



Modeling in the Power BI

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International Association Crime Analysts
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INSTRUCTOR



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Modeling in Power BI

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Source:

<https://data.oaklandca.gov/PublicSafety/CrimeWatch-Data/ppgh-7dqv>

CrimeWatch Data

Public Safety

View Data

Visualize ▾

Export

API

⋮

A full dataset of CrimeWatch data.

The Oakland Police Department provides crime data to the public through the City of Oakland's Crime Watch web site. This site presents the data in a geographic format, which allows users of

[More](#)

Updated

February 7, 2023

Data Provided by

Oakland Police Department

About this Dataset

Mute Dataset

Updated

February 7, 2023

Data Last Updated

February 7, 2023

Metadata Last Updated

February 7, 2023

Date Created

June 17, 2021

Topics

Category

Public Safety

Tags

crime

POWER BI – GET DATA

The screenshot displays the Microsoft Power BI Desktop application interface. At the top, the title bar reads "Untitled - Power BI Desktop" and includes a search bar and the user name "Svetlana Gubin". The ribbon menu is visible, with the "Home" tab selected. The "Get data" group on the ribbon is highlighted with a blue box, showing options for "Excel workbook", "Data hub", "SQL Server", "Enter data", "Dataverse", and "Recent sources".

In the center of the workspace, a dialog box titled "Add data to your report" is displayed, also highlighted with a blue box. It contains the text "Once loaded, your data will appear in the Data pane." and four buttons: "Import data from Excel", "Import data from SQL Server", "Paste data into a blank table", and "Try a sample dataset". Below these buttons is a link: "Get data from another source →".

On the right side, the "Visualizations" pane is visible, showing various chart and table icons. The "Filters" pane is also visible, showing options for "Values", "Drill through", "Cross-report", and "Keep all filters".

At the bottom left, the "Page 1" tab is visible, and at the bottom right, the zoom level is set to 63%.

POWER BI – TEXT/CSV

The screenshot displays the Microsoft Power BI Desktop interface. The top ribbon includes tabs for File, Home, Insert, Modeling, View, Optimize, Help, and External tools. The 'Home' tab is active, and the 'Get data' button is highlighted with a red circle. A dropdown menu is open, listing 'Common data sources' such as Excel workbook, Power BI datasets, Dataflows, Dataverse, SQL Server, Analysis Services, Text/CSV (highlighted with a red circle), Web, OData feed, Blank query, and Power BI Template Apps. Below the menu, the main workspace shows a 'Data' pane on the right with a search bar and a message: 'You haven't loaded any data yet. Get data'. The central area is titled 'Add data to your report' and contains four options: 'Import data from Excel', 'Import data from SQL Server', 'Paste data into a blank table', and 'Try a sample dataset'. A link 'Get data from another source →' is also visible. The bottom status bar shows 'Page 1' and a zoom level of 63%.

POWER BI – DATA

Open

This PC > Desktop > IACA Webinar 2023 > 7_Simple Visuals

Search 7_Simple Visuals

Organize · New folder

Name	Date modified	Type	Size
CrimeWatch_2023.txt	6/14/2023 7:26 PM	Text Document	80 KB

File name: Text Files (*.txt;*.csv;*.prn)

Open Cancel

POWER BI – LOAD DATA

File Origin: 1252: Western European (Windows) | Delimiter: Tab | Data Type Detection: Based on first 200 rows

