

# Low Level Design

## Black Friday Sales Prediction

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Contents

1.	Introduction	04
1.1	What is a Low-Level Design Document?	04
1.2	Scope	04
2.	Architecture	05
3.	Architecture Description	08
3.1	Data Description	08
3.4	Data insertion into database	10
3.5	Connection with SQL server	10
3.5	Export Data from database	13
3.6	Deployment	13
4.	Unit test cases	15

## 1. Introduction

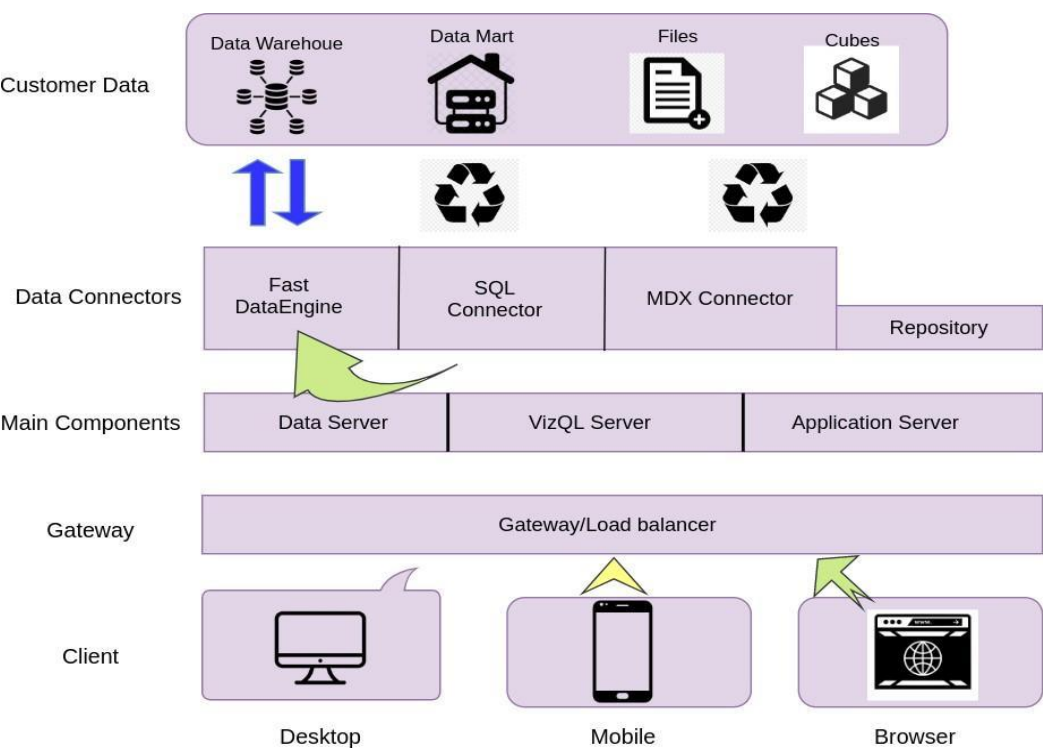
### 1.1 What is a Low-Level design document?

