

Paper SAS4359-2020

## Modernize your SAS® Visual Analytics Environment

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### ABSTRACT

In recent releases of SAS Visual Analytics on SAS® Viya®, many reporting and dashboarding capabilities have been introduced that make the move to the current version of SAS Visual Analytics very attractive. Because the underlying architecture has changed, this move has to be prepared carefully. We take a closer look not only at how you can promote SAS Visual Analytics reports from earlier releases to the current version, but also at which other object types can be converted to SAS Viya. These include SAS® Visual Data Builder queries, information maps, SAS® Stored Processes, and SAS® OLAP cubes. After attending this session, you should have a comprehensive overview of which parts of your SAS®9 applications are ready to be promoted to SAS Visual Analytics on SAS Viya.

### INTRODUCTION

The fifth release of SAS® Visual Analytics on SAS Viya® is currently available. While new customers are already enjoying the benefits of the newest release, there is a significant number of environments still running SAS Visual Analytics 7 on SAS 9. If you are an administrator of a SAS Visual Analytics 7 environment, you might have already asked yourself the question of what it would take to move the content to the latest release. In the following sections I want to outline how you can best prepare for the promotion process, learn about objects that are promoted, and additional things that need to be done to get your SAS Visual Analytics reports up and running in the target environment. In a second part, we are taking a closer look which other objects of an existing SAS 9 environment can be promoted as well.

### PRELIMINARY CONSIDERATIONS

It is inevitably necessary that you check the prerequisites for SAS Visual Analytics on SAS Viya before you start planning your promotion process. In general, hardware requirements and supported operating systems are the same, so you should be able to run SAS Visual Analytics on SAS Viya on the same box that the existing version is already deployed. You should also think about running SAS Visual Analytics 7 and SAS Visual Analytics 8 for some time side-by-side. This allows you to move users from the old system to the new system gradually as different user groups might also have different requirements.

There is also a technical aspect that must be considered carefully. In SAS Visual Analytics 7 on SAS 9.4 there was a choice for information consumers to either use the Flash or the HTML5 version of the Viewer. You might already be aware of Adobe ending the support for Flash by 2020. This means that at some point soon your users will have to make the move to the HTML5 version anyway. Running SAS Visual Analytics in the HTML5 version requires a browser that is supported, which means that your users will not be able to use Microsoft Internet Explorer 11. In any case, you should provide a 64-bit version of a supported browser (for example, Google Chrome, Firefox, Edge, or Safari) as application performance is better. This performance gain comes with a cost as the 64-bit browser versions do need more memory to run smoothly. You should not plan to run these browsers on desktops that only have 4GB of RAM. From my personal experience 6GB of RAM is the absolute minimum, but I would recommend at least 8GB.

If your clients do not have 8GB of RAM available but are already running on Windows 10, you can consider installing the SAS Visual Analytics App on these machines. The memory consumption of this app is significantly smaller compared to a 64-bit browser. Another advantage is the performance of the app itself as all the necessary HTML5 components are already installed and do not need to be downloaded. I strongly recommend considering this option if it is applicable. It is worth noting that you can use the app for viewing SAS Visual Analytics 7 reports too.

## ASSESS INVENTORY

The first step is to get an overview of what content is included in your current environment. With the intention of making this task less painful for administrators, SAS has developed an assessment tool to automate the process of creating an inventory for you. This tool is only available on Linux and Windows and mainly consists of a couple of scripts that must be run in your existing environment. The tool creates an inventory data mart that can be published to a SAS Visual Analytics 8 instance with predefined reports that can help you analyze your existing system (Display 1). There are multiple things that you can easily extract from these reports:

1. The content types that you have in your inventory. This is very important as not all content types are part of the promotion process.
2. The size of your inventory, meaning the number of reports and explorations that you have.
3. You will be able to compare different environments (for example, dev versus prod).