Address	CaseNumber	City	CrimeType	DateTime	Description	Page
1300 MADISON ST	12-004282	Oakland	TOWED VEHICLE	1/25/2023 11:30:00 AM	BURGLARY-AUTO	03
1400 JACKSON ST	22-000412	Oakland	STOLEN VEHICLE	1/2/2023 8:00:00 PM	VEHICLE THEFT - AUTO	04
400 23RD ST	22-002001	Oakland	BURG - AUTO	1/12/2023 12:37:00 PM	BURGLARY-AUTO	08
800 ISABELLA ST	23-000003	Oakland	ROBBERY	1/1/2023 12:37:00 AM	CARJACKING - STRONGARM	07
1500 MADISON ST	23-000024	Oakland	BURG - COMMERCIAL	1/1/2023 3:28:00 AM	BURGLARY-FORCIBLE ENTRY	04
800 MILTON ST	23-000033	Oakland	MISDEMEANOR ASSAULT	1/1/2023 3:00:00 AM	BATTERY	07
2900 MCCLURE ST	23-000036	Oakland	OTHER	1/1/2023 4:15:00 AM	SC UNEXPLAINED DEATH	08
400 7TH ST	23-000038	Oakland	OTHER	1/1/2023 7:55:00 AM	VIOLATION CUSTODY DECREE	03
500 39TH ST	23-000055	Oakland	THREATS	1/1/2023 8:36:00 AM	CRIMINAL THREATS THREATED CRIME W/INTENT TO TE...	08
500 39TH ST	23-000055	Oakland	THREATS	1/1/2023 8:36:00 AM	EXHIBIT F/ARM THRTNG MANR	08
1400 JACKSON ST	23-000073	Oakland	DOMESTIC VIOLENCE	1/1/2023 11:40:00 AM	BATTERY:SPOUSE/EX SPOUSE/DATE/ETC	04
1400 JACKSON ST	23-000073	Oakland	DOMESTIC VIOLENCE	1/1/2023 11:40:00 AM	KIDNAPPING	04
400 6TH ST	23-000074	Oakland	ROBBERY	1/1/2023 12:02:00 PM	ROBBERY-FIREARM	03
3400 ADELIN ST	23-000154	Oakland	STOLEN VEHICLE	1/1/2023 5:49:00 PM	VEHICLE THEFT - AUTO	07
600 23RD ST	23-000159	Oakland	VANDALISM	1/1/2023 4:00:00 PM	VANDALISM:DEFACE PROPERTY	06
100 14TH ST	23-000183	Oakland	MISDEMEANOR ASSAULT	1/1/2023 2:43:00 AM	FORCE/ADW-OTHER DANGEROUS WEAPON:GBI	04
1000 CLAY ST	23-000190	Oakland	BURG - COMMERCIAL	1/2/2023 4:38:00 AM	BURGLARY-FORCIBLE ENTRY	03
100 13TH ST	23-000193	Oakland	HOMICIDE	1/2/2023 7:16:00 AM	SC UNEXPLAINED DEATH	03
200 29TH ST	23-000195	Oakland	STOLEN VEHICLE	1/2/2023 7:34:00 AM	VEHICLE THEFT - AUTO	08
400 7TH ST	23-000200	Oakland	STOLEN VEHICLE	1/2/2023 8:52:00 AM	VEHICLE THEFT - AUTO	03

Buttons: Extract Table Using Examples | Load | Transform Data | Cancel

NEW TABLE – BY DAX

The screenshot shows the Microsoft Power BI Desktop interface. The ribbon is set to 'Table tools'. The 'Name' field is 'Calendar'. The 'Table tools' ribbon includes options like 'Mark as date table', 'Manage relationships', 'New measure', 'Quick measure', 'New column', and 'New table'. Below the ribbon, the 'Structure' pane shows a table named 'Calendar' with the DAX formula: `1 Calendar = CALENDAR ("01-01-2018", "12-31-2023")`. A red circle highlights this formula. The main area displays the instruction: 'Build visuals with your data. Select or drag fields from the Data pane onto the report canvas.' Below this is an illustration of a report canvas and a data pane. The bottom status bar shows 'Page 1' and a zoom level of 78%.

NEW TABLE – BY DAX

File Home Help External tools **Table tools** Column tools

Name: Rank Format: Whole number Summarization: Don't summarize Data category: Uncategorized

Data type: Whole number \$ % 0 Sort by column Data groups Manage relationships New column

Structure Formatting Properties Sort Groups Relationships Calculations

1 Time = {("0", 1), ("1", 2), ("2", 3), ("3", 4), ("4", 5), ("5", 6), ("6",7), ("7", 8), ("8", 9), ("9", 10), ("10", 11), ("11", 12), ("12",13), ("13", 14), ("14", 15), ("15", 16), ("16", 17), ("17", 18), ("18",19), ("19", 20), ("20", 21), ("21", 22), ("22", 23), ("23",24)}

Hour	Rank
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	10
10	11
11	12
12	13
13	14
14	15
15	16
16	17
17	18
18	19
19	20
20	21
21	22

Data

Search

- Calendar
- CrimeWatch_2023
- DOW
 - DOW
 - Rank
- Time
 - Hour
 - Rank

NEW TABLE – BY GET DATA

The screenshot shows the Microsoft Power BI Desktop interface. The 'Home' ribbon tab is selected, and the 'Get data' button is circled in red. An 'Open' dialog box is open, showing the file explorer view of the '10_Temporal' folder. The file 'Rank_Hour Group.xlsx' is selected and circled in red. The background shows a Power BI query editor with a DAX formula for a table named 'DOW'.

