

# Data Handling with SAS Access Engine to Handle all your Data Engineering needs

DH12

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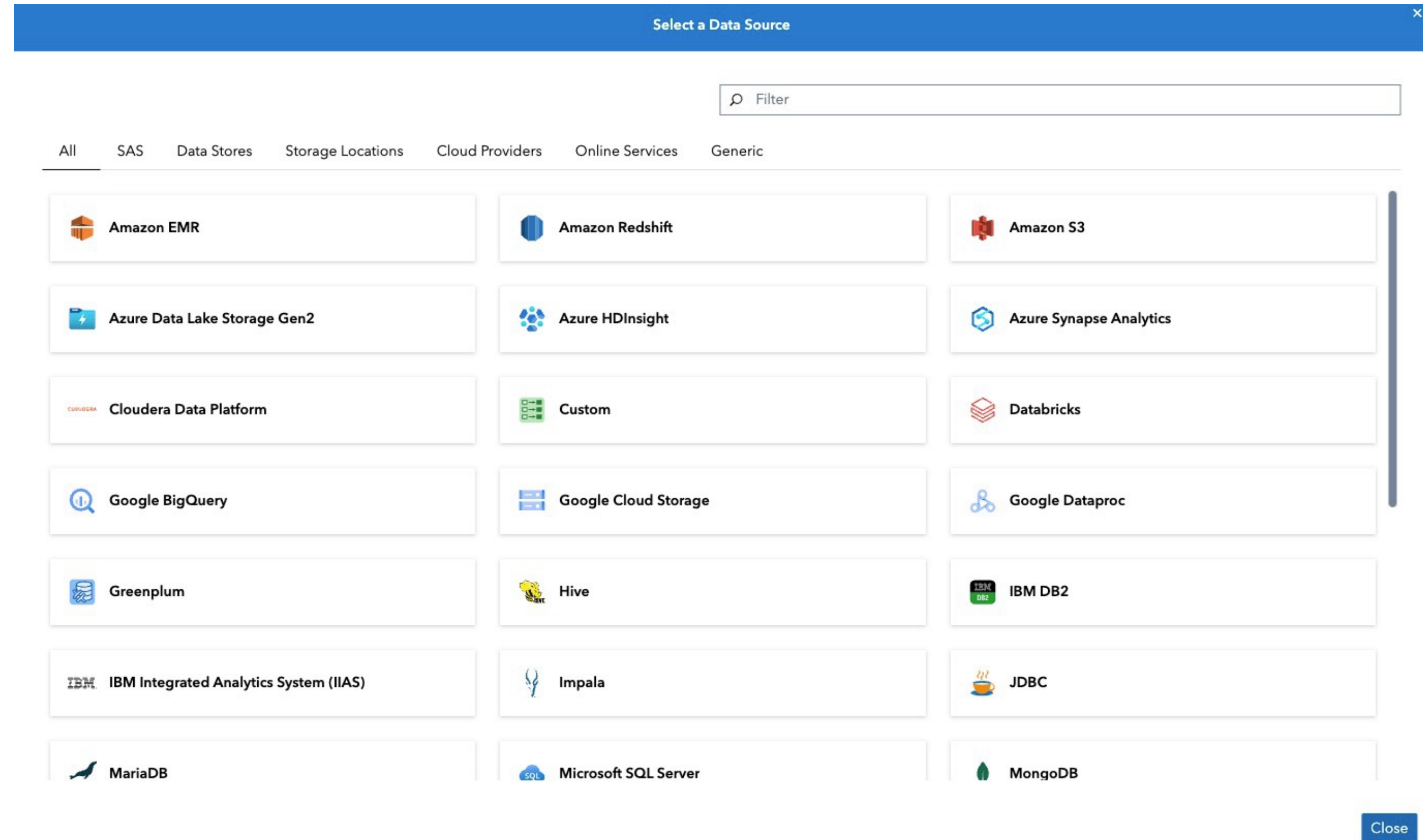
# Background

How often we run into these challenges?

- Consider some scenarios where you are not dealing with flat files (csv, txt, tsv)
- What if you are accessing anyone of more than 60 relational and non-relational databases, PC files, data warehouse appliances, and distributed file systems
- From SAS directly, how can we take advantage of performance-related DBMS features and benefits including bulk load support, temporary table support, and native SQL support with Implicit and Explicit Pass-Through

