AGREEYA®

Guide to creating business **dashboard & reports** using **Power BI & SharePoint**

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Introduction

Data in the 21st century is like Oil in the 18th century: an immensely, untapped valuable asset. Like oil, for those who see Data's fundamental value and learn to extract and use it, there will be huge rewards. In the present-day digital economy, data is more valuable than ever. Minding such a scenario, organizations need to streamline and utilize their data through business reporting to gain intelligent insights that drive growth and accelerate innovation.

More than 250,000 organizations around the world rely on SharePoint as a safe repository of their organizational content and documents. This makes SharePoint one of the largest sources of valuable organizational data. Through its deep integration with Microsoft Office and Office Web Apps, Excel, and Access Services, SQL Server connectivity, and the ability to define connections to other external data sources, SharePoint can easily become your hub for quick and effective business analysis. It carries a treasure trove of information that can transform the way you operate and provide a leading-edge in the intensely competitive marketplace.

But for that, organizations must begin to treat their SharePoint data as an enterprise asset and nurture it efficiently. However, many organizations just do not know how to turn their SharePoint data into meaningful insights and impactful business reports.

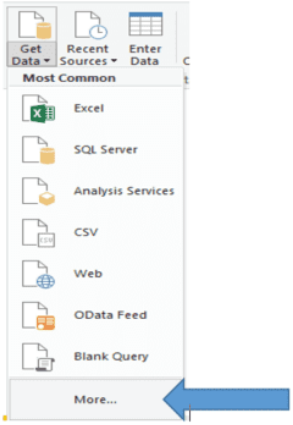
In this Whitepaper we would introduce you to Power BI, business intelligence centre in Microsoft 365, and its important feature Power Query. We will also provide you with a step-by-step guide on using Power Query and Power BI to create impactful dashboards and business reports utilizing their SharePoint data.
Now, let us begin.

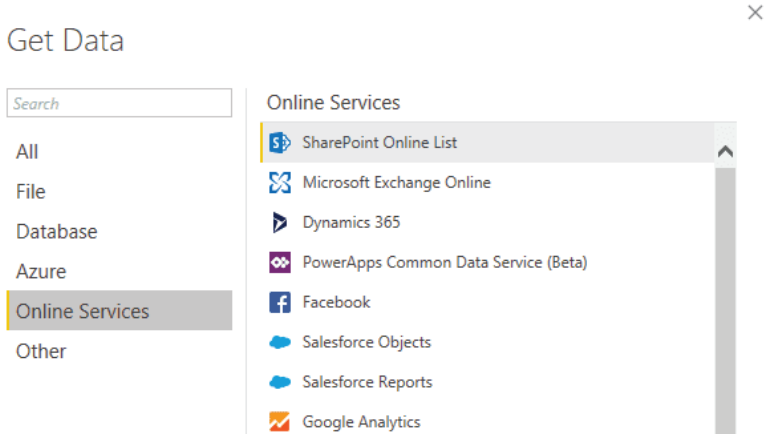
What is the Power BI online service?

Power BI is Microsoft's online reporting service that enables users to create reports and dashboards for single or multiple data sources.

How to leverage Power BI desktop application for business reporting with SharePoint data?

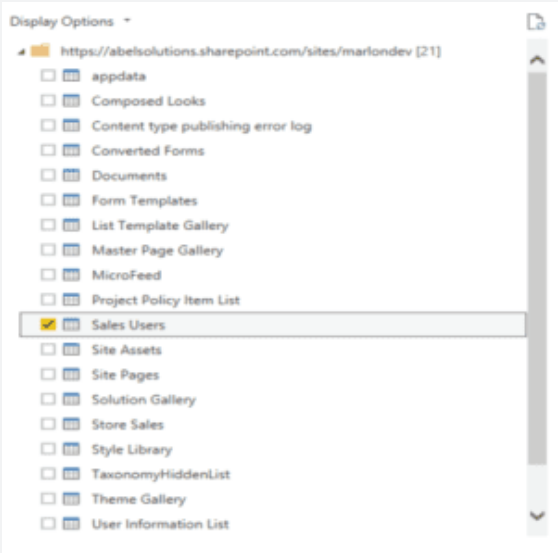
Launch the Power BI desktop application. Click on **Get Data** in the ribbon and select **More** from the drop-down menu.



