

# SAS Content Assessment

SAS Viya Migration Planning

# Objectives

- Discuss the planning step of the content migration process
- Introduce the Content Assessment Utility
- Review the features of Content Assessment Applications
- Create and review Content Assessment Reports
  - CodeCheck
  - Inventory
  - Profile

# Planning

## Understanding the Source Environment

In order to plan for a successful migration from SAS 9.4 you need to understand the source environment.

- Content
  - Type
  - Volume
  - Details
- Security model
- Key configuration

Content Assessment helps provide information to create a plan.

# How does it work?

Documentation located in the doc folder

- Tasks 1-13 – Linux and AIX

- Because the apps can take hours to run, consider running the apps with nohup

1. nohup sudo ./systemEvaluation &
2. nohup sudo ./inventoryContent &
3. nohup sudo ./profileContent &
4. nohup sudo ./gatherSASCode --all &nohup sudo ./codeCheck --scan-tag SASCode --sources-file pathlist.txt &
5. nohup sudo ./i18nCodeCheck --scan-tag i18n --sources-file pathlist.txt --encoding latin1 &
6. nohup sudo ./summarizeSASLogSteps --scan-tag SASLogs --sources-file pathlogs.txt &
7. nohup sudo ./applicationUsage --config-dir /opt/sas/config/Lev1 --details &
8. nohup sudo ./publishAssessedContent --create-uploads --encrypt-aes --datamart-type i18n &
9. nohup sudo ./publishAssessedContent --create-uploads --encrypt-aes --datamart-type codecheck &
10. nohup sudo ./publishAssessedContent --create-uploads --encrypt-aes --datamart-type inventory &
11. nohup sudo ./publishAssessedContent --create-uploads --encrypt-aes --datamart-type profile &
12. nohup sudo ./publishAssessedContent --create-uploads --encrypt-aes --datamart-type summarizeLogs &
13. nohup sudo ./publishAssessedContent --create-uploads --encrypt-aes --datamart-type appusage &

- To monitor the progress, use the tail command

tail -f nohup.out

# Content Assessment Utility

SAS 9 Content Assessment is a collection of applications designed to help you understand various characteristics of your SAS 9.4 system. The utility is intended to help customers plan for a transition to Viya.

The screenshot displays the SAS Content Assessment utility interface. The title bar reads "SAS Content Assessment" and includes a "Close" button. The main content area is divided into several sections:

- Left Sidebar (Summary Metrics):**
  - # BI Reports: 19
  - # Information Maps: 1
  - # OLAP Cubes: 0
  - # DI Studio Jobs: 6
  - # Libraries: 16
  - # Tables: 77
- Central Panel (System at-a-glance):**
  - Header: *System at-a-glance*
  - Text: *Select an item below to explore further*
  - Section: **BI Reports**
  - Section: **Information Maps**
    - [Relational Expressions](#)
    - [OLAP measures used](#)
  - Section: **OLAP Cubes**
- Right Sidebar (Summary Metrics):**
  - # App Servers: 0
  - # Stored Processes: 170
  - # InfoMap Expressions: 1
  - # OLAP Hierarchies: 0
  - # OLAP Calc. Measures: 0
  - # Member Permissions: 0

# Content Assessment Utility

## Usage



A set of command-line applications:

- Assessment run against SAS 9.4 creates SAS datasets
- SAS Data sets loaded to CAS or LASR
- Visual Analytics Reports to surface the results

# SAS 9 Content Assessment

## Migration Applications

### *SAS 9 Code Check Internationalization*

attempts to find known internationalization issues in programs



### SAS 9 Inventory

Counts and collects data about what exists on the SAS 9 system.



### SAS 9 Publish

Prepares results for reporting.



### SAS 9 Profile

Provides details about selected SAS artifacts.



### SAS 9 Code Check

Validates that code will migrate to SAS Viya.



### SAS 9 Gather SAS Code

Collects and organizes SAS Code from artifacts for Code Check.  
*Requires SAS 9 Profile*



# Content Assessment

## Inventory

Inventory scans SAS 9 systems and documents type and volume of content.

- Metadata Server
- Filesystem areas
- SAS Content Server
- Deployment and License info

The screenshot displays the 'SAS 9 Inventory Report' interface. It features a navigation bar with tabs: 'What's Being Used', 'What's Being Used (Graphical View)', 'Drill to Counts', 'Drill to Items', 'Software Version and Hotfix Info', 'Software License Info', and 'SAS Type Definitions'. Below the navigation is a search bar containing 'Lev1'. The main content area is divided into two tables: 'Content Items Found' and 'Servers Found'. The 'Content Items Found' table lists portfolios, sellable offerings, and their frequencies. The 'Servers Found' table lists server definitions and their frequencies, with horizontal bar charts indicating the volume of content for each server type.