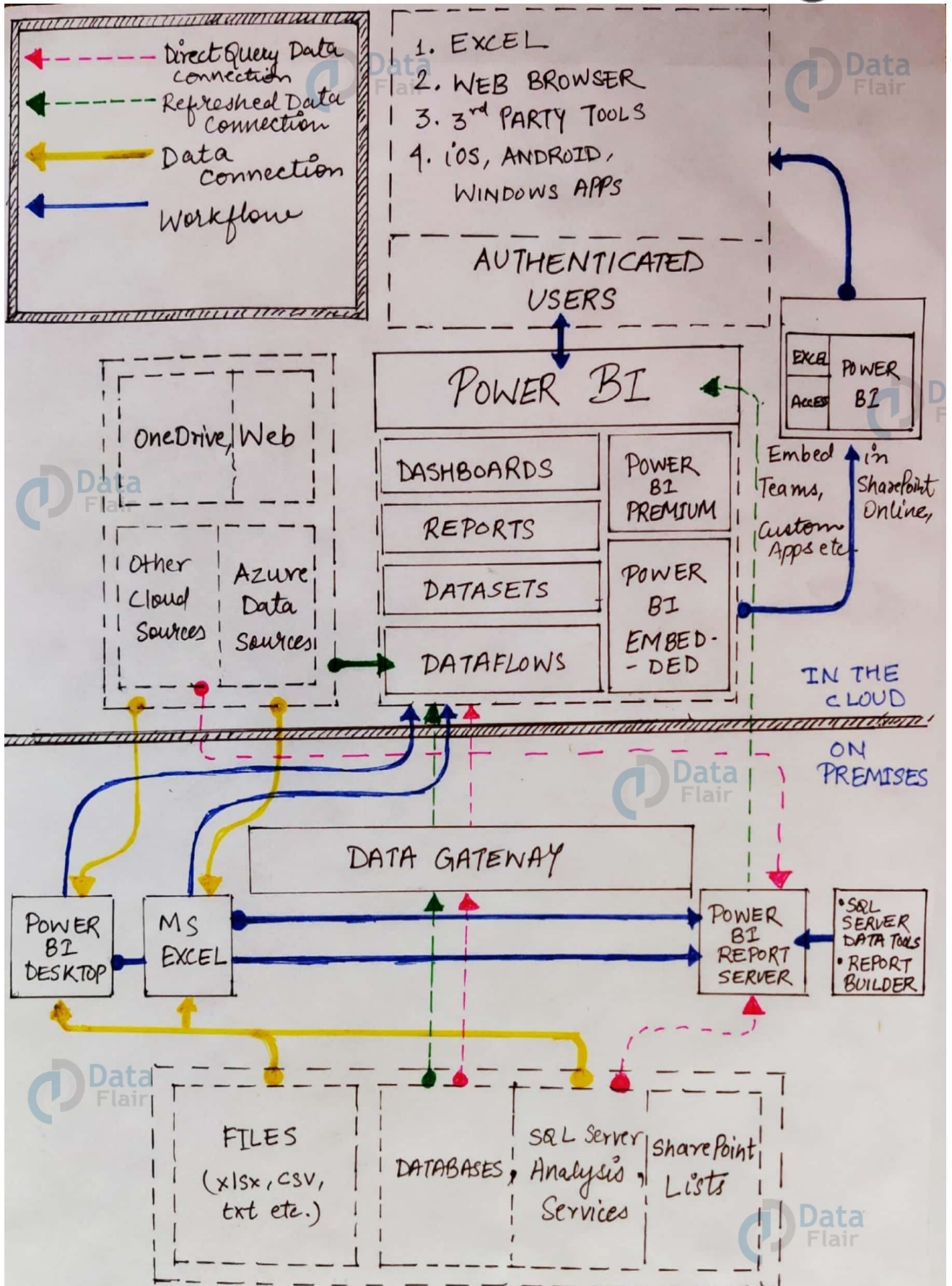
The goal of the LDD or Low-level design document (LLDD) is to give the internal logic design of the actual program code for the Customer Lifetime Value Prediction dashboard. LDD describes the class diagrams with the methods and relations between classes and programs specs. It describes the modules so that the programmer can directly code the program from the document.

### 1.2 Scope

Low-level design (LLD) is a component-level design process that follows a step-by-step refinement process. The process can be used for designing data structures, required software architecture, source code and ultimately, performance algorithms. Overall, the data organization may be defined during requirement analysis and then refined during data design work.

2. Architecture





POWER BI  
ARCHITECTURE

### **1. Power BI Desktop**

This desktop-based software is loaded with tools and functionalities to connect to data sources, transform data, data modeling and create reports.

### **2. PowerBI Service**

Power BI Service is a web-based platform from where you can share reports made on Power BI Desktop, collaborate with other users, and create dashboards.

