconfigure the SAS Deployment Backup and Recovery Tool on any secondary middle tier servers, then upgrade all tiers in order.

Starting in the second maintenance release for SAS 9.4, the new recovery method, SAS-RECOVER-OFFLINE, can be run while many of the servers in the deployment are offline. The recovery method can also be run while the servers are up, but a successful run will take many hours to complete if these conditions are met:

- SAS Environment Manager is using the SAS Web Infrastructure Platform Database (PostgreSQL) for its database

- SAS Environment Manager Server is running during the recovery

To perform a recovery the second time from an existing backup, the FORCED option must be specified. However, this option might return a null pointer exception if it is the first option in the backup configuration file. To correct both issues, create the file with FORCED as the second option.

For details about using the SAS Deployment Backup and Recovery Tool, see "Using the Deployment Backup and Recovery Tool" in *SAS® 9.4 Intelligence Platform: System Administration Guide.*

METADATA SERVER CLUSTERING

The new metadata server clustering feature provides redundancy and high availability of the SAS Metadata Server, which is a core component of the SAS infrastructure. Clustering ensures that the metadata server continues to operate if a server host machine fails. When clustering the Metadata Server, the metadata backup location for the primary node must be set to a location accessible from all

nodes in the cluster, such as network attached storage. If you are clustering the Metadata Server after an initial deployment, prior to adding the secondary nodes, set the backup location to a shared location and backup the primary Metadata Server node to that location before adding the clustered nodes.

You can monitor clustered Metadata Server nodes either from SAS Management Console or in the SAS Environment Manager. As of the third maintenance release, SAS 9.4 provides a new metadata analysis and repair tool called the SAS® Metadata Server Cluster Synchronization. SAS Administrators run this tool daily or weekly to sync metadata across the clustered nodes. It is also useful when recovering from a node failure or to troubleshoot inconsistent metadata query results.

For more information about metadata server clustering, see "Using Metadata Server Clustering" in *SAS® 9.4 Intelligence Platform: System Administration Guide*.

MIDDLE-TIER CLUSTERING

The SAS Deployment Wizard has been enhanced to simplify clustering the SAS Web Application Server. With the enhancements, you can easily configure vertical cluster members (additional server instances on the same machine) and horizontal cluster members (install and configure servers on additional machines).

The SAS Deployment Wizard Cluster Configuration option allows you to select a middle tier machine to cluster when you have multiple machines with SAS Web Application Servers and SAS web applications.

If you have a horizontal middle-tier cluster and you are adding new products to your deployment, when you run the SAS Deployment Wizard on a middle tier node machine, the Web Application Server Node Configuration on the "Select Products to Configure" dialog is not automatically checked. You must check it to add any new web application servers and/or web applications to the middle-tier node machine. If you miss this manual step, the middle tier node will not have the additional web application servers and web applications that match the middle-tier machine's configuration and no error or warning is issued. For more guidance on adding products to a clustered middle tier, see the section "Add SAS Products to a SAS Middle-Tier Horizontal Cluster" in *SAS 9.4 Intelligence Platform: Installation and Configuration Guide."*

Not all products support clustering at this time. Products that do not support middle-tier clustering run on the primary node in the cluster but are not deployed on the cluster nodes. If the primary node is not available, then those products are not available for use. For more information, see *SAS® 9.4 Guide to Software Updates*. Beginning in the second maintenance release for SAS 9.4, the Instructions.html for one or more middle-tier machines lists the clusterable and non-clusterable SAS web applications.

For more information about middle-tier clustering, see *SAS® 9.4 Intelligence Platform: Middle-Tier Administration Guide.*

SECURITY CERTIFICATES, HTTPS/TLS, AND WHITELISTS

SAS deployments can be secured through the use of security certificates and the HTTPS protocol for web applications. With the third maintenance release of SAS 9.4, several changes were implemented for transport layer security (TLS) and HTTPS security that affect how certificates are imported. You must still perform installation and configuration in separate steps, importing certificates between the steps.

How you implement and manage security certificates in your SAS 9.4 environment varies based on your maintenance level.

- Starting in the third maintenance release for SAS 9.4, a default CA certificate bundle is shipped with SAS. You add additional certificates with the SAS Deployment Manager. A new task, Add Certificate to the Trusted CA Bundle, was added in the SAS Deployment Manager to replace the Java keytool command method of importing certificates. A new default truststore (jssecacerts) takes precedence over the cacerts truststore in the SAS Private JRE. The SAS Deployment Wizard now sets the SSLCALISTLOC system option in the SASHome/SASFoundation/9.4/sasv9.cfg file to point to the trusted CA bundle (trustedcerts.pem in SASHome/SASSecurityCertificateFramework/1.1/cacerts) by default. See the "Setting Up Certificates

for SAS Deployment" chapter in the *SAS 9.4® Intelligence Platform: Installation and Configuration Guide* for details.

- If you upgrade to the first or second maintenance release for SAS 9.4, you must re-import your site certificate into the SAS Private JRE default truststore (the cacerts file) using a Java keytool command.

Starting with the third maintenance release of SAS 9.4, websites that link directly to your SAS web applications using URLs must be added to a whitelist, or security filter, of allowed sites. The default configuration includes only SAS applications. This provides protection against browser-based vulnerabilities referred to as Cross Site Request Forgeries (CSRF). Any website that performs such activities as retrieving reports, using a single sign-on session, or linking to a SAS web application needs to be explicitly added to the whitelist. Users who link to a SAS application from a company intranet or portal page that is not hosted in the SAS installation will encounter access denied messages. Whitelist entries can be specified with wildcards, such as http[s]:*port*/*.*mydomain*.com. Whitelist entries can be adjusted post-deployment. For details, see the *SAS 9.4® Intelligence Platform: Middle Tier Administration Guide.*

MIGRATION

Migration to SAS 9.4 is supported from SAS 9.2, SAS 9.3, and SAS 9.4. Migration is also supported from one maintenance release of 9.4 to another of the same or higher maintenance release. Specific baseline requirements might apply for each release of products. For more information about migration requirements, see the Focus Area for Migration at http://support.sas.com/rnd/migration/index.html.

