

From SAS® to Power BI: Tips to Smooth the Way

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ABSTRACT

Data visualization and data dashboards are now common, and often expected, project outcomes. What if the preferred visualization platform is Power BI when you did all the data preparation and analysis in SAS®? Takeaways from the session include a checklist for navigating the connection process from SAS to Power BI and tips on SAS data structure to minimize the set-up / prep work needed once the data is in Power BI.

INTRODUCTION

As a Microsoft product, Power BI is commonly available to end-users. While SAS can certainly be used to create compelling visuals, end-users may feel more comfortable building data visuals in Power BI. Currently, it is not possible to upload SAS data directly into Power BI; a generic interface is needed. There are several options available; four are presented here.

SAS and Power BI both offer multiple data functions to modify variables, create variables, and link data sets. Determining the appropriate framework structure for the data depends on several criteria including project goals, user skills, and data longevity.

SAS TO EXCEL TO POWER BI

SAS data sets can easily be turned into Excel files for direct upload into Power BI (Figure 1). This option can be a good choice in a tech-limited or heavily secured environment, particularly if the data visuals will not need to be updated with new data at a future point in time. In addition, the ability to utilize Excel is a common skill among a wide range of job titles and roles, expanding the usability of the data beyond SAS or Power BI.

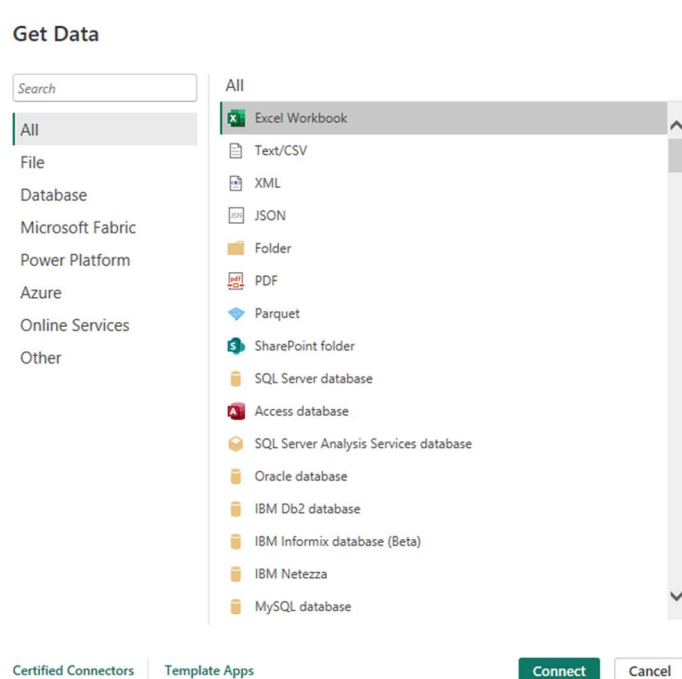


Figure 1. Screenshot from Power BI with Excel connection highlighted.

SAS TO SQL SERVER TO POWER BI

By using SAS/ACCESS and a SAS ODBC driver, SAS data can be loaded into an SQL server database. Chris Hemedinger notes that “to use the SAS ODBC driver, you need a SAS/SHARE server or a special running SAS ODBC server” (SAS Communities, 2019). Once the data is in SQL the data can be pulled into Power BI (Figure 2).

