Tech Saksham

Case Study Report

Data Analytics with Power BI

“Real-Time Analysis of Bank Customers”

“College Name”

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ABSTRACT

In the digital age, data has become an invaluable asset for businesses, particularly in the banking sector. The proposed project, “Real-Time Analysis of Bank Customers,” aims to leverage PowerBI, a leading business intelligence tool, to analyze and visualize real-time customer data. This project will enable banks to gain deep insights into customer behavior, preferences, and trends, thereby facilitating data-driven decision-making and enhancing customer satisfaction. The real-time analysis will allow banks to respond promptly to changes in customer behavior or preferences, identify opportunities for cross-selling and up-selling, and tailor their products and services to meet customer needs. The project will also contribute to the broader goal of digital transformation in the banking sector, promoting efficiency, innovation, and customer-centricity.

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INTRODUCTION

1.1 Problem Statement

In today's competitive banking landscape, understanding customer behavior and preferences is crucial for customer retention and revenue generation. However, banks often face challenges in analyzing customer data due to the sheer volume and velocity of data generated. Traditional data analysis methods are time-consuming and often fail to provide real-time insights. This lack of real-time analysis can lead to missed opportunities for customer engagement, cross-selling, and up-selling, impacting the bank's revenue generation and customer satisfaction. Furthermore, the complexity and diversity of customer data, which includes transaction history, customer feedback, and demographic data, pose additional challenges for data analysis.

1.2 Proposed Solution

The proposed solution is to develop a PowerBI dashboard that can analyze and visualize real-time customer data. The dashboard will integrate data from various sources such as transaction history, customer feedback, and demographic data. It will provide a comprehensive view of customer behavior, preferences, and trends, enabling banks to make informed decisions. The dashboard will be interactive, user-friendly, and customizable, allowing banks to tailor it to their specific needs. The real-time analysis capability of the dashboard will enable banks to respond promptly to changes in customer behavior or preferences, identify opportunities for cross-selling and up-selling, and tailor their products and services to meet customer needs.

1.3 Feature

- **Real-Time Analysis**: The dashboard will provide real-time analysis of customer data.
- **Customer Segmentation**: It will segment customers based on various parameters like age, income, transaction behavior, etc.
- **Trend Analysis**: The dashboard will identify and display trends in customer behavior.

- **Predictive Analysis**: It will use historical data to predict future customer behavior.

1.4 Advantages

- **Data-Driven Decisions**: Banks can make informed decisions based on real-time data analysis.
- **Improved Customer Engagement**: Understanding customer behavior and trends can help banks engage with their customers more effectively.
- **Increased Revenue**: By identifying opportunities for cross-selling and up-selling, banks can increase their revenue.

1.5 Scope

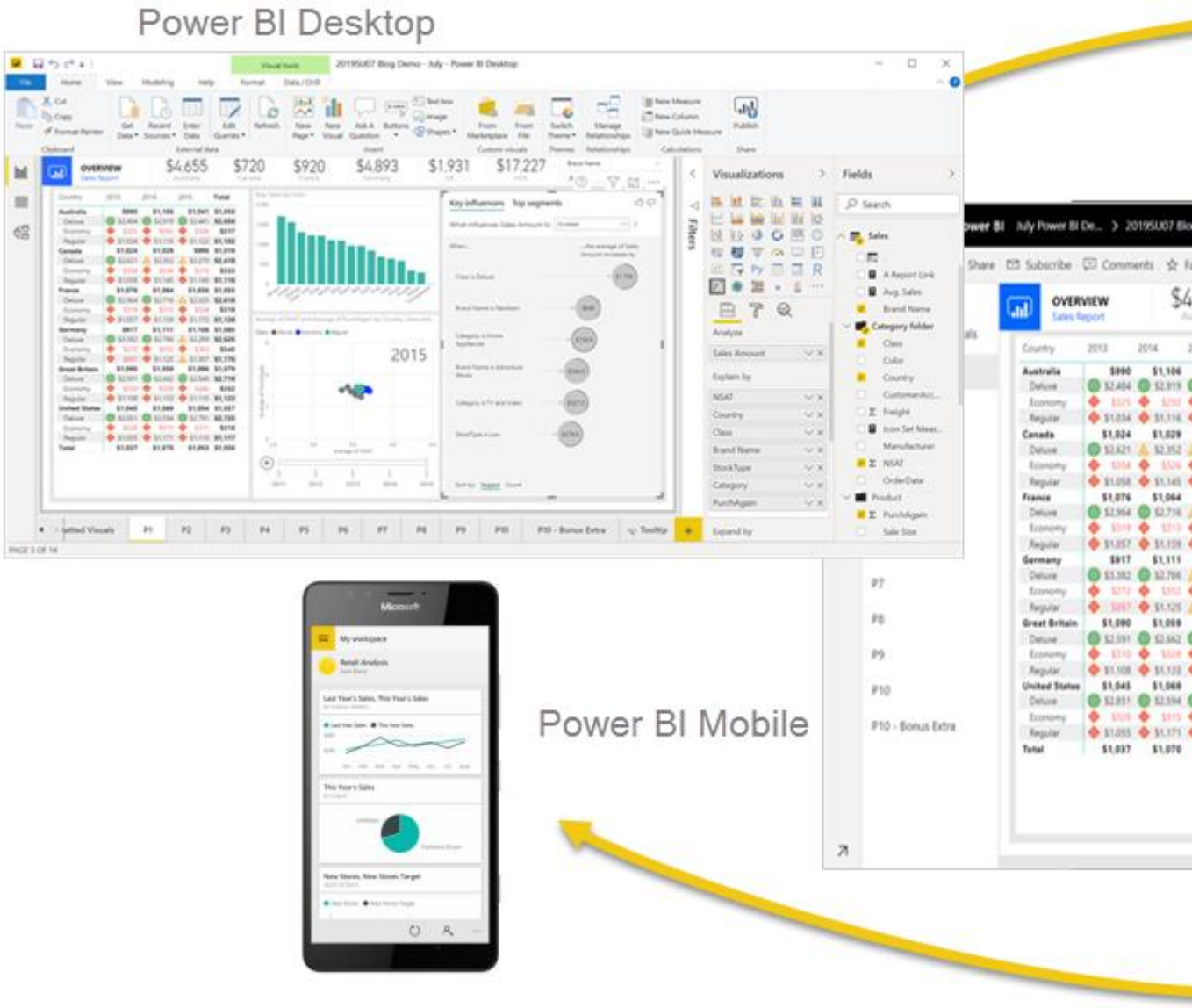
The scope of this project extends to all banking institutions that aim to leverage data for decision-making and customer engagement. The project can be further extended to incorporate more data sources and advanced analytics techniques, such as machine learning and artificial intelligence, to provide more sophisticated insights into customer behavior. The project also has the potential to be adapted for other sectors, such as retail, healthcare, and telecommunications, where understanding customer behavior is crucial. Furthermore, the project contributes to the broader goal of digital transformation in the banking sector, promoting efficiency, innovation, and customer-centricity.

Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Your data might be an Excel spreadsheet, or a collection of cloud-based and on-premises hybrid data warehouses. Power BI lets you easily connect to your data sources, visualize and discover what's important, and share that with anyone or everyone you want.