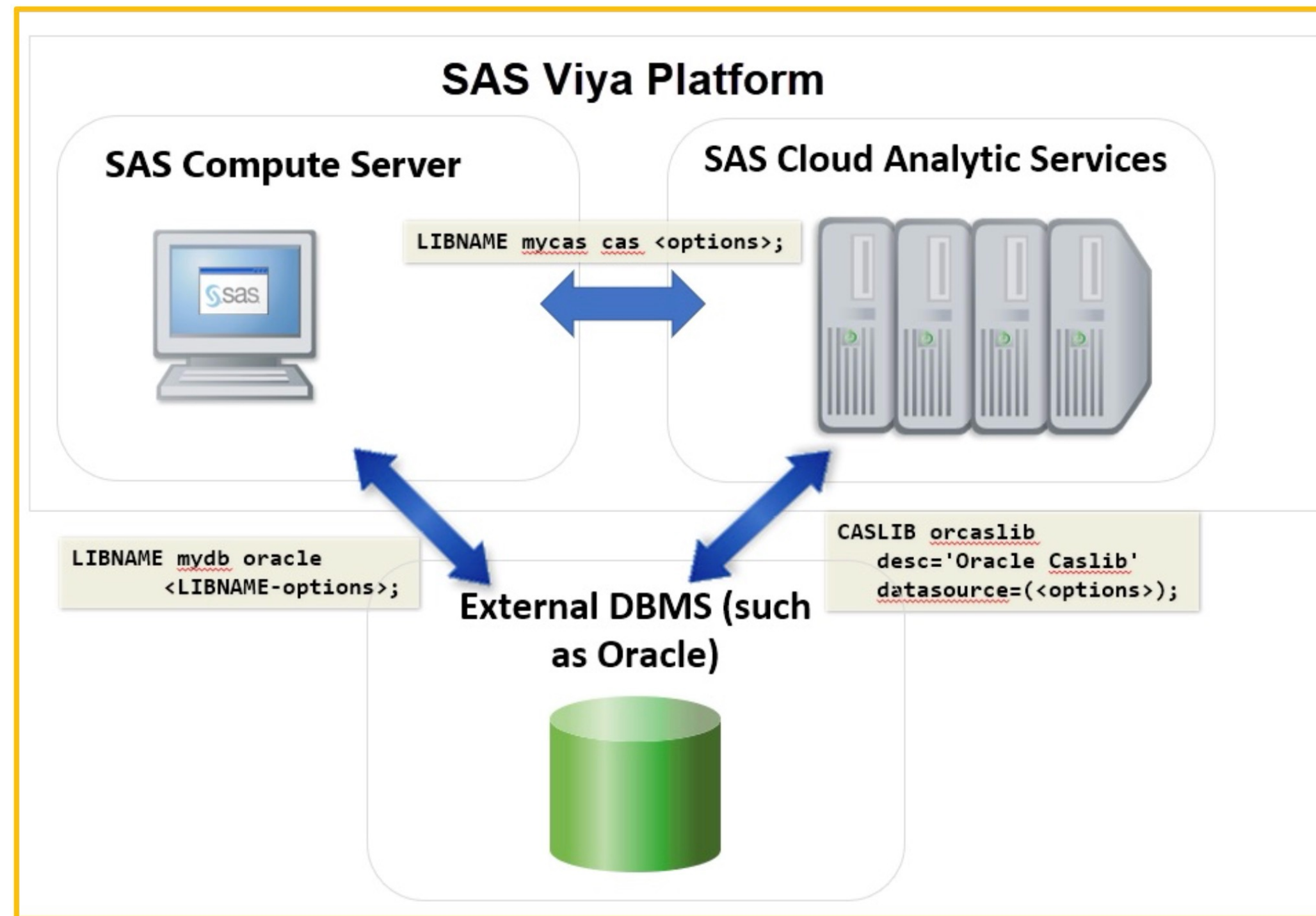
# What are SAS Access Engine or SAS Data Connector?

SAS Access serves as a vital software component within the SAS suite of products, acting as a seamless link between SAS applications and external data systems. Through the utilization of SAS Access engines, users gain the capability to effortlessly read, write, and manipulate data for comprehensive analysis and reporting, eliminating the necessity for extensive data movement or conversion.



# Overview

## Overview of Data Flow with SAS Viya Platform



# Examples of SAS Access Engine

```
1  /*******/
2  /*      S A S   S A M P L E   L I B R A R Y      */
3  /*      */
4  /*      NAME: bulkloadS3.sas      */
5  /*      TITLE: Sample Programs      */
6  /*      PRODUCT: SAS/ACCESS to Snowflake      */
7  /*      SYSTEM: UNIX, WINDOWS      */
8  /*      REF: SAS/ACCESS 9 for Relational Databases: Reference      */
9  /*      USAGE: Invoke SAS, submit the autoexec, createLibname,      */
10 /*      and then submit this program.      */
11 /*      PRE-REQUISITE: AWS S3_Bucket, Access_key, Secret_key, Region and      */
12 /*      Security_Token      */
13 /*      NOTE: Some interfaces require that you add the SAS data set      */
14 /*      option, SASDATEFMT=, to the name of the DBMS view      */
15 /*      or table to have the output format correctly.      */
16 /*      NOTE: Some interfaces are case sensitive. You may need to      */
17 /*      change the case of table or column names to comply      */
18 /*      with the requirements of your database.      */
19 /*      */
20 /*******/
21
22 /* CREATE GLOBAL MACROS FOR BULKLOAD */
23
24 %GLOBAL m_bucket;          /* specifies amazon s3 bucket */
25 %GLOBAL m_key;             /* specifies an AWS key that you use to access t
26 %GLOBAL m_secret;          /* specifies the secret access key to access
27 %GLOBAL m_region;          /* specifies the AWS region from which S3 da
28 %GLOBAL m_security_token;   /* specifies a temporary token associated with t
29
30 /* ASSIGN GLOBAL MACRO VALUES FOR BULKLOAD */
31
32 %let m_bucket ="bucket-name";
33 %let m_key =key-value;
34 %let m_secret =secret-access-key;
35 %let m_region ="region";
36 %let m_security_token =temporary-token;
37
```

```
38
39 /*=====
40 /* BULKLOAD Sample 1
41 /*=====
42
43 /*******
44 /* Clean up the table,
45 /*******
46
47 proc delete data=mydblib
48
49 /*******
50 /* CREATE DATASET
51 /*******
52
53 data work.SNBLKDAT;
54     input name $ age sex
55     cards;
56 amy 3 f 030185
57 bill 12 m 121277
58 charlie 35 m 010253
59 david 19 m 101469
60 elinor 42 f 080845
61 pearl 78 f 051222
62 vera 96 f 101200
63 frank 24 m 092663
64 georgia 1 f 040687
65 henry 46 m 053042
66 joann 27 f 020461
67 buddy 66 m 101432
68 ;
69 run;
70
```

```
71 /*******/
72 /* CREATE DBMS TABLE WITH OPTIONS */
73 /*******/
74
75 /* Load via a Snowflake external stage (AWS S3 bucket) */
76 proc sql;
77 create table mydblib.SNBLKTAB
78     (BULKLOAD=YES bl_bucket=&m_bucket
79     bl_key="&m_key" bl_secret="&m_secret"
80     bl_region=&m_region bl_security_token="&m_security_token") as
81     select * from work.SNBLKDAT;
82 quit;
83
84 /*******/
85 /* READ TABLE      */
86 /*******/
87
88 proc print data=mydblib.SNBLKTAB (BULKUNLOAD=YES bl_bucket=&m_bucket
89     bl_key="&m_key" bl_secret="&m_secret"
90     bl_region=&m_region bl_security_token="&m_security_token");
91     format bdate date7.;
92 title 'proc print of table';
93 run;
```

