

Paper 482-2013

Do I Need a Migration Guide or an Upgrade Coach?

Donna Bennett, Gerry Nelson, and Mark Schneider

SAS Institute Inc., Cary, NC

ABSTRACT

Don't bring a hammer when you need a paintbrush! There are many kinds of changes you can make to your SAS® deployment. Sometimes, SAS migration tools might provide the best path for making changes to your system. Other times, your changes might need other deployment and management tools. Whether you are an administrator managing the changes or an IT administrator overseeing SAS software, this paper will help you choose the right tools to plan and manage SAS software changes. As an added bonus, the paper includes a glossary of common terms and concepts that often require collaboration between IT and SAS management.

INTRODUCTION

As a SAS® administrator, you manage and track a wide array of changes. Understanding the relationships and dependencies between pieces of a SAS deployment will help you navigate those changes. In the following sections we identify the phases that you will typically consider. Then in the common scenarios, we provide examples of the interrelationships between those dependencies and provide pointers to planning steps and reference materials.

How Will I Make the Change?

When the game begins, there are two main tactical approaches you can take to make your change:

Create a New SAS Deployment

- **Migration:** In SAS terminology, migration means creating a new SAS deployment based on an existing SAS deployment, using the automated migration tools—the SAS® Migration Utility and SAS® Deployment Wizard. You will sometimes hear this approach described as automated migration.

The automated migration tools and process are designed to create a target deployment that preserves the content and configuration information from the source. These tools require an all-at-once approach, and provide limited options for making changes to the deployment during the upgrade. The automated migration tools support a like-for-like transition—the operating system family and the distribution of SAS components must be the same in the source and target environments.

- **Deploy-New-and-Promote:** Promotion is a related concept to migration; promotion is the process of copying selected metadata and associated content within or between planned deployments of SAS software. Promotion of metadata content is typically used to support movement across development, test, and production environments.

To make a change using promotion, use the SAS Deployment Wizard to create a new SAS deployment and use the export/import functionality of the promotion tools to move the content from the old deployment. You will sometimes hear this approach described as manual migration.

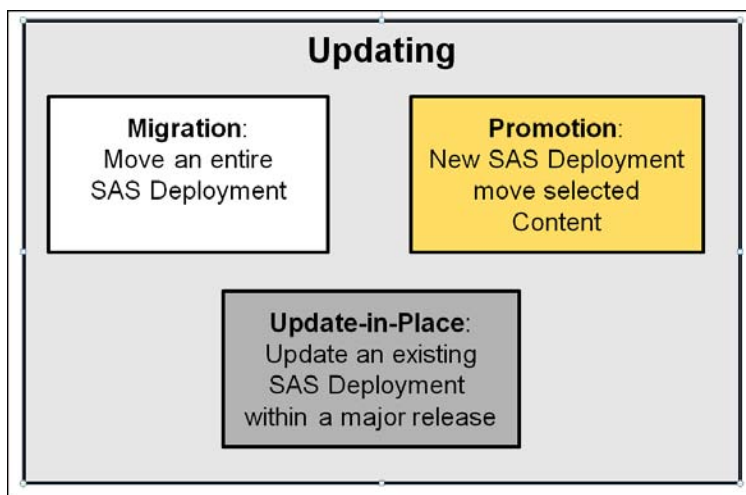
The promotion framework is designed to allow customers to selectively move content from one deployment to another. There are limits to the content that can be exported using promotion; however, this option offers the most flexibility in changing the deployed topology.

Update an Existing SAS Deployment

- **Update-in-Place:** This is the process of updating an existing SAS deployment to apply maintenance, or add and update SAS products. The update modifies the existing deployment rather than creating a new deployment.

Update-in-place is supported only within a major SAS release. For example, you can use update-in-place to update a SAS 9.2 deployment to maintenance 1 or maintenance 2; however, you cannot use update-in-place to transition a SAS 9.2 deployment to SAS 9.3.

Update-in-place typically involves updating the existing deployment using the SAS[®] Deployment Manager and/or the SAS Deployment Wizard. However, a variety of changes can also be made to SAS deployments manually using administration tools like SAS[®] Management Console.



WHAT AM I CHANGING?

There are many elements of a SAS environment that you might need to replace or upgrade. Several of these are discussed below in isolation. Later in the paper, we'll pull combinations of these elements together into common upgrade scenarios.

Machines

In most cases, replacing a physical machine or virtual machine image hosting SAS software requires redeploying the software on the new machine. To minimize the impact to your deployment, you should try to preserve configured values including the host name, port numbers, and installation and configuration directory locations.

Changing a machine running Windows forces you to redeploy your SAS software in order to establish required Windows registry keys. The only exception is if you're able to do a complete image backup and restore, including the operating system.

Operating System

Whether an operating system upgrade requires coincident changes to your SAS environment depends on the nature of the upgrade. In most cases, operating system vendors maintain compatibility with currently installed software. However, in some cases, major operating system upgrades require redeployment of SAS and other software. In all cases, you should follow your operating system's vendor-supplied upgrade documentation in terms of how to handle existing software.

Moving from one operating system to the next requires you to redeploy SAS software. This includes changing the "bitness" of an operating system (e.g., moving from 32-bit to 64-bit Windows). For planned deployments, you can use SAS migration tools to ease this process, but only if you're moving within flavors of an operating system (e.g., Windows Server 2003 to Windows Server 2008, or if you're changing bitness). For all other deployments, you must reinstall and reconfigure your SAS software on the new target operating system.

SAS Software

New SAS[®] Foundation Version or Maintenance

Updating SAS[®] Foundation to a new major version (e.g., SAS 9.2 to SAS 9.3) implies doing a new install (and

configuration in planned deployments) to a new installation directory, and optionally using migration tools to transfer your content to the fresh installation. Conversely, updating SAS Foundation to include the latest maintenance implies reusing the existing installation and configuration directories. The SAS deployment tools guide you in either case.

New Product Version

The level of complexity associated with updating to a new SAS product version depends on relationships to other deployed SAS products. When SAS makes a new product version available, the latest versions of all other products will accompany it in your order. You cannot deploy one new product version in isolation of accompanying new product versions. In many cases, the accompanying products will include a new SAS Foundation or maintenance version (see above). If not, you might be able to upgrade your existing environment in-place, without changing installation or configuration directories.

Hot Fixes

Hot fixes are always installed on top of an existing deployment. Installation and configuration locations remain the same.

Third-Party Software

When upgrading your third-party software, using vendor-supplied tools, you must make sure you remain within supported versions as described at the SAS third-party support reference on the SAS support site.. This reference also covers additional configuration steps you need to take to integrate your existing SAS software with the new third-party software versions.

Topology

You can think of your SAS topology as simply the definition of which SAS software products go on which machines. In most cases, changes of topology require a brand new deployment on the target systems, followed by manual promotion of your content from the old to the new deployment. Exceptions to this would be scenarios in which you're adding SAS products and associated machines to your existing environment, or in which you're scaling up the number of servers in your environment to handle increased load.

THE PHASES OF SAS CHANGES

This section highlights decisions and preparation that you need to consider when evaluating and managing changes to your SAS software, and to your working SAS deployments. Regardless of the tools that you use, there are five general phases—and you need to care about each phase: Plan, Prepare, Execute, Validate, Rollout.



Note that the Execute (implementation) phase is the shortest step in managing change! Your investment in developing a written plan, and preparing to execute that plan, is time well spent.

