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I Want the Latest and Greatest!
The Top Five Things You Need to Know about Migration

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ABSTRACT

Determining what, when, and how to migrate SAS® software from one major version to the next is a common challenge. SAS provides documentation and tools to help make the assessment, planning, and eventual deployment go smoothly. We describe some of the keys to making your migration a success, including the effective use of the SAS® Migration Utility, both in the analysis mode and the execution mode. This utility is responsible for analyzing each machine in an existing environment, surfacing product-specific migration information, and creating packages to migrate existing product configurations to later versions. We show how it can be used to simplify each step of the migration process, including recent enhancements to flag product version compatibility and incompatibility.

INTRODUCTION

There are three primary options when migrating SAS® software from one earlier version to the latest version, Migration, Promotion, and Update in Place. With help from SAS ® Migration Utility, your migration process is simplified.

Migration: In SAS terminology, migration means creating a new SAS deployment based on an existing SAS deployment, using automated migration tools—the SAS® Migration Utility and SAS® Deployment Wizard, sometimes referred to 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 homogeneous 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, also called 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 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.
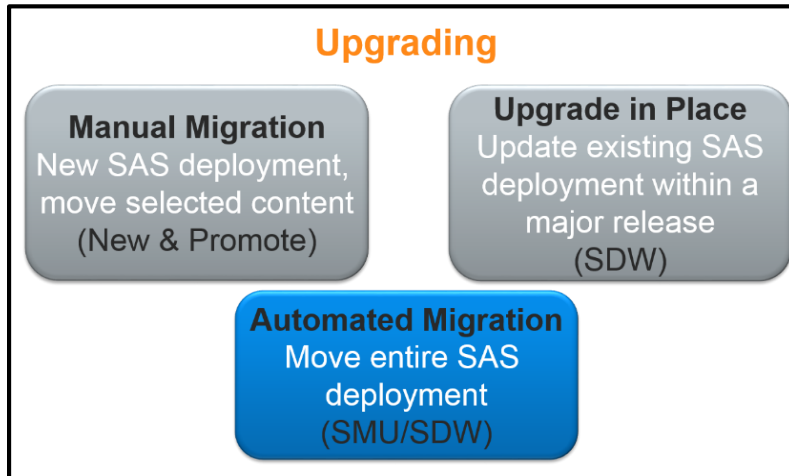

Figure 1. Migration, Promotion, and Update in Place

OVERVIEW OF THE PROCESS

The general phases to upgrading a deployment are: **Plan, Prepare, Execute, Validate, and Rollout**. The diagram below highlights the important tasks in each phase. The top five things you need to know about migration will fall under a number of these phases.
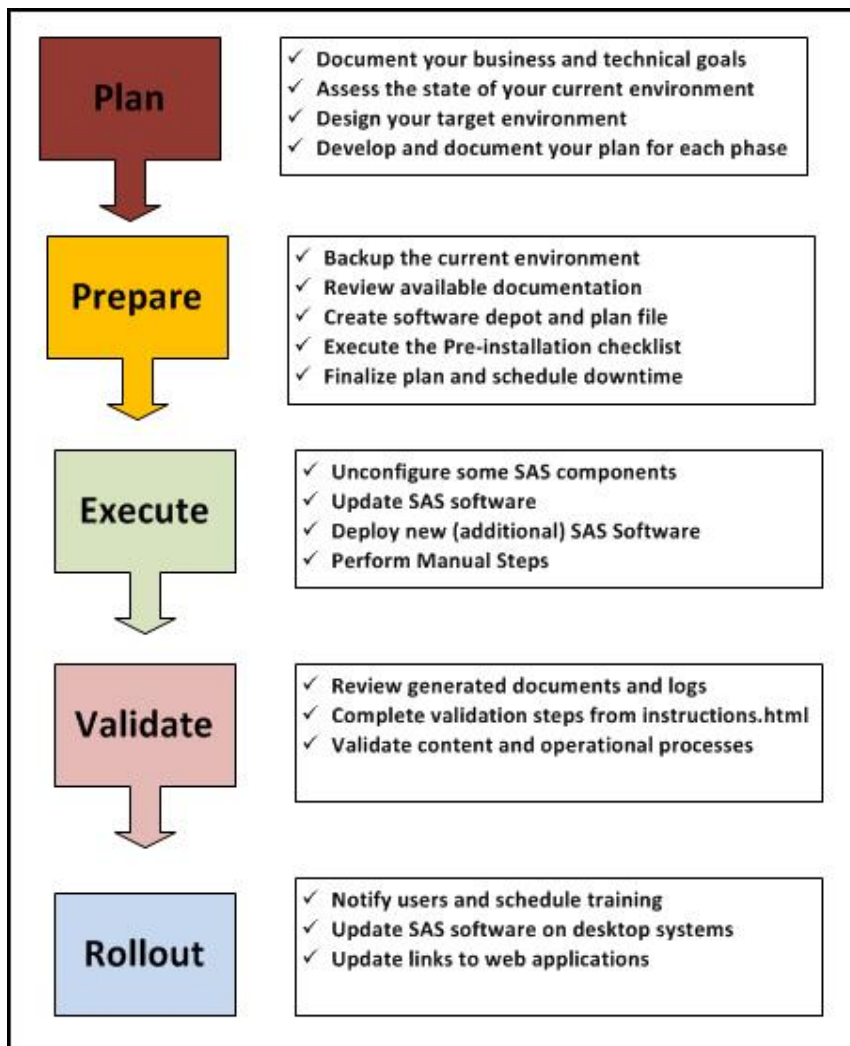
Figure 2. The General Phases to Upgrading a Deployment