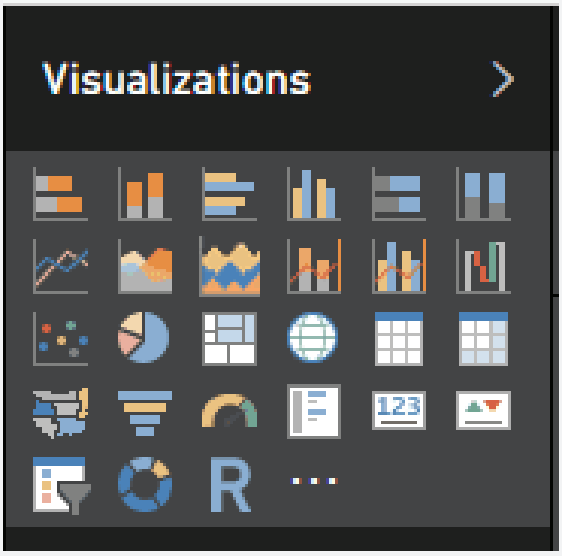


In the left-hand navigation of the pop-up window, select **Online Services**, select **SharePoint Online List**, and then **Connect**.

In the URL field enter the SharePoint site URL where the list is located, and then select **Ok**. Enter your credentials if prompted. Once connected, in the Navigator window, select the list or lists you would like to connect to.

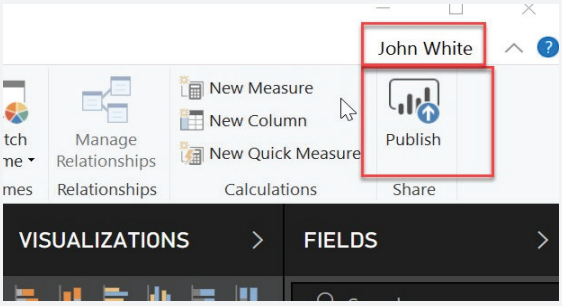


Select the **Edit** button to customize the imported data or **Load** to import the selected data. Once the data is imported you can start creating a report. There are several pre-built visualization templates for use or you can import your own visualization template.



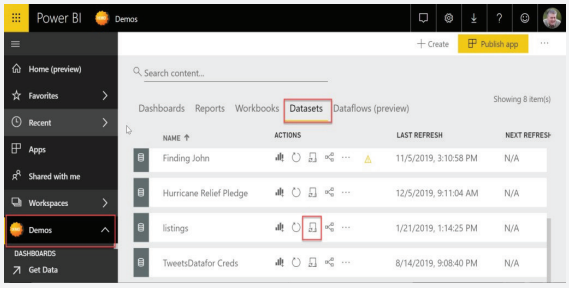
How to Publish a report to the Power BI service?

Once the report has been built, it can be published to the Power BI service for access through a browser and easy sharing. Publishing is done with the **Publish** button in the Power BI desktop ribbon. If you are working with multiple tenants through multiple identities, the destination tenant will be determined by the account which is currently signed in. This can be inspected, and changed, by clicking on the **account name** in the upper right of the desktop just above the ribbon.

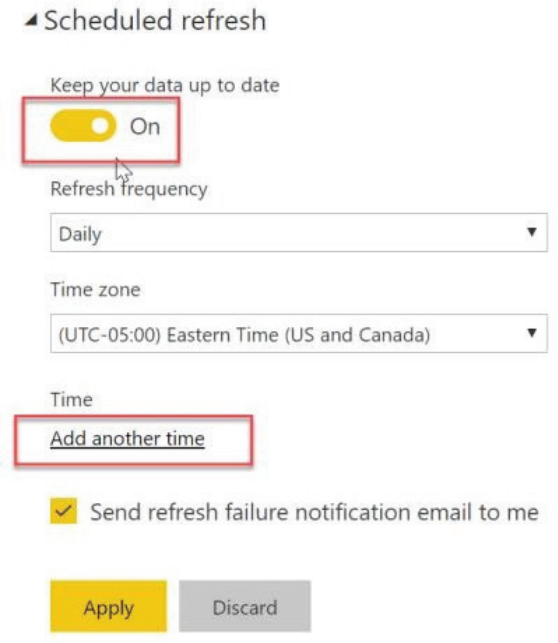


Automatic Refresh

To keep the data used in the report current, an automatic refresh process must be configured on the dataset from which the report is connected. To set up such a process, select the **workspace** from the left navigation, then the **Datasets** tab, and finally select the **schedule refresh** button.