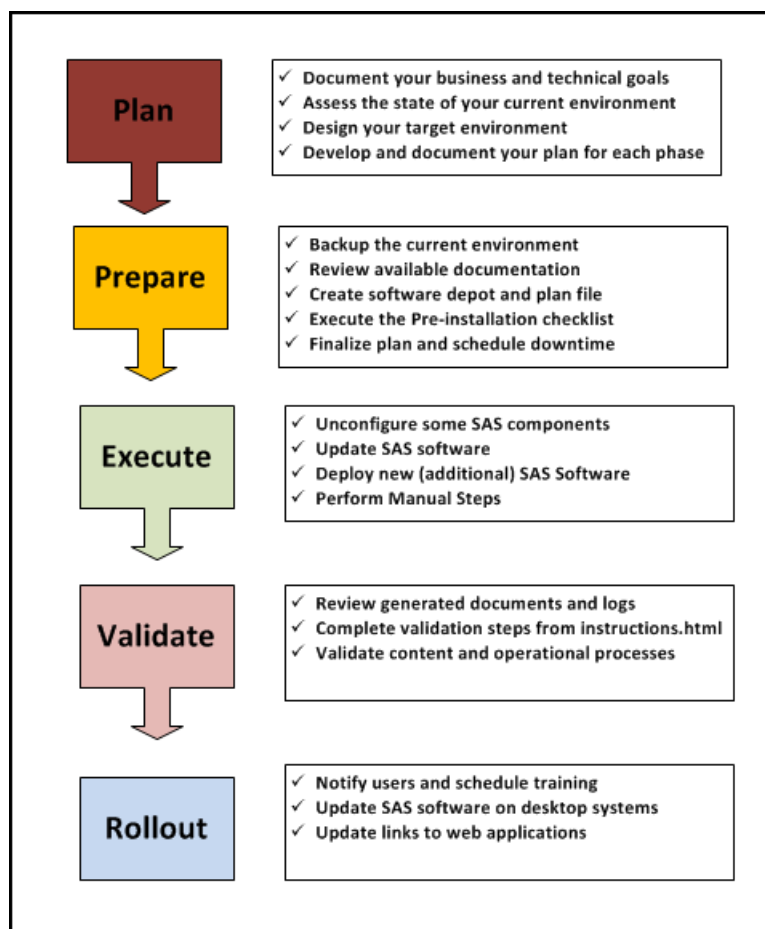
When you use these phases to help organize your changes, you will find it easier to create a plan and to choose and assemble the right tools from SAS.

These five phases apply whether you define your change as a migration, or an upgrade—or simply a change.

Focus on building your plan to cover each of the five phases – and you will find the guidance and coaching that you need!

The change process encompasses five main phases, where the actual execution (implementation) of the change is the shortest phase. While the names for the phases might vary slightly based on your company policy or reference standard, the general organization is ubiquitous. Refer, for example, to the phases associated with the Information Technology Infrastructure Library (ITIL) Service Transition processes.

This overview of the five phases of managing change to SAS software highlights general steps in each phase.



Many factors influence the time you will need to manage the complete cycle of change for your SAS software deployments. As a general rule, expect the cycle to take *days* for simple changes, *weeks* for mid-sized deployments, and *months* for complex deployments. You will invest most of your time in planning and preparing for the changes.

Plan

Planning is the critical first step in ensuring your success. Spending time in planning and preparation will result in a win once the game starts.

Very often the planning takes longer than the execution. The amount of time you need to allow will vary based on the complexity of your deployment topology, the number of users and the amount of content, and your corporate guidelines and policies governing changes.

During the planning phase you will:

- **Document the Business Goals:** Identify general goal dates and key milestones. Do you want to complete the change this week? Next month? Do you need to minimize downtime during any particular business cycle? Do you need to wait for hardware availability? Do you need approvals from a change review board? Review your corporate policies and procedures.
- **Document the Technical Goals:** Outline what changes will be made to the environment, including whether you are changing SAS software, third-party software, operating system, hardware, or infrastructure.

- **Understand Your Current Environment:** As an input to what approach you will take, you need to understand the state of your current system. This understanding should include a list of machines (physical and logical), the role of each machine, a list of SAS software and where it is located, and an inventory of user-created content. You can use tools such as the SAS Migration Utility and the View Registry tool. In addition, you should locate existing administration and deployment materials, including the SAS software depot, the deployment plan, and the license file.
- **Design Your Target Environment:** Evaluate the baselines for the target (new/updated) SAS software deployment, including operating system level and third-party software. Determine the topology of your target environment.
- **Plan Your Execution Approach:** Make a preliminary assessment of the SAS tools that you will use, based on the information you have gathered about the current state of your SAS deployment, and the target you want to achieve.
- **Plan for Validation:** Define key validation tests that you want to perform. Do you need to ensure that a specific report is available? Do you want to review the new formats that will be displayed when you open a project in the latest client release? Do you need to confirm that critical ETL jobs are in the batch queue, ready to run? Defining these goals up front will help you focus on the steps and content that is most important to you. You might also identify some content or data sources that is no longer important.
- **Plan for Rollout:** Coordinating the desktop upgrades and the server upgrades requires assessment and policy decisions on your part. You can continue using the current version of some (but not all) desktop client products if they meet specified baselines.

Prepare

A team typically prepares for a whole week before executing a sixty-minute game. The planning and preparation make the execution go smoothly. Your preparation time will vary, based on the extent of the changes you are making.

During the preparation phase you will:

- **Make a Full Backup** of the source system.
- **Review Available Documentation:** Key SAS documentation includes the following.
 - *Maintenance Release Announcement* highlights the most recent maintenance release and links to more detailed documentation such as the *SAS 9.3 Guide to Software Updates*, including announcements of product and feature deprecations.
 - Install Center provides QuickStart Guides, System Requirements, SAS Deployment Wizard documentation.
 - SAS Intelligence Platform administration documentation.
 - Solution or product-specific documentation. You might need to contact your SAS representative for links and passcodes to access some solution documents.
 - Third party software requirements, including tips for configuring middle-tier components such as Java application servers.
 - What's New documentation.
- **Select a Deployment Plan:** If you have SAS[®] Metadata Server in your deployment, the SAS Deployment Wizard. (For more information, see the documentation for SAS Deployment Wizard at the Install Center on the SAS support site.) In cases where you are just adding maintenance, you won't need the deployment plan; however, you might find it useful to review the deployment checklist that is associated with the plan.
- **Execute the Pre-installation Checklist:** including ensuring the availability of required ports, creating required host accounts, and confirming that your third-party software components (Java, JBoss) meet the required version levels for the update.
- **Create or Update your SAS Software Depot:** Acquire the software and build a SAS software depot. Using an already existing SAS software depot will speed the process when you are adding maintenance, or staying within a major platform version of SAS.
- **Finalize Your plan** and review it with your team. At this point, you should have a good idea about what tools you need to use as you implement your SAS software change.
 - Review checklists and approvals that must be completed before you begin changes.
 - Coordinate with other teams who might need to help.
 - Understand what steps will be automated, and what manual steps are needed.
 - Advise end users of the pending changes and anticipated downtime.

- **Schedule Downtime:** At a planned time, shut down user access to the SAS deployment with appropriate notifications.
- **Package Your Source:** In scenarios such as migration or promotion where you are creating a new SAS deployment from an existing SAS deployment, create the package of your source system and content. For migration, you will use the SAS Migration Utility. For deploy-new-and-promote, you will use the content import and export tools.

Execute

Once your plan is in place and reviewed and a backup is completed, you are ready to begin implementing changes to your SAS software. If you manage multiple SAS deployments, you will perform the execute phase (along with validate and rollout) for each SAS deployment. If you have only one SAS deployment, you are ready to implement your plan!

Important Tips and Reminders!

- *You need administrator privileges for some administration tasks, especially on Windows systems.*
- *Use the same userid for updates as you used for the initial installation and configuration.*
- *Anti-virus software interferes with many installation and configuration processes. Arrange to shut down any anti-virus software running on your desktop on servers for the duration of the SAS install and configuration tasks.*
- *Each SAS deployment will need a license file. Contact your SAS site representative if you have any questions about which license file to use.*

In the execution phase you will follow the plan. The execution phase can include:

- **Unconfiguring SAS Software**
- **Updating SAS Software**
- **Deploying New SAS Software**
- **Performing Manual Steps**

Be aware that, for a metadata-based deployment, if you are deploying SAS on a multiple-machine, distributed system, you must install software on your machines in a particular order. You will run the SAS Deployment Wizard first on the SAS Metadata Server machine, followed by the compute server, the middle tier, and finally the clients. If an unconfigure is required, you will use the SAS Deployment Manager and the order is reversed. Machines might be physical machines, or might be logical (virtual) machines.

The Instructions.html files produced by the deployment tools identify additional configuration or review steps that you need to perform to complete the installation and configuration processes. The list of manual instructions will vary based on your source and target environments. For example, when you are upgrading from a metadata-based deployment of SAS 9.1.3, you need to carefully review the changes associated with the new security model

Validate

In the validation phase you will validate that the new environment is operational and that user-created content is available and working.

During the validation phase you will:

- **Check Logs and Generated Documentation:** SAS software updates are tracked in the deployment logs, and in the deployment registry on each machine. Review log files and deployment reports. We recommend that you save a copy of the DeploymentSummary.html report and the ViewRegistry report for each machine after completing the update.
- **Complete Validation Steps from Instructions.html:** If you have a metadata -based deployment, the steps in Instructions.html include accessing web applications and testing access to servers. These steps are designed to validate that you have a working SAS deployment. Also make sure you follow any instructions or links provided at the end of your SAS Deployment Wizard session.
- **Validate Content:** Perform validation tests that you defined in your original plan. These steps should include validation that content is accessible to the correct resources.