[Link](#)

# Examples of SAS Data Connectors

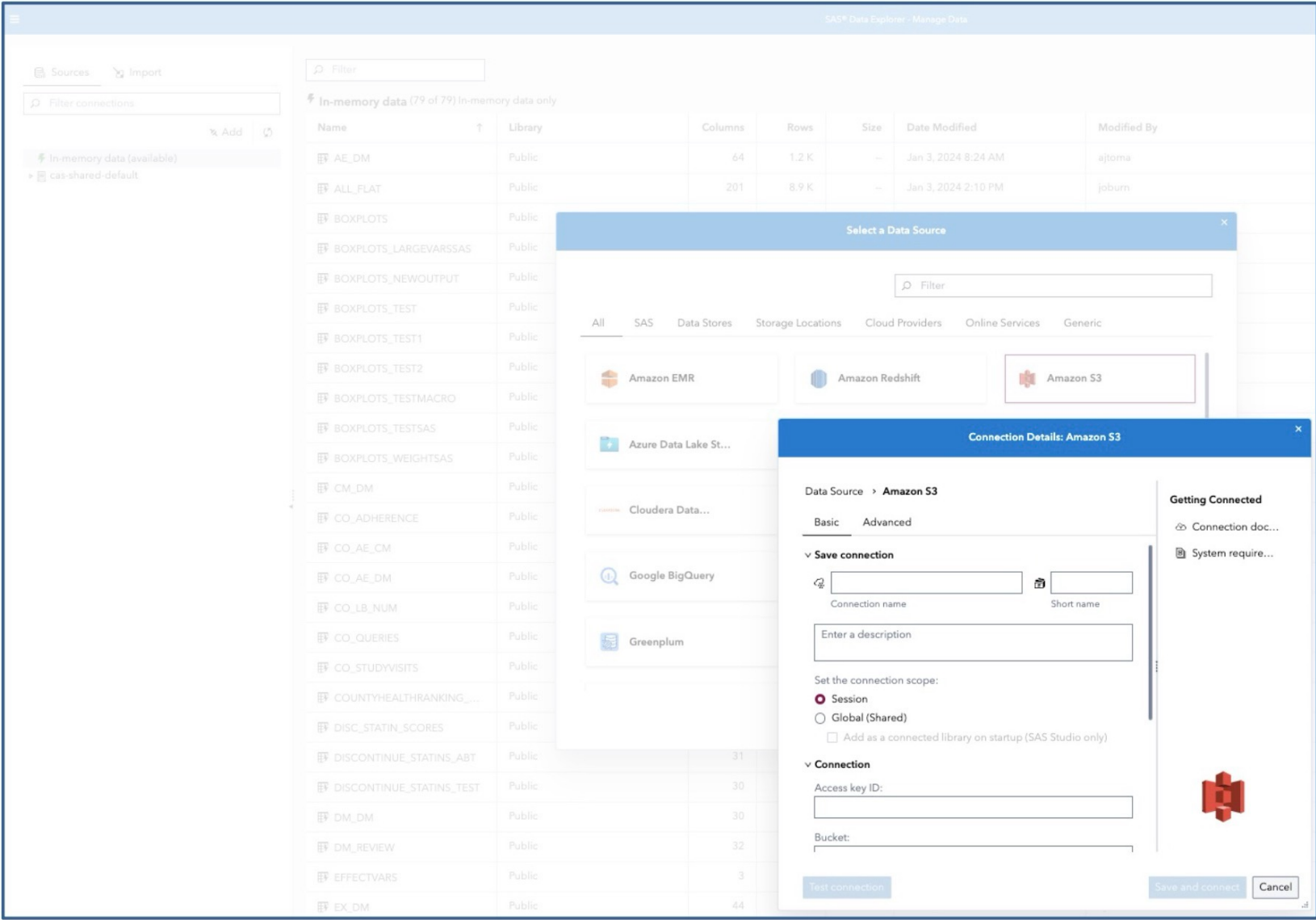
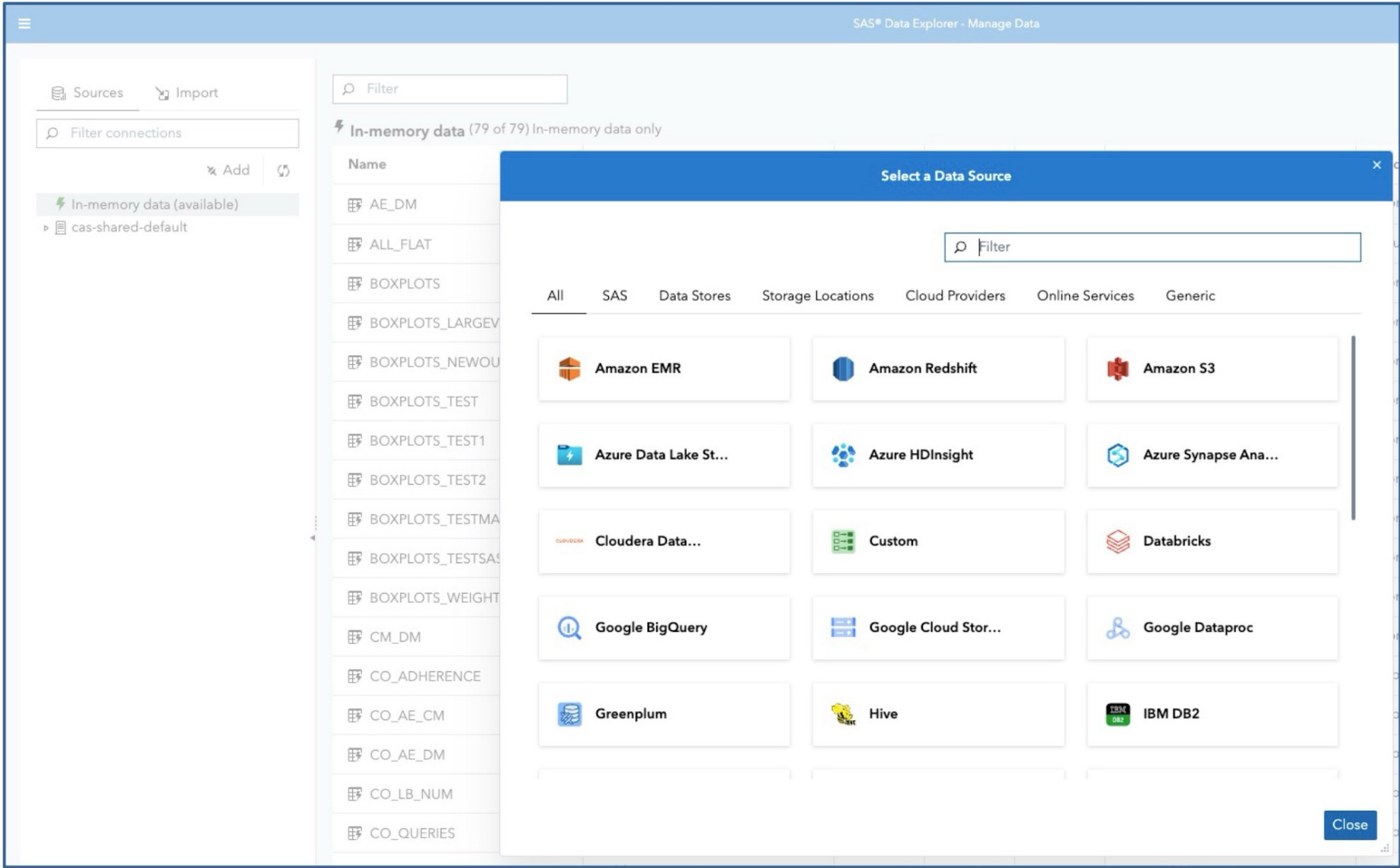
## Quick Reference for Data Connector Syntax