To migrate a SAS environment from one set of machines to another, you first run the SAS® Migration Utility from your new SAS® Software Depot to build a migration package.

A SAS Migration Utility properties file can now be shared across machines without failing by omitting the SMU.SASROOT property. When this property is not supplied, the migration utility attempts to derive the location of SAS Foundation from the SMU.SASHOME value. If the utility does not find SAS Foundation, it continues to create a migration package and does not fail. This is useful if you want to use the same migration utility properties file across a mix of machines that might or might not contain SAS Foundation. SMU.SASROOT is now commented out of the smu.properties.template that is delivered in the SAS Software Depot. According to the template, this option should not be used unless directed to do so by SAS Technical Support.

The SAS Migration Utility now defaults to requiring passwords specified with {sas002} encoding and could prevent you from proceeding with a migration. By default, the SMU.cleartext.password.is_allowed option is set to FALSE, enforcing {sas002} passwords. If the SMU.cleartext.password.is_allowed option is set to TRUE to allow clear text passwords, the SAS Migration Utility presents a message and provides directions on how to proceed.

In the first maintenance release for SAS 9.4, a feature was added to the SAS Migration Utility that identifies previous releases of SAS products that currently cannot be migrated directly to SAS 9.4. The Migration Utility Analysis Report identifies which products you need to update to prepare them for migration.

The new Migration Version Analysis section shows the product releases that are not supported for migration. If a product is listed in the Migration Version Analysis section, it might need to be migrated or updated to an interim release before migrating to a SAS 9.4 system.

- The information in the Migration Version Analysis is limited to target systems of 9.4M1 (and later) and applies only to software that has already shipped on SAS 9.4.

- The Migration Version Analysis does not have any messaging for products that will never support migration to a future release.

- In the remainder of the analysis report, some products show a message with a green check mark. This indicates that "migration is supported for this version" even if the product is listed in the Migration

Version Analysis section with unsupported versions. In this case, disregard the "migration is supported" message. The Migration Version Analysis takes precedence.

- If the Migration Version Analysis section shows a product with unsupported versions on any machine in the deployment, then migration using the SAS Migration Utility is not supported. To migrate using the SAS Migration Utility, products on all machines of the deployment must be supported for migration.

When you run the SAS Migration Utility from support.sas.com to analyze an environment before requesting an order for SAS 9.4, the information in the analysis report can give the impression that migration to SAS 9.4 is supported when it is not. The report reflects information for product releases that shipped at the time the SAS Migration Utility was downloaded. For example, if your existing deployment includes a SAS solution that is not available at SAS 9.4, the Migration Version Analysis section of the report does not include the products from that solution in its analysis. You do not receive a warning that a SAS 9.4 release of the solution is not available. However, later in the Details section of the report, you might see messages indicating that migration is available for individual products in that solution. The bottom line is that while migration to SAS 9.4 is supported, you cannot migrate this solution to SAS 9.4 because that solution has not been released. Using the SAS Migration Utility from the SAS Software Depot for your SAS 9.4 order ensures that you have up-to-date version information for all products in your order.

Starting with the second maintenance release for SAS 9.4, the SAS Deployment Wizard prevents users from proceeding with a SAS Migration Utility package for an unsupported migration based on migration analysis incompatibilities. The Migration Version Analysis section in the Migration Utility Analysis Report identifies any incompatibilities with the source system's configured version. By reviewing this section, you can identify any problems before encountering issues in the SAS Deployment Wizard. If the SAS Deployment Wizard detects incompatibilities on any tier, the wizard prevents migration. Always check the migration version analysis carefully for all tiers in your configuration to confirm that your migration can succeed.

For more information about the new Migration Version Analysis feature, see *SAS® 9.4 Intelligence Platform: Migration Guide*.

When creating a migration package for a SAS 9.4 deployment using the SAS Migration Utility, consult the migration guide for what servers and processes should be running based on your SAS version and maintenance release.

- At SAS 9.3, the Metadata Server and the Web Infrastructure Platform database must be running.

- At SAS 9.4, in addition to the Metadata Server and the Web Infrastructure Platform database, other Data Servers in the environment must be running.

- In environments containing SAS Visual Analytics or Visual Analytics Administration and Reporting 7.2 or earlier, the Web Server, Cache Locator, SASServer 1 and SAS Server 12 also must be running.

If the required servers and processes are not running, errors will occur during migration package creation.

The ordersummary.html file (located in the SAS Software Depot) now lists the maintenance release number for a product. This information can help you determine the target release numbers associated with the software in your SAS Software Order. This information is needed when reviewing and evaluating the Migration Version Analysis section in the SAS Migration Utility Analysis Report.

The SAS Migration Utility that creates packages from SAS 9.3 configurations (smu93) and SAS 9.2 configurations (smu92) requires a 32-bit JRE. When launched on UNIX, this utility searches in many typical locations for Java. If the utility does not find a 32-bit JRE, specify the location of the JRE for the SMU_JAVA environment variable using the `EXPORT` command (for example `export SMU_JAVA=`*`path-to-32bit-jre`*`) and then run the SAS Migration Utility.