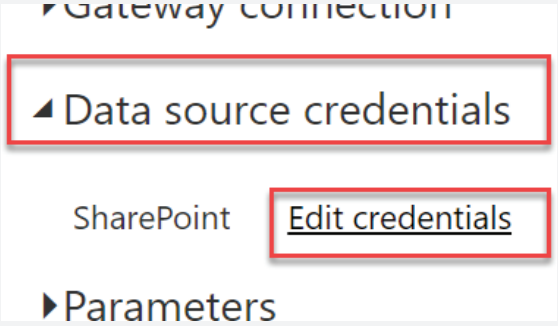


Next, you would come across the schedule refresh screen. In this screen, automatic refresh is turned off by default. To turn it on, open the **Scheduled Refresh** section, and turn on **Keep your data up to date**.



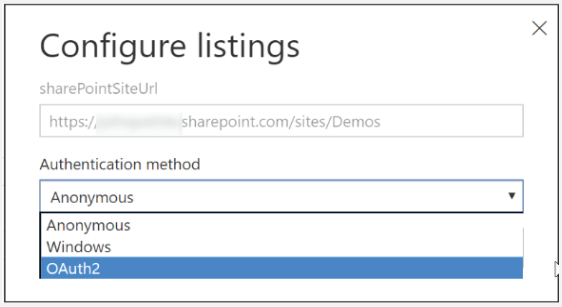
Once turned on, the service will automatically update the dataset from the SharePoint list once per day at a time of the service's own choosing. If you want to specify a refresh time, just select the Add another time link, and specify the refresh time. Additional refreshes can be added for the report, up to 8 per day, and 48 per day if your workspace is in a Power BI Premium capacity.

If this is the first time that Power BI has connected to this list, credentials will need to be added. This is done by opening the section titled **Data source credentials** and selecting the **Add credentials** or **Edit credentials** link for the **SharePoint** data source.



Although there are several authentication options in the resulting dialog box, **OAuth2** is the only one that will work with SharePoint Online.

Once selected, you will be taken through an authentication flow, and the resulting token will be stored in the service and used for subsequent refreshes.



What is Power Query?

Power Query
Extract content from SharePoint lists and cache it into a tabular data model.

Power Query is the Microsoft Data Connectivity and Data Preparation technology that enables business users to seamlessly access data stored across hundreds of data sources and reshape it to fit their needs. It offers an easy to use, engaging, and no-code user experience. This ETL (extract, transform, and load) tool is built into Power BI (the service), Power BI Desktop, Excel, and is now available online through Power BI Dataflows and Microsoft Flow. Power Query can extract content from a SharePoint list and cache it into a tabular data model for reporting purposes.

Benefits of using Power Query

Difficulty in finding and connecting data:

Power Query enables connectivity to a wide range of data sources, including data of all sizes and shapes.

Fragmented experiences for data connectivity:

It offers consistency of experience and parity of query for all data sources.

Data needs to be reshaped before consumption:

It provides an interactive and intuitive experience for rapidly and iteratively building queries over a data source of any size.

What are Data Connectors?

Data Connector is a lightweight out-of-the-box solution that provides a secure and convenient way to transfer business data between SharePoint lists and external data sources.

Connectors for SharePoint Data in Power Query

As an ETL tool, Power Query can connect to SharePoint data via several connectors. Once connected, it uses a step-based approach to transform the data into a required shape and load it into a data model for reporting purposes. In the case of Power Query Online, the data is loaded into a Power BI Dataflow for further modifications and reuse.