This table shows the syntax, supported file types (if applicable), and an example for each data source. For path-based data source syntax, see `DATASOURCE= (SRCTYPE="type", data-source-options, ENCRYPTIONPASSWORD="string")`.

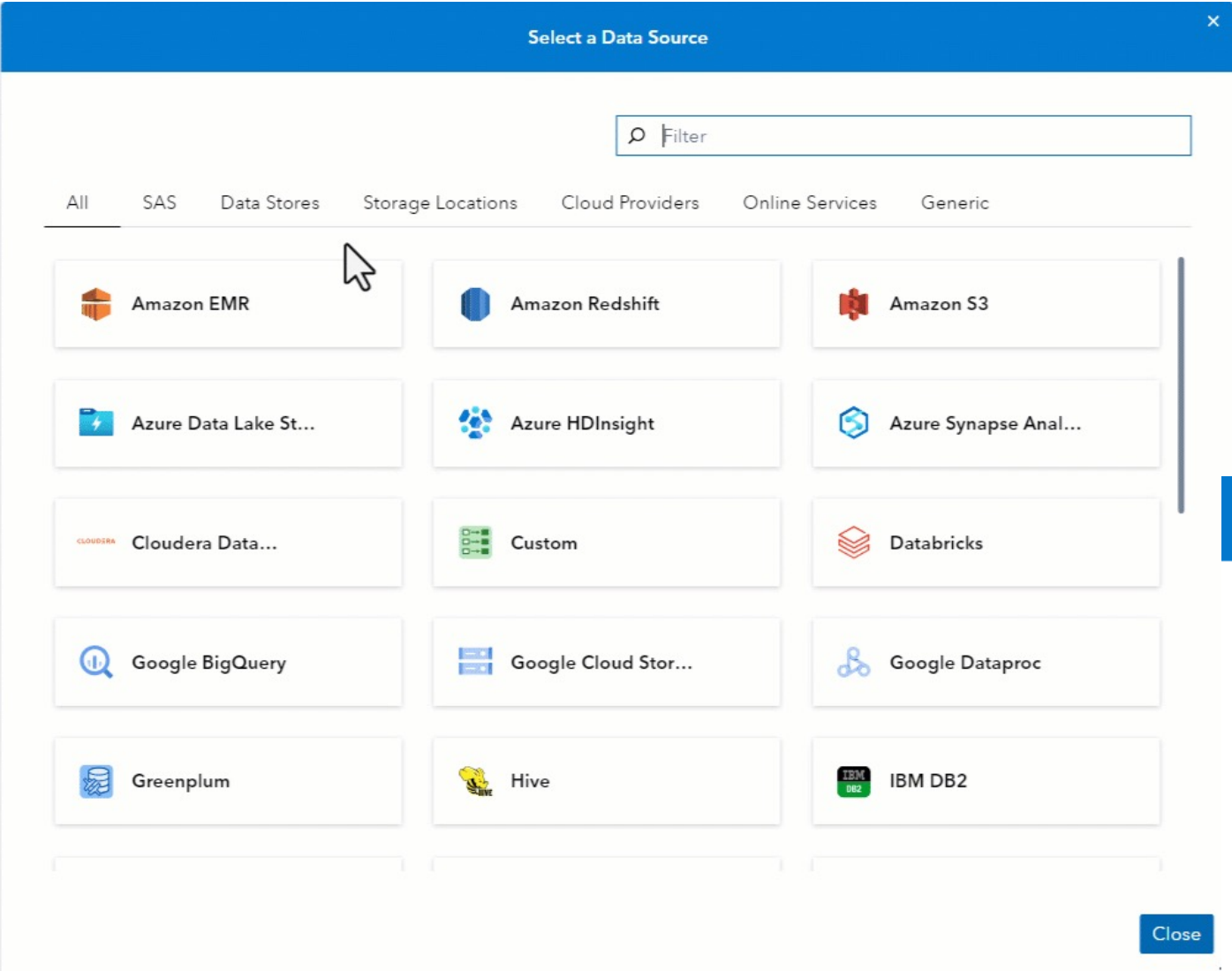
### Data Source Types and Options

| srcType= | Type | Option Syntax                                                                                | Example                                                                                                                                                                                                                                                                 |
|----------|------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hadoop   |      | <a href="#">SAS Data Connector to Hadoop and SAS Data Connect Accelerator for Hadoop</a>     | <pre>caslib hvlib desc="Hadoop Caslib" datasource=(srctype="hadoop",   dataTransferMode="parallel",   hadoopjarpath="/data/cdh54/sdm/lib",   hadoopconfigdir="/data/cdh54/sdm/conf",   username="hadoopuser",   server="hive01.example.com",   schema="default");</pre> |
| impala   |      | <a href="#">SAS Data Connector to Impala</a>                                                 | <pre>caslib imlib desc="Impala Caslib" datasource=(srctype="impala",   username="impalauser",   server="impala01.example.com");</pre>                                                                                                                                   |
| odbc     |      | <a href="#">SAS Data Connector to ODBC</a>                                                   | <pre>caslib odbccaslib desc="ODBC caslib" datasource=(srctype="odbc"   username="user1"   password="password1"   database="dbodbc"   catalog="*");</pre>                                                                                                                |
| oracle   |      | <a href="#">SAS Data Connector to Oracle</a>                                                 | <pre>caslib oraclecaslib desc="Oracle Caslib" datasource=(srctype="oracle",   username="user1",   password="password1",   path="//machine.lnx.com:5570/exadat");</pre>                                                                                                  |