When you make the decision to migrate, the following top five points under these general phases help you remember the required tasks during the process. Each topic serves as an easy to remember guidepost that will direct the process.

KNOW WHAT YOU'RE TRYING TO ACCOMPLISH

In the previous section, we described the main approaches to upgrading to SAS 9.4. One of the first decisions you will make during the planning phase of your upgrade is to choose which approach is most appropriate. Understanding what you are trying to accomplish is critical to choosing an approach.

While the overall goal of an upgrade is to transition to the latest release of your SAS products, there can be many other requirements that influence the approach you choose. Understanding the detailed requirements for the transition is the first step in planning your upgrade.

Many times, when a software upgrade is underway, there is a desire to make other changes at the same time. For example, it might make sense to perform one or many of the following:

- Upgrade the hardware
- Change the operating system
- Adjust the topology or architecture

In addition, any business requirements about how the upgrade should proceed should be considered. Requirements such as the desire to minimize downtime or transition to the target environment in stages.

A detailed understanding of all the business and technical requirements, the nature of the source deployment, and the detailed capabilities of each approach is required in order to decide on the right approach.

In order to fully understand all of the requirements for an upgrade, take the following steps.

1. **Collect and document detailed business requirements** early in the process. Understand the usage patterns of SAS, tolerance for downtime, timescales desired, and the testing requirements. Will the all-at-once approach work or is a staged transition important?

2. **Collect and document all of the technical requirements**. Answer questions like: Will the operating system stay the same? Is there a desire to change the SAS topology? Is new hardware being purchased?

3. **Review the SAS documentation** in the upgrading area in order to fully understand the available approaches.

    a. SAS Guide to Software Updates
    b. SAS Migration Guide
    c. Solution Specific Migration Guides
    d. SAS System Administration Guide
    e. SAS Installation and Configuration Guide

4. **Understand the current environment**, including understanding

    a. **Source system architecture and topology**, including the operating system of the machines, what SAS software is installed on each machine, and volume of data and metadata.
    b. **Volume and nature of existing content.** Create a content inventory. This is important because the type of content can impact the approach selected. For example, a large volume of dashboard content would result in using automated migration. The SAS Migration Utility can help with this. In addition there are many SAS tools that allow you to access the metadata and report on the content that it surfaces.

Consider a situation with the following requirements: the source system is SAS 9.2 Enterprise BI Server and the target system is SAS 9.4 M1 Enterprise BI Server. The current hardware will be reused and the current configuration should be preserved. The source environment contains significant and critical

content that should be upgraded including, stored processes, Web Report Studio reports and BI dashboards. The requirement to preserve content and configuration, and upgrade critical dashboard content, would indicate that automated migration with the SAS Migration Utility and the SAS Deployment Wizard should be used for this environment.

Understanding what you are trying to accomplish and all the goals of an upgrade is the first key step in the path to your new deployment.

The remainder of this paper will focus on the automated migration approach.