4 Major data connectors in Power Query for SharePoint data

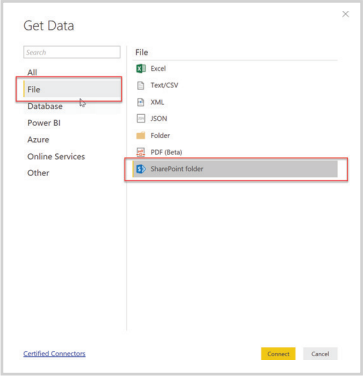
SharePoint Folder	OData	SharePoint List	SharePoint Online List

Let us now explore and understand how to utilize these connectors to create powerful business reports.

Connecting via SharePoint Folder

The SharePoint folder connector is used to report on files stored in SharePoint, or to extract data from such files. There are native connectors for different file-based data types (XLSX, CSV, PDF) in Power Query, these connectors are expected to find the files stored in a file system. The SharePoint folder is as a gateway to these files, and in fact, it will load the file connector for the relevant file type.

How to connect?

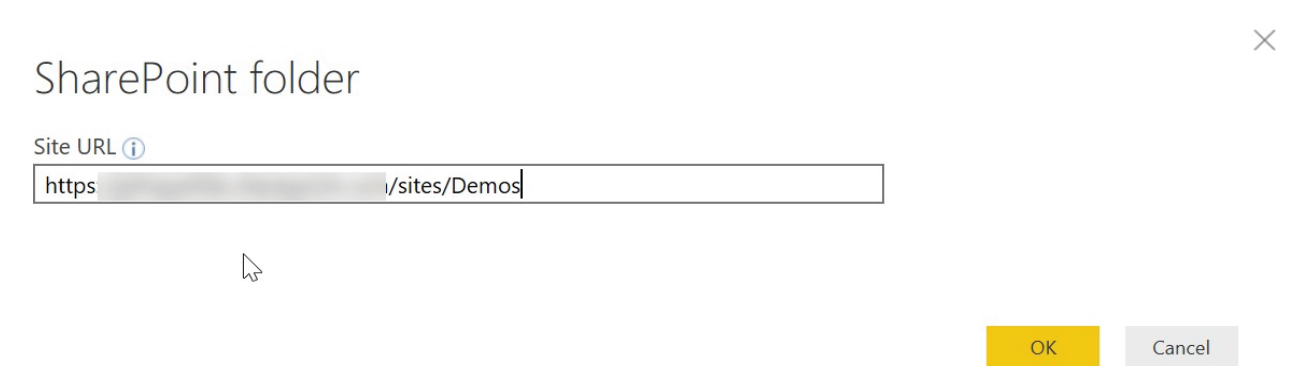


STEP #1

To access file-based information, use the **Get Data** button in either Excel or Power BI Desktop, and choose **SharePoint Folder**.

STEP #2

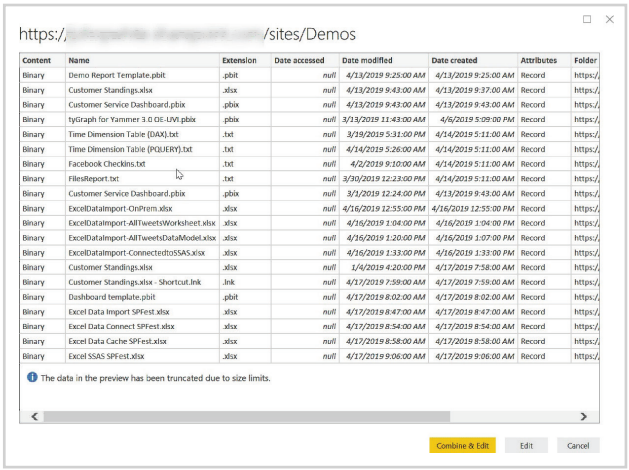
Enter the URL of the site, not the URL of a folder as the title might show.



STEP #3

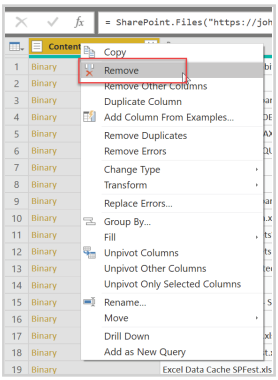
The options on the next screen are **Combine and Edit** or **Edit**.