| postgres |      | <a href="#">SAS Data Connector to PostgreSQL</a>                                             | <pre>caslib postgrescaslib desc='PostgreSQL Caslib' datasource=(srctype='postgres'   username='user1'   password='password1'   server="postgresServer"   database="postgresDatabase");</pre>                                                                            |
| teradata |      | <a href="#">SAS Data Connector to Teradata and SAS Data Connect Accelerator for Teradata</a> | <pre>caslib TDcaslib desc='Teradata Caslib' datasource=(srctype='teradata'   username='user1'   password='password1'   server="teradataServer");</pre>                                                                                                                  |

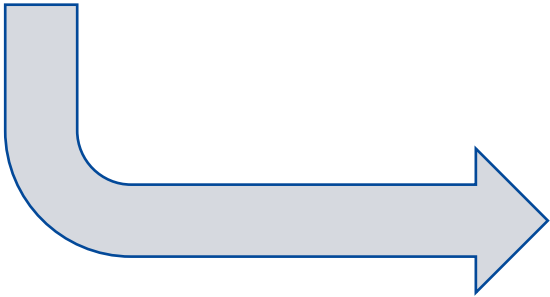
# Drag and Drop



# Governance



Create connection to any data source



- **Data source agnostic**
- **Manage access to different data sources**
- **Manage row level access to tables**

Edit Authorization

Clinical

Any membership-based impact of unsaved changes is not displayed.

☒ Show individual permissions

☐ Show horizontal column headings

| Principal                      | Access Level     | ReadInfo     | Select       | LimitedPromote | Promote      | CreateTable  | DropTable    | DeleteSource | Insert       | Update       | Delete       | AlterTable   | AlterCaslib  | ManageAccess |
|--------------------------------|------------------|--------------|--------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <div>Authenticated Users</div> | <div>Read</div>  | <div>✓</div> | <div>✓</div> | <div>✗</div>   | <div>✗</div> | <div>✗</div> | <div>✗</div> | <div>✗</div> | <div>✗</div> | <div>✗</div> | <div>✗</div> | <div>✗</div> | <div>✗</div> | <div>✗</div> |
| <div>Samiul Haque</div>        | <div>Write</div> | <div>✓</div> | <div>✓</div> | <div>✓</div>   | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✗</div> | <div>✗</div> |
| <div>Data Builders</div>       | <div>Write</div> | <div>✓</div> | <div>✓</div> | <div>✓</div>   | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✓</div> | <div>✗</div> | <div>✗</div> |