Power BI

Power BI consists of several elements that all work together, starting with these three basics:

- A Windows desktop application called *Power BI Desktop*.
- An online software as a service (SaaS) service called the *Power BI service*.
- Power BI Mobile apps for Windows, iOS, and Android devices.



These three elements—Power BI Desktop, the service, and the mobile apps—are designed to let you create, share, and consume business insights in the way that serves you and your role most effectively.

Power Query

Power Query is a data transformation and data preparation engine. Power Query comes with a graphical interface for getting data from sources and a Power Query Editor for applying transformations. Because the engine is available in many products and services, the destination where the data will be stored depends on where Power Query was used. Using Power Query, you can perform the extract, transform, and load (ETL) processing of data.

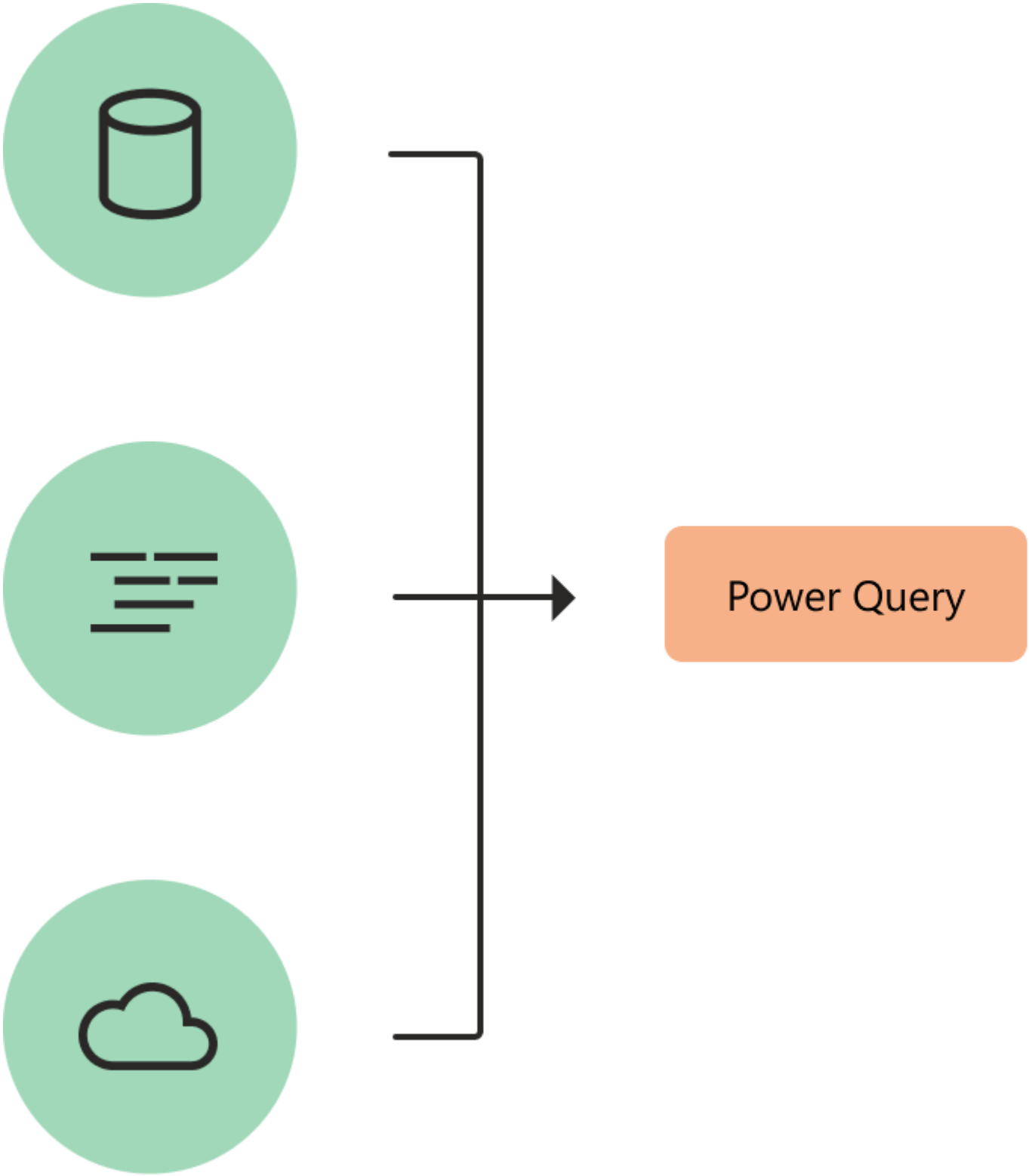


Diagram with symbolized data sources on the left, passing through Power Query for transformation in the center, and then going to four destinations on the right: Microsoft Azure Data Lake Storage, Microsoft Dataverse, Microsoft Excel and Microsoft Power BI.

How Power Query helps with data acquisition

Business users spend up to 80 percent of their time on data preparation, which delays the work of analysis and decision-making. Several challenges contribute to this situation, and Power Query helps address many of them.

Existing challenge	How does Power Query help?
Finding and connecting to data is too difficult	Power Query enables connectivity to a wide range of data sources, including data of all sizes and shapes.
Experiences for data connectivity are too fragmented	Consistency of experience, and parity of query capabilities over all data sources.
Data often needs to be reshaped before consumption	Highly interactive and intuitive experience for rapidly and iteratively building queries over any data source, of any size.
Any shaping is one-off and not repeatable	When using Power Query to access and transform data, you define a repeatable process (query) that can be easily refreshed in the future to get up-to-date data. In the event that you need to modify the process or query to account for underlying data or schema changes, you can use the same interactive and intuitive experience you used when you initially defined the query.
Volume (data sizes), velocity (rate of change), and variety (breadth of data sources and data shapes)	Power Query offers the ability to work against a subset of the entire data set to define the required data transformations, allowing you to easily filter down and transform your data to a manageable size. Power Query queries can be refreshed manually or by taking advantage of scheduled refresh capabilities in specific products (such as Power BI) or even programmatically (by using the Excel object model). Because Power Query provides connectivity to hundreds of data sources and over 350 different types of data transformations for each of these sources, you can work with data from any source and in any shape.