Combine and Edit will extract the contents of all files and merge them into a single table. This action may be appropriate if all files are of the same format, and they have the same schema. However, it is more likely that some additional filtering and transformations will be required before any such combinations. Therefore, the **Edit** button should be used in most cases.



However, business users might want to achieve various goals with the SharePoint data. Accounting for this, let us learn about different scenarios.

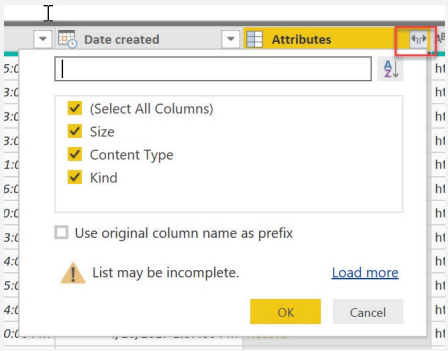
Scenario #1: Extracting File Metadata



The data available here is the file-based metadata for each file. If the goal is to report on the files in the site, a couple of additional steps should be performed.

First, the **Content** column contains the binary file content of each file. This data is available for metadata reporting and can be removed easily. Simply, right-click on the column header and select **Remove**.

Next, to access metadata such as file size, etc., the **Attributes** column must be expanded. Click the **expand icon** on the right of the column header and select the columns necessary for the report.



Click the **OK** button to expand the column.

	Date modified	Date created	Size	Content Type	Kind
null	4/13/2019 9:25:00 AM	4/13/2019 9:25:00 AM	18674	application/x-zip-compressed	File
null	4/13/2019 9:43:00 AM	4/13/2019 9:37:00 AM	22497	application/vnd.openxmlformats-officedocument.spreadsheetml.sheet	Excel File
null	4/13/2019 9:43:00 AM	4/13/2019 9:43:00 AM	626955	application/x-zip-compressed	File
null	3/13/2019 11:43:00 AM	4/6/2097 5:09:00 PM	15246556	application/x-zip-compressed	File
null	3/19/2019 5:31:00 PM	4/14/2019 5:11:00 AM	760	text/plain	Text File
null	4/14/2019 5:26:00 AM	4/14/2019 5:11:00 AM	1883	text/plain	Text File
null	4/2/2019 9:10:00 AM	4/14/2019 5:11:00 AM	256	text/plain	Text File
null	3/30/2019 12:23:00 PM	4/14/2019 5:11:00 AM	2434	text/plain	Text File
null	3/1/2019 12:24:00 PM	4/13/2019 9:43:00 AM	108614	application/x-zip-compressed	File
null	4/16/2019 12:55:00 PM	4/16/2019 12:55:00 PM	336169	application/vnd.openxmlformats-officedocument.spreadsheetml.sheet	Excel File
null	4/16/2019 1:04:00 PM	4/16/2019 1:04:00 PM	24838042	application/vnd.openxmlformats-officedocument.spreadsheetml.sheet	Excel File

Power Query will now auto-detect the data types of expanded columns. In such a scenario, we would recommend you to set the data types of the three expanded columns to:

Size: Whole number
Content-Type: Text
Kind: Text

Now, the data can be loaded into the data model using the **Close and Apply** button on the Home tab, and the visuals can be built.

Once the report is built and published, it can be embedded into a modern SharePoint page using the Power BI web part to complete the picture.

Scenario #2: Extracting File Contents

SharePoint data might be nestled in various file types such as Excel, CSV, PDF, and others. If the data to be reported is stored within these files, it can be extracted using the file contents connector. In such a scenario, the Content column should NOT be removed.

Instead, scroll to the desired file and click on the **Binary** link in the **Content** column.

	Content	Name	Extension
31	Binary	Event Tweets.xlsx	.xlsx
32	Binary	SharkAttacks.xlsx	.xlsx
33	Binary	SharkAttacks.xlsx	.xlsx
34	Binary	Texas Expenditures 2016.xlsx	.xlsx
35	Binary	TweetsInSheetsAndModelEdit.xlsx	.xlsx
36	Binary	TweetsInSheets.xlsx	.xlsx
37	Binary	TweetsInModel.xlsx	.xlsx
38	Binary	TweetsInSheets.xlsx	.xlsx
39	Binary	TweetsInSheetsAndModel.xlsx	.xlsx
40	Binary	TweetsInModel.xlsx	.xlsx
41	Binary	Ready list.csv	.csv

If the site has a lot of files, it would be wise to use some of the other columns, like **Extension**, to filter the relevant results first. Click the **Binary** link to detect the file type in question and load the file contents.