Content Items Found			Servers Found	
Portfolio	Sellable_Offering	Frequency	Server Definitions	Frequency
Analytics	SAS Enterprise Guide	1	Connect and Grid Servers	3
Business Intelligence	SAS Visual Analytics	38	SAS Data Servers	6
Business Intelligence	SAS Enterprise BI Server	189	Integration Technology Servers	23
Data Management	SAS DI Studio	94		

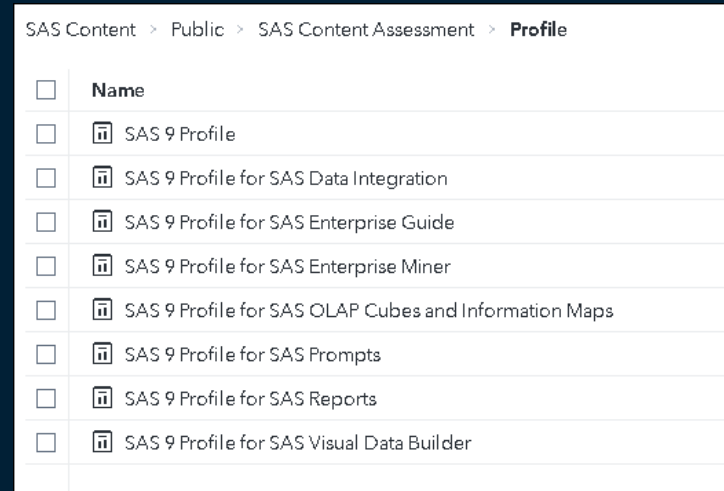


# Content Assessment









## Profile

SAS 9 Profile drills deeper into the specific characteristics of each type of object including:

- OLAP cubes
- Information Maps
- Di Studio Jobs
- Visual Data Builder jobs
- VA and EBI Reports
- Enterprise Miner & Enterprise Guide Projects
- Prompts



SAS Content > Public > SAS Content Assessment > Profile

<input type="checkbox"/>	Name
<input type="checkbox"/>	 SAS 9 Profile
<input type="checkbox"/>	 SAS 9 Profile for SAS Data Integration
<input type="checkbox"/>	 SAS 9 Profile for SAS Enterprise Guide
<input type="checkbox"/>	 SAS 9 Profile for SAS Enterprise Miner
<input type="checkbox"/>	 SAS 9 Profile for SAS OLAP Cubes and Information Maps
<input type="checkbox"/>	 SAS 9 Profile for SAS Prompts
<input type="checkbox"/>	 SAS 9 Profile for SAS Reports
<input type="checkbox"/>	 SAS 9 Profile for SAS Visual Data Builder

# Content Assessment

## Gather SAS Code

Generates SAS Code from artifacts and outputs to the file system supporting assessment of the code with CodeCheck.

- SAS Catalogs
- SAS Stored Processes
- SAS Enterprise Guide Projects
- User-written Code in DI Studio Jobs.

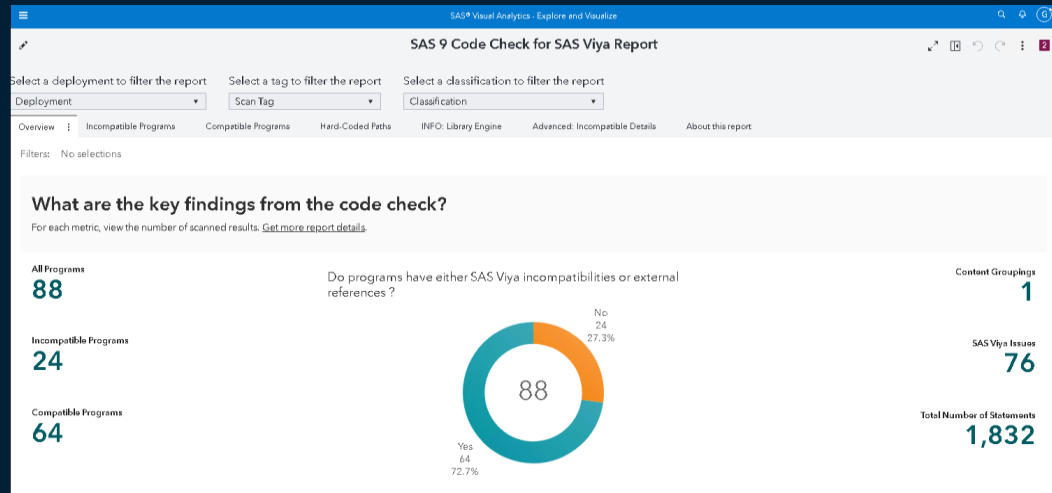
```
cd /drives/d/workshop/SAS9ContentAssessment/assessment/  
./gatherSASCode.exe --eg-projects
```