Power Query experiences

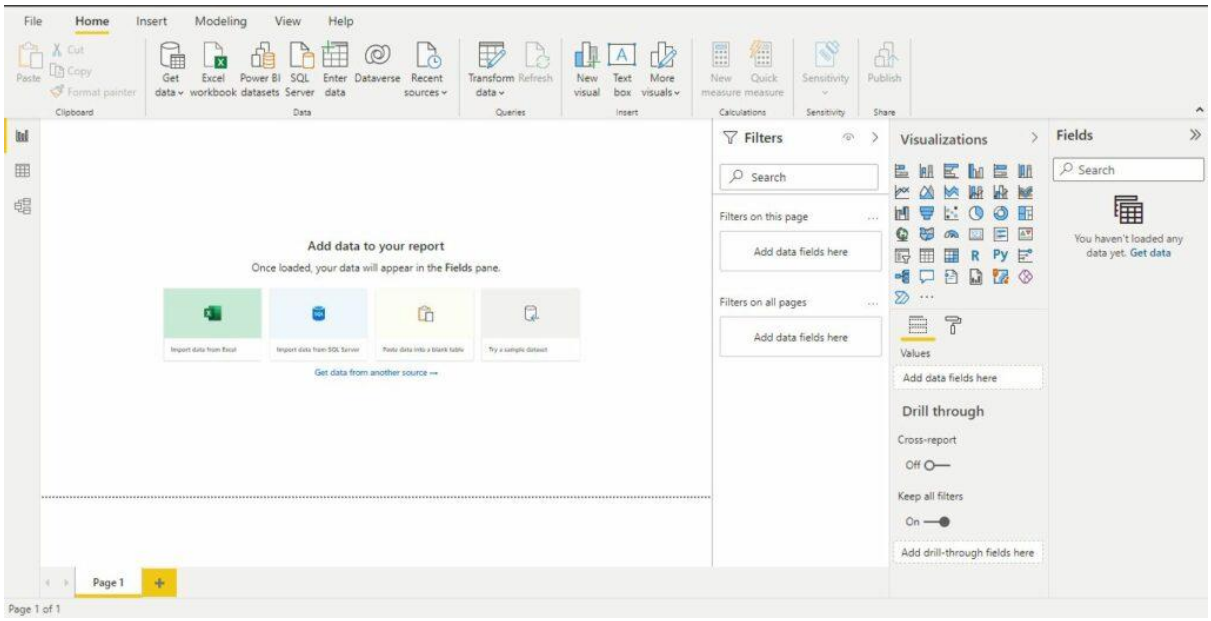
The Power Query user experience is provided through the Power Query Editor user interface. The goal of this interface is to help you apply the transformations you need

simply by interacting with a user-friendly set of ribbons, menus, buttons, and other interactive components.

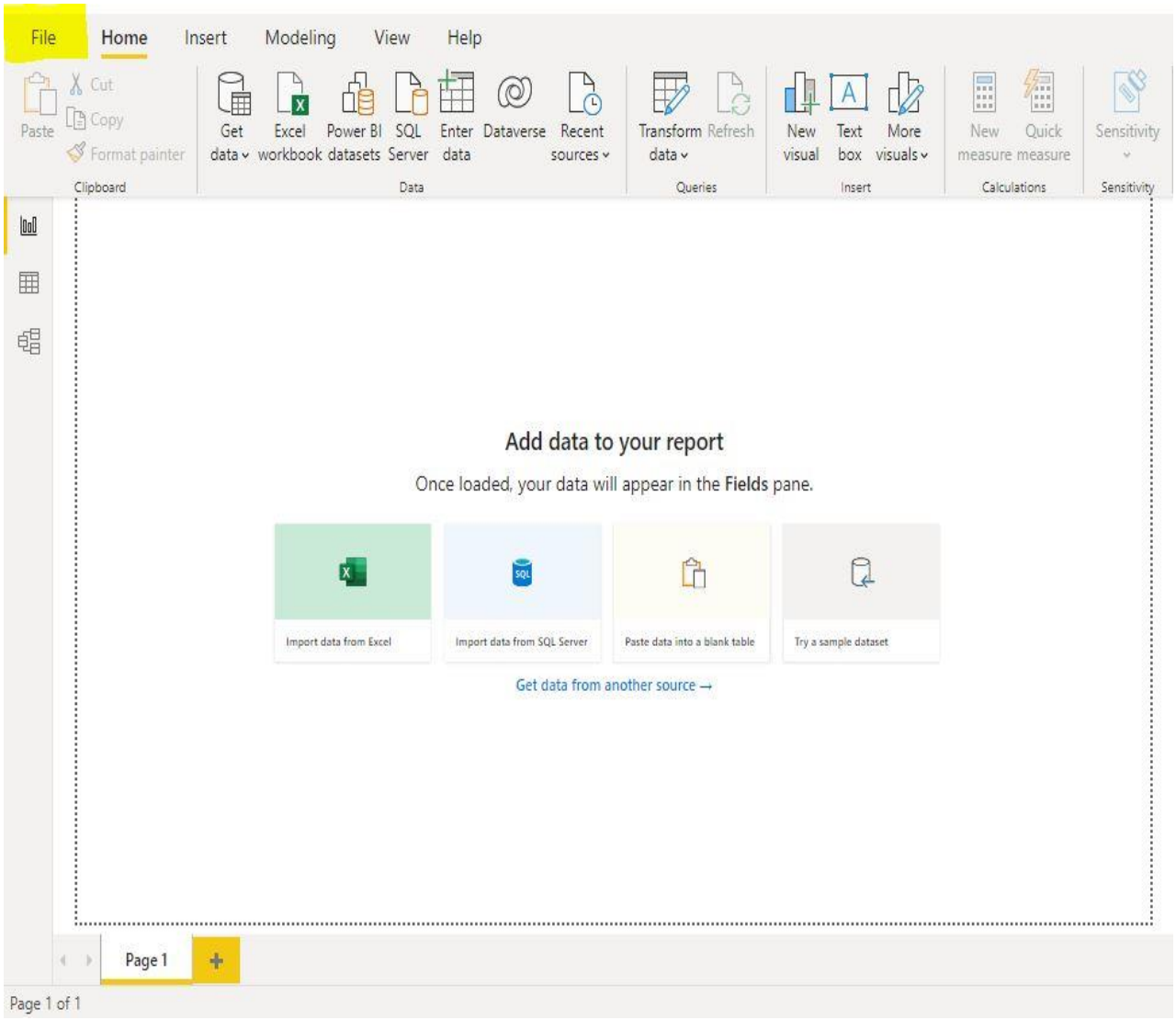
The Power Query Editor is the primary data preparation experience, where you can connect to a wide range of data sources and apply hundreds of different data transformations by previewing data and selecting transformations from the UI. These data transformation capabilities are common across all data sources, whatever the underlying data source limitations.

When you create a new transformation step by interacting with the components of the Power Query interface, Power Query automatically creates the M code required to do the transformation so you don't need to write any code.