Roll Out Software to Users

You are close to the buzzer!

In this phase, you need to think about who is using the software, and when and how they will transition to use the new version. How do they know they have access to the new stuff? What do they need to do to continue to access their existing data?

In the rollout phase you will:

- **Notify Users:** Notification processes about the change should follow your standard corporate procedures.
- **Schedule Training** for your users as you roll out new software versions.
- **Update SAS Clients:** In most cases, you will need to update the SAS software clients that communicate with the servers at the same time. There is a limited set of SAS software clients that allow mismatched versions of clients and servers to connect. SAS[®] Enterprise Guide[®], SAS[®] Add-In for Microsoft Office, and SAS[®] Data Integration Studio support cross-version connections. As such, you do not need to upgrade these clients at the same time as your server machines. Note that once projects are accessed by a later version of the client, those projects typically cannot be read by the earlier version of the client software.
- **Announce New Web Application URLs:** After an update, web applications like SAS[®] Web Report Studio will use the new version of SAS as soon those applications are changed on the middle tier. End users can start using these new versions immediately, because no SAS software needs to change on their desktop. In some cases, you might need to advise users of new URL links.

PLAYBOOK OF COMMON SCENARIOS

In this section, our “coaches” provide considerations for planning and performing several types of changes. The table provides a high-level overview of the six representative scenarios included in this paper. While your site might not correspond directly to one of these scenarios, select one that is similar to the deployment that you maintain. Review the playbook pages for that scenario to see the coach’s guidance on actions that will help you successfully manage change for your SAS deployment—and some background on how to sort through the options and tools.

COMMON SCENARIO	PRODUCTS REFERENCED IN THIS EXAMPLE SCENARIO	“TYPICAL WORKFLOW” ASSOCIATED WITH THIS SCENARIO
1. Installing maintenance for an existing deployment that includes metadata	SAS® BI Server, SAS® Data Integration Server, SAS® Strategy Management, SAS® Enterprise Miner, SAS Enterprise Guide, SAS Add-In for Microsoft Office	Simple upgrade
2. Upgrading a nonplanned deployment to the next major SAS Foundation release	SAS Foundation: Base SAS®, SAS/STAT®	Simple upgrade (no metadata)
3. Moving a planned deployment to the next major SAS Foundation release	SAS® Enterprise BI Server, SAS Enterprise Guide, SAS Add-In for Microsoft Office, SAS Web Report Studio	Migration
4. Upgrading a specific product to the latest version	SAS® Financial Management	Simple upgrade (with metadata)
5. Changing operating systems for the server machines in a planned (with metadata) deployment	32-bit → 64-bit Windows SAS BI Server	Migration tools <i>(in some cases, otherwise, new)</i>
6. Moving the middle tier of a planned deployment to a different operating system	Any metadata-based product mix. Moving the SAS middle tier.	Reconfigure <i>(new deployment of middle tier)</i>

The following six sections describe typical planning, implementation, validation and rollout tasks for the scenarios summarized above.

COMMON SCENARIO 1: INSTALLING MAINTENANCE TO AN EXISTING DEPLOYMENT THAT INCLUDES METADATA

Desired Change

You know that the second maintenance release of SAS 9.3 (SAS 9.3M2) is available, and you are ready to update your site. You have applied a few hot fixes, but in general, you prefer to wait for a maintenance release to make changes; however, you have applied a hot fix for your SAS Data Integration Servers and clients, and you want to ensure that those fixes are retained. Downtime of the entire environment is to be minimized during the upgrade. Because you are managing a highly regulated environment, you will start by implementing and validating the change in a test environment.

Current Topology

Your SAS production environment has three server machines, supporting 200 end users. It is critical that the SAS system is available for business processing from 8 AM to 8 PM eastern standard time, or your company risks losing business or making poor choices about investments. The analysts get grumpy if they cannot access modeling tools, but the business suffers if SAS software and corporate data is not constantly available to them. Your site has licensed SAS BI Server, SAS Data Intelligence Server, and SAS Strategy Management software.

Because of corporate governance requirements, you have a separate TEST environment and changes must be validated in the TEST environment before they can be applied to the PRODUCTION system. The TEST environment is an exact duplicate of the SAS servers, although only a subset of sample data is available in the TEST system. All

changes to PRODUCTION must be scheduled in advance, and IT prefers to implement scripts that automate any changes that need to be made on the PRODUCTION system.

Most of the business users are running predefined analysis by accessing SAS models that are automatically linked into Microsoft Excel spreadsheets. Half of the users have authorization to create custom reports using SAS Web Report Studio. One department of 20 people uses SAS Enterprise Guide to examine data using several predefined models and techniques. There are 20 analysts who use SAS Enterprise Miner to explore data and experiment with analytical models.

The servers supporting SAS software are running Linux, and they are dedicated to running only SAS software. All SAS software was originally deployed about 18 months ago, and was based on SAS 9.3. The IT team chose JBoss as the Java application server—and has implemented a JBoss instance that is dedicated to SAS.

Options and Coach's Tips for Scenario 1: Installing Maintenance to an Existing Deployment That Includes Metadata

Your product mix includes a SAS Metadata Server. Deployments of SAS software that leverage metadata are described as *planned deployments* because you use a deployment plan to guide the setup and configuration of the software.

Because you are already running SAS 9.3, applying the maintenance updates to the current deployment is a fairly simple process. Alternately, you could choose to create a copy of your existing deployment, and upgrade that copy with the newer software components.

- Option 1: just apply maintenance. This scenario is typically handled as a simple upgrade that modifies the existing software and configuration files. You use the SAS deployment tools to apply maintenance, and you do not need to use the SAS Migration Utility.

Note that you will receive maintenance for all of your SAS software, and not just for specific components. That means that you might be applying maintenance or upgrades for products such as SAS Web Report Studio or SAS Strategy Management in addition to updating any Base SAS or metadata components.

- Option 2: use same-version migration to create a copy of your existing TEST deployment. You could create a new deployment based on SAS 9.3M2 using the same-version migration capabilities introduced in SAS 9.3. If you choose this approach, you will typically use the SAS Migration Utility when you create your duplicate copy of the deployment. If you choose to create a complete new copy, refer to the common scenario 3, which describes the migration process.

PLAYBOOK Guidelines for Scenario 1: Installing Maintenance to an Existing Deployment That Includes Metadata

Remember that planning is a critical step—and might take longer than implementing the changes! Because in this example scenario you are working in a highly governed environment with multiple deployments, we encourage you to develop a detailed plan, and consider reviewing that plan with your SAS consulting team. This section focuses on option 1 (just apply maintenance).

Plan

Refer to the general planning guidelines earlier in this document for tips about your planning framework. Because this scenario is about managing separate SAS deployments for TEST and PRODUCTION, you should have separate sections in your plan that describe the goals, timelines, and current state of each of these deployments.

- You will apply the maintenance separately to each deployment.
 - Using the record mode of the SAS Deployment Wizard when you apply maintenance to your TEST deployment can help you capture details to use when you make changes to PRODUCTION.
- Select which users will participate in the initial testing phases. This will define which user desktops might need to be modified. Note that the web applications (which are loaded on the server) will automatically be modified for all users who access the deployment.

- Evaluate the impact of allowing users to continue to use existing versions of desktop clients (versus upgrading each of the desktops).

Prepare

- The What's New document for SAS 9.3 highlights changes and enhancements introduced in each maintenance release.
- If you have kept your SAS 9.3 software depot online, load the maintenance order into your existing depot. This will speed the download process.
- You do not need a SAS deployment plan, because you are installing maintenance.
- Backups are especially important because you are modifying your current deployment. Restoring from backup is the only way to undo changes once you have completed deployment tasks.
- Verify that all steps on the preinstallation checklist associated with your deployment plan have been completed. In particular, ensure that your third-party software components (Java, JBoss) meet the required version levels for the update.
- Review the "Product Details and Requirements" section of the *SAS 9.3 Guide to Software Updates* for details about the relationship of the maintenance release to SAS Data Integration Studio hot fixes, and to understand the changes and conversions to the 4.3 format that will happen when you access SAS Web Report Studio reports or SAS[®] Information Delivery Portal content that was created with the 4.2 version of these components.
- Be sure to review your SAS Strategy Management documentation, too!

Execute

Starting with the metadata machine, and moving in turn to the compute machine, and finally to the middle-tier machine, you execute the SAS Deployment Wizard from your SAS 9.3 software depot.