### **3. PowerBI Report Server**

The Power BI Report Server is similar to the Power BI Service. The only difference between these two is that Power BI Report Server is an on-premise platform. It is used by organizations who do not want to publish their reports on the cloud and are concerned about the security of their data.

### **4. PowerBI Gateway**

This component is used to connect and access on-premise data in secured networks. Power BI Gateways are generally used in organizations where data is kept in security and watch. Gateways help to extract out such data through secure channels to Power BI platforms for analysis and reporting.

### 3. Architecture Description

#### 3.1. Data Description

Variable	Definition		
User_ID	User ID		
Product_ID	Product ID		
Gender	Sex of User		
Age	Age in bins		
Occupation	Occupation	(Masked)	
City_Category	Category of the City (A,B,C)		
Stay_In_Current_City_Years	Number of years stay in current city		
Marital_Status	Marital Status		
Product_Category_1	Product Category	(Masked)	
Product_Category_2	Product may belongs to other category also	(Masked)	
Product_Category_3	Product may belongs to other category also	(Masked)	
Purchase	Purchase Amount (Target Variable)		



### 3.2. Data Insertion into Database

- a. Database Creation and connection - Create a database with the name passed. If the database is already created, open the connection to the database.
- b. Table creation in the database.
- c. Insertion of files in the table

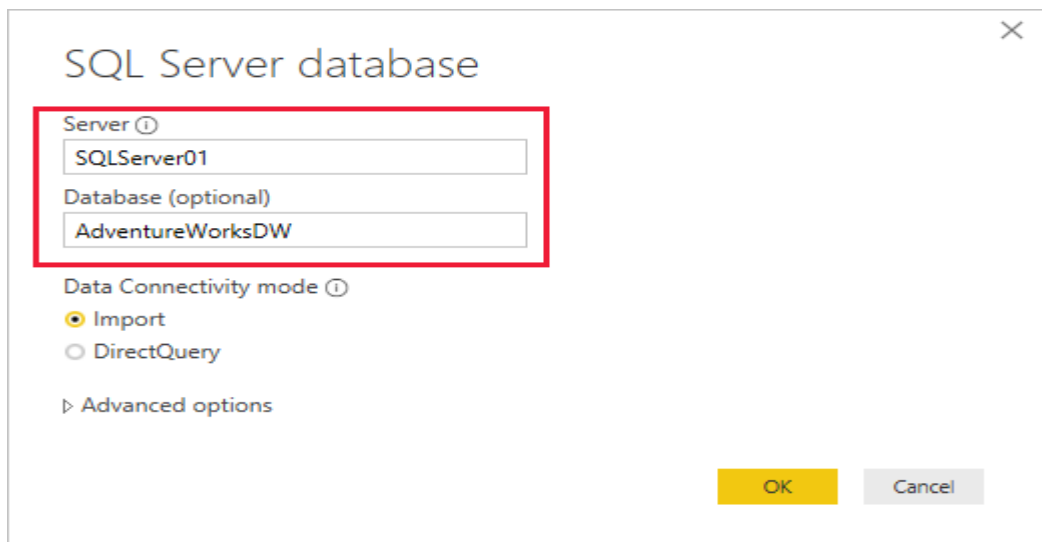
### 3.3. Make the SQL connection and set up the data source

#### Step 1: Configuring Power

Launch Power BI on your workstation and select SQL Server from the connect column on the left. This will open a dialogue box where you need to provide the connection details for SQL Server.

To connect with Power BI, you will need to provide information about the server which hosts your database. If you want to connect to a contained database, you can also specify the name of the database.

1. In Power BI Desktop, on the Home tab, select **Get data > SQL Server**.
2. In the SQL Server database dialog box, enter the Server and Database (optional) names, make sure the Data Connectivity mode is Import, and then select OK.