The screenshot shows the 'SAS Inventory V2.1' report in a web browser. The interface includes a top navigation bar with 'SAS Visual Analytics - Explore and Visualize Data', a search bar, and the user name 'Gregor Herrmann'. Below the navigation bar, there are several tabs: 'What's Being Used', 'What's Being Used (Graphical View)', 'Drill to Counts', 'Drill to Items', 'Type Navigator', 'Software Version and Hotfix Info', 'Software License Info', 'Not Categorized Items', and 'Not Categorized Details'. The main content area is a tree view with three columns: 'Portfolio', 'Sellable\_Offering', and 'Type', with a 'Frequency' column on the right. The tree is expanded to show 'Business Intelligence' > 'SAS Enterprise BI Server' > 'SAS Visual Analytics' > 'SAS Visual Analytics'. The 'Frequency' column shows counts for various content types, with subtotals highlighted in green.

Portfolio	Sellable_Offering	Type	Frequency		
Business Intelligence	SAS Enterprise BI Server	DashboardTemplate	4		
		EventSubscriber	1		
		Indicator	390		
		IndicatorConfiguration	298		
		IndicatorData	180		
		IndicatorDataSource	8		
		IndicatorGaugeDefinition	56		
		IndicatorGraphicalHandler	62		
		IndicatorViewDefinition	84		
		InformationMap.CLAP	198		
		InformationMap.Relational	1,008		
		Job.CubeBuild	134		
		OLAPSchema	3		
		Range	134		
		Report	1,551		
		Report.Component	15		
		Report.Image	937		
		SharedDimension	7		
		Subtotal: SAS Visual Analytics			17,080
		Customer Intelligence	SAS Business Rules Manager	BIReportGallery	26
				ESRI Map Server	2
				GraphTemplate	1,546
				Report.BI	13,056
Server.LASR	59				
VisualDataQuery	19				
Subtotal: Customer Intelligence			17,304		
Customer Intelligence	SAS Decision Manager	BusinessRuleFlow	23		
		DecisionLogic	26		
		Subtotal: SAS Decision Manager			26
		Subtotal: SAS Business Rules Manager			23

Display 1. Example Inventory Report

## PREPARATION

### OBJECTS THAT ARE NOT PROMOTED

Step 1 should have given you the answer to the following question: Do I have content that does not participate in the standard promotion process? The following content types belong to that category:

1. Data
2. User-defined formats
3. SAS Visual Data Builder jobs
4. Comments
5. Custom themes
6. SAS Visual Statistics projects

Data must be loaded to the target system before you can start the promotion process. It is possible to create a path-based SAS Cloud Analytic Services (CAS) library where you can copy your SAS data sets to. Keep in mind that it is no longer necessary to load tables into memory upfront before opening a report.

User-defined formats must be imported in the target environment either via a new graphical user interface in SAS Environment Manager or programmatically. In any case, the formats must be present before loading any table that uses a user-defined format into memory.

There is currently no way to promote SAS Visual Data Builder jobs to SAS Viya. However, you might be able to save a SAS Visual Data Builder job as SAS code and reuse it in CAS.

Comments cannot be promoted, and you must re-create them if necessary.