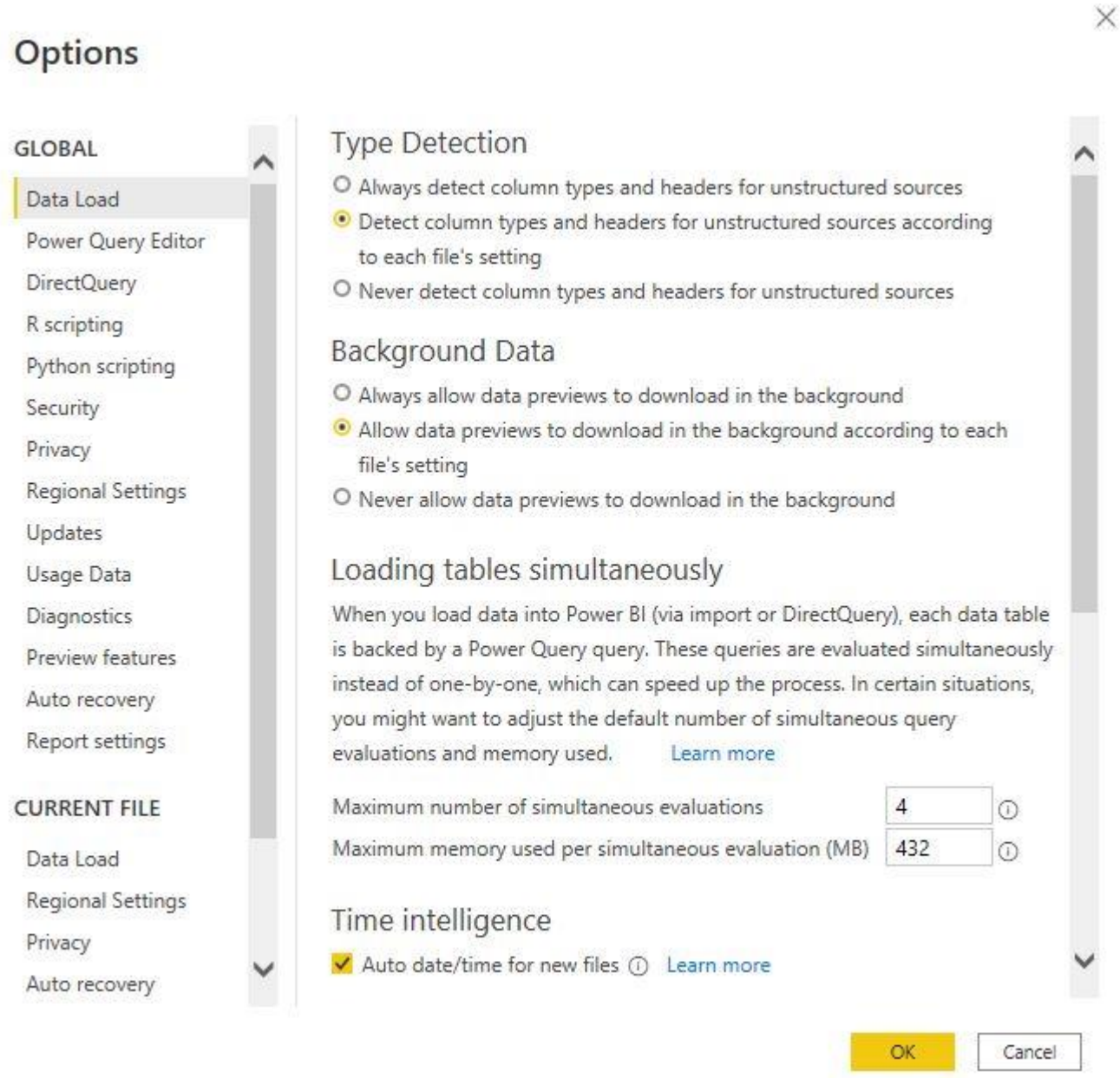
User Interface



After that, the next thing to do is to set your **preview features**, and you can do this by clicking “**file**” at the top left corner.



And click on **options and settings**, then select **options**.



Click **Preview Features** and check all boxes except **Spanish language support for Q&A** (except if you understand Spanish).

Then select **OK** to save your settings. You will be prompted to restart the app to save your settings. After this, restart your Power BI Desktop, and return to the home screen.

About my project

ower BI Desktop introduces a new way to author, collaborate, and save your projects. You can now save your work as a ***Power BI Project*** (PBIP). As a project, report and

semantic model *item* definitions are saved as individual plain text files in a simple, intuitive folder structure.

Saving your work as a project has the following benefits:

- **Text editor support** - Item definition files are JSON formatted text files containing semantic model and report metadata. They're publicly documented and human readable. While project files support simple text editing tools like Notepad, it's better to use a code editor like Visual Studio Code (VS Code), which provides a rich editing experience including intellisense, validation, and Git integration.

- **Programmatic generation and editing item definitions** - You can create scripts using the popular and easy to use Tabular Model Scripting Language (TMSL) , or create your own custom applications to make changes to your item definitions. Applications can be based on public documentation of the item definition schemas and/or client libraries.

- **Source control** - Power BI semantic model and report item definitions can be stored in a source control system, like Git. With Git, you can track version history, compare revisions (diff), and revert to previous versions. Source control can also unblock collaboration when using Power BI Desktop by using familiar collaboration mechanisms for resolving conflicts (merge) and reviewing changes (pull requests). To learn more, see Version control in Git.

- **Continuous Integration and Continuous Delivery (CI/CD)** - You can use systems where developers in your organization submit a proposed change to the CI/CD system. The system then validates the change with a series of *quality gates* before applying the change to the production system. These quality gates can include code reviews by other developers, automated testing, and automated build to validate the integrity of the changes. CI/CD systems are typically built on top of existing source control systems. To learn more, see DevOps - Continuous integration, and DevOps - Continuous delivery.

Video

See Power BI Desktop projects and other developer mode features being introduced at Microsoft Build 2023.