- During the testing phase, you will limit the distribution of desktop applications to end users who are participating in the validation. You will need to run the SAS Deployment Wizard on each desktop machine that will be updated.
 - Run SAS Deployment Wizard on TEST desktop machines for SAS Enterprise Guide, SAS Add-In for Microsoft Office, and SAS Enterprise Miner users.
- Run SAS Deployment Wizard on each administrator's desktop machine to ensure that administrative tools (including SAS Management Console, SAS Data Integration Studio, and SAS[®] Information Map Studio) as well as SAS clients are updated.

Validate

During validation, review representative projects and reports to ensure that you understand what changes your end users might see. When you initially run the newer versions of client software, and open an existing project file, the software will automatically update the format of the project or report. Note that once the conversion has been performed, users who are running older versions of the client software will not be able to access the project.

Roll Out Software to Users

- Rollout happens in phases! When performing the upgrade on test machines, you will need to plan which users will participate in testing access to the new systems.
- Notify users who have local projects that some extra time might be required the first time they open a project with the new software version because updates might be happening in the background.

COMMON SCENARIO 2: UPGRADING A NON-PLANNED (BASIC) DEPLOYMENT TO THE NEXT MAJOR FOUNDATION RELEASE

Desired Change

You read in the *SAS Tech Report* last September that new analytics capabilities are available, and you want to update your SAS software and use some of the new features. You manage the SAS software for your desktop, and for three of your colleagues who also use SAS. Your colleagues generally wait for you to test the upgrade, and then they update their systems. The four of you have been creating and running SAS software for several years, and you have a big collection of batch jobs and data models that you stored in a shared directory on a networked file system.

Current Topology

You and your colleagues run SAS software on your Windows desktop machines. You and two colleagues are running Windows 2008, and one colleague is running Windows XP. Your site has licensed Base SAS and SAS/STAT software.

It has been a while since you have updated the software, and you think you are running SAS 9.2. The *SAS Tech Report* article noted that SAS statistical products will now be numbered 12.1 and beyond, and as you read about the capabilities, you saw that these versions are based on the SAS 9.3 major foundation release.

Options and Coach's Tips for Scenario 2: Upgrading a Non-planned (Basic) Deployment to the Next Major Foundation Release

This scenario is typically handled as a simple software upgrade. Because you are not running a metadata server, and because your SAS software is on a single machine, the process for moving to the new major foundation version of SAS is fairly simple. You will use the SAS deployment tools. You will not use the SAS Migration Utility.

You have three general options:

- Option 1: Create a new SAS 9.3 deployment, and still be able to run your existing SAS 9.2 deployment.
- Option 2: Update the existing SAS deployment so that you are running the latest version of the software.
- Option 3: Change from using a 32-bit version of SAS 9.2 to using a 64-bit version of SAS 9.3.

Do you have questions about the differences between the options? Coach provides some quick perspective!

- Are my processes and decisions different if I want to run both SAS 9.2 and SAS 9.3 on my Windows system?
 - Yes. SAS tools work with default filenames and locations, unless you specifically make changes. There are also considerations regarding some files that are shared by the releases. The Windows registry can reference only one version of SAS.
 - Order matters when you choose to install more than one version of SAS on the same Windows system. Be sure you install the newest version of the software last.

If you choose to keep two versions of SAS software on the same system, be sure that you add or update the most recent version last; otherwise, changes to the earlier version could overwrite more recent updates.

- Why do I need to care about choosing a 32-bit version of SAS or a 64-bit version?

The SAS 9.3 release is the last SAS software version designed to be run on 32-bit Windows systems. Contact your SAS sales representative if you have not started evaluating a transition to 64-bit software for future releases.

- If you are running a 32-bit Windows operating system, then you don't have any choice to make. However, many customers are adopting 64-bit Windows because most of the newer hardware on the market is based on 64-bit hardware, which supports bigger address spaces and enables applications to grow.
 - You can continue to run 32-bit versions of most software applications on a 64-bit machine running a 64-bit version of Windows. Many customers who are continuing to run 32-bit versions of Microsoft Office specifically choose 32-bit SAS to facilitate integration and data exchange.
- How to decide whether you want 32-bit SAS software or 64-bit SAS software installed on your Windows operating system?
 - Refer to Usage Note 37314 (<http://support.sas.com/kb/37/314.html>) if you need tips to help determine what version of Windows you are running.
 - If you choose to start using 64-bit versions of SAS, then you will be installing a new SAS deployment.
 - If you choose to install both the 32-bit version and the 64-bit version of SAS 9.3 on the same machine, *make sure that you install the 64-bit version first*. See Installation Notes 46649

(<http://support.sas.com/kb/46/649.html>) and 44168 (<http://support.sas.com/kb/44/168.html>) on the SAS support site for additional guidance.

PLAYBOOK Guidelines for Scenario 2: Upgrading a Non-planned (Basic) Deployment to the Next Major Foundation Release

Remember that planning is a critical step. Even though you are focusing on changing just your machine, you will benefit from reviewing the changes and creating a written plan that you can use as a reference when you help your colleagues update their systems.

Plan

Because you are not running a metadata-based deployment, you do not need a deployment plan, and you are typically not implementing a SAS middle tier.

- Your primary documentation is the *SAS Deployment Wizard and SAS Deployment Manager 9.3: Users Guide* and the *SAS 9.3 Guide to Software Updates*. The "What's New" sections of the documentation will highlight new features and capabilities. You might also want to scan Samples and SAS Notes on the SAS support site for the most recent enhancements or tips. The QuickStart Guides in the SAS Install Center provide pointers to key documents for specific details.
- You will need to create new file system directories for your SAS 9.3 software depot and SASHOME. We recommend that the software depot be located on a shared file system.
- The SAS file formats have not changed between SAS 9.2 and SAS 9.3. If you are changing from using 32-bit SAS software to 64-bit SAS software, then you should review options about changing your data file structures. Beginning with SAS 9.3, Base SAS data sets (and associated indexes, if any) are interoperable between Microsoft Windows 64-bit and Microsoft Windows 32-bit operating systems. Check the Installation Note 38379 on the SAS support site (<http://support.sas.com/kb/38/379.html>).

Assess your current deployment.

- Because this scenario assumes you are running SAS on your desktop computer, you need to confirm the "bitness" of the computer, and the "bitness" of the version of SAS that you are running.
 - Determine if you are running 32-bit SAS or 64-bit SAS – and decide what option you prefer when you install SAS 9.3. Usage Note 37314 (<http://support.sas.com/kb/37/314.html>) on the support website provides some guidance. You will define your choice when you order your updated software.
 - Verify your system requirements. Ensure that your version of Windows meets the minimum requirement for the new SAS software release.

Prepare

Deploying SAS software requires a SAS software depot. Plan for time and space to create a new depot for SAS 9.3 software: you cannot use the same depot for SAS 9.2 and SAS 9.3 software.

- You create the SAS 9.3 software depot when you download your software order, or when you receive and load your physical media.
- Perform a backup of your SAS deployment.

Execute

Because you are currently running SAS 9.2 software, you will need to install into the new SASHOME directory on your desktop machine when you install the SAS 9.3M2 software. You cannot install SAS 9.2 and SAS 9.3 in the same directory. You can have both versions installed on the same machine (but only one version will be linked from the registry). If you plan to install more than one version of the software, ensure that you install the most recent version last. Installation Note 44390 (<http://support.sas.com/kb/44/390.html>) on the SAS support site provides screen shots and guidance.

Before you start the SAS Deployment Wizard, shut down your SAS applications, including scheduled batch jobs, **and your anti-virus software**.

Remember that you need to **Run as administrator**, and that you will use the same administrator username when you install and update your SAS software.

- Run SAS Deployment Wizard on your desktop Windows machine. Double-click the `setup.exe` at the root of your SAS software depot to start the SAS Deployment Wizard. If your Windows operating system is Windows Vista, Windows 7, or Windows Server 2008, you might have to right-click the `setup.exe` and select **Run as administrator**.
- Use the record mode of the SAS Deployment Wizard so that you have the option of automatically capturing some of the choices when you repeat the deployment process for your colleague's systems.
- Update the license. Use the **Renew SAS Software** tool to review and update the license. Usage Note 43617 (<http://support.sas.com/kb/43/617.html>) provides tips and guidelines for applying the updated license to your personal deployment of SAS. The new license file is delivered in conjunction with your SAS 9.3 software order.