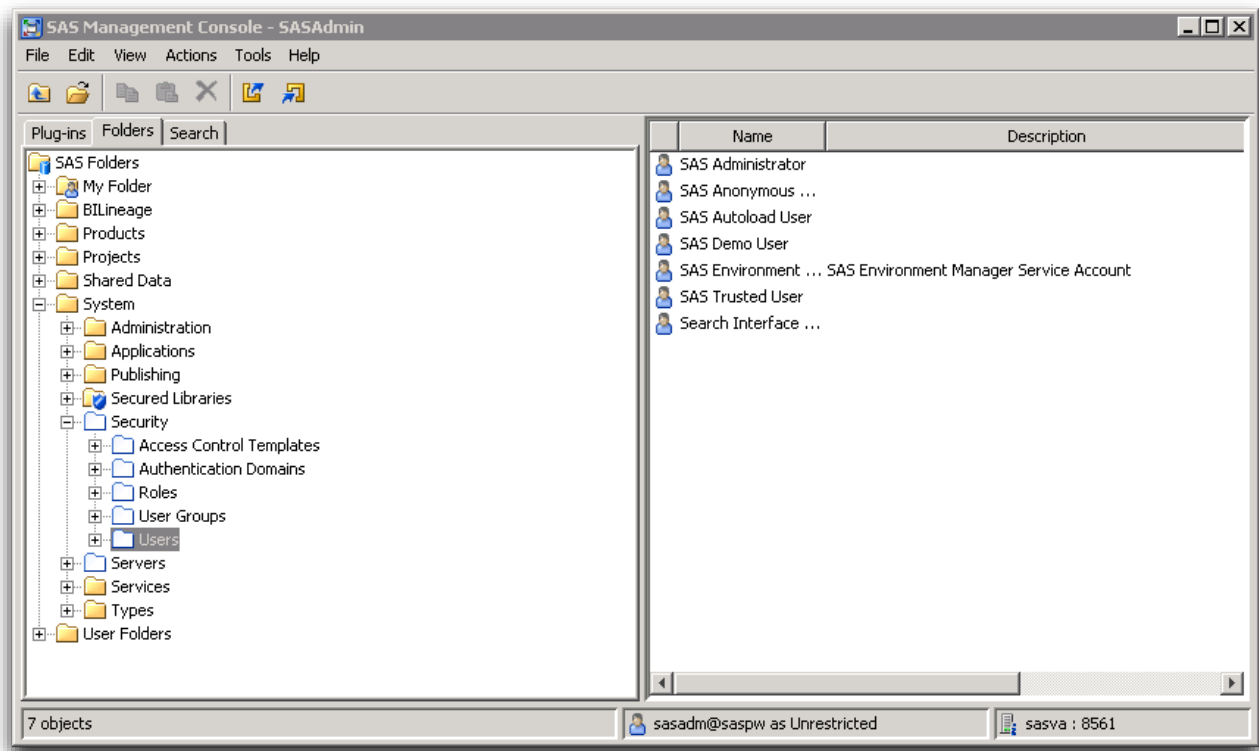
Due to the switch in technology from Flash to HTML5, custom themes cannot be reused in SAS Visual Analytics 8. You must re-create the custom theme with the new HTML5 Theme Designer and then reapply it to the report.

If you have SAS Visual Statistics projects from SAS Visual Analytics 6.4 or SAS Visual Analytics 7.1 and want to promote the content, you must upgrade to SAS Visual Analytics 7.2 or higher. That upgrade converts SAS Visual Statistics project objects to visual exploration objects.

### AUTHORIZATION

One main goal of the promotion is to preserve authorization rules when moving from the existing system to the target system as this could save a lot of extra work. There is one obstacle to overcome to achieve this goal and this is the fact that CAS no longer stores user information internally like the SAS 9 Metadata Server. CAS authenticates against a directory server that pulls all the required user and group information from the server or from a cache that is refreshed frequently. We need to make sure that all the required users and groups can be mapped correctly during the promotion process. Otherwise, the authorization settings cannot be applied.

To get this done, we must export all necessary identities and groups from the security folders in the SAS 9 Metadata Server into a package file (Display 2). This package file will then be used with the sas-admin Command-Line-Interface (CLI) to check the mappings of users and groups within the SAS Viya environment. Any user or group that cannot be mapped will be listed so that you can amend accordingly.



Display 2. Exporting Identities Package from SAS Management Console

## VISUAL EXPLORATIONS

Visual Explorations no longer exist as a separate file format in SAS Visual Analytics 8 due to the efforts to consolidate interfaces. All objects that have been available in SAS Visual Analytics Explorer are now available in SAS Visual Analytics Designer on SAS Viya. When you promote a Visual Exploration from your existing environment, it will be automatically converted to a SAS Visual Analytics report in the target environment. Keep in mind that the new consolidated interface in SAS Visual Analytics 8 brings a couple of new capabilities that might allow you to enhance the promoted explorations. You can choose from a larger variety of objects and they can all interact with each other, so it is highly likely that there is some potential to amend the promoted explorations to make them even more useful for the consumer.