CONSIDER WHERE YOU ARE MIGRATING FROM, WHERE YOU ARE MIGRATING TO, AND POTENTIAL BUMPS ALONG THE WAY

Now that you are confident about what you want to accomplish and have determined that full system migration is the best approach, the next step is to make sure your products support it. Careful understanding of what versions of products are in the source system, including SAS software release and the intended target product versions, is necessary to anticipate action and manual steps necessary.

The SAS Migration Utility offers an analyze mode which is invaluable for the planning phase. It is delivered as a self-extracting executable that ships with your SAS software, as well as a direct download from support.sas.com. There is a separate SAS Migration Utility available for each mainline SAS release and operating system. **It is important that you only use the SAS Migration Utility from the SAS Software Depot of the target environment that you are migrating to, when analyzing or packaging your source environment.** If you do not have a SAS software order and are trying to see if you can migrate before placing your order, it is recommended that you download the latest version of the SAS Migration Utility corresponding to your baseline SAS release of your source environment (http://support.sas.com/demosdownloads/setupcat.jsp?cat=SAS%20Migration%20Utility). For example, if your current environment is on SAS 9.2M3, and you plan to migrate to SAS 9.4M1, you use the 9.2 SAS Migration Utility from the SAS 9.4M1 depot to run against your SAS 9.2M3 system.
Once the most up-to-date SAS Migration Utility has been obtained, you should complete the following steps:

1. Pre-analyze mode preparation steps
2. Set up a properties file from the template for SAS Migration Utility runs
3. Run the SAS Migration Utility using analyze mode and create a full analysis report
4. Review the full report and migration log

The migration utility must be run on every SAS server and middle tier in the environment. For detailed instructions on how to setup and run the utility, refer to the SAS Migration Guide documentation on the support web site (http://support.sas.com/documentation/cdl/en/bimig/63853/HTML/default/viewer.htm#n10001intelplatform00migrate.htm).

Execute the SAS Migration Utility in Analyze Mode

Execute the SAS Migration Utility in analyze mode to produce the full analysis report. For multiple-machine deployments, **always run the utility on the metadata server first**. The order of machines following the metadata server is not important. You cannot run the utility on multiple machines simultaneously because the migration schema might be updated by more than one process at the same time.

Review the Analysis Output on Each Machine

Review the complete report after each successive run of the migration utility on each machine. This report summarizes important details necessary for planning a full migration. In addition to the report, you should review the migration log to detect anomalies such as missing products or content.

- Found products on each tier
- What products can migrate
- What products cannot migrate
- Important warnings

Migration Analysis Report

The migration analysis report generated for each machine has four sections.

- The status icon key explains what actions are necessary for each status
- The migration version analysis containing product version analysis results
- Individual product output tables containing itemized details
- The list of found configured products

Migration Analysis report: Migration Version Analysis Section

Beginning with the release of 9.4 M1, the migration utility will determine what versions of the source deployment offerings are unable to migrate directly to 9.4.

Migration Version Analysis

The migration version analysis of this machine detected potential issues with the following product versions. If you intend to migrate to one of these product versions, then migration is not supported for any of the machines in your environment. This restriction is true even if migration version analysis on other machines did not detect unsupported versions. Please contact your SAS representative for assistance.

If you intend to migrate to a supported version of the products listed in this section, review the remaining product sections of this Migration Analysis report to determine if there are other migration issues that must be considered.

	Product Name	Version Configured	Versions not supported
✗	SAS BI Server	4.2	4.4, 4.4M1
✗	SAS Enterprise BI Server	4.2	4.4M1, 4.4
✗	SAS Information Delivery Portal	4.2	4.4, 4.4M1

See http://support.sas.com/migration/utilitynotes for more migration information.

Figure 3. Migration Version Analysis

The version analysis section is located at the top of the full report, before the individual product sections. The overarching version checking is done in order to address the most important question, can I migrate my environment directly to SAS 9.4?

Migration Version Analysis Table

- Found product name
- Version of product identified as configured in source environment present on that machine
- Versions which direct migration is not supported for the found configured source version

If you already have the SAS Software Depot for your new 9.4 order, you can determine if full migration of all your deployed source offerings is supported. Using the migration version analysis section with your SAS software summary (ordersummary.html in your SAS software depot), you can determine if full migration of your offerings directly to 9.4 is supported by checking the unsupported target versions column of the report against the target versions of the same offerings in the summary.