If the file type in question is Excel, then the next screen will show different worksheets that can be imported. The sheet data can be accessed by clicking on the relevant **Table** link.

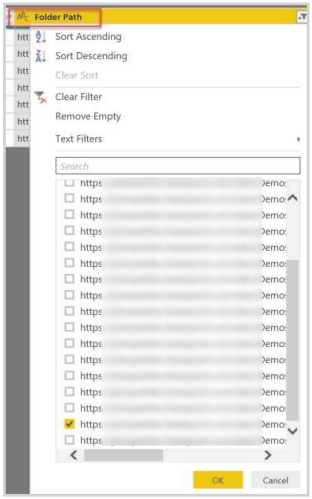
	Name	Data	Item	Kind
1	Visuals	Table	Visuals	Sheet
2	Data	Table	Data	Sheet
3	vwTGTweets	Table	vwTGTweets	Table

Once the worksheet data is loaded, it can be transformed and loaded into the data model just as with any other data source. It can also be refreshed by the Power BI service, or by using the SharePoint folder connector. An on-premises data gateway is not needed if the file is stored in SharePoint Online.

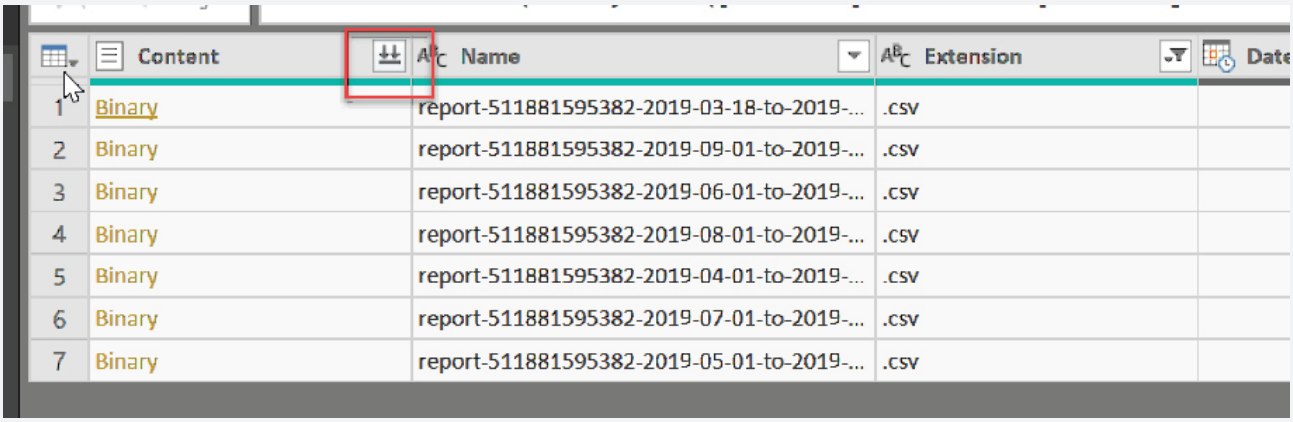
Scenario #3: Combining File Contents

Then there are scenarios when users might want to import the contents of multiple files simultaneously. An example of such a logging scenario arises when new data files are created periodically in the same folder. These files would all have the same schema. However, multiple queries can be created using the above approach and to combine the results of those queries, but Power BI offers a more elegant approach through the SharePoint folder connector.

Using the example above, the **Content** column is not removed, and the **Binary** link is not clicked. Since the folder connector returns the contents of all libraries in the site, it is necessary to first filter the results down to the target folder. This is done by first filtering the **Folder Path** column and selecting only the desired folder.