If at any point during the execution of the SAS Deployment Wizard you are prompted to choose a SAS Application Server to manage an object being configured, do not choose SASMeta. The application server context SASMeta is for use by the SAS Metadata Server only. In some cases, the SAS

Deployment Wizard might have SASMeta selected as the default. You must change this selection to an appropriate application server context for the component being configured. The *SAS® 9.4 Intelligence Platform: Migration Guide* includes several warnings to change the SAS Application Server Context if it is set to SASMeta. Starting with the second maintenance release for SAS 9.4, improvements have been made to remove SASMeta as a dependency selection in the SAS Deployment Wizard.

If your new order results in the addition of a foundation server (Workspace, Pooled Workspace, Stored Process Server, and so on) as an add-on during migration, the DefaultAuth authentication domain might be applied. If you have a custom authentication domain, this might result in issues with the software. An example when this could occur is the addition of a SAS® Visual Analytics LASR™ Server or SAS® Solution LASR Server. In this case, the LASR servers might fail to start. To avoid this situation, split the deployment into two passes of the SAS Deployment Wizard, one for migrating existing software and one for adding on new products.

UPDATING OR UPGRADING SAS® 9.4

When updating or upgrading an existing SAS 9.4 deployment, if the SAS Deployment Wizard determines that there is newer SAS software in the current order than what is already deployed, the wizard automatically goes into Update mode.

During the update process, the SAS Deployment Wizard installs and uses hot fixes that are flagged as required.

- Not all hot fixes are automatically included, however. To determine whether additional hot fixes are available for your products, run the SASHFADD tool (available from support.sas.com) after completing your deployment. You apply additional hotfixes using the SAS Deployment Manager.

- If you must run the update process again because of an incomplete prior attempt, the SAS Deployment Wizard might find that the software is updated, so it does not apply the hot fixes. You can work around this issue by installing the hot fixes manually. Complete the steps in the *SA®S Deployment Wizard and SAS® Deployment Manager 9.4: User's Guide*.

When upgrading an existing SAS offering and a new component is included, the SAS Deployment Wizard first performs the update. You must then run the SAS Deployment Wizard a second time to add new components. For example, if the existing deployment does not include SAS Visual Analytics but the offering is being updated to a release that does include SAS Visual Analytics, the SAS Deployment Wizard must be run a second time to add SAS Visual Analytics and related components.

Be aware of these security aspects when upgrading or updating your environment:

- When upgrading to the first or second maintenance release of 9.4 in an environment with signed certificates in the SAS Private JRE, any signed certificates need to be re-imported in the SAS Private JRE after the updates are installed but before these updates are configured during the update process. With the third maintenance release, certificates are managed through the SAS Deployment Manager.

- If the SAS Web Server or SAS Web Application Servers were manually configured for HTTPS/TLS, before applying any maintenance releases or upgrades to the system, those configuration changes need to be reverted to the original non-HTTPS/TLS values. In the third maintenance release of SAS 9.4, during the configuration, the SAS Deployment Manager detects this and does not continue until the changes are reverted. In earlier maintenance releases, the SAS Deployment Wizard fails when starting the SAS Web Application Server. Once the upgrade process completes, the manual TLS configuration steps can be reapplied to the upgraded system. Be sure to review the updated documentation in the *SAS 9.4® Intelligence Platform: Middle-Tier Administration Guide* to follow the most current process when reapplying the manual TLS steps.

When you upgrade SAS software, backup directories are created that contain the entire contents of the $levconfig/Web/WebAppServer directory, which can be quite large. The SAS Environment Manager Server and the SAS Environment Manager Agent folders are also backed up to a time-stamped directory name. After validating your upgrade, you can delete this backup content to recover space. See "General Information about Creating and Removing Backup Files" in the *SAS® 9.4: Guide to Software Updates*.

If you have a clustered middle tier and you have upgraded from the second maintenance release of 9.4 to the third maintenance release, the deployment administrator might repeatedly receive email that contains this error:

> Error Message: com.sas.svcs.search.client.IndexDataExtractionException:Encountered problem while retrieving content for these type(s) "JcrFolder".HOST: xxxxxxxx.xxx.com

To resolve the issue, you should delete the Apache Lucene index on the middle tier node machine and restart the middle tier servers. You will find two copies of the index that should be deleted in these directories:

> $levconfig/AppData/SASServer1_1/Repository/repository
> $levconfig/AppData/SASServer1_1/Repository/workspaces/default

For an explanation of the process for software updates, including upgrading to a new product release, applying a SAS (Foundation) maintenance release, applying a product-specific maintenance release, or obtaining and applying hot fixes, see the *SAS 9.4 Guide to Software Updates*.

To learn more about applying hot fixes after the initial installation, see the *SAS® Deployment Wizard and SAS® Deployment Manager 9.4: User's Guide.*

ORDER CONTENT CHANGES

With SAS 9.4, the contents of your order could change. Here are a few of the more common changes:

SAS® Data Management Standard replaces the SAS® Enterprise Data Integration.
SAS has fully integrated the DataFlux® suite of data quality, data integration, data governance, and master data management solutions. The newly branded SAS® DataFlux® products are now being combined into software offerings that include other SAS products. As a result of these changes, SAS Data Management Standard replaces SAS Enterprise Data Integration. Although SAS Enterprise Data Integration Server included SAS/SHARE® software, SAS Data Management Standard does not. Therefore, your source environment might have SAS/SHARE, but your migrated environment will not. Contact your SAS account representative if you need to continue to license SAS/SHARE at SAS 9.4.