If you ran the version analysis prior to ordering the SAS software, you will need to contact your SAS account manager or customer loyalty representative to find out the current product versions for the intended target system.

Limitations of the Migration Version Analysis Check

- Like the SAS Migration Utility, it must be run against every machine in the source environment (excluding client-only machines) to give conclusive results
    - Unsupported versions not detected on one machine does not guarantee that unsupported versions will not be detected on another machine in a subsequent check
- The scope of reporting versions that are not supported is currently limited to already released target versions on SAS 9.4
- A product that has not been released on SAS 9.4 that will not support migration from a prior version will **not** be flagged
    - The product section of the analysis report might indicate that the migration is generically support in a specific scenario but you might learn later that it is not supported.
- If the bundling of SAS software has changed in some significant way, it is possible that the product noted in the version analysis section will have changed names in 9.4 (for example with the release of SAS 9.4, SAS Enterprise Data Integration Server is replaced by SAS Data Management Standard)

It is important to remember that the migration version analysis is overarching and representative of the entire source system. This section is intended to answer the question of full migration support first, where the individual product output tables will provide specific details. **It is important to remember that the version check must be run against all applicable machines before concluding that a specific migration of a source deployment offering is possible.**

Versions that do not support migration reported **always** overrule products that indicate migration is supported in their product table (when in conflict). Though it might be confusing at first, this is because migration of a product could be supported to a different version than the versions cited as incompatible in the version analysis check.

Migration Analysis report: Individual Product Output and Configured Product List

SAS Migration Utility

Version 9.2-2.554

Migration Analysis for midt.demo.sas.com

Tue Dec 17 13:15:01 GMT-05:00 2013

Status	Action
✓	No action required
🟡	An item failed to migrate. Review comments. Manual migration of the item might be required.
✗	A product failed to migrate. If the product is being deployed at a future release, remediation and re-migration is required.

See http://support.sas.com/migration/utilitynotes for more migration information.

Migration Version Analysis

The migration version analysis has not revealed any issues with proceeding with the migration process. However, you must review the remaining product sections of this Migration Analysis report to determine if there are other migration issues that must be considered.

Product: SAS Content Server

Status	Item name	Classification	Item type	Version	System location	Package location	Details
✓	SAS Content Server	Product		9.2	/data1/config92/Lev1/AppData/SASContentServer/Repository		Migration is supported for this version.

Product: SAS Web Infrastructure Platform Extensions for BI Dashboard

Status	Item name	Classification	Item type	Version	System location	Package location	Details
✓	SAS Web Infrastructure Platform Extensions for BI Dashboard	Product		4.3			Migration is supported for this version.
🟡	User Customization	Config		4.3			Customizations made to the SAS Web Infrastructure Platform Extensions for BI Dashboard are the users responsibility to migrate. Such customization could include: [1] Java source (JSPs, additional class files), [2] Web applications, [3] Packages published to the file system (Archive Packages), [4] Portlets

Figure 4. SAS Migration Utility Analysis Report

The tables produced by each product indicate which products reside on the machine, whether or not the product supports the automated migration tools, and which SAS configuration and content require

manual migration. The itemized tables are helpful by providing the type, classification, locations, and relevant details regarding the migration status. There are some expected gaps that should be included in your planning. For example, cubes will need to be recreated, stored processes and other content outside the configuration directory may need to be copied, and third-party servers in metadata might need to be edited. It is strongly recommended that you review the online reference of the specific product analysis report messages and their significance to ensure you do not overlook important items (http://support.sas.com/rnd/migration/utility/messages.html).

The following configured components were found:	
Product Code	**Product Name**
bidashmid	SAS BI Dashboard
bidwipxpoll	SAS Web Infrastructure Platform Extensions for BI Dashboard
biportlets	SAS BI Portlets
biservmid	SAS Shared Services
cfgwizard	SAS Deployment Manager
citationweb	SAS Web Report Studio
dproserver	SAS Deployment Tester - Server
flexthemes	SAS Flex Application Themes
globalroot	Deployment Properties - GlobalRoot
javaportal	SAS Information Delivery Portal
jboss	JBoss Application Server
jps	SAS Foundation Services
levdirroot	Deployment Properties - LevDirRoot

Figure 5. Configured Components Found

The configured product list can be helpful for a summarized reference of what is configured on each machine. Migration requires the target topology be "like" the source topology. The configured product list can help in choosing or creating a SAS 9.4 deployment plan to satisfy this requirement. The deployment plan is consumed by the SAS Deployment Wizard during the installation and configuration of your migrated environment.