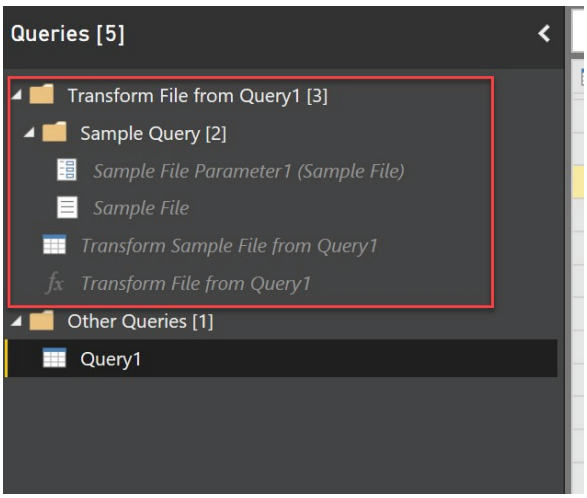
The file contents can then be combined by using the **Combine Files** button at the right of the **Content** column header.

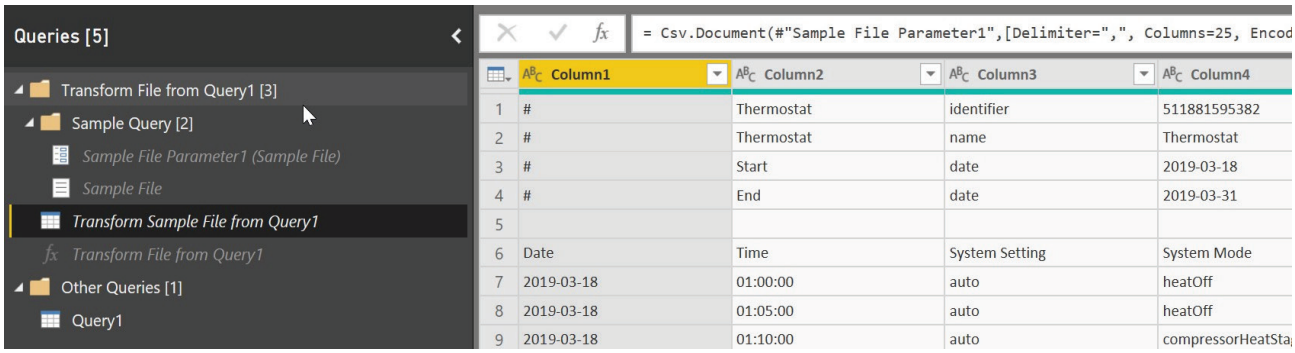


	Content	Name	Extension	Date
1	Binary	report-511881595382-2019-03-18-to-2019-...	.csv	
2	Binary	report-511881595382-2019-09-01-to-2019-...	.csv	
3	Binary	report-511881595382-2019-06-01-to-2019-...	.csv	
4	Binary	report-511881595382-2019-08-01-to-2019-...	.csv	
5	Binary	report-511881595382-2019-04-01-to-2019-...	.csv	
6	Binary	report-511881595382-2019-07-01-to-2019-...	.csv	
7	Binary	report-511881595382-2019-05-01-to-2019-...	.csv	

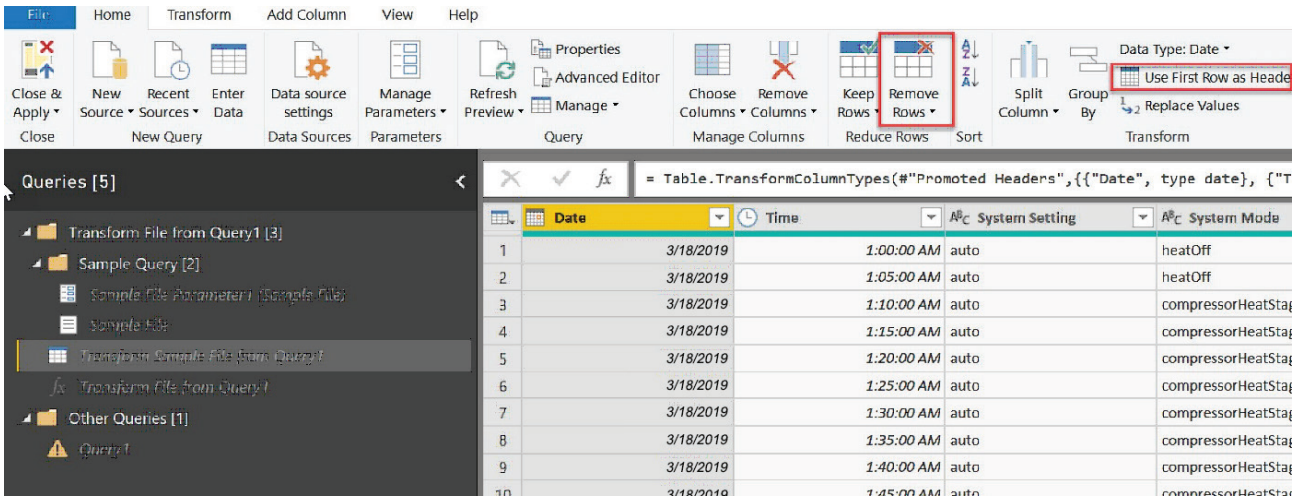
Depending on the type of file, Power Query will prompt added parameters and construct a series of functions and parameters that are used to combine the file contents.