Validate

- Review log files and deployment reports to ensure the deployment steps completed successfully.
- Review the **Additional Resources** links displayed by the SAS Deployment Wizard screen.
- Ensure that you can log in and access your projects. Reboot the machine, and reconfirm access. Because this is not a metadata-based deployment, you will not run scripts that validate the metadata-based servers and connections.

Roll Out Software to Users

- Because you are sharing data and project files with some of your colleagues, you need to ensure that they know if you update or change project formats.
- The first time you open a project with the new software version, you might experience some delay because updates might be happening in the background.
- Remember: you must use administrative mode when installing SAS software. If you install SAS on your colleagues' computers, you will need administrative access to their systems.

COMMON SCENARIO 3: MOVING A PLANNED DEPLOYMENT TO THE NEXT MAJOR SAS FOUNDATION RELEASE

Desired Change

You would like to move all your metadata and compute servers currently running under SAS 9.2 to the latest maintenance release for SAS 9.3 (SAS 9.3M2). In addition, you want to pick up the latest versions of client software and incrementally roll it out to end users. Downtime of the entire environment is to be minimized during the upgrade.

Current Topology

Your SAS environment involves Linux and Solaris server machines and Windows client machines. The metadata and compute servers are hosted on two physical Linux boxes, respectively. The web application server uses JBoss on a Solaris server. All SAS software was originally deployed from an order reflecting the third maintenance release for SAS 9.2 (SAS 9.2M3). Several dozen Windows desktops have SAS Enterprise Guide 4.3 and SAS Add-In 4.3 for Microsoft Office installed, each of which submits requests to the metadata and compute servers. A total of 100 desktop systems have access to SAS Web Report Studio via their web browser of choice. The environment has been operational for years, and involves an extensive amount of metadata-based information (such as server definitions, users, roles, jobs).

Options and Coach's Tips for Scenario 3: Moving a Planned Deployment to the Next Major SAS Foundation Release

Your product mix includes a SAS Metadata Server. Deployments of SAS software that leverage metadata are described as *planned deployments*, because you use a deployment plan to guide the setup and configuration of the

software. *Major SAS Foundation release* refers to the version designation of SAS 9.1.3 or SAS 9.2 or SAS 9.3 or SAS 9.4.

There are two primary options when you update a planned deployment to the next major SAS Foundation release:

- Option 1: Deploy a brand new SAS 9.3 server environment and manually promote desired content (such as metadata, jobs, stored processes). In SAS terminology, this process is known as promotion or deploy-new-and-promote. If you want to start with a completely vanilla environment in order to retire unused content or rework environment-wide settings (e.g., roles, permissions, compute server allocations), the promotion approach is favored. This is sometimes described as a “manual migration”.
- Option 2: Use the automated migration tools to create a new SAS 9.3 deployment that is based on the content and configuration in your current SAS 9.2 deployment. If you have a lot of existing content to move to SAS 9.3, the migration approach is favored. In this scenario 3 example, the large amount of metadata content suggests choosing to use the automated migration tools.

PLAYBOOK Guidelines for Scenario 3 : Moving a Planned Deployment to the Next Major SAS Foundation Release

Remember that planning is a critical step—and might take longer than implementing the changes! The amount of time you need to allow for the update will vary based on the complexity of your deployment topology, the number of users and the amount of content, and your corporate guidelines and policies governing changes.

Plan

When you start planning your upgrade, you need an inventory of the server machines in your environment, and the SAS software on each. You need this inventory regardless of the option you choose.

- Run the SAS Migration Utility in **analyze** mode on the Linux and Solaris server systems in your environment. Because we’re migrating a SAS 9.2 environment, we will run the SAS 9.2 version of the SAS Migration Utility, either downloaded from the SAS support site or directly from our SAS 9.3 software depot. The latter is preferred, but the former can be used if you do not yet have your SAS 9.3 order. The SAS Migration Utility produces a report showing the products and content to be migrated in addition to highlighting any special considerations or prerequisite steps.

Prepare

- Backups are important. Note, however, that the upgrade from SAS 9.2 to SAS 9.3 will always create a new deployment. After you complete the upgrade and validation, you can remove your SAS 9.2 deployment.
- You need a SAS 9.3 deployment plan to perform this upgrade.
 - If your original SAS 9.2 deployment took advantage of a standard deployment plan, you will be able to use a corresponding SAS 9.3 standard plan.
 - If your SAS 9.2 deployment involved a custom deployment plan delivered to you separately from your order, you will need to contact your SAS account representative to get an equivalent custom plan created for SAS 9.3. This process is simplified if you have a copy of your original SAS 9.2 custom plan and your topology is not changing significantly for your SAS 9.3 environment (i.e., same set of products being deployed to the same set of machines).
- Whether you use a standard or custom deployment plan, you will have an associated pre-installation checklist of steps to execute prior to installing any SAS 9.3 software. The checklists for standard plans are available for download from the SAS support site. The checklists for custom plans are delivered as attachments to the corresponding e-mail containing the plan itself.
- Run the SAS Migration Utility again (in **execute** mode) to gather up all the information about your current environment and save it to a migration package. The utility will produce the same reports as it did in the aforementioned analyze mode, and will also write machine-specific information and content to a shared migration package directory structure. This migration package created by the SAS Migration Utility is then used as input for the SAS Deployment Wizard when you install the SAS 9.3 software.
 - Be sure to use the version of the SAS Migration Utility that is delivered in your SAS 9.3 software depot!
 - Remember to run the SAS Migration Utility on every server machine in your SAS 9.2 deployment.
- Review the *SAS 9.3 Guide to Software Updates* document (“Product Details and Requirements” section) to understand the changes and conversions that will happen when you access SAS Web Report Studio reports or SAS Information Delivery Portal content that was created with the 4.2 version of these components: they

will be updated to 4.3 when you apply the maintenance release. The documentation will advise of specific preparation steps that are needed.

Execute

Starting with the Linux metadata machine, and moving in turn to the Linux compute machine, and finally to the Solaris middle-tier machine, you execute the SAS Deployment Wizard from your SAS 9.3 software depot. You will be directed to deploy your software into a brand new installation directory (known as SASHOME) and configuration directory because SAS 9.2 and SAS 9.3 cannot be mixed in a single deployment. The SAS Deployment Wizard will install the latest maintenance associated with the product versions in your order. Critical hot fixes will also be installed if you chose to download them when creating your SAS Software Depot (SAS 9.3M2 and later).

During the deployment process, the SAS Deployment Wizard will ask if you're migrating from a previous version of SAS. In all cases you will respond yes, and supply the path to the aforementioned migration package created by the SAS Migration Utility. The SAS Deployment Wizard will retrieve the appropriate content, seeding it into your new SAS 9.3 deployment.

You also need to apply the software updates to administrator desktops, and roll out new software to end users. To update the SAS software on desktop machines, you run the SAS Deployment Wizard on each desktop, either interactively or in batch via the record-and-playback deployment tool functionality in concert with third-party provisioning systems.

Validate

Validating your new EBI environment entails following the steps supplied by the SAS Deployment Wizard in the Instructions.html file generated at the end of your automated deployment. For EBI, you have no additional manual steps to perform. Your servers should be operational as soon as they are deployed. Following the validation steps, you'll confirm you can connect to your new servers, as well as execute Web Report Studio and other web applications to ensure that your middle tier is working.

Rollout

Rollout includes applying software updates to client applications that run on end users' desktops. Users who run SAS web applications will need to be advised on the updated URLs for their applications. To update the SAS software on desktop machines, you run the SAS Deployment Wizard on each desktop, either interactively or in batch via the record-and-playback deployment tool functionality in concert with third-party provisioning systems.

Both SAS Enterprise Guide and SAS Add-In for Microsoft Office support cross-version compatibility. As such, you do not need to upgrade these clients at the same time as your server machines. For all other SAS clients, however, you need to upgrade the desktop-based client software at the same time that you update the server software components.

Once you're finished updating the server tiers to SAS 9.3, you can incrementally provision the latest versions of SAS Enterprise Guide and SAS Add-In for Microsoft Office clients to the dozens of Windows desktop machines in your environment. Because your order was for SAS 9.3M2, you will receive SAS Enterprise Guide 5.1 and SAS Add-In 5.1 for Microsoft Office. Using the record-and-playback functionality of the SAS Deployment Wizard, you can silently deploy this client software to subsets of users in your organization, or alternatively provide them with scripts to execute when they are individually ready to upgrade.

Note that all web applications including Web Report Studio will migrate to use the new version of SAS as soon as the middle-tier migration is complete. Because the only software required to use these applications on the 100 desktops is a web browser, end users can start using the new versions via the new URLs immediately.