Review the Migration Log

The migrate.log file records all the informational, warning, and error messages given when the SAS Migration Utility runs. You can find this in the output directory (<output dir>/<machine dir>/migrate.log). Careful review of the log output will indicate what product extensions have run and their execution results. If a problem is encountered during a utility run, the utility provides the option to continue or quit on the command-line (unfortunately, these options are not provided on z/OS or MVS). Note that when an error is reported and you opt to continue, it might result in an incomplete migration package.

An analysis and packaging summary should always be the last two lines output in the console and the migration log. The summary should highlight how many product analyses (extensions) were run on the machine (when packaging, this will also indicate how many products were successfully packaged). The absence of this output indicates that the migration utility was unable to complete. A common cause is the lack of available disk space.

Remember, the SAS Migration Utility provides an invaluable analyze mode that can generate an analysis report for each machine it is run against. The composite of those findings and checks against the entire source environment will inform you if you can perform an automated full migration as-is to SAS 9.4 environment, and if you cannot, which products are preventing you from performing the task, and manual action steps you need to take during migration.

PERFORM HOUSECLEANING ON THE SOURCE SYSTEM

A thorough review of the analysis report might reveal issues in the source system that need to be repaired prior to a migration. For example, you may need a hotfix or version upgrade so that migration is supported. In addition to critical issues, it is also possible to have configuration or content in the source system that you no longer need. It is a recommended best practice to clean your source system prior to migration.

The all or nothing nature of migration means that if there are problems or issues in your source system then they will be migrated to your target system. Note that the alternative to the approach of housecleaning pre-migration is to migrate your source system as is and then clean up on the target system at the end of the migration. One possible reason for this is that some enterprise environments might require 24/7 uptime in production, so modifying the existing production environment in any way is not viable. We recommend doing the housecleaning tasks prior to the migration as a means to prevent issues and to establish a source system baseline, which allows you to validate the entire target system one time at the end in order to make sure you have everything you need moved.

Overview

- Create a full backup of the source system
- Upgrade the source system when direct migration to SAS 9.4 is not supported
- Complete manual steps highlighted in analysis report
- Apply fixes for flagged issues
- Clean up the metadata

Create a Full Backup of the Source System

To begin the housecleaning process, you should first make a full backup of your source system. This will ensure nothing is irreversibly harmed.

Once a full backup of the source system is complete, there are a number of actions that may be required before you create the migration package, especially if there were warnings or errors in the analysis report.

Upgrade the Source System When Direct Migration to SAS 9.4 is Not Supported

There are scenarios when the migration version check indicate that a direct migration to a target version on SAS 9.4 is unsupported from the source version. To remedy this, there are two options, upgrade the source system to product versions that will enable direct migration support or migrate to an interim deployment first that will support migration to the intended SAS 9.4 version. Essentially, this is repeating the entire automatic migration process in order to get to the intended target of SAS 9.4. You should obtain a compatible baseline if your source system version is older than the third maintenance release,

for example SAS 9.2M3. There are more product-specific baseline requirements that must be met that are detailed in the SAS 9.4 Migration Guide.

There are pros and cons to updating and then migrating, versus performing two migrations. Since the update-in-place option does not require a temporary SAS deployment, it is less effort if the update is successful. Update-in-place is riskier since it updates the running deployment. Performing an interim migration is non-destructive to the source environment and therefore less risky. However, it requires a temporary SAS deployment resulting in additional resource, effort, and testing requirements.

Manual Steps Highlighted in Analysis Report

You need to plan tasks that the migration utility will not do automatically. There are some known manual tasks that are applicable to most deployments, and then there are many other product-specific tasks possible.

Example common manual steps:

- SAS server configuration files are not automatically migrated
- OLAP cubes will need to be recreated
- Any content outside of the configuration directory besides WebDAV content, will not be copied automatically, these include:
  - Source code
  - Scripts
  - Stored procedures
  - SAS datasets or other physical data files
  - Web application server configuration and custom web apps

Apply Fixes for Flagged Issues

A review of the migration log produced by the utility on each tier, as described earlier, might reveal errors like ERROR or NOTFOUND. Search the migration.log for the string "ERROR" and "NOTFOUND". If you expect to see a product but it is listed as not found, investigate the issue or the product will not be migrated to the target system. A common cause for this issue is that the product was installed to a non-default location.