# Content Assessment

## Code Check

Examines SAS programs to determine compatibility with SAS Viya, including:

- Elements not supported
- Location of physical paths



# Content Assessment

## SAS 9 Code Check Internationalization

Finds **known internationalization issues in SAS programs.**

It searches files for patterns that have been identified as not i18n-compatible in SAS Viya:

- embedded strings
- concatenated text strings
- locale-sensitive SAS formats/informats
- SAS string functions
- SAS string macros
- column pointer

Filters: IFN: String Functions x

### Which SAS 9 programs have incompatible internationalization code in SAS Viya?

Select a [content grouping](#) and items in the list to filter the table. In the table, double-click the program name of an incompatible program.

Which content grouping has the most incompatible programs?  
Content Grouping

Status  
 INFO 48

Problems  
 IFN: String Functions 48

A program is flagged as incompatible if the code is not available for programs that are incompatible.

Program File
D:\workshop\gelcorp\finance\code\importfinance.sas
D:\workshop\gelcorp\shared\code\04_carlasr_compute_c
D:\workshop\gelcorp\shared\code\2_list_users_and_ema
D:\workshop\gelcorp\shared\code\change_formats.sas
D:\workshop\gelcorp\shared\code\create_code_fordatas
D:\workshop\gelcorp\shared\code\housing_map.sas
D:\workshop\gelcorp\shared\code\runactivity\run_server
D:\workshop\gelcorp\shared\code\scanlogforerrorsandc
D:\workshop\gelcorp\shared\code\security_report_race.s
D:\workshop\gelcorp\shared\code\version_info.sas
D:\workshop\gelcorp\shared\code\ziptocounty.sas

# Content Assessment Utility

## Supporting Applications

- **PublishAssessedContent**: aggregates results for deployments into a single datamart.
- **importEGProjects**: imports multiple SAS Enterprise Guide projects on the file system to SAS Viya 4
- **importPackages** imports multiple .spk files projects on the file system to SAS Viya 4
- **createSASPackages**: creates SAS packages for the specified SAS metadata objects.

```
./importEGProjects.exe --sas-viya-path "D:\\ViyaHome\\CLI\\sas-viya.exe" --source-file "C:\\Users\\student\\Downloads\\List - Compatible EGP Names.csv"
```