Power BI Query Editor Formula Bar:
1 DOW = {"Mon", 1}, {"Tue", 2}, {"Wed", 3}, {"Thu", 4}, {"Fri", 5}, {"Sat", 6}, {"Sun", 7}

Open Dialog Box File List:

Name	Date modified	Type	Size
Rank_Hour Group.xlsx	11/3/2021 7:09 PM	Microsoft Excel W...	9 KB

Open Dialog Box File Details:

File name	Authors	Date modified	Date created
Rank_Hour Group.xlsx	Svetlana Gubin	11/3/2021 7:09 PM	10/7/2023 10:49 AM

Open Dialog Box File Properties:

File name	Authors	Date modified	Date created	Size	Content type	Date accessed
Rank_Hour Group.xlsx	Svetlana Gubin	11/3/2021 7:09 PM	10/7/2023 10:49 AM	8.74 KB	application/vnd.open...	10/7/2023 10:52 AM

Open Dialog Box File Type: Excel Files (*.xl;*.xlsx;*.xlsm;*.xl)

Open Dialog Box Buttons: Open, Cancel

ADD TABLE FROM FILE

The screenshot shows the Microsoft Excel interface with the following data in the worksheet:

	A	B	C	D	E	F	G	H	I
1	Hour	Rank							
2	2400 - 0359	1							
3	0400 - 0759	2							
4	0800 - 1159	3							
5	1200 - 1559	4							
6	1600 - 1959	5							
7	2000 - 2359	6							
8									
9									
10									
11									
12									

The formula bar for cell A2 displays the text: 2400 - 0359

ADD COLUMN BY DAX

The screenshot displays the Microsoft Power BI Desktop interface. The 'Table tools' ribbon is active, with the 'Column tools' sub-ribbon selected. The 'New column' button, represented by a grid icon, is circled in red. The formula bar at the top of the data view contains the DAX formula: `1 Year = YEAR ('Calendar'[Date])`, which is also circled in red. The data view shows a table with two columns: 'Date' and 'Column'. The 'Date' column contains a list of dates from 2018-01-01 to 2018-01-24. The 'Column' column is currently empty. The 'Data' pane on the right shows the 'Calendar' table selected, with its columns listed: Date, Address, CaseNumber, City, Count, CrimeType, Date, Date.1, DateTime, Description, Description (groups), Hour, Latitude, Longitude, PoliceBeat, State, and Year.

File Home Help External tools Table tools Column tools

Name Column Format \$% Summarization Don't summarize Data category Uncategorized

Data type Whole number \$ % % Auto

Sort by column Data groups Manage relationships New column

Structure Formatting

1 Year = YEAR ('Calendar'[Date])

Date Column

2018-01-01
2018-01-02
2018-01-03
2018-01-04
2018-01-05
2018-01-06
2018-01-07
2018-01-08
2018-01-09
2018-01-10
2018-01-11
2018-01-12
2018-01-13
2018-01-14
2018-01-15
2018-01-16
2018-01-17
2018-01-18
2018-01-19
2018-01-20
2018-01-21
2018-01-22
2018-01-23
2018-01-24

Data

Search

Calendar

Column

Date

CrimeWatch_2023

Address

CaseNumber

City

Count

CrimeType

Date

Date.1

DateTime

Description

Description (groups)

Hour

Latitude

Longitude

PoliceBeat

State

Year

DAX FORMULAS

New Table by DAX

```
Calendar = CALENDAR ("01-01-2018", "12-31-2023")
```

```
DOW = {("Mon", 1), ("Tue", 2), ("Wed", 3), ("Thu", 4), ("Fri", 5), ("Sat", 6), ("Sun", 7)}
```

```
Time = {("0", 1), ("1", 2), ("2", 3), ("3", 4), ("4", 5), ("5", 6), ("6", 7), ("7", 8), ("8", 9), ("9", 10), ("10", 11), ("11", 12), ("12", 13), ("13", 14), ("14", 15), ("15", 16), ("16", 17), ("17", 18), ("18", 19), ("19", 20), ("20", 21), ("21", 22), ("22", 23), ("23", 24)}
```