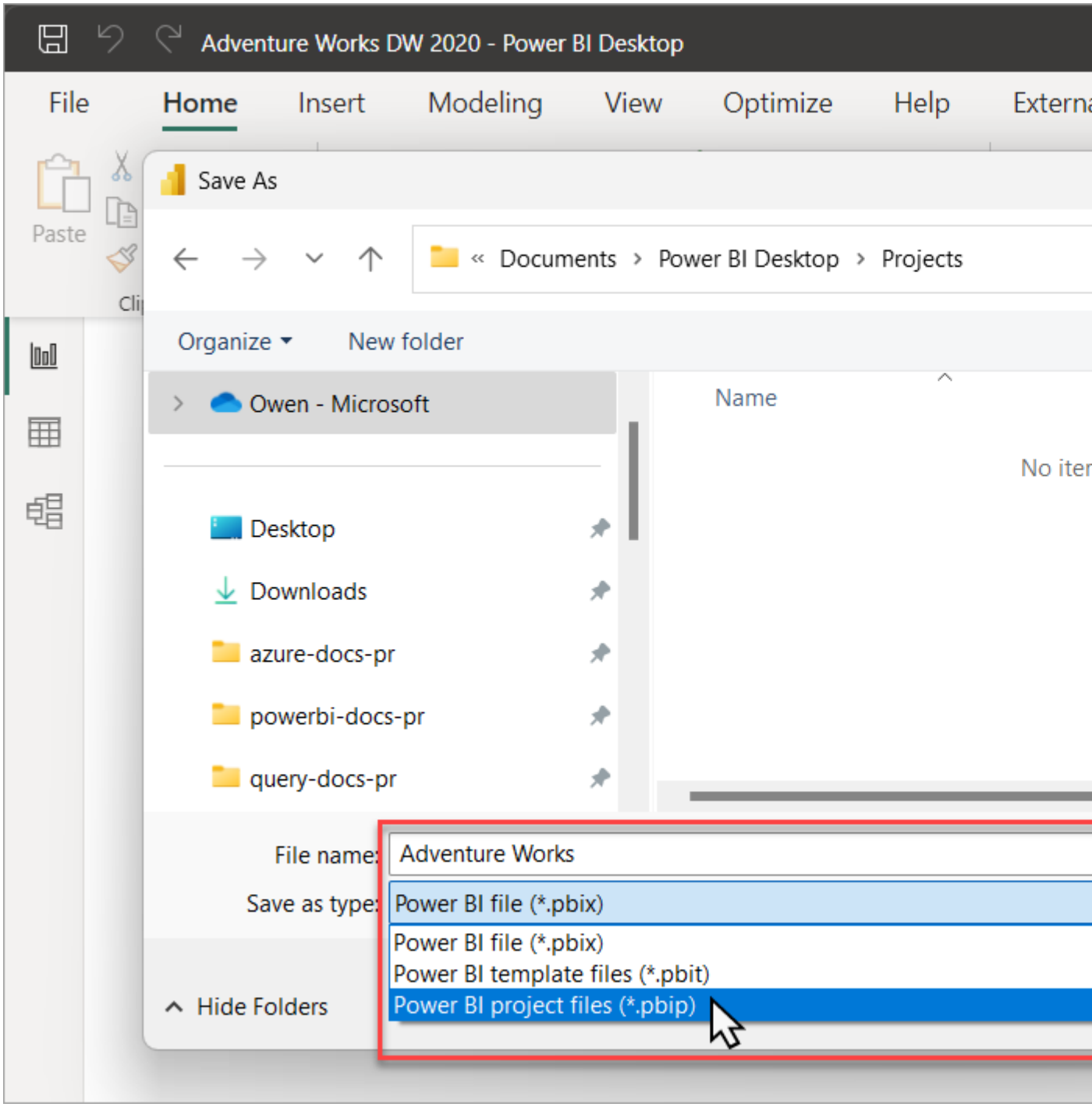
Enable preview features

Saving as a project in Power BI Desktop is currently in **preview**. Before giving it a try, you must first enable it in **Preview features**.

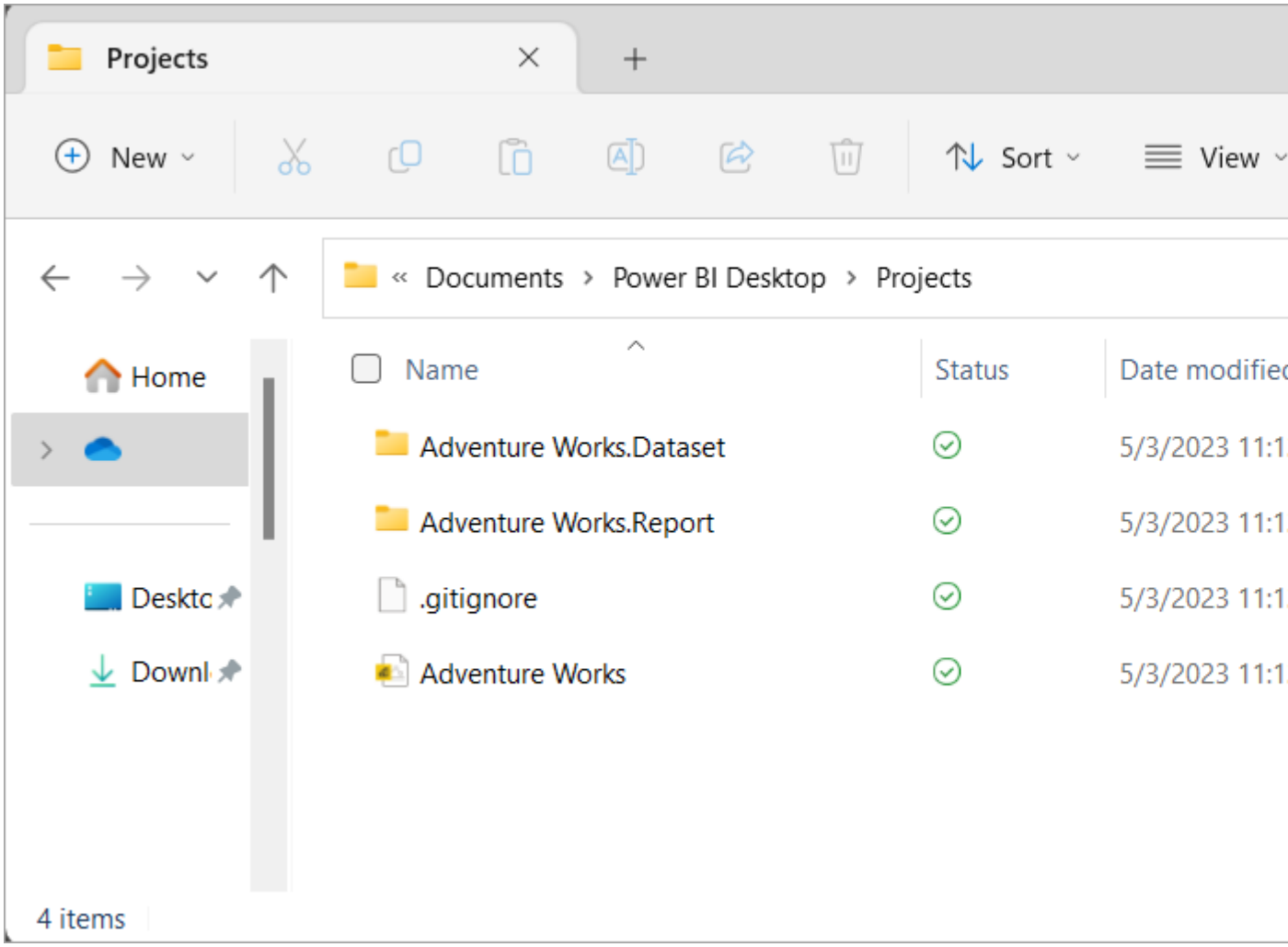
To enable, in Power BI Desktop > **File** > **Options and settings** > **Options** > **Preview features**, select the checkbox for **Power BI Project (.pbip) save option**.

Save as a project

If you're working on a new project or you've opened an existing Power BI Desktop file (pbix), you can save your work as a Power BI *project* file (pbip):



When you save as a project, Power BI Desktop saves report and semantic model items as folders, each containing text files that define the item. You see the following:



Let's take a closer look at what you see in your project's root folder:

`<project name>.Dataset`

A collection of files and folders that represent a Power BI semantic model. It contains some of the most important files you're likely to work on, like model.bim. To learn more about the files and subfolders and files in here, see Project Semantic Model folder.

`<project name>.Report`

A collection of files and folders that represent a Power BI report. To learn more about the files and subfolders and files in here, see Project report folder.

.gitIgnore

Specifies intentionally untracked files Git should ignore. Power BI Desktop creates the .gitignore file in the root folder when saving if it doesn't already exist.