SAS® Enterprise BI Server now supports SAS® Mobile BI on iPad and Android.
If you license SAS Enterprise BI Server, you can use the SAS Mobile BI app on the iPad and Android to view basic SAS Web Report Studio relational reports. You can manage mobile access permissions through the use of whitelisting and blacklisting devices. Beginning in the 4.4 release, the SAS Enterprise BI offering includes several SAS® Visual Analytics products and components in support of mobile reporting. However, this inclusion does not imply that SAS Visual Analytics is licensed nor does it mean that the full SAS Visual Analytics offering is included. Only the components required to use Enterprise BI with the SAS Mobile BI app are included. When deploying SAS Enterprise BI, the SAS Deployment Wizard prompts for information related to these software components. The `Instructions.html` file for the SAS Enterprise BI middle tier might also include a SAS Visual Analytics section. This section is purely informational unless you also license SAS Visual Analytics. For more information, see the "Viewing SAS Web Report Studio Reports on Mobile Devices" in *SAS 9.4 Intelligence Platform: Middle-Tier Administration Guide*.

SAS/SECURE™ software is included with SAS Foundation beginning in SAS 9.4.
The default encryption algorithm is SASProprietary. (Previously, the default was AES). Customers who want to use an alternative algorithm can make a different selection in the SAS Deployment Wizard. For countries with encryption restrictions, the SAS Deployment Wizard shows the SAS/SECURE products in bold to indicate that these products are in the plan file but not in the software order.

SAS® VISUAL ANALYTICS

Starting in late 2013, SAS solutions shipping on SAS 9.4 now include SAS® Visual Analytics Administration and Reporting. The main difference between the separately licensed SAS Visual Analytics and SAS Visual Analytics Administration and Reporting is that SAS Visual Analytics includes the SAS

Visual Analytics Explorer component. In addition, SAS Visual Analytics Administration and Reporting does not provide the auditing capabilities of SAS Visual Analytics.

Be aware that SAS Visual Analytics is supported only on Linux and Microsoft® Windows® 64-bit hosts. Therefore, if you upgrade and add SAS Visual Analytics to an environment that is not on these hosts, you must deploy SAS Visual Analytics on a separate Windows or Linux machine.

SAS Visual Analytics offers two types of deployment of the SAS® LASR™ Analytic Servers: distributed and non-distributed. A software order can include a distributed LASR Analytic Server, a non-distributed LASR Analytic Server, or both. When both are licensed, you can choose which to configure first. To later configure the LASR Analytic Server in the other mode, follow the instructions for "Deploying SAS LASR Analytic Server in a Different Mode" in the *SAS Visual Analytics Installation and Configuration Guide (Distributed SAS LASR)*. In addition, SAS solutions may create their own distributed or non-distributed LASR servers. Several solutions support the deployment of the non-distributed Solution LASR server on a host separate from the non-distributed VA LASR server.

Regardless of the type of SAS Visual Analytics deployment that you plan to use, you might be able to set up SAS Visual Analytics separately from your existing SAS environment or you might be able to create a single environment that shares certain common components, such as the SAS Metadata Server. Discuss your deployment plans with your SAS account representative to ensure that your software order meets those needs. Furthermore, several solutions support the delayed deployment of Visual Analytics or Visual Analytics Administration and Reporting for customers who do not wish to set it up immediately. For details about delayed deployment and a list of solutions for which it is not an option, see *SAS Visual Analytics Administration and Reporting: Installation Guide for Delayed Deployments*.

SAS Enterprise BI and other software bundles that include Enterprise BI might have included Mobile Services (formerly Report Services) to enable Mobile BI. These Mobile Services include some of the same software that is also included with SAS Visual Analytics software. Before adding SAS Visual Analytics to an existing configuration, the Mobile Services may need to be unconfigured with SAS Deployment Manager and reconfigured during SAS Visual Analytics deployment so that their full functionality is enabled. The products affected are SAS® Visual Analytics Administrator and SAS® Visual Analytics Services. For more information, see the *SAS Visual Analytics: Administration Guide*.

The SAS Visual Analytics® Hub acts as a central access point, both for SAS Visual Analytics applications and for SAS solutions that integrate with the Hub.

- Depending on which products you license and the user roles defined in metadata, you might see links to launch other SAS applications, such as SAS® Decision Manager or SAS® Enterprise Case Management. If a user has metadata permissions for these applications but they are not listed in the Hub, then the middle tier server might need to be restarted.

- If you try to directly access a Visual Analytics application for which you do not have permission, you are redirected to the SAS Visual Analytics Hub.

- Versions 7.2 and later of the SAS Visual Analytics Hub can be run in either classic or modern mode, which corresponds to the interface being Flash or HTML5. Be aware that the modern HTML5 interface, which is the default, does not support all of the same features as the classic interface.

- SAS Visual Analytics offers an option to enable guest access for connections via the SAS Visual Analytics Hub, SAS Visual Analytics Report Viewer, and SAS Mobile Services. With guest access enabled, other users at your site can view SAS Visual Analytics reports and other Visual Analytics content. This feature requires that anonymous web access also be enabled.

- For more information, see the *SAS Visual Analytics: Administration Guide*.

If you are migrating from SAS Visual Analytics 6.1 to 7.1, contact SAS Technical Support before you begin the migration. In SAS Visual Analytics 7.1, the SAS Migration Utility is looking for a Public LASR Server, which did not exist in SAS Visual Analytics 6.1. SAS has addressed the issue in SAS Visual Analytics 7.2. The problem does not occur if you are migrating to the 7.2 release or higher.