DAX FORMULAS

```
Time = {("00", 1), ("01", 2), ("02", 3), ("03",  
4), ("04", 5), ("05", 6), ("06", 7), ("07", 8),  
("08", 9), ("09", 10), ("10", 11), ("11", 12),  
("12", 13), ("13", 14), ("14", 15), ("15",  
16), ("16", 17), ("17", 18), ("18", 19), ("19",  
20), ("20", 21), ("21", 22), ("22", 23), ("23", 24)}
```

DAX FORMULAS

Add Column to Calendar Table

```
Year = YEAR ('Calendar'[Date])
```

```
MonthNumber = MONTH ('Calendar' [Date])
```

```
MonthPrefix = FORMAT ('Calendar' [Date], "MMM")
```

```
DOWNumber = WEEKDAY( ('Calendar' [Date]))
```

```
DOWPrefix = FORMAT( ('Calendar' [Date]), "DDD")
```

```
DateWithCrimes =
```

```
'Calendar'[Date]<=MAX('CrimeWatch_2023'[Date])
```

FACT TABLES

- **Fact tables** are a central repository for storing metrics and data.

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CrimeWatch_2023.txt

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DIMENSION TABLES

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	0800 - 1159	3	
	1200 - 1559	4	
	1600 - 1959	5	
	2000 - 2359	6	

MANAGE RELATIONSHIP