# New CA Application

## previewAssessedContent.exe

```
Command Prompt - previewAssessedContent.exe --datamart-type codecheck
C:\Users\stahal\OneDrive - SAS\Desktop\Content Assessment Test\assessment>previewAssessedContent.exe --datamart-type codecheck

Beginning the query process: [ 20Jan23:13:47:34 ]

Validating the environment:
Validating the environment: SUCCESS

Validating the specified settings:
Validating the specified settings: SUCCESS

Initializing directories:
Initializing directories: SUCCESS

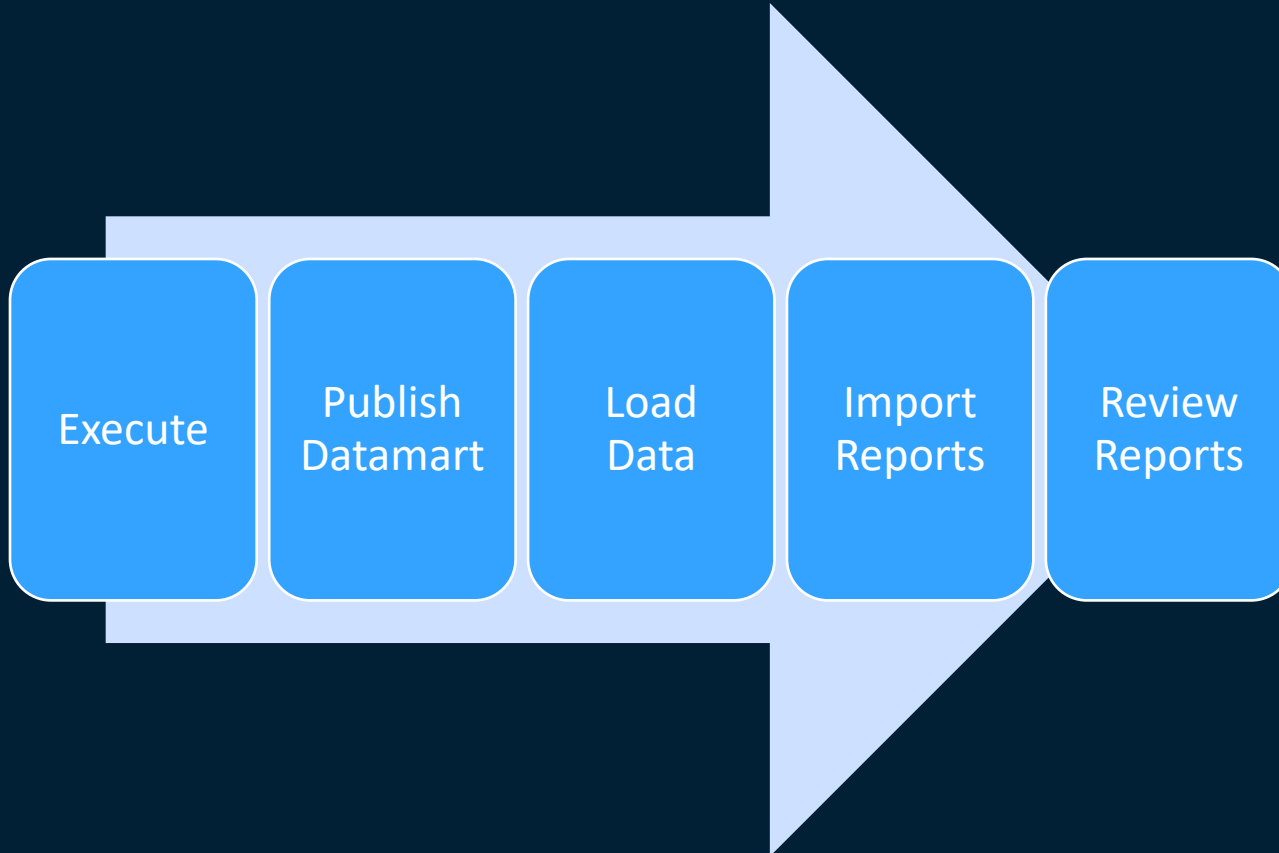
Starting the query process. This may take some time...
Query process is complete

SAS 9 Codecheck Summary:
File Created      Description
-----
grids.csv         Contains content about grid-type restrictions in the data mart.
hardpaths.csv     Contains content about hard-coded paths in the data mart.
incompatibles.csv Contains content about incompatible code in the data mart.
compatibles.csv   Contains content about compatible code in the data mart.
warnings.csv      Contains content about warnings in the data mart.
unique_engines.csv Contains content about unique engines in the data mart.

The resulting content from this execution can be found here: C:\Users\stahal\OneDrive - SAS\Desktop\Content Assessment Test\assessment\preview\codecheck\CSVs

Please see codecheck_README.md located at C:\Users\stahal\OneDrive - SAS\Desktop\Content Assessment Test\assessment\preview\codecheck\codecheck_README.md for more
information.
```

# Content Assessment Process



# Content Migration from SAS

## 9.4: Participating Resources

Viya4: Migration Resources



# What is supported

## Platform



SAS Version 9 Object	SAS Viya Object(s)
Folders	Folders
Identity Groups	Custom Groups
Direct Access Control Entries	CAS Access Control Entries General Authorization Rules
SAS Libraries	CAS Library
LASR Analytic Server	LASR CAS Library

# What is supported

## Visual Analytics



SAS Version 9 Object	SAS Viya Object(s)
VA Report	Report
VA Exploration	Report
VDB Query: SQL	SAS Studio Query
VDB Query: Star Schema	Data Plan
VDB Query: Append	Data Plan
Graph Template	Graph Template
Image	Image
VDB Query: Save to HDFS	Not Supported