SQL Server database

Server ⓘ  
SQLServer01

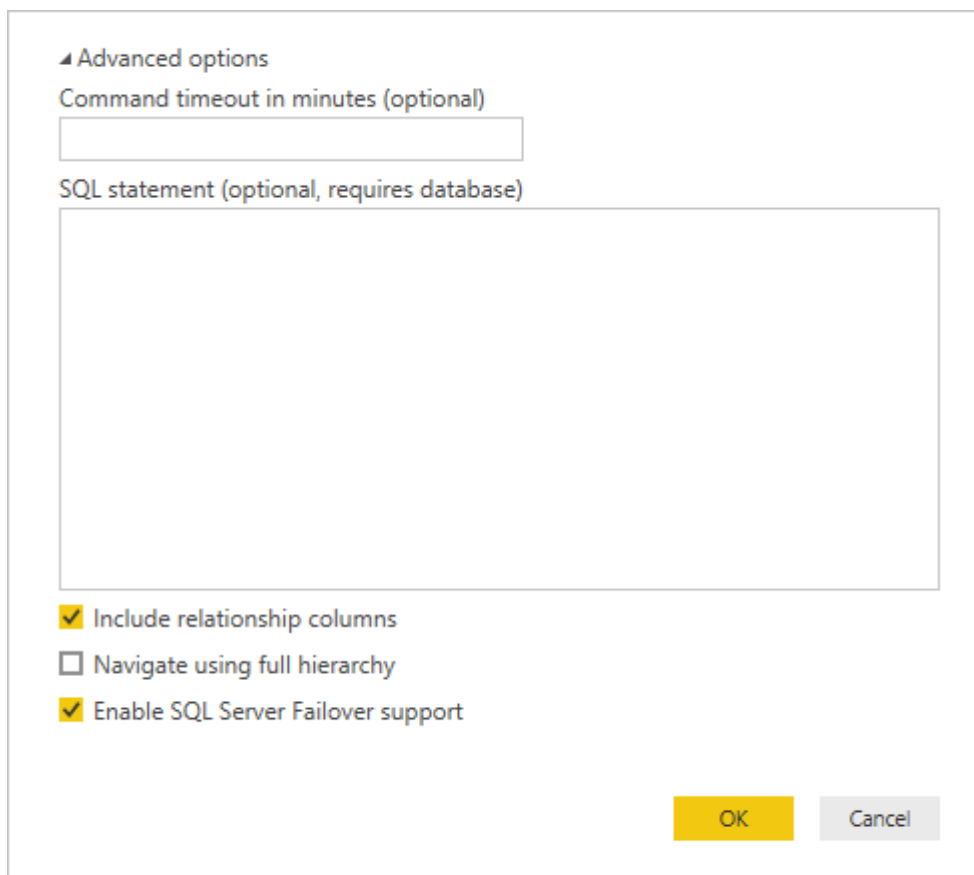
Database (optional)  
AdventureWorksDW

Data Connectivity mode ⓘ  
☒ Import  
☐ DirectQuery

▶ Advanced options

OK Cancel

We're not using Advanced options in this tutorial, but note that you can specify a SQL statement and set other options like using [SQL Server Failover](#).



▲ Advanced options

Command timeout in minutes (optional)

SQL statement (optional, requires database)

☒ Include relationship columns  
☐ Navigate using full hierarchy  
☒ Enable SQL Server Failover support

OK Cancel

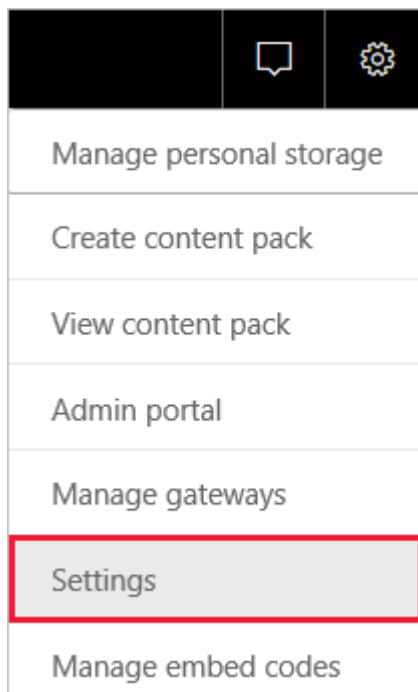
3. Verify your credentials, then select Connect.