## CUSTOM THEMES

As I have already mentioned before, Custom Themes will not participate in the promotion process. If you promote a report with a Custom Theme, a dummy copy of the default theme will be created and applied to the report. If you want to avoid that behavior, you must re-create the custom theme with the same name in your target environment before running the promotion.

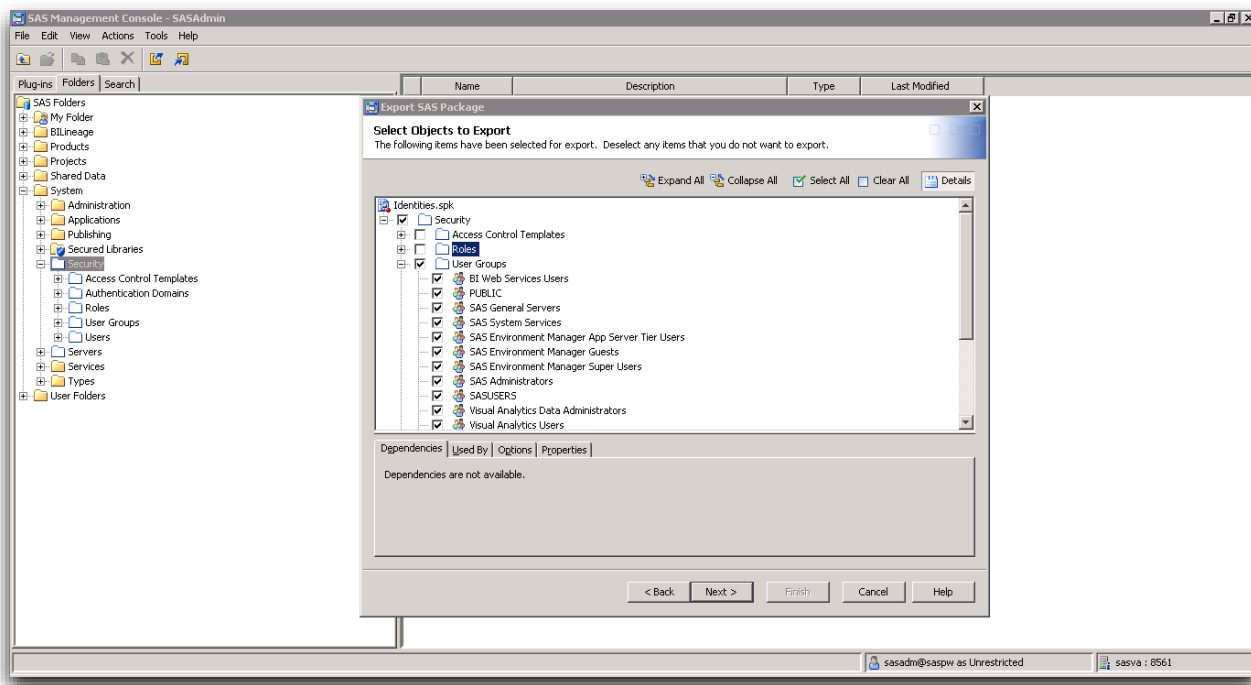
## PROMOTION PROCESS

### CREATING THE EXPORT PACKAGES FOR SAS 9

The following items need to be exported for promotion:

1. Identities: This package must contain all the relevant user and group information.

The process of creating the export packages from SAS 9 is straight forward. In SAS Management Console you can create this package by navigating to the System Folder and clicking on the export icon in the toolbar. Deselect Access Control Templates and Roles in the Export SAS Package window (Display 3). You can also deselect any groups or users that do not impact authorizations for your SAS Visual Analytics reports and explorations.