Semantic model and report subfolders each have default git ignored files specified in .gitIgnore:

- Dataset
  - .pbi\localSettings.json
  - .pbi\cache.abf
- Report
  - .pbi\localSettings.json

<project name>.pbip

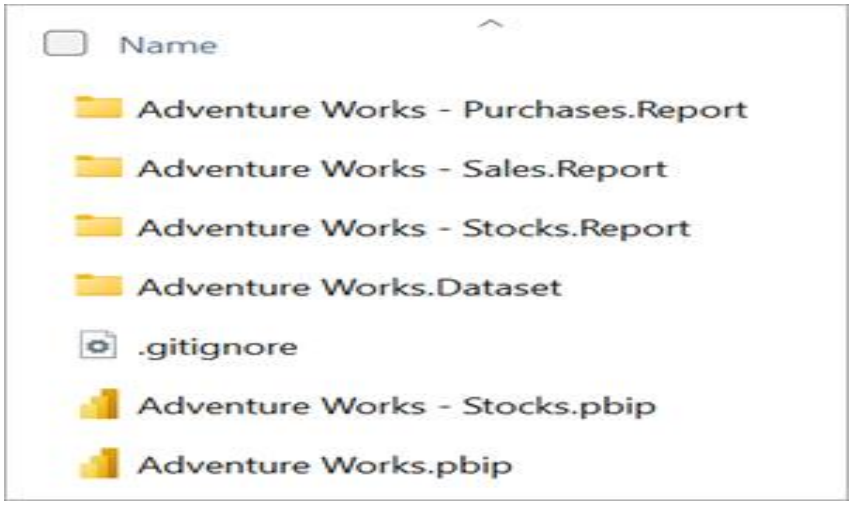
The PBIP file contains a pointer to a report folder, opening a PBIP opens the targeted report and model for authoring.

For more information, refer to the pbip schema document.

Open a Power BI Project

You can open Power BI Desktop from the Power BI Project folder either by opening the **pbip** file or the **pbir** file in the report folder. Both options open the report for editing, and the semantic model, if there's a relative reference to a semantic model.

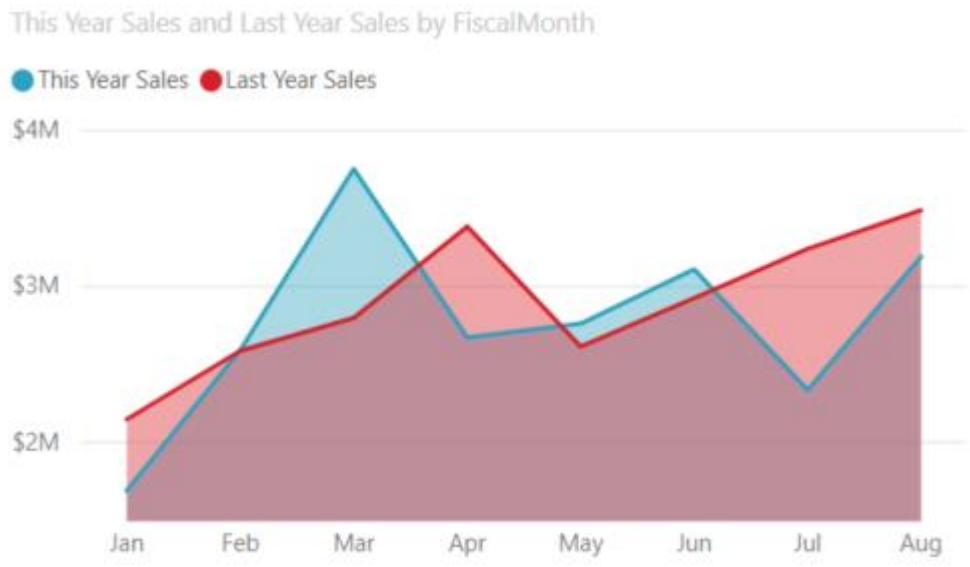
You can save multiple reports and semantic models to the same folder. Having a separate pbip file for each report isn't required because you can open each report directly from the pbir within the report folder.



Visualizations in Power BI

All of these visualizations can be added to Power BI reports, specified in Q&A, and pinned to dashboards.

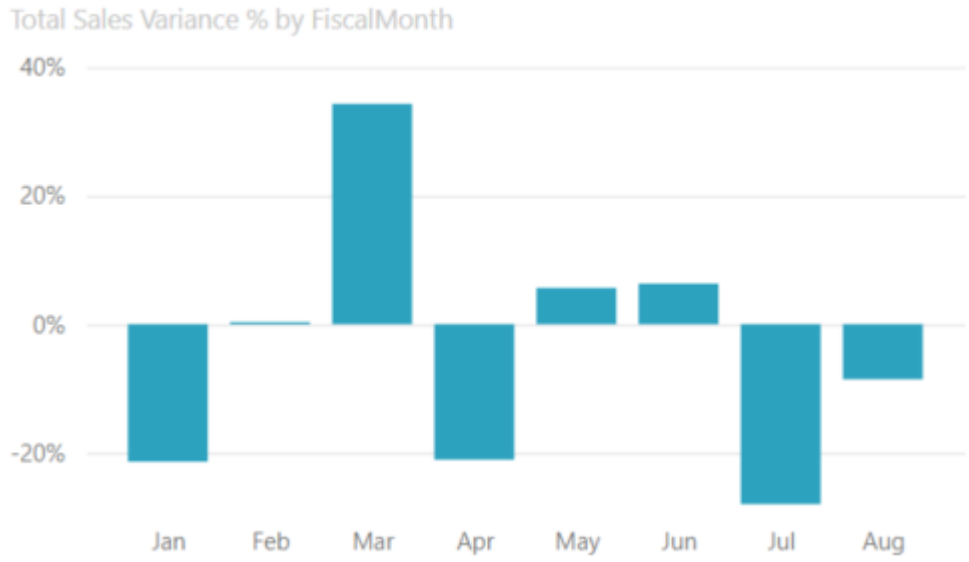
Area charts: Basic (Layered) and Stacked

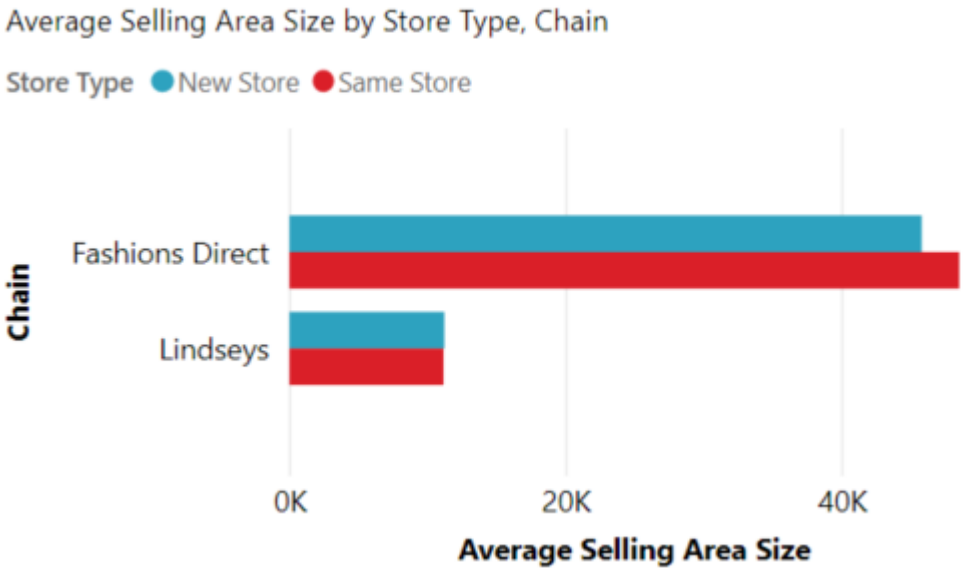


The basic area chart is based on the line chart with the area between the axis and line filled in. Area charts emphasize the magnitude of change over time, and can be used to draw attention to the total value across a trend. For example, data that represents profit over time can be plotted in an area chart to emphasize the total profit.