File Home Help External tools

Paste Get data Excel workbook OneLake data hub SQL Server Enter data Dataserve Recent sources Transform data Refresh data Manage relationships New measure New column New table Manage roles View as Q&A setup Language Linguistic schema Sensitivity Publish

Clipboard Data Queries Relationships Calculations Security Q&A Sensitivity Share

CrimeWatch

- Address
- CaseNumber
- City
- CrimeType
- Date
- DateTime
- Description
- Description (groups)
- Location
- Collapse ^

Calendar

- Date
- MonthNumber
- MonthPrefix
- Year
- Collapse ^

Data

Search

- Calendar
 - Date
 - MonthNumber
 - MonthPrefix
 - Year
- CrimeWatch

Manage relationships

Active	From: Table (Column)	To: Table (Column)
There are no relationships defined yet.		

New... Autodetect... Edit... Delete

Close

MANAGE RELATIONSHIP

CrimeWatch

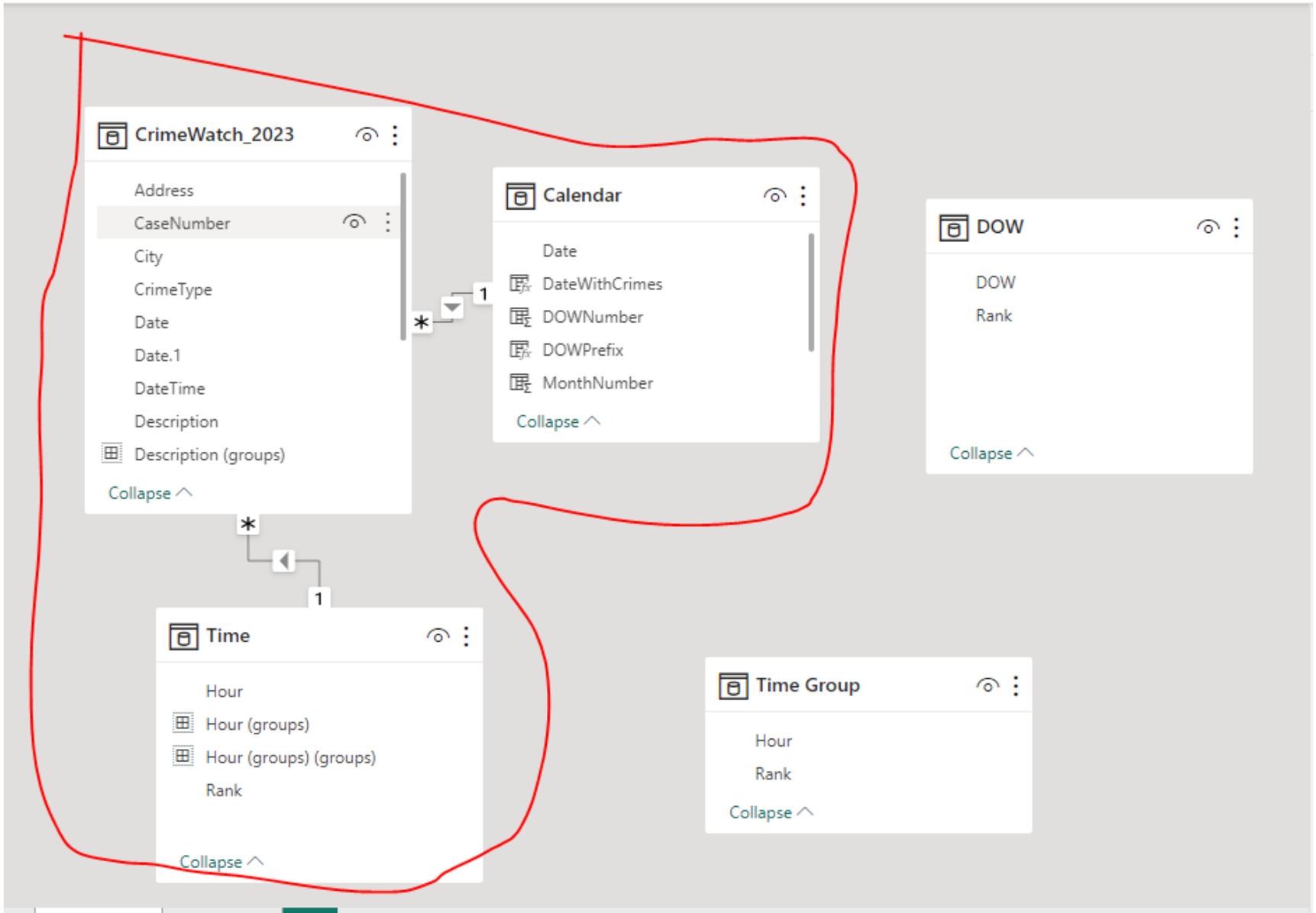
- Address
- CaseNumber
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- Date**
- DateTime
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- Description (groups)
- Location
- Collapse ^