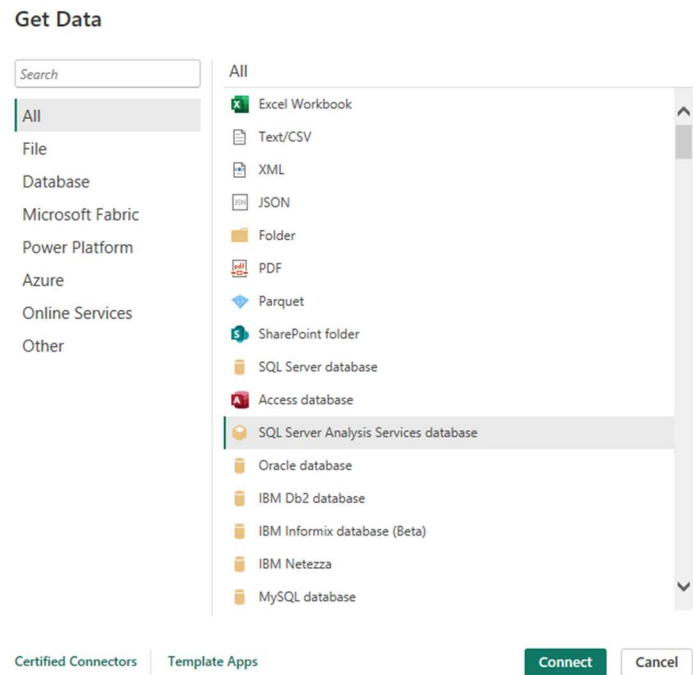


Figure 2. Screenshot from Power BI with SQL Server highlighted

SAS TO POWER BI WITH OLE DB

Another option to bring SAS data into Power BI is through the use of an OLE DB connector (Figure 3). Downloads are available at <https://support.sas.com/downloads/package.htm?pid=648>

Downloads
SAS Providers for OLE DB

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The SAS Providers for OLE DB allow you to access SAS data through OLE DB and ADO. By selecting different access components, you will be able to access SAS data through a variety of mechanisms. For more information on the different access options, see the installation instructions.

To begin the download process, select the item in the table below which best meets your needs.

SAS Providers for OLE DB						
Platform	Description	Request Download	Size	Uncompressed	Release Date	ReadME
Microsoft® Windows®	SAS Providers for OLE DB	sasoledb_92230_win_xx_web_1.zip	130MB	142MB	2010-05	pdf txt
Microsoft® Windows® for x64	SAS Providers for OLE DB	sasoledb_92230_wx6_xx_web_1.zip	131MB	144MB	2010-05	pdf txt

Figure 3. Screenshot from SAS Support.

After selecting the OLE DB option under “Other” (Figure 4), a second screen will pop up (Figure 5). There are two options to start the upload; provide a connection string or use an SQL statement.

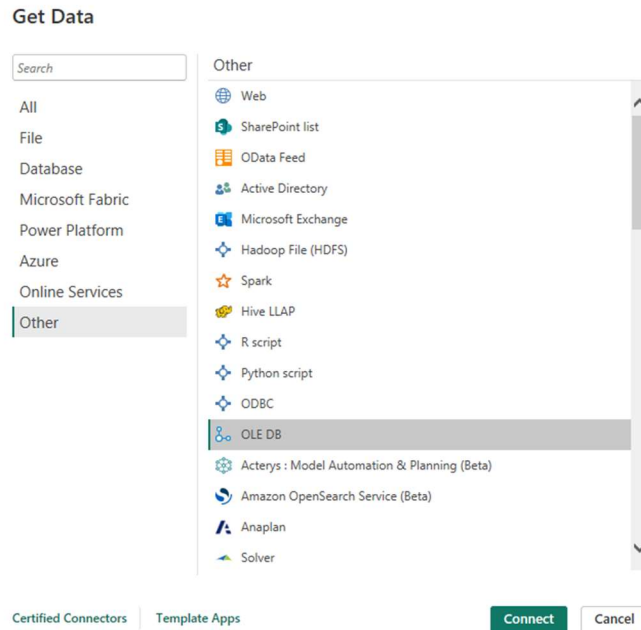


Figure 4. Screenshot from Power BI with OLE DB highlighted.