When updating solutions that include the SAS® High-Performance Analytics Infrastructure, you must manually update the SAS® High Performance Analytics Environment as well. See "Update the Analytics Environment" in *SAS® High-Performance Analytics Infrastructure: Installation and Configuration Guide*. Solution configuration changes are also required. The *SAS® Visual Analytics: Administration Guide* describes how to edit the SAS LASR Analytic Servers to use the new SAS High Performance Analytics Environment path.

If you upgrade or add SAS software to an existing SAS Visual Analytics deployment, a new SAS Application Server context might be created during configuration. The application server context might not be available in the SAS Visual Analytics web applications until additional steps are performed. For instructions, see the section, "Using Multiple SAS Application Servers" in the *SAS Visual Analytics 7.3 Administration Guide.*

THIRD-PARTY INFORMATION

For third-party software information, see **Third-Party Software for SAS® 9.4** at http://support.sas.com/resources/thirdpartysupport/v94/index.html.

WEB APPLICATION AND HTTP/S SERVERS

As stated earlier, the middle-tier software includes the SAS Web Server for use as an HTTP server and the SAS Web Application Server for running SAS web applications. A third-party web application server (such as JBoss server, Oracle WebLogic server, IBM WebSphere application server) is no longer needed or supported.

JAVA RUNTIME ENVIRONMENTS

For SAS 9.4, a Java 7 Runtime Environment (JRE) is provided by SAS and installed by the SAS Deployment Wizard. This JRE is used for all clients by default (for all platforms other than z/OS). Some clients, such as the SAS Deployment Wizard and SAS Management Console, might experience problems (such as you cannot enter information in some dialog boxes) because of an Oracle bug that causes some X servers to lose focus when run with Java 7. Additional details are available on the **SAS® 9.4 Support for Additional Software Products** site at http://support.sas.com/resources/thirdpartysupport/v94/othersw.html.

In the second maintenance release for SAS 9.4, an updated JRE is provided by SAS and installed by the SAS Deployment Wizard. The issue of being unable to enter information in some SAS client dialog boxes is resolved by this version of the JRE, but there still might be times where you must click in the entry field to get focus (even though you can see the cursor in this field).

Some SAS applications, such as SAS® Enterprise Miner™ and SAS® Forecast Server, are delivered as Java Web Start clients. These clients are launched by clicking a link in a web page, and they require a JRE to be installed on the client machine. When using Java Web Start, JRE 1.7 or later needs to be installed on the client machine. It is important to review the information related to applicable third-party JREs for use with Java Web Start. For more information, see the system requirements for your product. Depending on the installed version of the SAS product and the JRE, a hot fix might be necessary. Use the SAS Hot Fix Analysis, Download and Deployment Tool to determine if a hot fix is required**.**

PYTHON

The installation of SAS Visual Analytics includes SAS® Information Retrieval Studio, which requires Python. Python is a third-party software product that is not provided by SAS. In Windows operating environments, the pywin module is also required. This module might not be included in all downloads of Python. If Python is downloaded from `python.org`, pywin32 also must be downloaded separately and added to the Python installation. Additional details are available on the **SAS® 9.4 Support for Additional Software Products** site at http://support.sas.com/resources/thirdpartysupport/v94/othersw.html.

SOLARIS 11 REQUIREMENT

If you are installing or running SAS 9.4 on Solaris 11, SAS requires that you install the Solaris compatibility/ucb and system/xopen/xcu4 packages. These came automatically installed with Solaris 10, but they are optional with Solaris 11 installation.

GENERAL CONFIGURATION

REDUCE DEPOT SIZE

Starting with the September 2014 release of SAS 9.4 (Rev. 940_14w36), you can significantly reduce the size of your SAS Software Depot with a new SAS Deployment Wizard command line option, `-compressdepot`. Starting with the third maintenance release of SAS 9.4, depots are compressed by default. See the *SAS® Deployment Wizard and SAS® Deployment Manager 9.4: User's Guide* for details about this option.

RESPONSE FILES

Starting with the second maintenance release for SAS 9.4, SAS® Deployment Wizard records a response file by default. It is no longer necessary for the user to explicitly specify the `-record` and `-responsefile` parameters to have the deployment choices logged. A response file is created automatically in the installer ID's home directory and is named `ResponseRecord_YYYY-MM-DD.HH.MM.SS.log`.

You can, however, continue to specify a recorded file, as it might be helpful for corrections or additional attempts. To use a recorded file, specify the `-inputresponsefile` option along with the `-record` and `-responsefile` options. If a mistake was made in the SAS Deployment Wizard dialogs, you can use an existing response file as input to a re-run to help prevent user error. The input file supplies all the recorded values in the dialogs, including your custom values. You only need to edit the incorrect values and not supply all custom values again. All of the values in the second run are recorded in a new, automatically generated response file.

SUSPENDING AND RESUMING A DEPLOYMENT

Starting with the third maintenance release, SAS 9.4 has added a feature that lets you exit the SAS Deployment Wizard during configuration or installation to remediate issues that caused a failure. You can later resume where you left off during your deployment. If a deployment is interrupted, then when the SAS Deployment Wizard or SAS Deployment Manager is restarted, you are prompted to continue the previous incomplete deployment. The state of the deployment is saved in files in the userhome location: `configRetry.properties` and `installRetry.properties`.

A benefit of this feature is that upon resuming a deployment, you can avoid repeating entries in dialogs again, except for password dialogs. There are restrictions, such as the subsequent attempt must use the same order number and any configuration steps bypassed on the initial attempt are again bypassed in the resumed deployment.