4. If an Encryption Support dialog box appears, select OK.
5. In the Navigator dialog box, select the DimProduct table, then select Load.

### 3.4. Connect a dataset to a SQL Server database

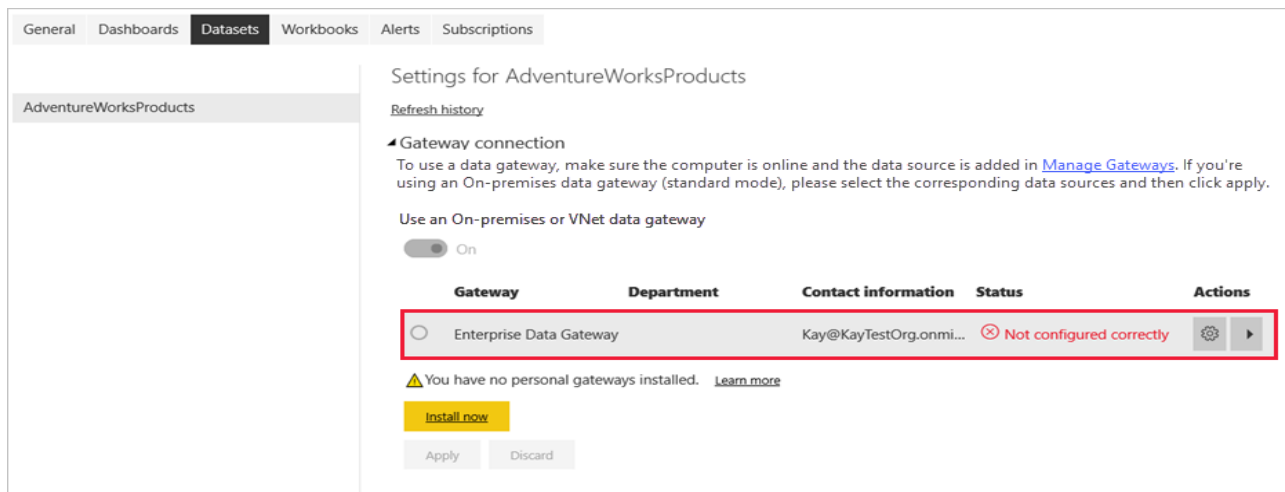
In Power BI Desktop, you connect directly to your on-premises SQL Server database, but the Power BI service requires a data gateway to act as a bridge between the cloud and your on-premises network. Follow these steps to add your on-premises SQL Server database as a data source to a gateway and then connect your dataset to this data source.