# What is supported

Analytic, EBI and EDI

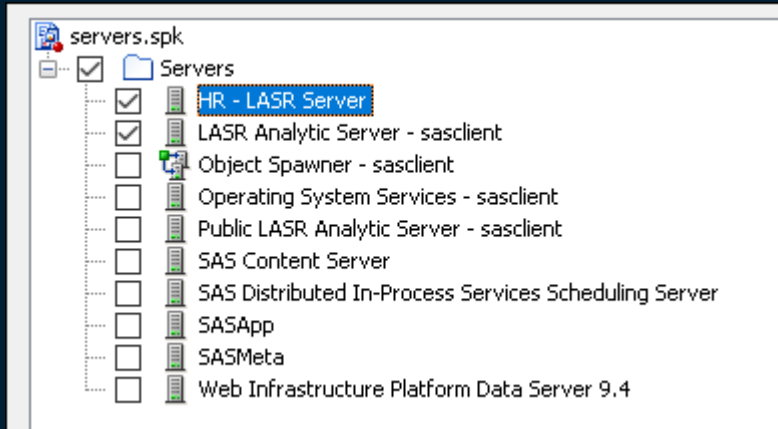


SAS V9 Object	SAS Viya Object(s)
Stored Processes	Job Definition
Stored Process Prompts	Task Prompts
Cube: Star Schema	Job Definition, Job Request and Report Data View
Cube: Detailed	CAS Table and Report Data View
Information Map: Relational	Job Definition and Job Request
Enterprise Guide Projects	SAS Studio Flow
DI Studio Jobs	SAS Studio Flow
Enterprise Miner Projects	Not Supported
Information Map: OLAP	Not Supported
Web Report Studio Report	Not Supported

# Servers



LASR servers can be exported to support accessing LASR data from Viya through a LASR based CASLIB



LASR based caslibs require an authentication domain be created in the target environment.

**Note:** the servers package is used as an input to create mappings, it is never imported to Viya.

# Data

- Physical **data is not migrated** by the tools
- LASR libraries and servers can be migrated to LASR based CASLIB's
- Base SAS Libraries
  - ---> path-based CASLIB's
  - ---> libraries in the Viya Compute Server
- Database Libraries ---> database CASLIB's
- LASR and/or Base table metadata is exported to support migration of authorization.

# EBI/ED/Analytic Content

## References to Data in SAS Libraries

When migrated content like Stored Processes, DI Jobs or EG Project reference data.

- The library and tables must be made accessible to the Viya compute server
- Any libnames in code may need to be edited to point to the location of the data
- Any other SAS 9 metadata related code must be removed.

# New Functionality

Content Migration

# New Import Interface

Import Interface

Import tab for import.

Mapping Set tab to manage mappings

Can selectively import

- Select source package
- Perform Mapping
- Preview and Import
- View Results

The screenshot displays the SAS Import Interface. On the left is a navigation menu with options: Data, Servers, Content, Users, **Import** (highlighted), Licensed Products, Configuration, Contexts, User-Defined Formats, MONITOR, Logs, and Metrics. The main area has two tabs: 'Import' (active) and 'Mapping Sets'. Under the 'Import' tab, there are sub-sections: Source, Mapping, Preview, and Results. The 'Source' section shows 'Import file: all\_gelcorp\_sep2020.spk'. Below that, a 'Content' section has a 'View: All resources' dropdown. A list of packages is shown with checkboxes for selection:  DataSupport,  Finance\_Analysis,  Finance\_Analysis,  Finance\_Analysis\_V2,  Finance\_Analysis\_V2,  finance\_dijob\_1, and  Finance\_map1. On the right, the 'Properties' tab for 'Finance\_map1' is visible, showing details like ID: A5ELUBD6.AX00007C and Type: InformationMap.Relational. An 'Import' button is located in the top right corner.



# Mapping Interface

A central aspect of importing is the creation, refinement, and application of mappings. Mappings govern the transformation of exported resources for use in the target environment.

Four categories of Mapping

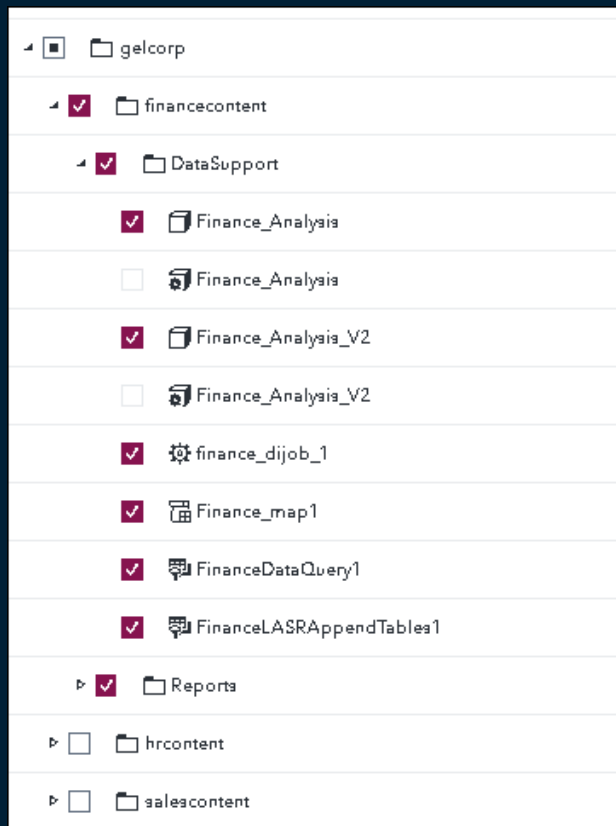
Mapping Sets can be loaded from and Saved to the Infrastructure Data Server