Display 3. Exporting Package in SAS Management Console

2. Export SAS LASR™ Analytic Server definitions, SAS LASR libraries, Base SAS libraries, and respective tables (optional). The export of these objects is optional. It is only needed if you want to access SAS LASR tables directly from SAS Viya or if you want Base SAS libraries to be converted to path-based CAS libraries. If you intend to export these objects, I recommend exporting libraries and tables in separate packages and importing the libraries package first so that the tables can be mapped to the libraries in a subsequent step.
3. Export explorations and report definitions.

### CREATING THE EXPORT PACKAGE FOR SAS VIYA

SAS Viya no longer creates .spk files as the package format, it uses .json files. You can use the export window in SAS Environment Manager to export folder content as a .json file.

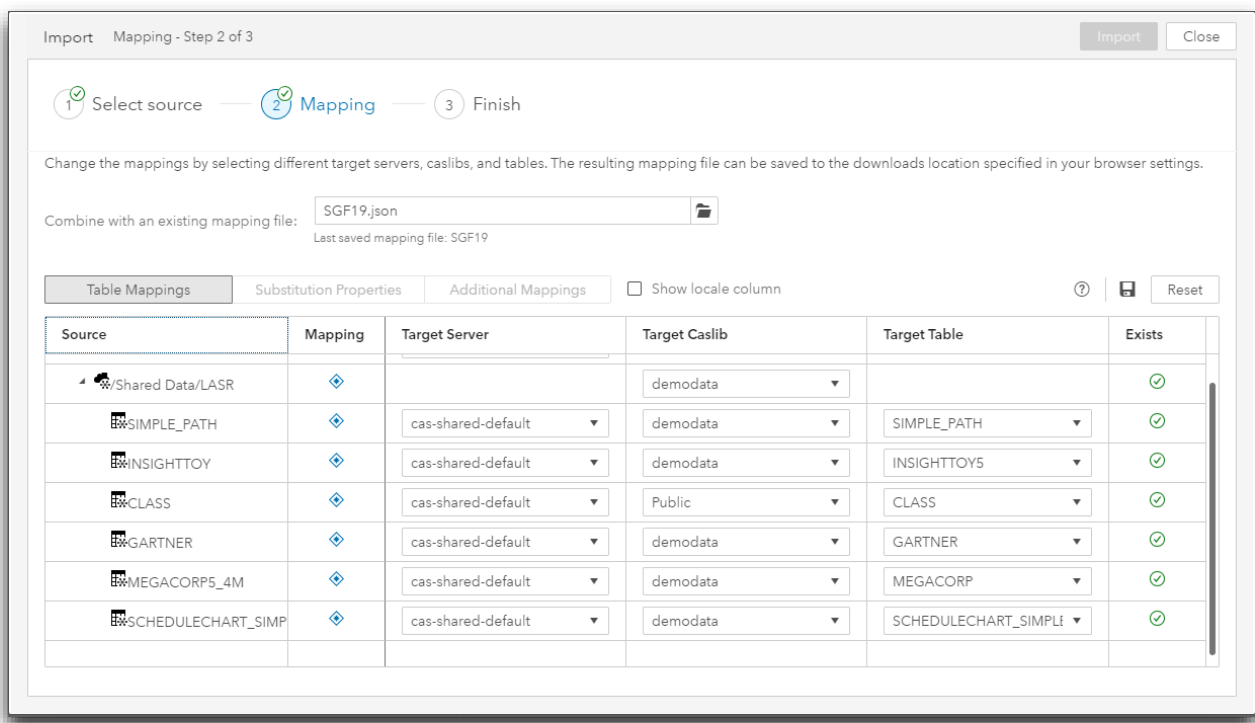
### GENERATE THE MAPPING FILE

To generate the mapping file that is needed for the import of the content, you should make yourself familiar with the transfer Command-Line Interface (CLI). The purpose of this step is to create a file that contains the mapping information for users, servers, libraries, and data

definitions. The default name for this mapping file is ContentMappings.json. It is recommended that you open the file in a text editor to check for correctness. If you have reports that contain Stored Processes, follow the instruction in the documentation to add the information for the storedProcessBaseUrl option.