COMMON SCENARIO 4: UPGRADING A SPECIFIC PRODUCT TO THE LATEST VERSION

Desired Change

Your organization originally deployed SAS Financial Management 5.21. You noticed there is a new version, 5.3, on the SAS website and are interested in deploying the new features to the servers and clients in your environment. You want to minimize change to your environment.

Current Topology

Your company uses separate Microsoft Windows Server 2003 for x64 machines for your metadata, compute, and middle-tier servers. You use IBM WebSphere for your web application server on the middle tier. Your desktop client machines are primarily 32-bit Windows XP Professional machines. All have Microsoft Excel installed, and take advantage of the Add-In for Microsoft Excel that's available in SAS Financial Management.

This scenario presumes that all SAS software was originally deployed from an order reflecting the initial release of SAS 9.3 (SAS 9.3M0). SAS Financial Management versions 5.21 and 5.3 were both released to run on the major foundation release SAS 9.3.

Options and Coach's Tips for Scenario 4: Upgrading a Specific Product to the Latest Version

Your product mix includes a SAS Metadata Server. Deployments of SAS software that leverage metadata are described as *planned deployments*, because you use a deployment plan to guide the initial setup and configuration of the software.

This scenario typically uses the tools associated with scenario 1 (installing maintenance to an existing planned deployment). Even though you are installing a new release of the SAS solution, the platform version is based on SAS 9.3. Your planning and preparation steps need to follow recommendations highlighted in the documentation provided for your solution as well as the guidelines in the SAS 9.3 Maintenance Release Announcement. We encourage you to review your upgrade plans with your SAS consulting team.

Remember: you will update *all* software in your deployment when you apply the new software release. This means that you will update software on all server tiers, including components such as SAS Web Report Studio, when you move to the newest release of SAS Financial Management.

- Read the SAS Financial Management documentation to get an overview of the changes to the product setup. Read the maintenance and upgrade site to get an overview of the platform and tool changes and pointers to additional details.
- Because you are not changing the major version of your SAS Foundation software, you will not need to run the SAS Migration Utility to perform the installation; you might still want to use the utility to analyze your deployment during the planning phase.

Because you're interested in minimizing changes to your environment, you really have one option only: update-in-place. This means reusing your existing installation and configuration directories.

PLAYBOOK Guidelines for Scenario 4: Upgrading a Specific Product to the Latest Version

Remember that planning is a critical step—and might take longer than implementing the changes! During your planning phase, you need to review the documentation for the platform changes as well as those changes associated with the new release of SAS Financial Management.

Plan

The initial phase of the planning process is assessing the state of your current deployment, and clarifying any goals and constraints associated with implementing the software changes.

Because SAS Financial Management client software is not cross-version compatible, you will need to upgrade all servers and clients during the same outage timeframe.

Prepare

- Backups are important.

- Because you are modifying the existing deployment, and you are keeping the same SAS software mix (just newer versions), you do not need a new deployment plan. However, you still need to inventory the machines in your environment to determine which ones have SAS software deployed.
- You must read all installation instructions that are specific to the new version of SAS Financial Management.

Execute

- Remember that you must **Run as administrator** when deploying software on Windows machines. When you are updating an existing SAS deployment, you need to use the same administrative credentials as you used during the initial deployment.
- As with all deployments, you should start with running the SAS Deployment Wizard on your metadata machine, moving on in turn to your compute and middle-tier machines in order. You need to run the deployment tools on each of the server machines in your SAS deployment to ensure that all SAS products are updated to the latest software versions appearing in your new order. In this case, the metadata and compute servers will be updated to use the SAS Foundation maintenance level delivered as part of your order.
- As you move from one machine to the next, the deployment tools will detect the new versions of products in your order, and guide you to install them. If they detect no new versions, you won't be prompted to install any software, and can simply move on to the next machine.
- Because your metadata, compute, and middle-tier machines all involve configuration directories, you will also be led through a reconfiguration process to accommodate changes in configuration associated with the new product versions. As with your original deployment, the deployment tools will produce a customized set of instructions to complete the configuration process, including validating your updated servers..

Validate

Validating your updated SAS Financial Management environment entails following the steps supplied by the SAS Deployment Wizard in the Instructions.html file generated at the end of your automated deployment. Because your upgrade involved applying SAS Foundation maintenance, you will want to make sure your SAS Metadata server and SAS Application Servers (e.g., Workspace Server, SAS[®] Stored Process Server) are all operational, in addition to checking that your SAS Financial Management software is working as documented.

Rollout

Now that you've upgraded your servers, you can provision your SAS Financial Management client software, including the SAS Add-In for Microsoft Excel. This client software is not cross-version compatible, and therefore you must perform a mass rollout to all users when you update the server software. This is most easily accomplished by using the silent deployment options of the SAS Deployment Wizard in conjunction with the Microsoft System Center Configuration Manager (SCCM) provisioning software running on Windows. Those users solely accessing the SAS Financial Management software through its corresponding web application will be able to access the new environment as soon as you finish updating your middle-tier machine.

COMMON SCENARIO 5: CHANGING THE OPERATING SYSTEM OF A PLANNED DEPLOYMENT

Desired Change

Your organization is modernizing its hardware to standardize on Windows 64-bit operating systems. As part of this modernization all Windows 32-bit operating systems are being replaced.

Current Topology

Your current SAS 9.3 deployment consists of a SAS Metadata Server on a Windows 32-bit machine, a compute server (SAS Application Server) on a Windows 64-bit machine, and a middle tier on a Windows 64-bit machine. The web application server uses JBoss on the Windows 64-bit server. All SAS software was originally deployed from an order reflecting the latest maintenance for SAS 9.3. In addition, you have 20 to 25 desktop users using SAS Enterprise Guide 5.1 and SAS 5.1 Add-In for Microsoft Office, and a small subset of these users also use SAS Enterprise Miner. A total of 100 desktop systems (also Windows 32-bit) have access to the SAS Information Delivery Portal, SAS[®] BI Dashboard and SAS Web Report Studio via their web browser of choice. The environment makes extensive use of the portal to surface web reports, dashboards and stored processes to users.

Options and Coach's Tips for Scenario 5: Changing the Operating System of a Planned Deployment

Your product mix includes a SAS Metadata Server. Deployments of SAS software that leverage metadata are described as *planned deployments*, because you use a deployment plan to guide the setup and configuration of the software.

In this specific scenario, the two primary options for making the change are the same as scenario 3 because the operating system change is staying in the same operating system family.

- Option 1: Create a new SAS 9.3 server environment and manually promote desired content (metadata, jobs, stored processes, etc.). In SAS terminology, this process is known as promotion or deploy-new-and-promote. If you want to start with a completely vanilla environment in order to retire unused content or rework environment-wide settings (e.g., roles, permissions, compute server allocations), the promotion approach is favored.
- Option 2: Use the automated migration tools to create a new SAS 9.3 deployment that is based on the content and configuration in your current SAS 9.3 deployment. If you have a lot of existing content to move to SAS 9.3, the migration approach is favored. In the scenario 3 example, the large amount of metadata content suggests choosing to use the automated migration tools.

In this scenario, the SAS deployment has a significant volume of user-developed content and customizations to configuration. For this reason we recommend that you use the automated migration tools. Beginning with SAS 9.3, the automated migration tools allow you to perform a same-version migration, which means you can use the automated migration tools to create a new SAS 9.3 deployment based on an existing SAS 9.3 deployment.

Changing operating system families is not supported by the automated migration tools. For example, the automated migration tools would not support changing from Windows to Linux. To move to a different operating system family for the SAS servers, you would need to create a new SAS deployment and promote content to that new SAS deployment. In this scenario the change is happening within the same operating system family (Windows), which is supported by the automated migration tools.

PLAYBOOK Guidelines for Scenario 5: Changing the Operating System of a Planned Deployment

Remember that planning is a critical step—and might take longer than implementing the changes!

Plan

The initial phase of the planning process is assessing the state of your current deployment, and clarifying any goals and constraints associated with implementing the software changes. Even though your goal is to change the operating system, you are making a new copy of your SAS deployment..

When you start planning your upgrade, you need an inventory of the server machines in your environment, and the SAS software on each. You need this inventory regardless of the option you choose.