For more information, see Basic Area chart.

Bar and column charts

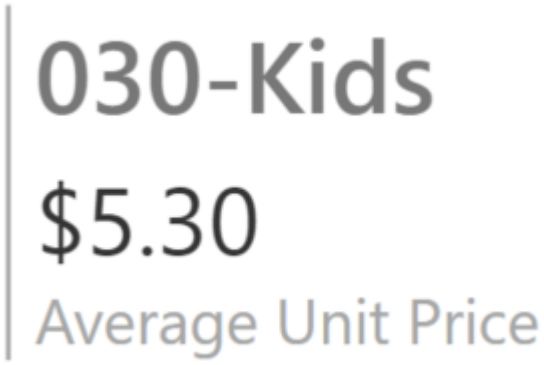




Bar charts are the standard for looking at a specific value across different categories.

Cards

Multi row



Multi row cards display one or more data points, one per row.

Single number

Single number cards display a single fact, a single data point. Sometimes a single number is the most important thing you want to track in your Power BI dashboard or report, such as total sales, market share year over year, or total opportunities.

For more information, see Create a Card (big number tile).

Combo charts

A combo chart combines a column chart and a line chart. Combining the two charts into one lets you make a quicker comparison of the data. Combo charts can have one or two Y axes, so be sure to look closely.

Combo charts are a great choice:

- When you have a line chart and a column chart with the same X axis.
- To compare multiple measures with different value ranges.
- To illustrate the correlation between two measures in one visual.
- To check whether one measure meets the target which is defined by another measure.
- To conserve canvas space.

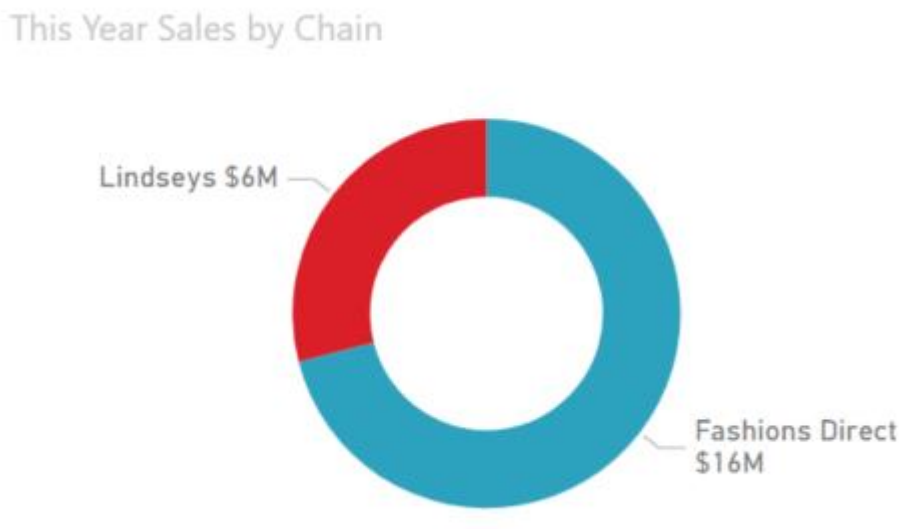
For more information, see Combo charts in Power BI.

Decomposition tree

The decomposition tree visual lets you visualize data across multiple dimensions. It automatically aggregates data and enables drilling down into your dimensions in any order. It is also an artificial intelligence (AI) visualization, so you can ask it to find the

next dimension to drill down into based on certain criteria. This makes it a valuable tool for ad hoc exploration and conducting root cause analysis.

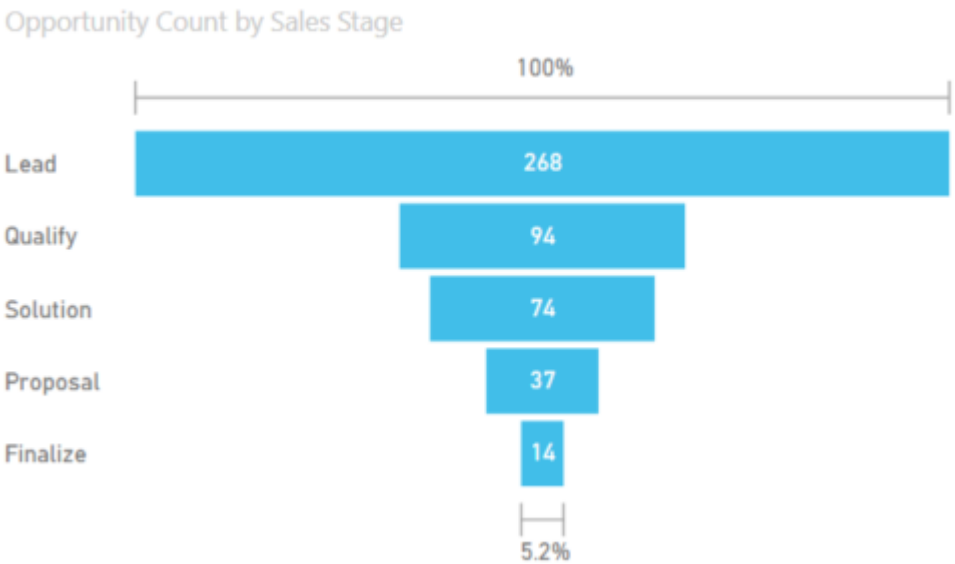
Doughnut charts



Doughnut charts are similar to pie charts. They show the relationship of parts to a whole. The only difference is that the center is blank and allows space for a label or icon.

For more information, see Doughnut charts in Power BI.