The screenshot displays the SAS Mapping Interface. On the left, a sidebar contains navigation options: Source, Mapping (selected), Preview, and Results. The main area is titled 'Mapping' and has tabs for 'Content', 'Users and Groups', 'Tables' (highlighted in pink), 'Properties', and 'Other'. A 'Mapping set:' dropdown is set to 'System default', and a 'Save' button is visible. Below these is a table with the following columns: Source, Target Server, Target Caslib, Target Table, and Exists. The 'Target Server' dropdown is set to 'cas-shared-default'. The table lists three source folders, each with a corresponding empty 'Target Table' dropdown and a red 'X' icon in the 'Exists' column.

Source	Target Server	Target Caslib	Target Table	Exists
├─ /gelcorp/salescontent/Data/Reporting Data	cas-shared-default			⊗
├─ /gelcorp/salescontent/Data/Source Data				⊗
├─ /gelcorp/salescontent/Data/Lasr Data				⊗

Mappings can be edited interactively

# Selective Import of Content



# 2021.2.1 Include Dependencies

Export

Location: /gelcorp

Type: Folder

Export file:

Package

Include dependencies

Export Cancel

```
sas-viya transfer export  
-u /folders/folders/82e2f89b-a53e-4c74-b8d0-de5ab3049acc  
--include-dependencies
```

# Relocate Content During Import

SAS<sup>®</sup> Environment Manager - Manage Environment

Import

Import Mapping Sets

Source  
Mapping  
Preview  
Results

**Mapping**

Content Users and Groups Tables Properties Other

Target location: /ConvertedEGPProjects

ConvertedEGPProjects

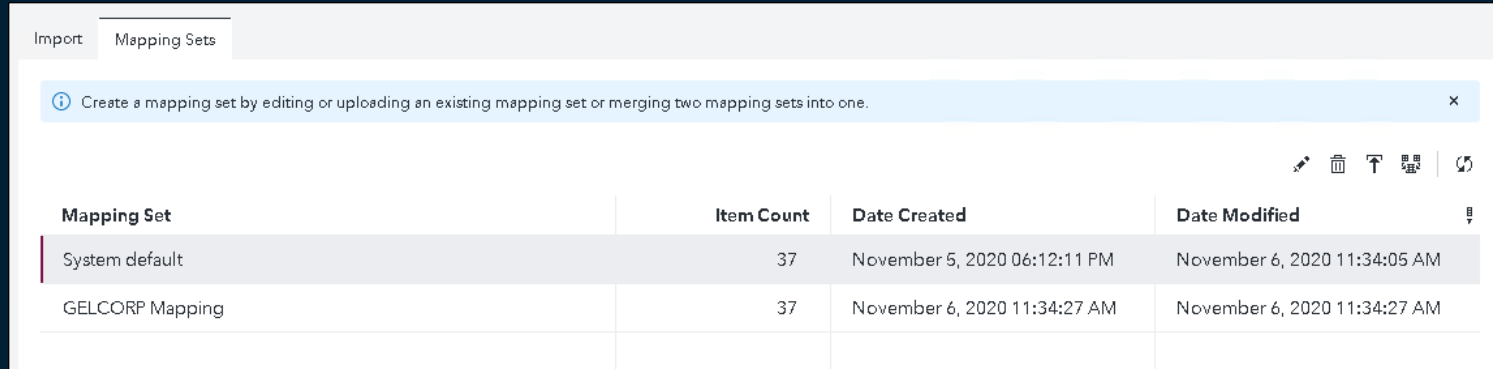
No items are available.

Specify target location.