- Run the SAS Migration Utility in **analyze** mode on the Linux and Solaris server systems in your environment. Because we're migrating a SAS 9.3 environment, we will run the SAS 9.3 version of the SAS Migration Utility, either downloaded from the SAS support site or directly from our SAS 9.3 software depot. The latter is preferred, but the former can be used if you do not yet have your SAS 9.3 order. The SAS Migration Utility produces a report showing the products and content to be migrated in addition to highlighting any special considerations or prerequisite steps.
- In addition to migrating all middle-tier content stored on the WebDAV server, such as SAS Web Report Studio reports, the SAS Migration Utility will migrate SAS content that is stored within the configuration directory. During this migration, the SAS Migration Utility will convert any SAS catalogs or data sets from 32-bit to 64-bit format. The utility will not migrate any content stored outside the configuration directory. This content must be migrated manually after the automated migration is completed. The analysis report will list any locations on the file system where content must be migrated manually. The manually migrated data sets and catalogs must be converted to 64-bit content using the CIMPORT or MIGRATE procedures. For more

information about these procedures, see the *Base SAS Procedures Guide* or the Migration Focus Area on the SAS support site.

Prepare

- Backups are important.
- You will need a SAS 9.3 deployment plan to perform this upgrade.
 - In this SAS 9.3-to-SAS 9.3 migration, you can utilize the same deployment plan used to originally deploy the environment.
- Whether you use a standard or custom deployment plan, you will have an associated preinstallation checklist of steps to execute prior to installing any SAS 9.3 software. The checklists for standard plans are available for download from the SAS support site. The checklists for custom plans are delivered as attachments to the corresponding e-mail containing the plan itself.
- You will now run the SAS Migration Utility to gather up all the information about your current environment, saving it to a migration package. The utility will produce the same reports as it did in the analyze mode, and will also write machine-specific information and content to a shared migration package directory structure. This migration package created by the SAS Migration Utility is then used as input for the SAS Deployment Wizard when you install the SAS 9.3 software.
 - Be sure to use the latest version of the SAS Migration Utility that is delivered in your SAS 9.3 software depot!
 - Remember to run the SAS Migration Utility on every server machine in your source SAS 9.3 deployment.

Execute

Starting with the Windows 64-bit metadata machine, and moving in turn to the Windows 64-bit compute machine, and finally to the Windows 64-bit middle-tier machine, you execute the SAS Deployment Wizard from your SAS 9.3 software depot.

During the deployment process, the SAS Deployment Wizard will ask if you wish to migrate. In all cases you will respond yes, and supply the path to the migration package created by the SAS Migration Utility. The SAS Deployment Wizard will extract all relevant content, seeding it into your new SAS 9.3 environment. At the completion of each tier, the Instructions.htm file might instruct you on manual steps required to complete the deployment.

At this point you can manually migrate any SAS data sets or catalogs that were stored outside the configuration directory and complete any other manual steps listed in your analysis report or in the Instructions.html generated by the SAS Deployment Wizard.

Validate

Validating your new environment entails following the steps supplied by the SAS Deployment Wizard in the Instructions.html file generated at the end of your automated deployment. Your servers should be operational as soon as they are deployed. Following the validation steps, you'll confirm you can connect to your new servers, as well as execute SAS Web Report Studio and other web applications to ensure that your middle tier is working.

The validation of a migration is a two-step process.

- First, validate that the environment is operational. The Instructions.html generated by the SAS Deployment Wizard provides a series of steps to validate that all SAS servers are working and that applications are accessible.
- Next, test that content and configuration has been loaded successfully from the migration package to the target system. This testing consists of accessing SAS content like dashboards, reports, data, and stored processes to ensure it is accessible to the same resources, and works in the same way, as it did in the source deployment.

Rollout

When testing is complete, the updated deployment can be made available to the user community.

- All web applications will migrate to use the new version of SAS as soon as the middle-tier migration is complete.
- The URL used to access the applications will need to be updated if the new SAS middle tier is located on a machine with a different host name than the old middle tier.
- Batch processing can be resumed by rescheduling flows and reports.

COMMON SCENARIO 6: MOVING THE MIDDLE TIER OF A PLANNED DEPLOYMENT TO A DIFFERENT OPERATING SYSTEM

Desired Change

The hardware that supports your middle tier is being changed from a Windows 64-bit machine to a Linux machine. You would like to simply move the middle tier of your SAS deployment to the new machine. Downtime should be minimized. You would have the option to do a migration or a deploy-new-and-promote to accomplish the movement of the middle tier by creating a completely new environment. However, hardware constraints limit your ability to create a completely separate environment as part of the process.

Current Topology

Your current SAS deployment consists of a SAS Metadata Server and SAS Application Server on a Windows 64-bit machine and a middle tier on a Windows 64-bit machine. The web application server uses JBoss on the Windows 64-bit server. All SAS software was originally deployed from SAS 9.3M2 order. You have SAS BI Server licensed and your users have access to the SAS Information Delivery Portal, SAS BI Dashboard, and SAS Web Report Studio via their web browser of choice.

Options and Coach's Tips for Scenario 6: Moving the Middle Tier of a Planned Deployment to a Different Operating System

Your product mix includes a SAS Metadata Server. Deployments of SAS software that leverage metadata are described as *planned deployments*, because you use a deployment plan to guide the setup and configuration of the software.

This scenario is a special case because the only component being changed is the SAS middle tier. Migration is ruled out because of hardware constraints.

You will perform several manual steps, which will result in a new deployment of the middle-tier components on the new Linux machine.

- Undeploy your existing SAS middle tier. This process removes the connections in metadata and removes the content on the existing middle-tier machine.
- The new middle tier on the Linux system will be configured to connect to the existing metadata and compute servers.

PLAYBOOK Guidelines for Scenario 6: Moving the Middle Tier of a Planned Deployment to a Different Operating system

Remember that planning is a critical step—and might take longer than implementing the changes! The amount of time you need to allow for the update will vary based on the complexity of your deployment topology, the number of users and the amount of content, and your corporate guidelines and policies governing changes.

Plan

The initial phase of the planning process is assessing the state of your current deployment, and clarifying any goals and constraints associated with implementing the software changes. Refer to the general planning guidelines for assessing the current state of your SAS deployment, and for creating a transition plan that aligns with your corporate

policies. In this scenario, we recommend that you limit the scope of the change, and keep your deployment topology the same. If you take this approach, you can use your existing SAS software depot and the deployment plan used to deploy your current environment.

To plan for the removal of the existing middle tier for the deployment you should identify all SAS middle-tier products and their dependent products.

Prepare

The process of unconfiguring is described in the *SAS 9.3 Intelligence Platform: Installation and Configuration Guide* section "Removing a SAS Configuration." Review this documentation carefully.

Prior to deploying the middle tier on your new Linux machine, complete the preinstallation checklist, which includes steps to execute prior to installing any SAS 9.3 software. The key steps to perform on the new machine are:

- Create required operating system accounts.
- Check port availability.
- Install third-party software JBoss and the JDK.

Prior to unconfiguring the middle tier you should export any user-created middle-tier content such as SAS Web Report Studio reports, dashboards, portal content, and so on to a SAS package file. The export provides an easy way to restore user-created content to the newly configured middle-tier machine.

Execute

To unconfigure the middle tier you will use the Remove Existing Configuration feature of the SAS Deployment Manager. The SAS Deployment Manager is the tool that you use to make changes to an existing SAS Deployment. The Remove Existing Configuration can be used to move SAS products. To accomplish this you will:

- Use the SAS Deployment Manager to remove the SAS middle-tier product configuration from the Windows machine.
- Use the SAS Deployment Wizard to install and configure the middle-tier product on the Linux machine.

The Removing Existing Configuration feature:

- Stops the product.
- Deletes metadata objects that contain the product's configuration information.
- Deletes configuration files and directories that are associated with the product.
- Determines whether other products depend on the removed products.
- Creates a summary HTML page and writes detailed logs to the `Levn\Logs\Configure` directory.

To remove the middle-tier configuration, you must first stop the web application server – which is JBOSS in this scenario. Once JBoss is stopped on the Windows machine where the middle tier is located, navigate to the directory containing the SAS Deployment Manager (*SAS-installation-directory/SASDeploymentManager/9.3*) and start the manager with the relevant executable. In the first panel, select Remove Existing Configuration and then step through the remaining prompts.

When the configuration removal is complete, the Additional Resources page is displayed. In this page, click on the document named *configuration-name-and-level_ConfigurationRemoval.html_YYY-MM-DD.HH.MM.SS.html*

This document contains details about the products that were removed and additional manual steps that you might need to perform. Perform any manual steps. After the configuration is removed, the associated software can be uninstalled.