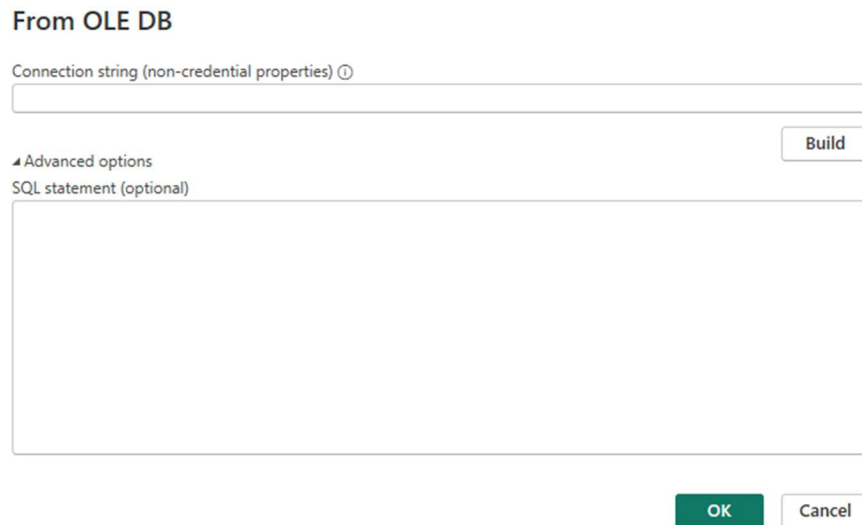


Figure 5. Screenshot from Power BI displaying OLE DB connection string and SQL options.

SAS TO R TO POWER BI

A fourth option uses R script as a conduit between SAS and Power BI. R-4.4.1 for Windows can be downloaded from <https://cran.r-project.org/bin/windows/base/>. The related manual is available at <https://cran.r-project.org/doc/manuals/R-data.html>. Figure 6 displays a portion of the table of contents. Figures 7 and 8 show the process of accessing an R script window in Power BI. Important reminders about the limitations of running R script in Power BI are displayed in Figure 9.

[Acknowledgements](#)

[1 Introduction](#)

[1.1 Imports](#)

[1.1.1 Encodings](#)

[1.2 Export to text files](#)

[1.3 XML](#)

[2 Spreadsheet-like data](#)

[2.1 Variations on read.table](#)

[2.2 Fixed-width-format files](#)

[2.3 Data Interchange Format \(DIF\)](#)

[2.4 Using scan directly](#)

[2.5 Re-shaping data](#)

[2.6 Flat contingency tables](#)

[3 Importing from other statistical systems](#)

[3.1 EpiInfo, Minitab, S-PLUS, SAS, SPSS, Stata, Systat](#)

[3.2 Octave](#)

Figure 6. Screenshot from R Core Team (2024); location of information on SAS imports highlighted.

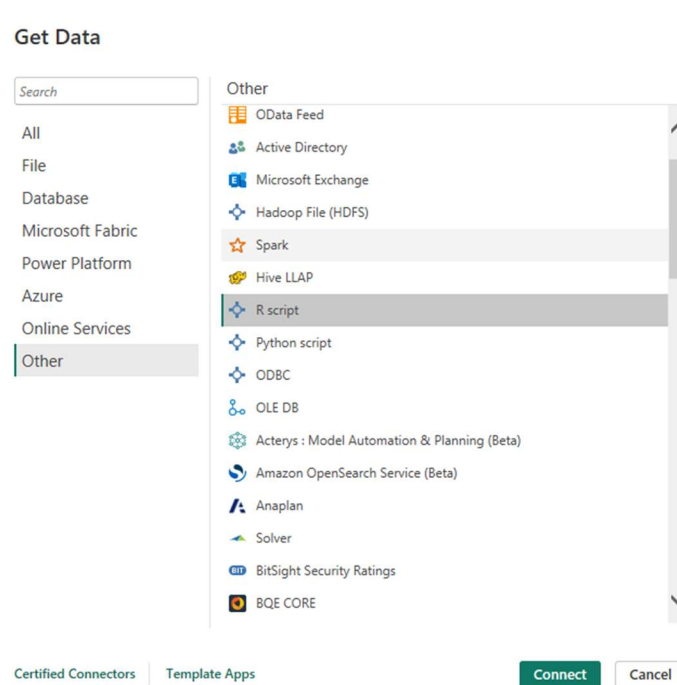


Figure 7. Screenshot from Power BI with R Script highlighted.