# Mapping Set Interface

Mapping Sets can be managed separately from the import process:

- Loaded and Saved from/to the Infrastructure Data Server
- Uploaded from a JSON File
- Edited
- Merged
- Deleted



The screenshot shows the 'Mapping Sets' interface. At the top, there are tabs for 'Import' and 'Mapping Sets'. Below the tabs is a light blue banner with an information icon and the text: 'Create a mapping set by editing or uploading an existing mapping set or merging two mapping sets into one.' To the right of the banner are icons for edit, delete, refresh, and a search icon. Below the banner is a table with the following data:

Mapping Set	Item Count	Date Created	Date Modified
System default	37	November 5, 2020 06:12:11 PM	November 6, 2020 11:34:05 AM
GELCORP Mapping	37	November 6, 2020 11:34:27 AM	November 6, 2020 11:34:27 AM

# SAS Libraries

Viya Compute libraries can now be:

- Defined in the resources section of Viya Compute Contexts
- Managed in SAS Studio
- Assigned automatically when compute sessions start.
- Created when importing V9 path-based SAS libraries.

The screenshot shows the SAS Environment Manager interface. The left sidebar contains a navigation menu with items like SYSTEM, Data, Servers, Content, Users, Import, Licensed Products, Configuration, Contexts (highlighted), User-Defined Formats, Features, MONITOR, and Jobs and Flows. The main area is titled 'Contexts' and shows a list of compute contexts. The 'SAS Studio compute context' is selected. A modal window titled 'Edit Compute Context' is open, showing the 'Resources' tab. The table below lists the resources assigned to this context.

<input type="checkbox"/>	Name	Assign	Use Default Libref
<input type="checkbox"/>	FINDATA Financial Data - Base SAS I/O Engine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> FINDATA
<input type="checkbox"/>	hrdata HR Data - Base SAS I/O Engine	<input type="checkbox"/>	<input checked="" type="checkbox"/> hrdata
<input type="checkbox"/>	sdeptdat Sales Reporting Library - Base SAS I/O Engine	<input type="checkbox"/>	<input checked="" type="checkbox"/> sdeptdat
<input type="checkbox"/>	sharedl Shared Data - Base SAS I/O Engine	<input type="checkbox"/>	<input checked="" type="checkbox"/> sharedl
<input type="checkbox"/>	slsdata Sales Data - Base SAS I/O Engine	<input type="checkbox"/>	<input checked="" type="checkbox"/> slsdata

# SAS Libraries

On Import V9 SAS Libraries can now create both a CAS Library and a Compute Library

Import to CAS and Compute

Mapping

Content Users and Groups Tables Properties Other

Mapping set: System default Save

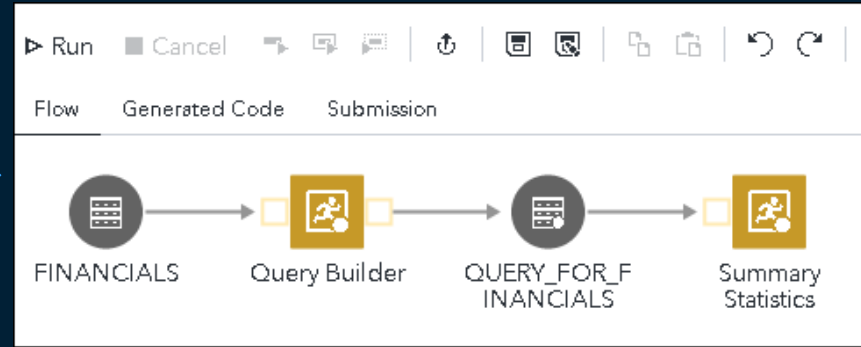
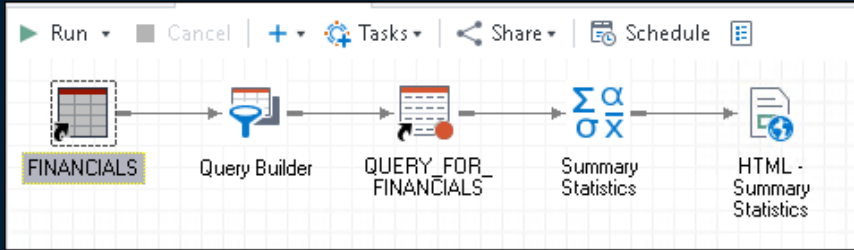
Resources & Properties	Old Value	New Value
Financial Data		
DirPath	/gelcontent/gelcorp/finance/data	/gelcontent/gelcorp/finance/data
CASServer		cas-shared-default
ImportTargetEnvs	CAS, Compute	CAS, Compute
ComputeContexts	SAS Studio compute context, SAS Job Execution compute context	SAS Studio compute context, SAS Job Execution compute context

Select Compute Contexts to Create Library

# Enterprise Guide Project to Studio Flow

## What Happens

Each process flow is converted to a SAS Studio Flow



Resultant studio flows may often require some changes to be fully functional.