Preview

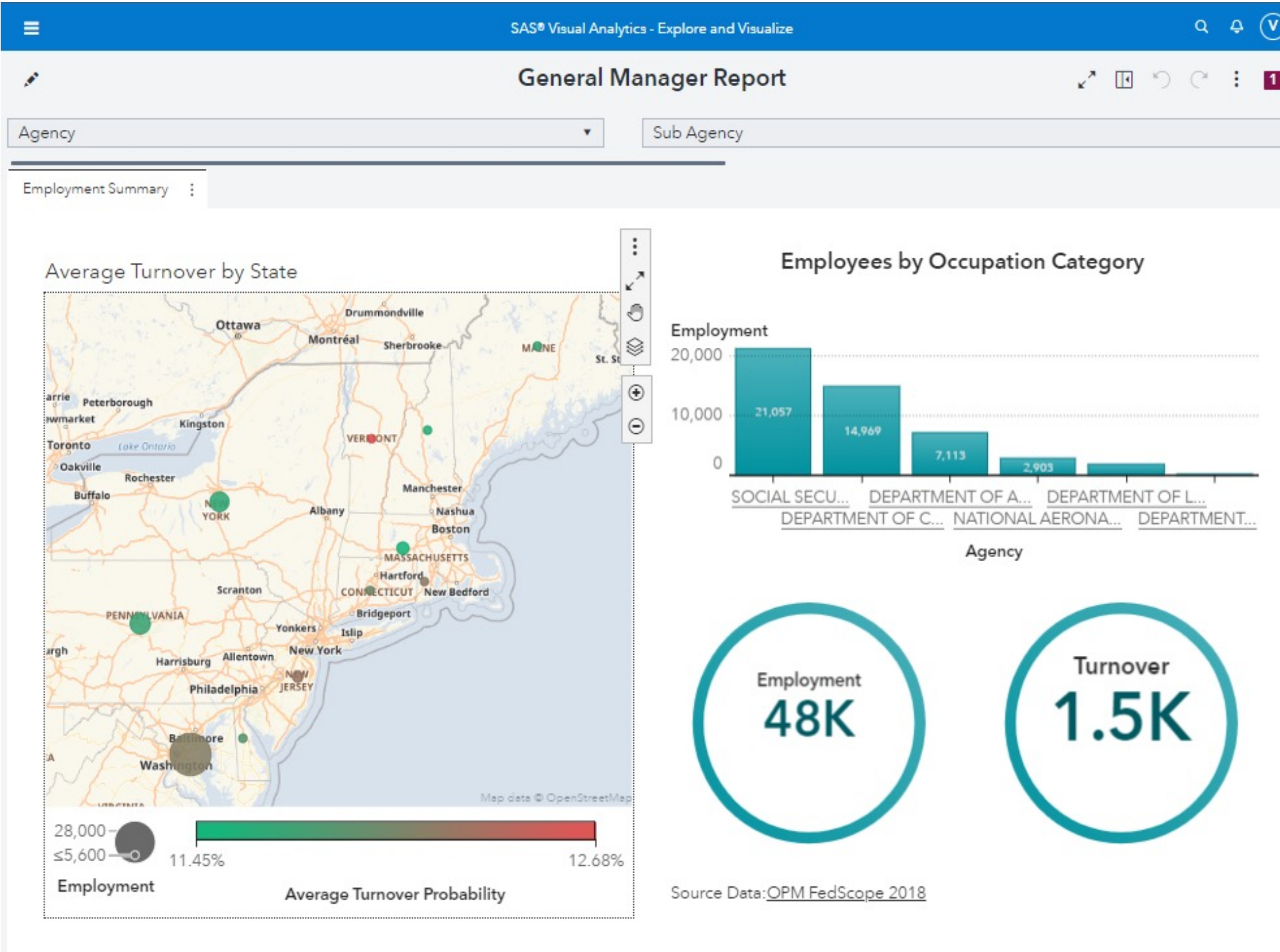
Save

Cancel

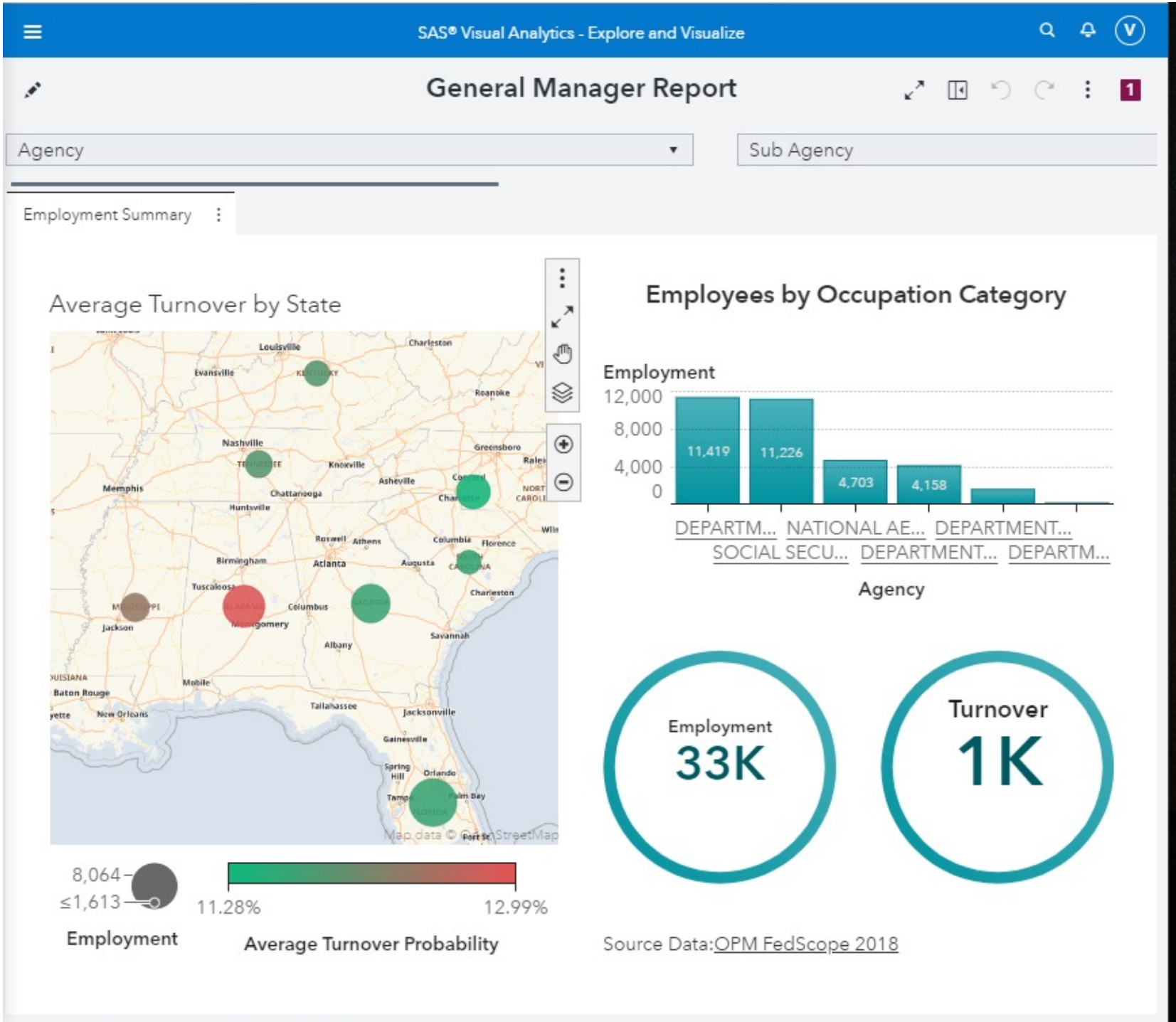
- SAS/ Access for [relational](#) and [Nonrelational](#) Databases.
- SAS supports [Parquet](#) and [JSON](#).