1. Sign in to Power BI. In the upper-right corner, select the settings gear icon and then select Settings.

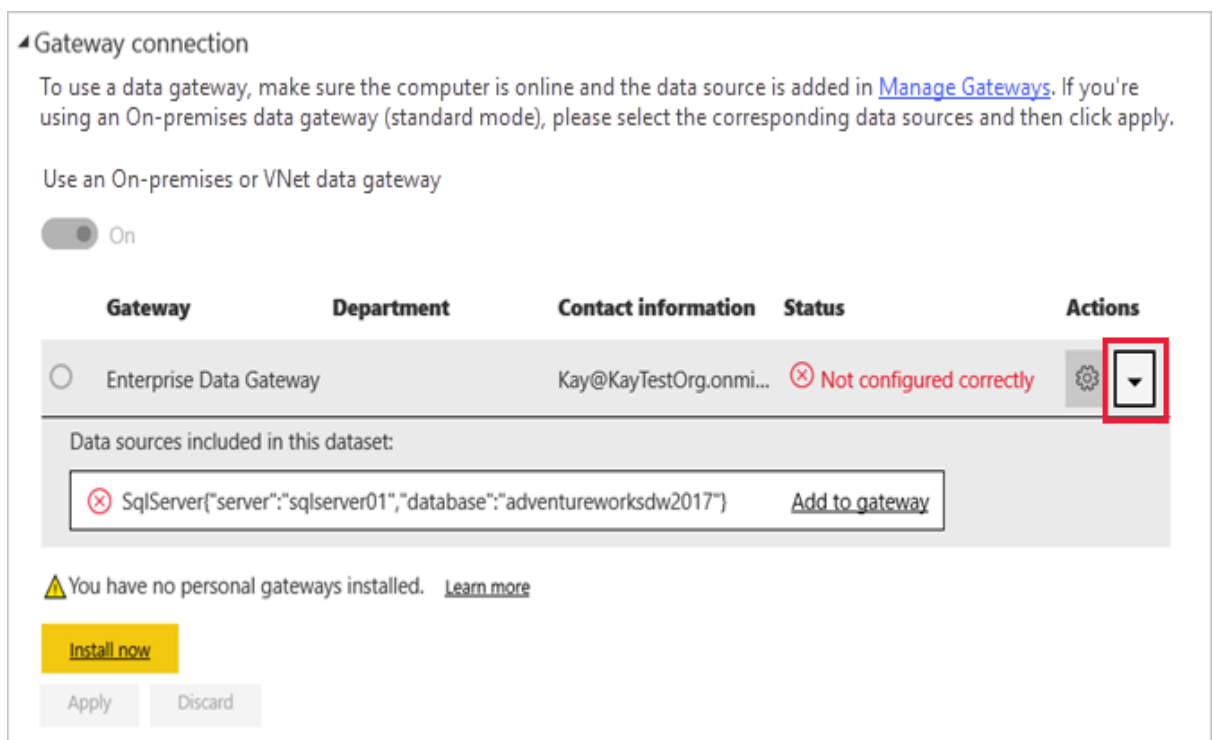


1. On the Datasets tab, select the dataset AdventureWorksProducts, so you can

- connect to your on-premises SQL Server database through a data gateway.
- Expand Gateway connection and verify that at least one gateway is listed. If you don't have a gateway, see the [Prerequisites](#) section earlier in this tutorial for a link to the product documentation for installing and configuring a gateway.



- Under Actions, expand the toggle button to view the data sources and select the Add to gateway link.



- On the Gateways management page, on the Data Source Settings tab, enter and verify the following information, and select Add.

Option	Value
Data Source Name	AdventureWorksProducts
Data Source Type	SQL Server
Server	The name of your SQL Server instance, such as SQLServer01 (must be identical to what you specified in Power BI Desktop).
Database	The name of your SQL Server database, such as AdventureWorksDW (must be identical to what you specified in Power BI Desktop).
Authentication Method	Windows or Basic (typically Windows).
Username	The user account you use to connect to SQL Server.
Password	The password for the account you use to connect to SQL Server.

Data Source Settings

Users

Data Source Name

AdventureWorksProducts

Data Source Type

SQL Server

Server

sqlserver01

Database

adventureworksdw2017

Authentication Method

Windows

The credentials are encrypted using the key stored on-premises on the gateway server. [Learn more](#)