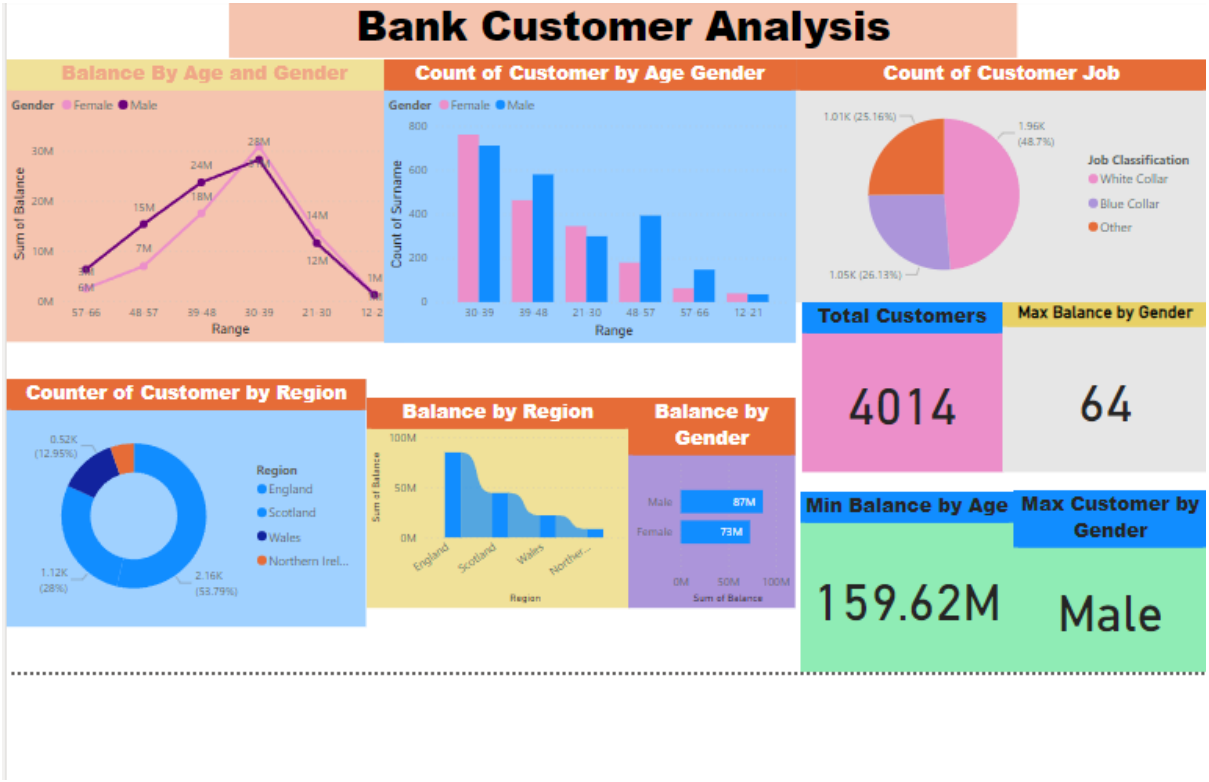
Funnel charts



Funnels help visualize a process that has stages, and items flow sequentially from one stage to the next. One example is a sales process that starts with leads and ends with purchase fulfillment.

For example, a sales funnel that tracks customers through stages: Lead > Qualified Lead > Prospect > Contract > Close. At a glance, the shape of the funnel conveys the health of the process you're tracking. Each funnel stage represents a percentage of the total. So, in most cases, a funnel chart is shaped like a funnel -- with the first stage being the largest, and each subsequent stage smaller than its predecessor. A pear-shaped funnel is also useful -- it can identify a problem in the process. But typically, the first stage, the "intake" stage, is the largest.

Dashboard and Report



Conclusion

This article forms part of the *Microsoft Fabric adoption roadmap* series of articles. For an overview of the series, see Microsoft Fabric adoption roadmap.

This article concludes the series on Microsoft Fabric adoption. The strategic and tactical considerations and action items presented in this series will assist you in your analytics adoption efforts, and with creating a productive data culture in your organization.

This series covered the following aspects of Fabric adoption.

- Adoption introduction
- Adoption maturity levels
- Data culture
- Executive sponsorship
- Business alignment
- Content ownership and management
- Content delivery scope
- Center of Excellence
- Governance
- Mentoring and enablement
- Community of practice
- User support
- System oversight
- Change management

The rest of this article includes suggested next actions to take. It also includes other adoption-related resources that you might find valuable.

Next actions to take

It can be overwhelming to decide where to start. The following series of steps provides a process to help you approach your next actions.

1. **Learn:** First, read this series of articles end-to-end. Become familiar with the strategic and tactical considerations and action items that directly lead to successful analytics adoption. They'll help you to build a data culture in your organization. Discuss the concepts with your colleagues.
2. **Assess current state:** For each area of the adoption roadmap, assess your current state. Document your findings. Your goal is to have full clarity on where you're now so that you can make informed decisions about what to do next.
3. **Clarify your strategic goals:** Ensure that you're clear on what your organization's goals are for adopting Fabric. Confirm that your adoption and data culture goals align with your organization's broader strategic goals for the use of data, analytics, and business intelligence (BI) in general. Focus on what your immediate strategy is for the next 3-12 months. For more information about defining your goals, see the strategic planning article.
4. **Prioritize:** Clarify what's most important to achieve in the next 12-18 months. For instance, you might identify specific user enablement or risk reduction areas that are a higher priority than other areas. Determine which advancements in maturity levels you should prioritize first. For more information about defining your priorities, see the strategic planning article.
5. **Identify future state:** For each area of the roadmap, identify the gaps between what you want to happen (your future state) and what's happening (your current state). Focus on the next 12-18 months for identifying your desired future state.
6. **Customize maturity levels:** Using the information you have on your strategy and future state, customize the maturity levels for each area of the roadmap. Update or

delete the description for each maturity level so that they're realistic, based on your goals and strategy. Your current state, priorities, staffing, and funding will influence the time and effort it will take to advance to higher maturity levels.

7. **Define measurable objectives:** Create KPIs (key performance indicators) or OKRs (objectives and key results) to define specific goals for the next quarter. Ensure that the objectives have clear owners, are measurable, time-bound, and achievable. Confirm that each objective aligns with your strategic BI goals and priorities.
8. **Create tactical plans:** Add specific action items to your project plan. Action items will identify who will do what, and when. Include short, medium, and longer-term (backlog) items in your project plan to make it easy to track and reprioritize.
9. **Track action items:** Use your preferred project planning software to track continual, incremental progress of your action items. Summarize progress and status every quarter for your executive sponsor.
10. **Adjust:** As new information becomes available—and as priorities change—reevaluate and adjust your focus. Reexamine your strategic goals, objectives, and action items once a quarter so you're certain that you're focusing on the right actions.
11. **Celebrate:** Pause regularly to appreciate your progress. Celebrate your wins. Reward and recognize people who take the initiative and help achieve your goals. Encourage healthy partnerships between IT and the different areas of the business.
12. **Repeat:** Continue learning, experimenting, and adjusting as you progress with your implementation. Use feedback loops to continually learn from everyone in the organization. Ensure that continual, gradual, improvement is a priority.

A few important key points are implied within the previous suggestions.

- **Focus on the near term:** Although it's important to have an eye on the big picture, we recommend that you focus primarily on the next quarter, next semester, and next year. It's easier to assess, plan, and act when you focus on the near term.
- **Progress will be incremental:** Changes that happen every day, every week, and every month add up over time. It's easy to become discouraged and sense a lack of progress when you're working on a large adoption initiative that takes time. If you keep track of your incremental progress, you'll be surprised at how much you can accomplish over the course of a year.
- **Changes will continually happen:** Be prepared to reconsider decisions that you make, perhaps every quarter. It's easier to cope with continual change when you expect the plan to change.
- **Everything correlates together:** As you progress through each of the steps listed above, it's important that everything's correlated from the high-level strategic organizational objectives, all the way down to more detailed action items. That way, you'll know that you're working on the right things.

Power BI implementation planning

Successfully implementing analytics throughout the organization requires deliberate thought and planning. The Power BI implementation planning series of articles, which is a work in progress, is intended to complement the Microsoft Fabric adoption roadmap. It includes key considerations, actions, decision-making criteria,

recommendations, and it describes implementation patterns for important common usage scenarios.

Power BI adoption framework

The Power BI adoption framework describes additional aspects of *how* to adopt Power BI in more detail. The original intent of the framework was to support Microsoft partners with a lightweight set of resources for use when helping their customers deploy and adopt Power BI.

The framework can augment this Microsoft Fabric adoption roadmap series. The roadmap series focuses on the *why* and *what* of adopting Fabric, more so than the *how*.

Note

When completed, the Power BI implementation planning series (described in the previous section) will replace the Power BI adoption framework.

GITHUB LINK :