# Same Report with Dynamic View on Data

Manager: Northeast US Region



Manager: Southeast US Region



Consumers of data products only see what they are allowed to see

Libraries

Connected Libraries

AE  
MAPS  
MAPSGFK  
MAPSSAS  
PSMATCH  
RWDSIM  
SASDQREF  
SASHELP  
SASUSER  
TRIALS  
WORK

Clinical - Read AE JSON Table

RunCancel

Select AE JSON Data

Provide Output table Name

Code panel

Automation

# Advantages of using SAS Access Engine or Data Connectors

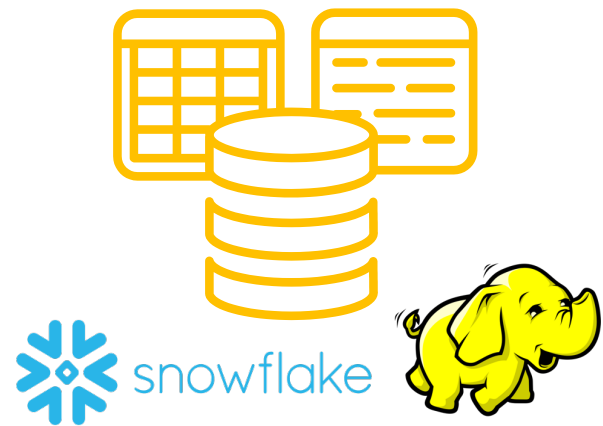
- Out-of-the-box solutions for enterprise data access
- Integration between SAS Platform and 3<sup>rd</sup> party databases
- Read\Write\Update data no matter what native databases or platforms for use
- Secure data transfer behind the firewall
- Multiple options for swift bulk loading and performance enhancement