## PROMOTE CONTENT

The content promotion can now be done within the import window of SAS Environment Manager. The user running the promotion must be a member of the SAS Administrators custom group in SAS Viya. After you have chosen the package file to import, the next step is to provide necessary server, library and table information for the target. Tables that have the same name in the target environment will automatically be mapped once the server and caslib information is provided. Display 4 shows the mapping window in SAS Environment Manager. After adjusting the mappings, you should only see green check boxes in the Exists column on the far right of the window. After finishing the import, there is an option to save the current mappings to a .json file. You can then use this JSON file while importing another package within SAS Environment Manager or when promoting content with the Command-Line Interface in batch.



Display 4. Importing Package in SAS Environment Manager

It is worth mentioning the following restrictions:

1. The import process will re-create the original folder structure in SAS Viya. You will not be able to specify a different folder location during the import process even if your package does not contain any folder at all. However, you can move the content subsequently.
2. Currently you cannot select the objects to import, you always must import the complete package.

After concluding the promotion process, you should be able to open the reports and converted explorations successfully in SAS Visual Analytics 8. I nevertheless recommend

testing every report thoroughly in the new environment especially when you have also promoted authorizations.

## OTHER SAS 9 OBJECTS

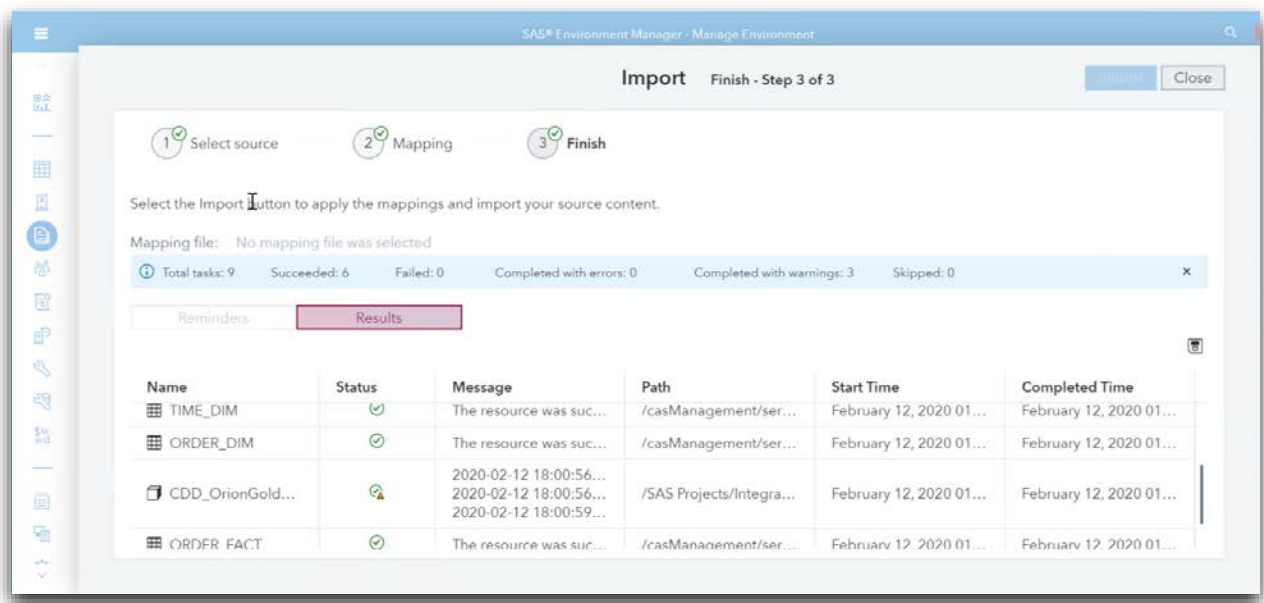
### SAS 9 OLAP CUBES

Before in-memory solutions became popular, storing data in a pre-aggregated way was the only way to reduce query runtimes for information consumers. If you are using SAS Enterprise BI Server, the probability is very high that under the hoods you are still surfacing OLAP Cubes to create web reports that provide drill-capabilities.