Username

<WindowsCredentials>

Password

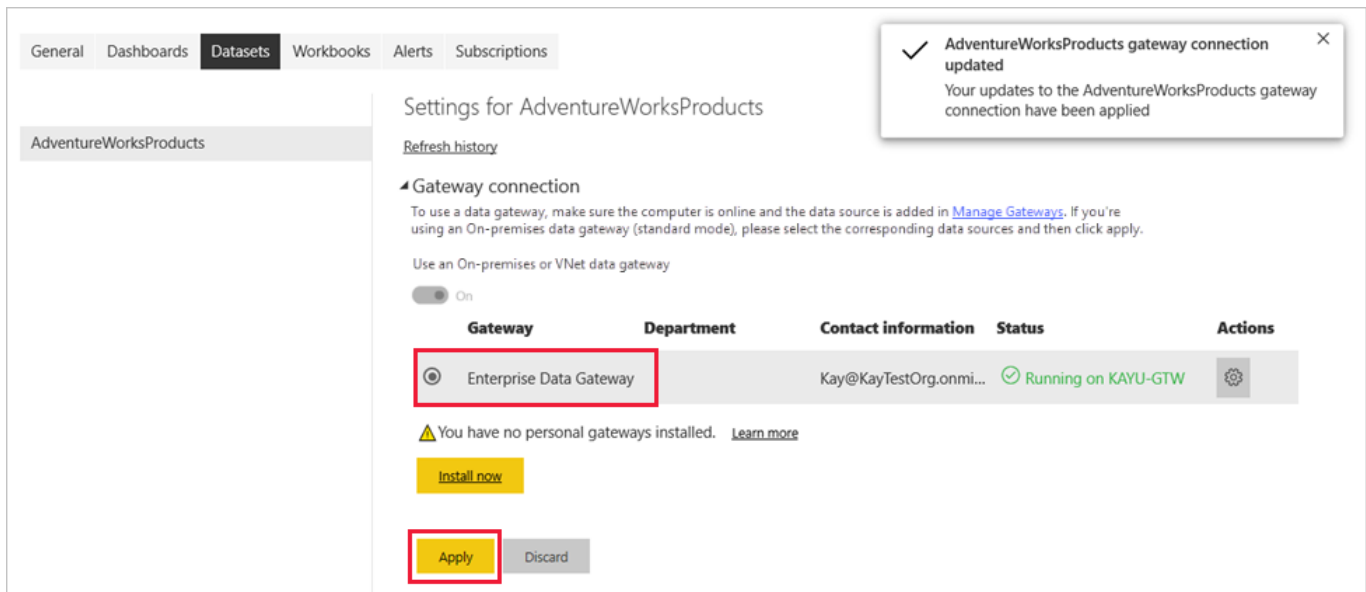
☐ Skip Test Connection

> Advanced settings

Add

Discard

9. On the Datasets tab, expand the Gateway connection section again. Select the data gateway you configured, which shows a Status of running on the machine where you installed it, and select Apply.



General Dashboards **Datasets** Workbooks Alerts Subscriptions

AdventureWorksProducts

Settings for AdventureWorksProducts

[Refresh history](#)

Gateway connection

To use a data gateway, make sure the computer is online and the data source is added in [Manage Gateways](#). If you're using an On-premises data gateway (standard mode), please select the corresponding data sources and then click apply.

Use an On-premises or VNet data gateway

☒ On

Gateway	Department	Contact information	Status	Actions
<input checked="" type="radio"/> Enterprise Data Gateway		Kay@KayTestOrg.onmi...	Running on KAYU-GTW	

You have no personal gateways installed. [Learn more](#)

[Install now](#)