Be aware that if another instance of either SAS Deployment Wizard or SAS Deployment Manager is started by the same user while the first instance is still running, the second instance will find the `*Retry.properties` files, and it will assume that a deployment was interrupted.

For more caveats, see the *SAS Deployment Wizard and SAS Deployment Manager 9.4: User's Guide*.

SETTING PASSWORDS USING THE UNRESTRICTED USER'S PASSWORD

Beginning with the third maintenance release of SAS 9.4, when the SAS Deployment Wizard prompts for the SAS Administrator internal account (unrestricted user) password, there is a checkbox to use that password on additional accounts. If this is checked when the prompting level is Express, this might reduce the number of dialogs displayed. If this is checked when the prompting level is Typical or Custom, the unrestricted user's password might be pre-filled in subsequent dialogs. The user can enter an

alternative password to override the value for other credentials. This option is available for new deployments and not for maintenance or SAS Deployment Manager tasks. Not all solutions support this feature at this time.

SUDO SUPPORT ON UNIX

For SAS 9.4 releases prior to the second maintenance release, the SAS Deployment Wizard allows setuid to run as sudo in specific instances during deployment on UNIX operating environments. On the metadata server machine, if the SAS Installer has sudo, a new dialog box appears, letting the user select to run `setuid` as sudo. If the SAS Installer does not have sudo on a metadata server machine, the SAS Deployment Wizard pauses and presents the classic pop-up prompt to run setuid as root as it has in the past. On server machines where the metadata server is not configured, the SAS Installer continues to receive the pop-up prompt to run `setuid` as root, even when the SAS Installer has sudo.

Starting with the second maintenance release for SAS 9.4, the ability to allow setuid to run as sudo at the beginning of script execution is now implemented on all UNIX tiers that include SAS Foundation. A new prompt, Automatic Script Execution, has been added in the SAS Deployment Wizard. This prompt enables an installer to run the `setuid.sh` script using sudo with the password provided. The option is not selected by default, so the installer must check the box on the Automatic Script Execution panel. If the installer account does not have the correct sudo privileges or chooses not to select the option, the SAS Deployment Wizard pauses and presents the classic pop-up prompt to run `setuid` as root.

For more information, see "Pre- for installation Checklist External User Accounts for SAS on Windows and UNIX" in the *SAS® 9.4 Intelligence Platform Installation and Configuration Guide*.

MIDDLE-TIER LOG FILES

The location of log files is somewhat different for the SAS 9.4 middle tier and middle-tier related features. When configuring multiple managed web application servers, `SASServer[n]` can represent `SASServer1`, `SASServer2`, and so on. When configuring only one web application server, `SASServer[n]` always represents `SASServer1`. Entities found on other tiers are listed because web applications might depend on them to be completely functional.

Web Tier Entity	Log location
Web Server	`Lev1/Web/WebServer/logs`
Web Application Server	`Lev1/Web/WebAppServer/SASServern_1/logs`
Web Application	`Lev1/Web/Logs/SASServern_1`
Environment Manager Server	`Lev1/Web/SASEnvironmentManager/server-5.n.n-EE/logs`
Server Tier Entity	
WIP Database (PostgreSQL)	`Lev1/WebInfrastructurePlatformDataServer/Logs`
Information Retrieval Studio	`Lev1/Applications/SASInformationRetrievalStudioforSAS/logs`
DIP Job Runner Server	`Lev1/Web/Applications/SASWIPSchedulingServices9.4/dip/DIPJobRunner.log`
Entities on Multiple Tiers	
Environment Manager Agent	`Lev1/Web/SASEnvironmentManager/agent-5.n.n-EE/log`
Cache locator	`Lev1/Web/gemfire/instances/ins_<port#>/gemfire.log`
JMS Server	`Lev1/Web/activemq/data/activemq.log`

Be aware that a middle-tier feature, such as the SAS Environment Manager, has agents on each tier. These agents are still deployed in and have logs in folders under `Lev[n]/Web` in the configuration directory as shown above.

If an issue is encountered in a web application, always first check the log for the web application (such as SAS Web Report Studio, SAS® Visual Analytics Explorer, and so on). Then, check the Web Infrastructure Platform (WIP) services log. Finally, check the server log (such as `SASServer1`, `SASServer2`, and so

on) itself. The culprit of the issue can often be found in the WIP services log
(`$levconfig/Web/Logs/SASServer1_1/SASWIPServices9.4.log`).

PORTS

The number of TCP ports used in SAS 9.4 is significantly higher than in previous releases. TCP ports in the ephemeral port range can be in use by the UNIX operating system and cause configuration failures. This error during the Start Web Application Server configuration step is a strong indication of port conflicts:

Timeout for Application Server startup has reached before port opened

For more information, see "Pre-Installation Checklist for Ports for SAS" in *SAS® 9.4 Intelligence Platform Installation and Configuration Guide.*

SAS ENVIRONMENT URL

During deployment you might be prompted by the SAS Deployment Wizard for the URL location of the SAS environment file. The SAS environment file defines a set of SAS deployments at your site for client applications (such as SAS Enterprise Miner and SAS Forecast Server) to use. Post-installation tasks associated with this file are no longer necessary now that the `sas-environment.xml` file is automatically deployed on the SAS Web Server. In SAS 9.2, the SAS Environment URL was not applicable for some products that now require it, and the default value for this file has changed since SAS 9.3. For more information, see "Configuring the SAS Environment File" in *SAS® 9.4 Intelligence Platform: Middle-Tier Administration Guide* as well as information about the SAS environment file in your product-specific documentation.