# Enterprise Guide Tasks

- Many Enterprise Guide tasks are migrated to SAS Program Nodes in SAS Studio.
- Some EG tasks
  - Are migrated to the equivalent node in Studio e.g., Query, Data, Append, Filter, Sort etc.
  - are **not supported** because there is no equivalent in Viya e.g., Update Library Metadata
  - **require manual updates** of the resulting program node e.g., Create Format from Dataset

Future development will add support for migration of tasks to nodes with equivalent functionality.

# Enterprise Guide Projects

Projects from Enterprise Guide 7 and 8 are supported.

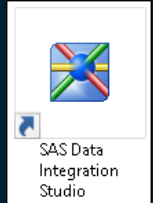
- **Individual Projects** can be imported directly using Environment Manager or the transfer plugin of the sas-viya CLI.
- **Multiple projects** can be imported in batch with a CLI delivered with Content Assessment
  - Use Content Assessment csv output and imports all Projects in a csv file
  - OR all Projects in a directory path.



# Data Integration Studio Jobs

SAS Data Integration Studio jobs are migrated to SAS Studio Flows in SAS Viya

- Data Integration Studio Transforms become a SAS Studio Steps
- Always include all dependent metadata objects in the package when you export DI Studio Jobs
- Libname statements are commented out
- Metadata server code is commented out
- Manual updates to the code created will most likely be required
- Future development will add support for migration of tasks to nodes with equivalent functionality.
- **Support for custom steps for customer generated transforms – Viya 2022.12;**  
**Generated Transform > Custom Step (The system creates a new custom step, or migrates to an existing custom step)**



# Migration Summary Report

## Migration Summary Report



Enterprise Guide Migration Activity

Data Integration Studio Migration Activity

SAS Studio Step Details

Summary by Step Type description

Migration Timeline

Filters: Project.EG \* Finance\_01.egg; Process Flow; Project.EG \*

This report page shows details on a per-node basis about whether resulting steps have been successfully migrated into SAS Studio.

Project.EG	Successfully Migrated (9)	Needs Attention (3)	Steps Not Migrated (3)		
SAS 9 Source Name	OriginalType	SAS Studio Flow Name	Total Number of Steps	Studio Step Type	Steps Not Migrated
Finance_01.egg	Project.EG	Process Flow	15	SAS Enterprise Guide Task	0
Finance_02.egg	Project.EG	Process Flow	10	SAS Enterprise Guide Query	0
Finance_Append_data.egg	Project.EG	Process Flow	5	Registered Table	0
Finance_Combine_and_Characterize.egg	Project.EG	Process Flow	14	ODS Result	3
Finance_Data_Prep.egg	Project.EG	Process Flow 1	5	Data	0
Finance_Data_Prep.egg	Project.EG	Process Flow	6		
Finance_distribution.egg	Project.EG	Process Flow	9		

ImportedTimeStamp	SAS 9 Source Name	SAS Studio Flow Name	Studio Step Name	Studio Step Type	Studio Migration Result
2021-06-01T19:38:33.665Z	Finance_01.egg	Process Flow	FINANCIALS	Registered Table	Needs Attention
2021-06-01T19:44:41.582Z	Finance_01.egg	Process Flow	FINANCIALS	Registered Table	Needs Attention
2021-06-01T19:47:25.004Z	Finance_01.egg	Process Flow	FINANCIALS	Registered Table	Needs Attention
2021-06-01T19:38:33.665Z	Finance_01.egg	Process Flow	HTML - Choropleth Map	ODS Result	Step Omitted
2021-06-01T19:44:41.582Z	Finance_01.egg	Process Flow	HTML - Summary Statistics	ODS Result	Step Omitted
2021-06-01T19:47:25.004Z	Finance_01.egg	Process Flow	HTML - Summary	ODS Result	Step Omitted

### Studio Migration Details

Path update needed.

### Studio Migration Hint

Referenced SAS programs are converted to SAS program nodes with a %INCLUDE statement pointing to the file location. The referenced SAS program needs to be made available to the SAS Viya software. Either place the file in a mounted location or place it in a file system that is accessible by the deployment.

# Summary

- SAS 9 content is migrated to Viya objects on import.
- Development work to support migration of SAS 9 content to Viya 4 is ongoing
- Review the Migration Status document for up-to-date status information on migration of SAS 9.4 content.