# Real World Use Cases

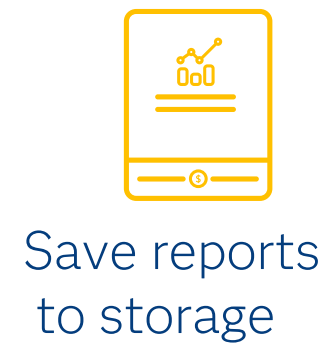
# Product Quality Assurance Application

## Data Marts

- Bulk read / write
- Parallel data transfer
- Scheduled jobs for ETL

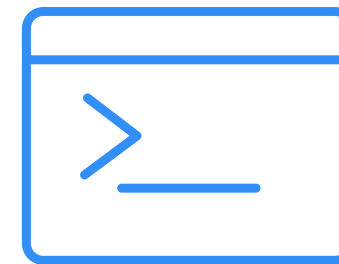


Storage



- Leverage MPP
- Trigger emails

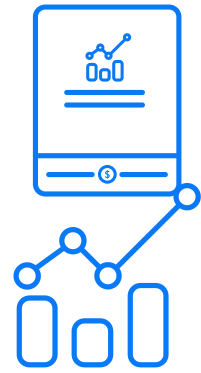
Jobs



Web apps



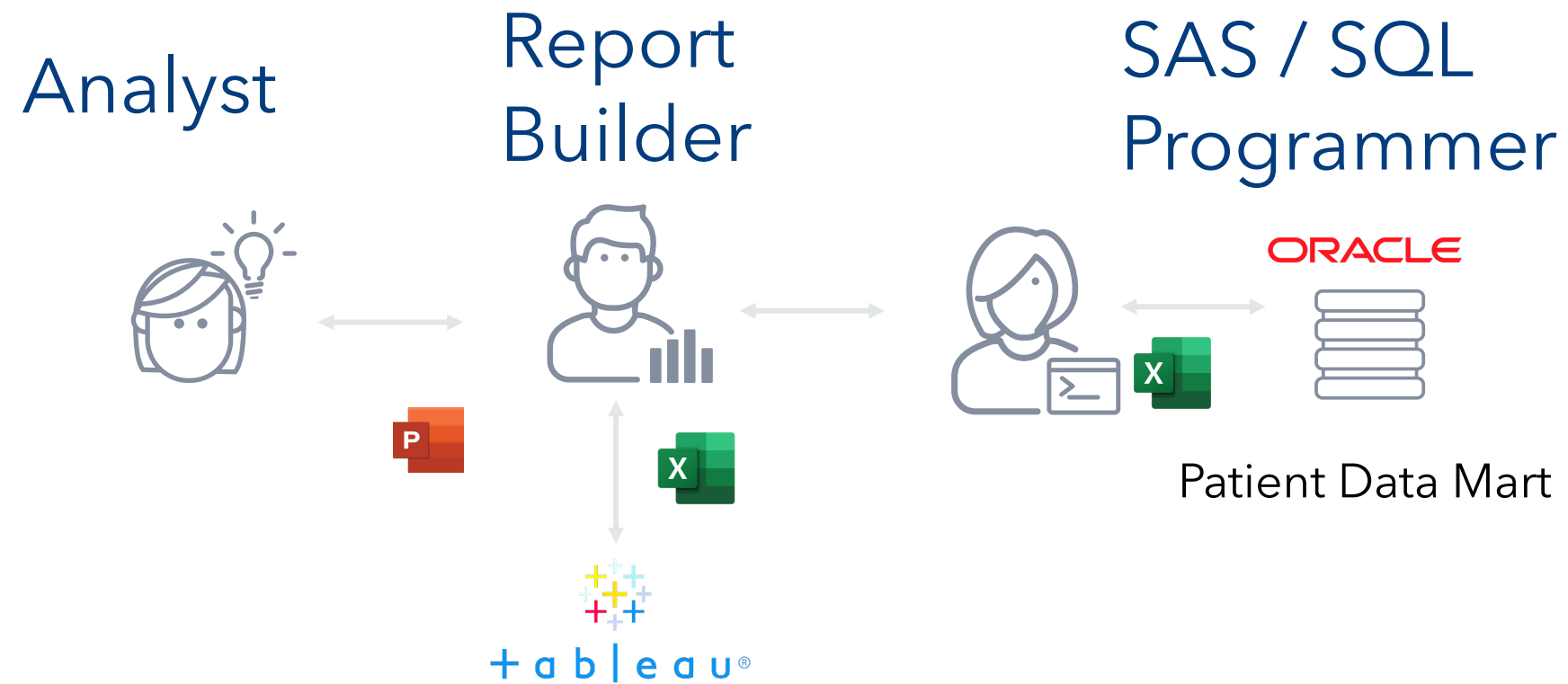
Logs, reports, dashboards



- Interactive, easy to use prompts
- Automated alerts & notifications

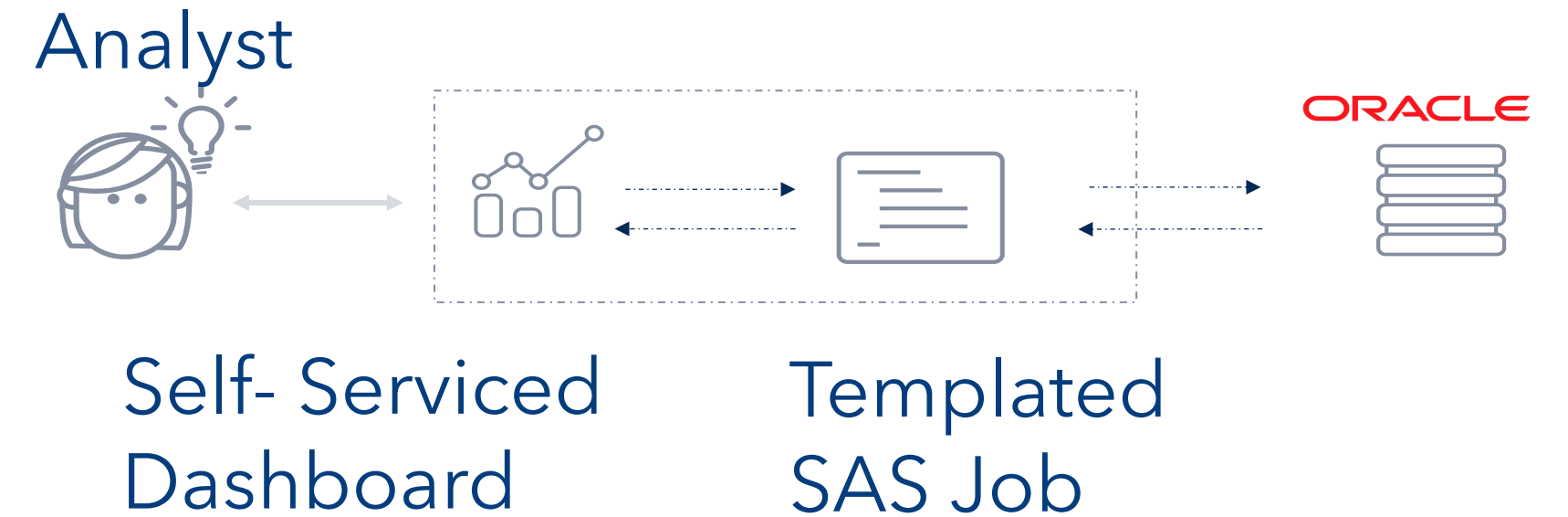
# Self-Service Cohort Analysis

## Before



- Download data from Oracle
- Process in SAS Studio

## Now



- One platform
- Leverage Access Engine and SQL passthrough
- Automation

# Q&A