Calendar

- Date**
- MonthNumber
- MonthPrefix
- Year
- Collapse ^



STAR SCHEMA



STAR SCHEMA - ADVANTAGES

1. Simplified Analysis

STAR SCHEMA - ADVANTAGES

1. Simplified Analysis
2. Improved Performance

STAR SCHEMA - ADVANTAGES

1. Simplified Analysis
2. Improved Performance
3. Reusability

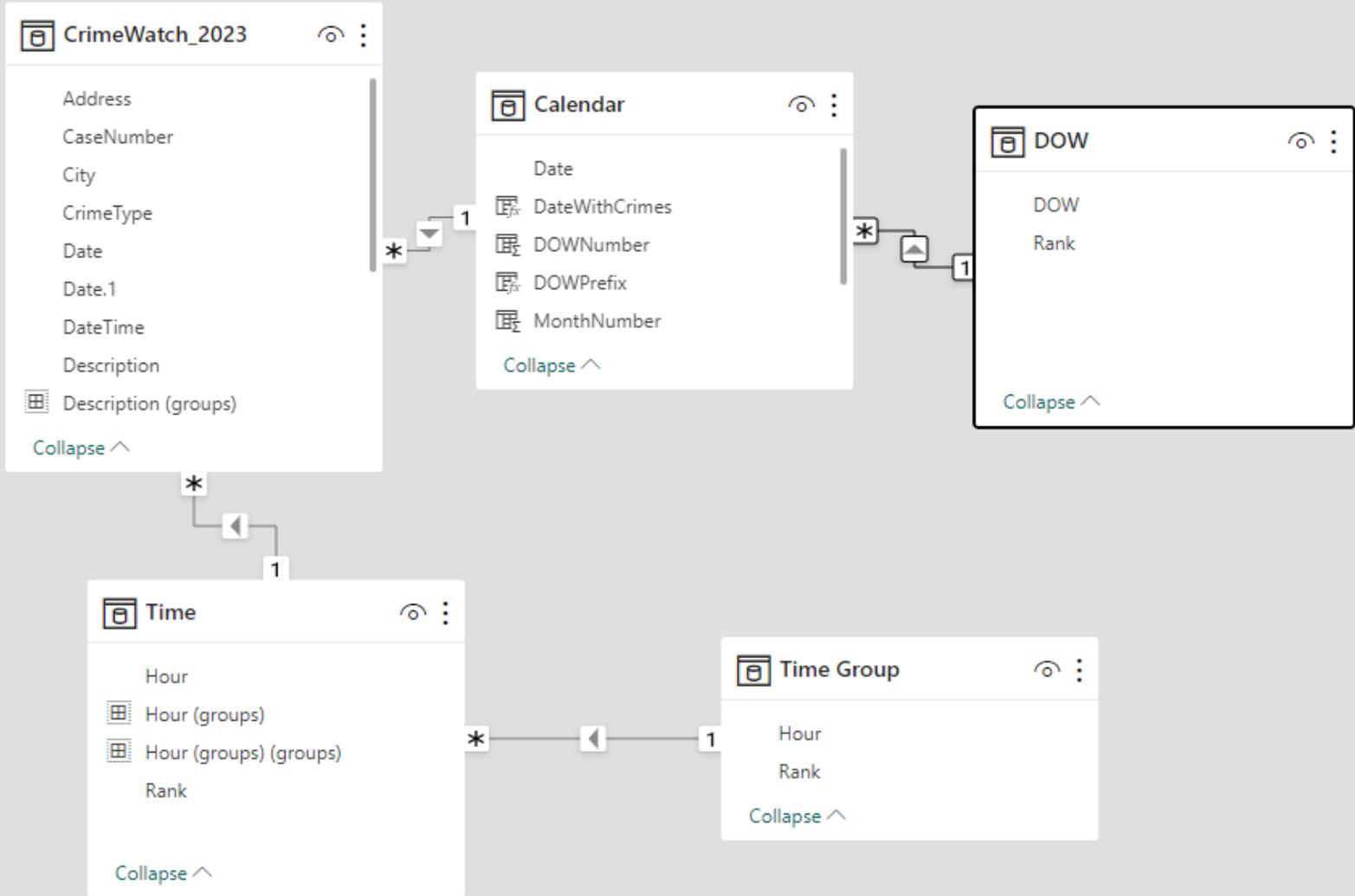
STAR SCHEMA - ADVANTAGES

1. Simplified Analysis
2. Improved Performance
3. Reusability
4. Flexibility

STAR SCHEMA - ADVANTAGES

1. Simplified Analysis
2. Improved Performance
3. Reusability
4. Flexibility
5. Scalability

SNOWFLAKE SCHEMA



WHAT IS CARDINALITY?

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- **One to One Cardinality** – In this type of cardinality, One entity attribute creates only one connection with another attribute.

WHAT IS CARDINALITY?