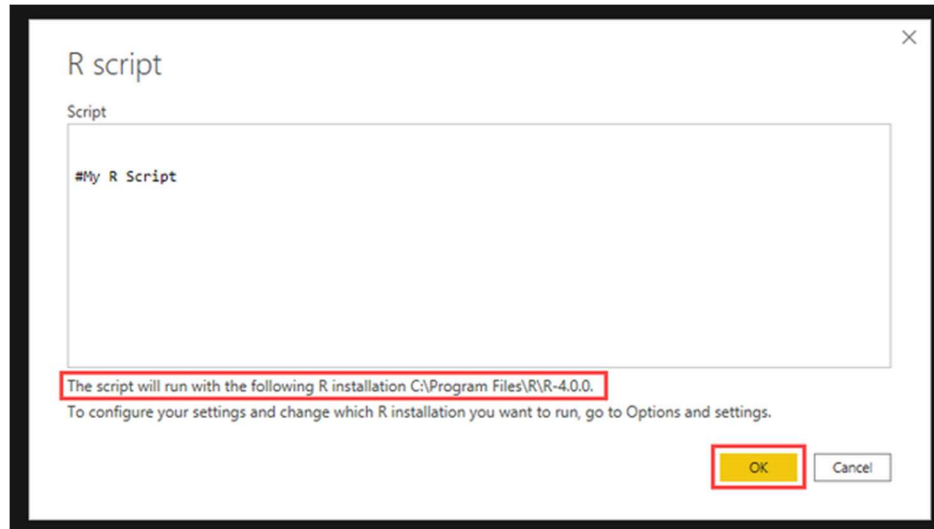


Figure 8. Screenshot from Power BI of window for R script.

Prepare an R script

To run an R script in Power BI Desktop, create the script in your local R development environment, and make sure it runs successfully.

To run the script in Power BI Desktop, make sure the script runs successfully in a new and unmodified workspace. This prerequisite means that all packages and dependencies must be explicitly loaded and run. You can use `source()` to run dependent scripts.

When you prepare and run an R script in Power BI Desktop, there are a few limitations:

- Because only data frames are imported, remember to represent the data you want to import to Power BI in a data frame.
- Columns typed as *Complex* and *Vector* aren't imported, and they're replaced with error values in the created table.
- Values of `N/A` are translated to `NULL` values in Power BI Desktop.
- If an R script runs longer than 30 minutes, it times out.
- Interactive calls in the R script, such as waiting for user input, halt the script's execution.
- When setting the working directory within the R script, you *must* define a full path to the working directory, rather than a relative path.
- R scripts cannot run in the Power BI service.

Figure 9. Screenshot from Microsoft (2023).

DATA STRUCTURE CONSIDERATIONS

Just as there are multiple approaches to SAS coding, there are multiple approaches to creating a framework for data. Addressing the following questions in the project planning phase can help minimize future difficulties:

- Who is responsible for working with the data in SAS? What is their level of expertise?
- Who is responsible for working with the data in Power BI? What is their level of expertise?
- Who will be using the Power BI visualizations? How will they use the visualizations?
- How complicated is the initial data preparation? Does it involve mergers of multiple data sources?
- Have the final visuals been pre-determined or is there a need for flexibility and visual development based on the data?
- Is the project considered a “one and done” or will Power BI need updated data in the future (e.g., an updatable dashboard)?
- How will the SAS and Power BI processes be documented for current and future users?

Full documentation of both SAS and Power BI processes is strongly encouraged. Extensive commenting within SAS code is suggested in combination with additional text documentation in a separate file.

CONCLUSION

Successful integration of SAS and Power BI depends on multiple factors. Technology factors are just one part of the integration process. Careful consideration of end users and their needs is also key for a successful integration.

REFERENCES

Microsoft (2023, November 11). “Run R scripts in Power BI Desktop.” <https://learn.microsoft.com/en-us/power-bi/connect-data/desktop-r-scripts>

Microsoft (2024, March 13). “Connect to data using generic interfaces.” <https://learn.microsoft.com/en-us/power-query/connect-using-generic-interfaces#data-sources-accessible-through-ole-db>

R Core Team (2024, June 14). “R data import/export.” <https://cran.r-project.org/doc/manuals/R-data.html>

SAS Communities (2019, April). “Microsoft integration with SAS/SAS Share and Power BI.” <https://communities.sas.com/t5/Microsoft-Integration-with-SAS/SAS-Share-and-Power-BI/td-p/551745>

RECOMMENDED READING

- Cook, J. & Truett, J. (PharmaSUG, 2023). *Making Publication Metric Tracking Easy: Using an Automated, Integrated System of R, SAS, and Microsoft Power BI to Ease the Pain of Assessing Publication Metrics*. Available at lexjansen.com

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