Beginning with SAS Viya 4 we will officially support the promotion of SAS 9 OLAP Cubes. Keep in mind that there will be some restrictions with regards to that capability. We know that OLAP Cubes can contain very complicated MDX expressions to create calculated columns. SAS has investigated, and they want to support the most widely used MDX functions. When SAS Viya 4 is available, the official documentation will list the available MDX function. The cube can be exported and imported using the standard tooling that is available (SAS Management Console and SAS Environment Manager).

A detailed cube is converted to an output table and a data view. The data view is associated with the output table and is displayed in SAS Visual Analytics when the table is selected.

A star schema cube converts into a job definition, a job request, and a data view. The job definition is in the folder that the SAS 9 cube was originally created in. The job request enables you to execute the job definition in SAS Environment Manager. A data view is used in a SAS Visual Analytics report. It is associated with the output table created by the job execution.



Display 5. Importing OLAP Cube in SAS Environment Manager

## STORED PROCESSES

Stored Processes have been used widely in SAS 9 since its very specific functionality can be encapsulated and then used from a wide variety of interfaces. SAS Visual Analytics 7 can also use Stored Processes as a part of a SAS Visual Analytics report.

What happens if you are promoting a SAS Visual Analytics 7 report to SAS Visual Analytics on SAS Viya? The promoted report with one or more Stored Processes will work correctly and Stored Processes will be executed if the SAS 9 environment is up and running. In a transition phase where you are running SAS Visual Analytics 7 and SAS Visual Analytics 8 in parallel everything should work fine.

But what options do you have when SAS 9 is no longer running? This depends heavily on what problem a Stored Process solves in SAS Visual Analytics 7 that could not be addressed by standard SAS Visual Analytics capabilities. In general, there are three options:

1. Replace the Stored Process with a standard capability of SAS Visual Analytics on SAS Viya. Of course, this only applies if the current version of SAS Visual Analytics provides this capability.
2. Replace the Stored Process with a data-driven content object. With these objects you can insert specific graphs that are not supported out of the box in SAS Visual Analytics by using external Java graph libraries. The data-driven content can also be used to fulfill other requirements like a data-entry form or data writeback.
3. A successor for the Stored Process Framework in SAS 9 for SAS Viya is already available, it is called SAS Job Execution. Beginning with SAS Viya 3.5 a Stored Process can be automatically promoted to a SAS Job Execution Job. Although these jobs can be executed from SAS Studio, there is not yet a SAS Job object available in SAS Visual Analytics.

## RELATIONAL INFORMATION MAPS

There is support planned for the promotion of relational information maps to SAS Viya. Like the promotion of cubes, a job is being created using FEDSQL that will create a table returning the same data as the original information map. As of today, it is planned to support this in the SAS Viya 4 Release.



## CONCLUSION

No question, the process for moving from SAS Visual Analytics 7 to SAS Visual Analytics 8 must be planned thoroughly. It is also vital to assess the requirements and usage patterns from consumers as this helps to decide which reports might benefit the most from the new capabilities and should be prioritized in the promotion process. Nevertheless, if you follow the guidelines outlined in this paper you will find that every minute you put into the preparation will pay off by avoiding unnecessary trouble. I strongly encourage you to consider the move from SAS Visual Analytics 7 to the current release on SAS Viya as the capability gap is significant and your consumers will appreciate it.

If you are still running SAS Enterprise BI Server, have a closer look at the promotion capabilities already provided and check if it is time to move to SAS Visual Analytics. It has never been easier.

## CONTACT INFORMATION

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

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