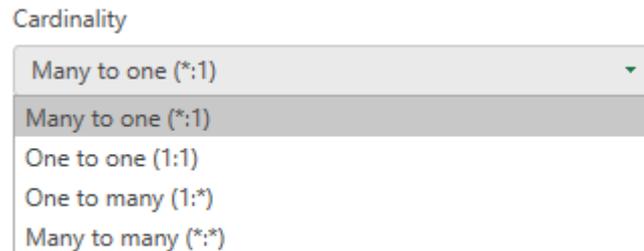
- Cardinality defines the number of relations from one table to another table. There are mainly 3 types of cardinality in a table.
- **One to One Cardinality** – In this type of cardinality, One entity attribute creates only one connection with another attribute.
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- Cardinality defines the number of relations from one table to another table. There are mainly 3 types of cardinality in a table.
- **One to One Cardinality** – In this type of cardinality, One entity attribute creates only one connection with another attribute.
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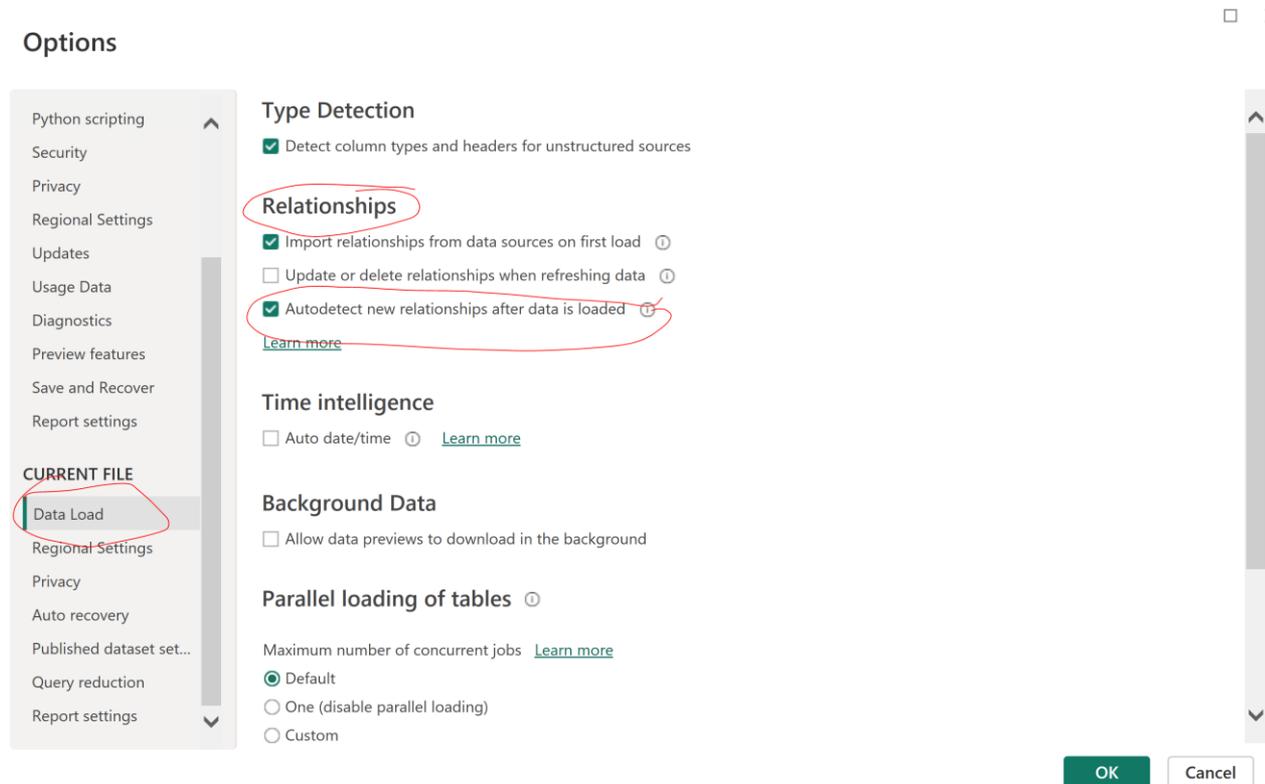


MANAGE RELATIONSHIP

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MANAGE RELATIONSHIP

File Home Help External tools

Paste Get data Excel workbook OneLake data hub SQL Server Enter data Dataverse Recent sources Transform data Refresh data Manage relationships Manage roles View as Q&A setup Language Q&A Linguistic schema Sensitivity Publish

Clipboard Data Queries Relationships Calculations Security Q&A Sensitivity Share

1 DOWPrefix = FORMAT(('Calendar' [Date]), "DDD")

Search

Calendar

- Date
- DateWithCrimes
- DOWNumber
- DOWPrefix**
- MonthNumber
- MonthPrefix
- Year
- CrimeWatch_2023
- DOW
- DOW
- Rank
- Time
- Hour
- Hour (groups)
- Hour (groups) (groups)
- Rank
- Time Group
- Hour
- Rank

Manage relationships

Active	From: Table (Column)	To: Table (Column)
<input checked="" type="checkbox"/>	Calendar (DOWNumber)	DOW (Rank)
<input checked="" type="checkbox"/>	CrimeWatch_2023 (Date.1)	Calendar (Date)
<input checked="" type="checkbox"/>	CrimeWatch_2023 (Hour)	Time (Hour)
<input checked="" type="checkbox"/>	Time (Hour (groups) (groups))	Time Group (Rank)

New... Autodetect... Edit... Delete

Close

Address CaseNumber City CrimeType Date Date.1 DateTime Description Description (groups) Collapse ^

Time

- Hour
- Hour (groups)
- Hour (groups)
- Rank

Collapse ^

MANAGE RELATIONSHIP

1. New – This option will help create a new relationship between tables.

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- 3. Edit** – This option will help you to edit your data relationship.

MANAGE RELATIONSHIP

- 1. New** – This option will help create a new relationship between tables.
- 2. Autodetect** – Using this option, Power BI automatically detects the relationship between data present in tables.
- 3. Edit** – This option will help you to edit your data relationship.
- 4. Delete** – It deletes the selected relationship between the tables.