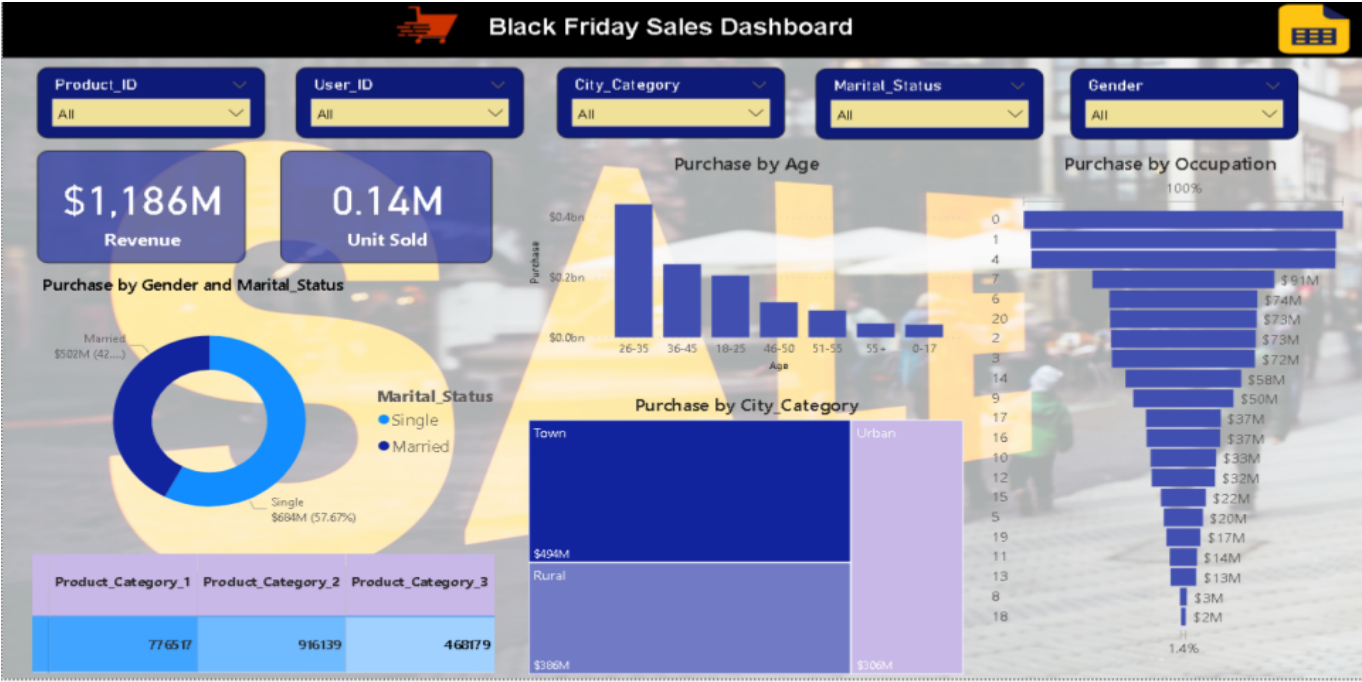
[Apply](#) [Discard](#)

AdventureWorksProducts gateway connection updated  
Your updates to the AdventureWorksProducts gateway connection have been applied

## Configure a refresh schedule

Now you've connected your dataset in Power BI to your SQL Server database on-premises through a data gateway, follow these steps to configure a refresh schedule. Refreshing your dataset on a scheduled basis helps to ensure that your reports and dashboards have the most recent data.

1. In the nav pane, open **My Workspace > Datasets**. Select the ellipsis (. . .) for the AdventureWorksProducts dataset, then select **Schedule refresh**.
2. In the **Scheduled refresh** section, under Keep your data up to date, set refresh to On.
3. Select an appropriate Refresh frequency, ( Daily for this example), and then under Time, select Add another time to specify the desired refresh time (6:30 AM and PM for this example).
4. Leave the checkbox Send refresh failure notification emails to me enabled and select **Apply**.
- 5.



**Black Friday Sales Dashboard**

Product\_ID: All User\_ID: All City\_Category: All Marital\_Status: All Gender: All

Product_ID	Age	Gender	Marital_Status	Product_Category_1	City_Category	Purchase	Total_Spend	AVG_Spend_On_Product
P00025442	26-35	Male	Single	123	Rural	\$22,01,677	98817589	16,774.33
P00110742	26-35	Male	Single	117	Town	\$20,35,541	207973483	35,303.60
P00028842	26-35	Male	Single	618	Town	\$19,32,721	199330805	33,836.50
P00110742	26-35	Male	Single	113	Rural	\$19,31,189	86769145	14,729.10
P00184942	26-35	Male	Single	112	Rural	\$19,04,416	89380268	15,172.34
P00184942	26-35	Male	Single	114	Town	\$18,99,213	208904978	35,461.72
P00112142	26-35	Male	Single	118	Rural	\$18,85,024	88093086	14,953.84
P00057642	26-35	Male	Single	114	Town	\$18,65,431	200813531	34,088.19
P00237542	26-35	Male	Single	108	Rural	\$18,60,869	90433084	15,351.06
P00025442	26-35	Male	Single	101	Town	\$18,23,771	169477497	28,768.88
P00052842	26-35	Male	Single	860	Town	\$18,18,723	170750498	28,984.98
Total				2972716		\$5,09,58,12,742	1059053747495	17,97,74,868.02