On the new Linux machine that will host the SAS middle tier, start the SAS Deployment Wizard. When prompted, select the deployment plan that contains your Linux middle tier and then select the option to deploy the middle-tier machine. Follow the prompts until you complete the wizard, and then review and complete any postdeployment steps listed in the generated *Instructions.html* file.

Once the deployment has been tested, import the user content from the package files created in the planning phase.

Validate

Validate that the new middle-tier environment is operational by confirming that you can access SAS middle-tier applications including the SAS Information Delivery Portal and SAS Web Report Studio. Then, confirm that middle-

tier content including dashboards, reports, and stored processes are available and work in the relocated middle tier.

Rollout

If the new SAS middle tier is located on a machine with a different host name than the old middle tier, then users who access the applications will need to update the URL links that they use.

SUMMARY AND CONCLUSIONS

In summary, there are many aspects of your SAS environment that potentially come into play when you perform an upgrade or migration. Whether you're updating hardware, software, or a combination of the two, you need to spend adequate time planning your change to understand:

- The current state of your environment, including machines, SAS software, third-party software, and overall topology
- What's being changed, both directly in what you're targeting to change, and indirectly in what else must change in order to support the targeted change
- The process to take to accomplish the change
- The tools to use in support of the process.

Once you've spent the time to plan your change, you can prepare, execute, and validate the results in a shorter timeframe, ensuring a less disruptive rollout to end users. Choose the tools that match your plan!

TERMINOLOGY

The following list identifies terms that are relevant when describing how to upgrade and/or migrate your SAS deployment. Most of the terms are used within this document.

configuration, unconfiguration

During the configuration phase of the deployment process, you run tools that create and define the connections and customizations for your SAS deployment.

Information managed by SAS is stored in the SAS[®] Metadata Repository and in the configuration directory. While many configuration tasks are performed using the SAS Deployment Wizard and the SAS Deployment Manager, some tasks require manual steps.

Unconfiguration is the removal of the existing configuration, which is also performed in the SAS Deployment Manager. This step deletes metadata and removes content from the configuration directory.

deployment, SAS deployment

A SAS deployment is an instance of operational SAS software and related components, including SAS components, required third-party software, integration with the host environment, and content.

The deployment process includes installation and configuration tasks and phases. The SAS Deployment Wizard and the SAS Deployment Manager are the primary SAS tools used to support the deployment process.

A SAS deployment is sometimes referred to as a SAS instance or a SAS environment.

deployment plans

A deployment plan is an XML file that provides input to the SAS Deployment Wizard. The file contains information about what software should be installed and configured on each machine in a SAS deployment. Sometimes called *plan files*.

Standard deployment plans are delivered with SAS software and support most simple and basic distributed topologies. Custom deployment plans can be created by SAS staff for specialized requirements.

deployment tools

The family of deployment tools includes SAS Deployment Wizard and its companion product SAS Deployment Manager. The wizard is used when installing software. The manager is used when you are changing an existing deployment. The SAS Migration Utility is sometimes considered a member of the deployment tools family.

hot fix

A hot fix is a software update that is critical, or that might affect a large number of customers. Hot fixes are made available to customers on the SAS Technical Support hot fixes and download site.

installation

During the installation phase of the deployment process, you run tools that put SAS software in the appropriate directory locations. The installation phase requires access to a SAS software depot.

machine

The machine refers to the resources, real or virtualized, that host a computing environment for software.

In some conversations, the terms *server*, *computer*, and *system* are used to mean the same thing as machine.

Maintenance, maintenance release

SAS describes maintenance as a collection of updates to SAS products or components that corrects customer-reported issues, adapts the product to a changed environment, and provides other modifications. A maintenance release number is associated with major platform versions, and focuses on the changes released for the platform components. Solutions and specific products might have different version numbers.

migration

Migration is a process of populating a new deployment of SAS software with the content, data, or metadata (or a combination of these) from an existing deployment. Migrating might include upgrading to a new software release, converting data or metadata, or other changes to ensure compatibility. SAS describes two general categories of migration: automated migration, using tools that include the SAS Migration Utility and that move complete deployments, and manual migration, using export and import tools to move subsets of content between SAS deployments.

SAS installation data

The SAS installation data, or SID, is your SAS license information. Some customers remember the older term, SETINIT.

SAS Deployment Wizard, SAS Deployment Manager

The SAS Deployment Wizard and the SAS Deployment Manager are deployment tools used to administer your SAS deployment. You use the SAS Deployment Wizard to install, configure, upgrade, and apply maintenance to SAS products. You also use it to manage SAS software depots, which contain your orders. You use the SAS Deployment Manager with an existing deployment to perform administrative tasks such as updating passwords, rebuilding web applications, and changing host names.

The SAS Deployment Wizard is located in the root of the SAS software depot. The SAS Deployment Manager is located in your SASHOME directory.

topology

Your topology is the description of what software is installed on what machines in your environment.

update

Updating is the process of bringing all of your software in SASHOME up to the most current levels. If your order contains newer revisions or maintenance to software deployed in SASHOME, the SAS Deployment Wizard switches into update mode. This must be done prior to adding new software to the deployed SASHOME instance.

upgrade

Upgrading is the process of installing and configuring new versions of SAS products that are already deployed on your system.

ACKNOWLEDGMENTS

Colleagues from across SAS have contributed to this paper by asking questions, researching answers, and sharing comments and insight. Thanks to the participation from this broad virtual team, this paper provides a comprehensive view of a SAS deployment.

RECOMMENDED READING

SAS Institute Inc. 2011. *SAS Guide to Software Updates*. Cary, NC: SAS Institute Inc. Available at <http://support.sas.com/documentation/cdl/en/whatsdiff/63859/PDF/default/whatsdiff.pdf>.

SAS Institute Inc. 2011. *SAS Intelligence Platform: Overview*. Cary, NC: SAS Institute Inc. Available at <http://support.sas.com/documentation/cdl/en/biov/63143/PDF/default/biov.pdf>.

SAS Institute Inc. 2011. *SAS Intelligence Platform: Installation and Configuration Guide*. Cary, NC: SAS Institute Inc. Available at <http://support.sas.com/documentation/cdl/en/biig/62611/PDF/default/biig.pdf>.

SAS Institute Inc. 2012. *Base SAS Procedures Guide*. Cary, NC: SAS Institute Inc. Available at <http://support.sas.com/documentation/cdl/en/proc/65145/PDF/default/proc.pdf>.

SAS Institute Inc. 2012. *SAS Deployment Wizard and SAS Deployment Manager 9.3: Users Guide*. Cary, NC: SAS Institute Inc. Available at <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/64204/PDF/default/user.pdf>.

SAS Institute Inc. Administrator tab on the SAS support site. Available at <http://support.sas.com>.

SAS Institute Inc. Hot fixes and download site. Available at <http://support.sas.com/techsup/download/>.

SAS Institute Inc. Install Center. Available at <http://support.sas.com/documentation/installcenter/>.

SAS Institute Inc. Maintenance Release Announcement for SAS 9.3 and related pages. Available at <http://support.sas.com/software/maintenance/index.html>.

SAS Institute Inc. Migration Focus Area documentation. Available at <http://support.sas.com/migration>.

SAS Institute Inc. SAS Intelligence Platform administration documentation. Available at <http://support.sas.com/documentation/onlinedoc/intellplatform/index.html#intell93>.

SAS Institute Inc. Samples and SAS Notes. Available at <http://support.sas.com/notes/index.html>.

SAS Institute Inc. System requirements. Available at <http://support.sas.com/resources/sysreq/index.html>.

SAS Institute Inc. Third-party software requirements. Available at <http://support.sas.com/resources/thirdpartysupport/>.

SAS Institute Inc. What's New documentation. Available at <http://support.sas.com/documentation/whatsnew/index.html>.

Schneider, Mark, Donna Bennett, and Connie Robison. 2011. "Understanding the Anatomy of a SAS® Deployment: What's in My Server Soup?" *Proceedings of the SAS Global Forum 2011 Conference*. Cary, NC: SAS Institute Inc. Available at: <http://support.sas.com/resources/papers/proceedings11/363-2011.pdf>.

Tubbs, Waynette. 2012. *SAS Tech Report*, September 2012. Available at <http://www.sas.com/news/newsletter/tech/2012-9.html>.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the authors at:

Donna Bennett, Gerry Nelson, Mark Schneider
SAS Institute Inc.
100 SAS Campus Drive
Cary, NC 27513
919-677-8000
Donna.Bennett@sas.com , Gerry.Nelson@sas.com , Mark.Schneider@sas.com

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.