SAS ENTERPRISE BUSINESS INTELLIGENCE

SAS® Web OLAP Viewer for Java explorations need to be converted to reports before migrating to SAS 9.4. Any data exploration objects that you want to migrate to the target system must be converted to SAS® Web Report Studio reports in the source system before creating the migration package. The Migration Utility Analysis Report addresses this situation. Bookmarks and references to the explorations need to be fixed after converting the reports but before creating the SAS Migration Utility package as well. SAS Web OLAP Viewer for Java explorations cannot be converted to reports with promotion to SAS 9.4. Convert the data explorations to reports prior to creating the promotion package. The previous documentation related to promoting data explorations has been removed from the SAS 9.4 documentation.

If you are migrating from SAS 9.2 orSAS 9.3 to the third maintenance release of SAS 9.4, the migration experience associated with SAS Web OLAP Viewer for Java (SWOVJ) data explorations is improved over earlier maintenance releases of SAS 9.4. If applicable, a warning is written in the Instructions.html file indicating data explorations are still being referenced in portlets. The warning includes information about how to correct the situation and points to a list of these portlets and their data explorations. For data exploration portlets that are converted to report portlets, the SBIP URL of the data exploration portlet is automatically converted in the report portlet, provided that a corresponding report is found in the same folder as the original report and named `<data_exploration-name>_<bookmark_name_with_spaces_removed>-report.srx`.

Details are in the "Promotion Exceptions and Variances" section of the *SAS® 9.4 Intelligence Platform: Web Application Administration Guide.*

SAS SOLUTION-SPECIFIC DEPLOYMENT REQUIREMENTS

Some SAS software solutions require configuration of a dedicated SAS Application Server context and token authentication on the workspace server. To configure a dedicated application server context, these solutions must be configured in a second pass of the SAS Deployment Wizard. To surface the token authentication option in the second pass, the prompting level for the SAS Deployment Wizard must be set to Typical or Custom, not Express. Examples of solutions with this requirement include:

- SAS® Factory Miner

- SAS® Forecast Server Client

- SAS® High-Performance Risk

- SAS® Risk Management for Banking

These requirements are described in the installation, configuration, or administration guides for these solutions.

SAS® MODEL MANAGER

SAS Model Manager has had an extreme makeover starting with the 13.1 release (The latest release is 14.1). The Java Client application for SAS Model Manager has been replaced with a web-based user interface. The SAS Model Manager client installation is no longer required on a user's desktop, and Java Web Start is no longer used. SAS Model Manager includes common components from SAS Decision Manager, so do not be surprised by SAS Deployment Wizard prompts for SAS Decision Manager components.

When upgrading to a newer version, SAS Model Manager requires two SAS Deployment Wizard passes. For detailed instructions to perform the upgrade, see the *SAS® Model Manager Administrator's Guide*.

SAS® STUDIO

SAS Studio is a tool that you can use to write and run SAS code through your web browser. There are three editions of SAS Studio: SAS Studio – Single User, SAS Studio Basic, and SAS Studio Mid-Tier (also called the Enterprise Edition). For software orders that include SAS Studio, the edition of SAS Studio is based on the licensed operating system and the software in the customer order.

- SAS Studio Single User – available on Windows operating systems when Base SAS is licensed

- SAS Studio Basic – available on UNIX and Windows operating systems when Base SAS is licensed

- SAS Studio Mid-Tier – available on supported middle-tier systems when SAS® Integration Technologies is licensed

SAS Studio was first available in March 2014 and runs on the first and later maintenance releases for SAS 9.4. To determine which edition of SAS Studio is included with your software order, see the SAS Software Summary (`ordersummary.html`) located in the `install_doc/<order-number>` directory of your SAS Software Depot.

An order can include SAS Studio Mid-Tier with either SAS Studio Single User or SAS Studio Basic, depending on the full contents of your software order. In these cases, SAS Studio Mid-Tier is installed and configured like any other SAS web application when included in a SAS deployment plan.

When installed, SAS Studio Single User is available from the **Start** menu. When started, SAS Studio – Single User starts running on a free port and launches a browser.

When configured, SAS Studio Basic is available from any supported browser running on the port that was specified in the SAS Deployment Wizard. An operating system account is required for this edition.

When deployed, SAS Studio Mid-Tier is available from any supported browser accessing the URL provided in the `Instructions.html` file. SAS Metadata Server login credentials are required for this edition. SAS Studio Mid-Tier is deployed when included in a SAS deployment plan.

If you use IBM WebSEAL to secure your web servers, be aware that a workaround is needed to avoid a SAS Studio 3.4 issue. Contact SAS Technical Support for information.

For more information about installing and configuring SAS Studio, see *SAS® Studio Administrator's Guide*. Details on using SAS Studio can be found in the *SAS® Studio User's Guide* found on the [SAS Studio Product Documentation](#) web page.

TERMS TO KNOW

Here are a few new terms in SAS 9.4:

Cache Locator (also known as "Gemfire") – used by applications on server-tier and middle-tier machines to locate other members and to form a data cache. The Cache Locator is based on Pivotal GemFire. For more information, see *SAS® 9.4 Intelligence Platform: Middle–Tier Administration Guide* and the Pre-Installation Checklist.

JMS Broker – based on Apache ActiveMQ. SAS middle tier software uses the broker for Java Messaging Services (JMS). For more information, see *SAS 9.4® Intelligence Platform: Middle-Tier Administration Guide*.

SAS Deployment Agent – required for deployments that run remote processes. SAS uses the agent to copy content and to perform configuration management operations that are associated with creating new servers and clustering. It is also used for server administration tasks such as deployment backups. For more information, see "SAS Deployment Agents" in *SAS® 9.4 Intelligence Platform Installation and Configuration Guide*.