Figure 6. Searching the migration.log File for Errors

Clean up the metadata

The full migration will copy all of the metadata from the source system to the target, so it is important to make sure the metadata is clean for the new system.

To start this process, check in objects from individual project repositories, then remove unused objects. Removing unused objects will prevent orphaned metadata in the target system. Examples include unused users, groups, roles, paths, libraries, stored processes, and directories. Additionally, it is a good practice to delete any unused SAS servers or spawners.

Using the analyze and repair metadata tool, available in SAS Management Console, can then further clean up the metadata. The orphaned objects tool identifies objects in metadata that are no longer referenced. This can happen when an application deletes a metadata object but does not delete the associated metadata. Removing orphaned metadata can decrease the repository size significantly, and thus increase performance and improve migration times.

When finished running the metadata repair tool, run a metadata backup with the REORG option set. The REORG option recreates the repository datasets in place, which optimizes the source metadata by eliminating unused space. Note that a backup with the REORG set pauses the server, placing it in a read-only state.

During a migration, after you perform any of these tasks on your source system, you should always run the SAS Migration Utility again and review the analysis reports. Any change you make to the source system could result in new information in the analysis reports.

One approach to cleaning your environment is to perform housecleaning on your source environment. The benefit of the approach is that once migration to the target system is completed, the remaining validation necessary is on a clean system. To implement this approach, backup your entire source system, apply necessary hotfixes and upgrades, address any errors and manual steps, and the clean up your metadata.

CREATE SNAPSHOTS AFTER MIGRATING EACH TIER

After you have created your migration package, you will use the SAS Deployment Wizard to deploy your target system. The SAS Deployment Wizard should be run on each machine on your target system starting with the metadata server. The wizard will read the migration package, configure the target environment based on the source configuration in the package and load the source content from the package to the target environment. In a multi-tier deployment, it is recommended that you back up your metadata repository, SAS content and your SAS configuration directory before you run the SAS Deployment Wizard on the next tier called for by your deployment plan.

The backup at the end of each tier acts as a checkpoint that you can return to in order to resume your migration in the event that there are configuration failures on a subsequent tier. If you do not have a backup, and you have a configuration failure, it is possible that you may have to remove the partial deployment from all tiers, and begin your deployment from the beginning.

To illustrate the problem, consider a two tier system with a metadata and application server on the first tier and a separate middle-tier.

The SAS Metadata Server controls access to a central repository of metadata that is shared by all of the SAS applications in the deployment. In a multi-tier deployment, throughout the deployment of the middle-tier the SAS Deployment Wizard will update and add metadata to the repositories controlled by the metadata server.

What happens if there is an unexpected configuration failure on the middle-tier deployment?

At the point of failure, the metadata will already have been altered. You cannot recover by simply understanding what the problem is and then restarting the deployment of the middle-tier. If this is attempted, the deployment will fail again, likely on one of the steps performed prior to the failure.

If no backup is available to recover from the middle-tier failure:

1. Stop any middle-tier servers that have started
2. Remove middle partial configuration
3. Stop any metadata and application servers that have started
4. Remove the metadata and application server configuration directory
5. Re-run the configuration of the metadata and application server
6. Re-run the configuration on the middle-tier

If a backup is available the process is easier:

1. Stop any middle-tier servers that have started
2. Remove middle partial configuration
3. On the metadata and application server restore the backup that was taken post-deployment
4. Re-run the configuration on the middle-tier

SAS 9.4 introduced the deployment backup and recovery tool which provides an integrated method for backing up and recovering your SAS content across multiple tiers and machines. The tool is installed on the middle-tier as part of the SAS Web Infrastructure Platform. It connects with the SAS Deployment Agent on each middle-tier and server-tier host machine and backs up the following:

- Metadata server, including all registered metadata repositories, the repository manager, and the server's configuration directory
- Contents of the data directories, SAS environment directories, and server configuration directories for each server on the SAS server tier
- SAS Content Server repository
- Databases that are managed by the SAS Web Infrastructure Platform Data Server
- Additional directories under <SAS-configuration-directory>/<Lev#>, as specified by the administrator

Since the deployment backup and recovery tools is a middle-tier application, it is only available after the middle-tier has deployed. At the end of the deployment of the metadata server and SAS application server tier complete the following steps to perform a backup:

1. Back up your metadata repository and repository manager on the SAS metadata server. To perform this task use the metadata server backup facility in SAS Management Console to perform an ad-hoc backup.