In the example, a series of CSV files were combined. The first file is used as an example, and its transformations are repeated for all files in the folder. This is seen above as the **Transform Sample file from Query1**. In many cases, the first transformation will need to be edited, and this can be done by simply selecting this file and performing the added Power Query steps.





For the files in this example, the first 5 lines of the file are informational only and supply no value. They need to be removed. Also, line #6 has the column names. This can be fixed in two steps using the **Remove Top Rows** and the **Use First Row as Headers** functions.



The final query shows an error because the column names have changed. This can be corrected by selecting it and removing the final "Changed Type" step in the list of Power Query transformations. Column types can then be set manually.

At this point, data can be loaded into the model using the **Close and Apply** button on the Home tab, and then the report can be built. Data will be loaded from all files in the folder, and any later changes to the files or the addition of new files will be reflected in any future refreshes.

Connecting via OData

Any SharePoint list since the SharePoint 2010 onwards can be expressed as OData. To do so, you can use the listdata.svc REST endpoint by appending /_vti_bin/listdata.svc to the end of a site URL. This URL can be used as a starting point within Power Query to access list-based data.

Connecting via SharePoint List and SharePoint Online List

The SharePoint List and SharePoint Online List connectors are identical and can be treated as one. The only fundamental difference between both is the method of authentication. One authenticates to SharePoint Online, and the other to an on-premises SharePoint.

The SharePoint List connector, much like the OData Connector, connects to the root of the SharePoint site and allows the report designer to import from one or more SharePoint lists. However, the type and quantity of data returned by this connector are significantly richer than that returned by the more generic OData connector. The SharePoint list connector returns more metadata about each item and provides helpers for use with complex SharePoint data types.

SharePoint as a Data Source

SharePoint is a textbook example of one tool that can be used in many different ways. It's a Swiss army knife for collaboration and productivity. SharePoint lists offer a quick and easy way for users to store and share millions of items. Its document libraries have become the industry standard for document management, supplying secure, reliable storage. While SharePoint libraries provide the backbone for document storage in all of Microsoft 365. When you add documents to Microsoft Teams or Yammer, they're stored in a document library.

In addition to lists, documents can also contain valuable data. Whereas one user may create a list to store data in rows and columns, another user may choose to do so in Excel, and then save the Excel file to a document library. Both containers hold valuable data, and as with most data, there will be a need to report on it.

When utilized and nurtured, loads of valuable business data dwelling in SharePoint can provide an organization with competitive advantage in the marketplace. Power BI and Power Query help organizations make the most of their SharePoint data. These tools help business users to easily connect their SharePoint data with Power BI and create dashboards and business reports they need.

Tools for SharePoint Data Reporting

While Power Query is the most popular tool for connecting SharePoint data (and that is largely why we focused on it), there are other tools available to turn your SharePoint data into purposeful business reports. These are Report Builder and SQL Server Intergration Service. However, we would dwell upon these tools sometime in the future.

Conclusion

There are several tools available to build powerful business reports from data stored in SharePoint. In most cases, reports are built using either Power BI Desktop or on Excel using Power Query. And hence we have explored both these areas in-depth during this Whitepaper. Both these options offer the widest array of features and the best user experience. Have fun preparing reports with your SharePoint data!

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