SAS Environment Manager Server – monitoring and management system for SAS deployments that runs on the middle tier. For more information, see *SAS® Environment Manager User's Guide*.

SAS Environment Manager Agent – a component of SAS Environment Manager that runs on each platform (middle tier and server tier) in a SAS deployment. The agent is responsible for discovering software components on its platform, gathering metrics, and reporting back to the management server. For more information, see *SAS® Environment Manager User's Guide*.

SAS Web Server – an HTTP server based on Pivotal Web Server. For more information, see the *SAS® 9.4 Intelligence Platform: Middle-Tier Administration Guide*.

SAS Web Application Server – a lightweight server that provides enterprise-class features for running SAS web applications. The SAS Web Application Server is based on Pivotal Web Application Server. For more information, see *SAS® 9.4 Intelligence Platform: Middle-Tier Administration Guide*.

CONCLUSION

With any transition, the best advice is to be prepared for what to expect. The SAS documentation provides valuable, detailed information that will help you move to SAS 9.4 and to maintain and optimize its use. Take the time to read the documentation first. Pay careful attention to pre-installation checklists, operating system and product-specific system requirements, and installation and configuration, administration, and user guides.

The information in this paper is intended to supplement existing documentation by calling out key features and providing hints on the various topics to help smooth the transition to SAS 9.4 based on our experiences in SAS Customer Experience Testing.

ACKNOWLEDGMENTS

Special thanks to all members of the Customer Experience Testing team for contributing to the content of this paper.

For consistency between SAS provided material, some of the information is taken directly from SAS 9.4 documentation.

RECOMMENDED READING

For installation, configuration, and migration information, see these resources at http://support.sas.com/documentation/onlinedoc/intellplatform/index.html

- *What's New in SAS® 9.4*

- *SAS® 9.4 Intelligence Platform: Installation and Configuration Guide*

- *SAS® Deployment Wizard and SAS® Deployment Manager 9.4: User's Guide*

- *SAS® 9.4 Intelligence Platform: Migration Guide*

- *SAS® 9.4 Guide to Software Updates*

For administration documentation, see these resources at http://support.sas.com/documentation/onlinedoc/intellplatform/tabs/admin94.html

- *SAS® 9.4 Intelligence Platform: System Administration Guide*

- *SAS® 9.4 Intelligence Platform: Security Administration Guide*

- *SAS® 9.4 Intelligence Platform: Middle-Tier Administration Guide*

- *SAS® 9.4 Intelligence Platform: Web Application Administration Guide*

- *SAS® 9.4 Web Applications: Tuning for Performance and Scalability*

For SAS Visual Analytics documentation, see these resources at http://support.sas.com/documentation/onlinedoc/va/

- *SAS® Visual Analytics: Administration Guide*

- *SAS® Visual Analytics Installation and Configuration Guide (Distributed SAS® LASR^{TM})*

- *SAS® Visual Analytics Installation and Configuration Guide (Non-Distributed SAS® LASR^{TM})*

For information about deploying Visual Analytics after your main deployment, see this resource:

- *SAS® Visual Analytics Administration and Reporting: Installation Guide for Delayed Deployments* at:
  http://support.sas.com/documentation/installcenter/en/vaarddicg/68723/PDF/default/install.pdf

Also, see this product-specific documentation:

- *SAS® High-Performance Analytics Infrastructure: Installation and Configuration Guide* at http://support.sas.com/documentation/onlinedoc/hpa/index.html

- *SAS® Environment Manager: User's Guide* at http://support.sas.com/documentation/onlinedoc/sev/index.html

- *SAS® Model Manager 13.1 Administrator's Guide* at http://support.sas.com/documentation/cdl/en/mdlmgrag/67039/PDF/default/mdlmgrag.pdf

- *SAS® Studio: Administrator's Guide* and *SAS® Studio User's Guide* at http://support.sas.com/documentation/onlinedoc/sasstudio/index.html

For information about supported characters in passwords in SAS data servers using PostgreSQL, see:

- *PostgreSQL 9.3 Documentation*. Chapter 4. SQL Syntax. "Constants" section. http://www.postgresql.org/docs/9.3/static/sql-syntax-lexical.html

For SAS 9.4 Support for Hadoop documentation, see these resources at:
http://support.sas.com/resources/thirdpartysupport/v94/hadoop/

- *SAS® and Hadoop Technology: Overview*

- *SAS® 9.4 Supported Hadoop Distributions*

- *Support for Apache Hadoop Software Distributed with SAS® Software*

- *SAS/ACCESS® and Hadoop Distributions*

- *Hadoop with Kerberos: Architecture Considerations*

- *SAS® and Hadoop Technology: Deployment Scenarios*

See this SAS Global Forum 2016 paper for guidance on implementing HTTPS/TLS in SAS 9.4:

- "Tips and Techniques for Using Site-Signed HTTPS with SAS® 9.4." Stuart J Rogers, SAS Institute Inc. Proceedings of SAS Global Forum 2016. Paper SAS3441-2016 http://support.sas.com/resources/papers/proceedings16/SAS3441-2016.pdf

See this SAS Global Forum 2014 paper for steps on adding SAS Visual Analytics to an existing environment:

- "Considerations for Adding SAS® Visual Analytics to an Existing SAS® Business Intelligence Deployment." Christine Vitron and James Holman, SAS Institute Inc. *Proceedings* of *SAS® Global Forum 2014.* Paper SAS146-2014. http://support.sas.com/resources/papers/proceedings14/SAS146-2014.pdf

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