2. Using operating system tools make a backup copy of your SAS 9.4 configuration directories.

In the event of a failure, a restore can be performed with the same tools, enabling an easier resumption of a deployment where problems have occurred.

When the deployment is complete, the SAS Deployment Wizard has run on each tier, and you have completed the steps in instructions.html, use the deployment backup and recovery tool to make a complete backup of the new deployment.

VALIDATE, VALIDATE, VALIDATE!!

Validation ensures that you identify any problems and fix them prior to rolling out the new environment to the user community.

In a migration, validation is a two-step process. First, validate that the system is operational. Second, validate that the configuration and content has migrated, is working and accurate. The first step should be performed at the end of the deployment process on each tier of the system. The second step, the validation of configuration and content, should be performed after performing the manual steps required to complete the migration. Manual steps include anything noted in the SAS Migration Utility analysis report or in instructions.html. Some common manual steps are rebuilding OLAP cubes, updating metadata to point to new locations for data, code and third-party servers, and re-implementing custom settings in SAS configuration and autoexec files.

In a migration, during the planning phase, you should take an inventory of the configuration and content in the source system. This inventory can be used during validation to check that everything has been migrated from the source to the target system, and to provide a list of content to test.

There are many different kinds of validation. Validation can include testing the following:

- Security and access to resources
- Data and values on reports and in tables
- Look and feel
- Integration with other software products
- Performance

The validation phase includes four parts:

1. **Check logs and generated documentation** - Review log files and deployment reports. The deployment reports are located in the configuration directory at Lev1/Documents and the logs are located at <SAS configuration directory>/<Lev#>/Logs/Configure.

2. **Complete validation steps from Instructions.html** – The steps in Instructions.html include accessing web applications and testing access to servers. The 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. These steps should be performed immediately after each tier is deployed.

3. **Validate configuration and content** – Perform validation tests that you defined in your original plan. These steps should include validation that content is accessible to the correct resources and that configuration has been migrated successfully.

Content should be validated from the data layer up to the presentation layer. Validating in this order ensures that you find any issues at their source rather than having to navigate through the layers of content to find the problem.

Example Validation Order
1. Data access (OLAP, SAS, Relational, In-memory)
2. Jobs and their output
3. Information Maps
4. Prompts
5. Stored Processes
6. Reports
7. Portal Content

Figure 7. Example Validation Order of Configuration and Content

In the case of a permissions problem when accessing a table, it is much easier to debug if you try to open the table directly in SAS Enterprise Guide, than in SAS Web Report Studio which accesses the table indirectly via an information map. The validation of content may need to be performed multiple times, once for each SAS client. For example, a stored process may need to be validated in SAS Enterprise Guide and the stored process web application.

4. **Validate performance** - Prior to roll out, the performance of the migrated system should be validated. In a migration to SAS 9.4, the new middle-tier is deployed with an out-of-the box configuration. As a result, any customizations made to the source system middle-tier, such as changes to the Java virtual machine settings on the web application server, are not migrated. The performance of the new system should be thoroughly validated by testing under a similar load to the prior production system. Performance testing should test for response time, throughput, resource utilization, and maximum user load.

Validation is a vital step in ensuring the success of a migration. When validation is complete, the system can be rolled out to the user community.

CONCLUSION

While there are many things to keep in mind when migrating to the latest versions of SAS software, there are five principles to remember. When you understand why you are migrating, have verified that your system is capable, methodically planned and prepared, then validated the new system against your plans, you are well on your way to successfully having the latest and greatest.

1. **Know what you are trying to accomplish**

2. **Consider where you are migrating from, where you are migrating to, and potential bumps along the way**

3. **Perform housecleaning on the source system**

4. **Create snapshots after migrating each tier**

5. **Validate, validate, validate**

REFERENCES

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

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.

Bennett, Donna, Mark Schneider, and Gerry Nelson. 2013. "Do I Need a Migration Guide or an Upgrade
Coach?" Proceedings of the SAS Global Forum 2013 Conference. Cary, NC: SAS Institute Inc.
Available at: http://support.sas.com/resources/papers/proceedings13/482-2013.pdf.

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