MANAGE RELATIONSHIP

File Home Help External tools

Clipboard: Paste, Cut, Copy
Data: Get data, Excel workbook, OneLake data hub, SQL Server, Enter data, Dataserve, Recent sources
Queries: Transform data, Refresh data
Relationships: Manage relationships
Calculations: New measure, New column, New table
Security: Manage roles, View as
Q&A: Q&A setup, Language, Linguistic schema
Sensitivity: Sensitivity
Share: Publish

CrimeWatch_2023

- Address
- CaseNumber
- City
- CrimeType
- Date
- Date.1
- DateTime
- Description
- Description (groups)

Collapse ^

Calendar

- Date
- DateWithCrimes
- DOWNumber
- DOWPrefix
- MonthNumber

Collapse ^

DOW

- DOW
- Rank

Collapse ^

Time

- Hour
- Hour (groups)
- Hour (groups) (groups)
- Rank

Collapse ^

Time Group

- Hour
- Rank

Collapse ^

Properties

^ Cards

Show the database in the header when applicable

No

Show related fields when card is collapsed

Yes

Pin related fields to top of card

No

Data

Search

- Calendar
- CrimeWatch_2023
- DOW
- Time
- Time Group

All tables Layout 1 +

MANAGE RELATIONSHIP

The screenshot displays the Microsoft Power BI Desktop interface. The top ribbon is visible, with the 'Manage relationships' button circled in red. Below the ribbon, the 'Manage relationships' dialog box is open, showing a table with columns 'Active', 'From: Table (Column)', and 'To: Table (Column)'. The table is currently empty, displaying the message 'There are no relationships defined yet.' At the bottom of the dialog box, the 'New...' button is circled in red, along with the 'Autodetect...', 'Edit...', and 'Delete' buttons. A 'Close' button is located in the bottom right corner of the dialog box. The background shows a list of tables, including 'CrimeWatch_2023' and 'Time', with their respective columns listed.

MANAGE RELATIONSHIP

File Home Help External tools

Paste Cut Copy Get data Excel workbook OneLake data hub SQL Enter Dataverse Recent Transform Refresh Manage New New New Manage View Q&A Language Linguistic schema Sensitivity Publish

Clipboard 1 Calendar = CALENDAR ("01-4

CrimeWatch_2023

- Address
- CaseNumber
- City
- CrimeType
- Date
- Date.1
- DateTime
- Description
- Description (groups)

Time

- Hour
- Hour (groups)
- Hour (groups) (gro
- Rank

All tables Layout 1 +

Create relationship

Select tables and columns that are related.

CrimeWatch_2023

Time	DateTime	Description (groups)	Date	Year	Longitude	Latitude	Date.1
T - AUTO	7/7/2020 17:38	Other	Tuesday, July 7, 2020	2020	-122.25808	37.798	07/07/2
T - AUTO	5/30/2020 17:30	Other	Saturday, May 30, 2020	2020	-122.25683	37.7984	05/30/2
T - AUTO	10/25/2020 11:15	Other	Sunday, October 25, 2020	2020	-122.25683	37.7984	10/25/2

Calendar

Date	Year	MonthNumber	MonthPrefix	DateWithCrimes	DOWNumber	DOWPrefix
2018-01-01	2018	1	Jan	True	2	Mon
2018-01-02	2018	1	Jan	True	3	Tue
2018-01-03	2018	1	Jan	True	4	Wed

Cardinality: Many to one (*:1)

Cross filter direction: Single

Make this relationship active

Assume referential integrity

Apply security filter in both directions

OK Cancel

Data

- Calendar
 - Date
 - DateWithCrimes
 - DOWNumber
 - DOWPrefix
 - MonthNumber
 - MonthPrefix
 - Year
- CrimeWatch_2023
 - DOW
 - Time
 - Time Group

POWER BI – LOAD DATA

The screenshot displays the Microsoft Power BI Desktop interface. The top ribbon includes the 'Home' tab with various data source and transformation options. The main workspace shows a data model with the following tables and relationships:

- CrimeWatch_2023**: Address, CaseNumber, City, CrimeType, Date, Date.1, DateTime, Description, Description (groups)
- Calendar**: Date, DateWithCrimes, DOWNumber, DOWPrefix, MonthNumber
- DOW**: DOW, Rank
- Time**: Hour, Hour (groups), Hour (groups) (groups), Rank
- Time Group**: Hour, Rank

Relationships are shown as follows:

- CrimeWatch_2023 (Date) to Calendar (Date): 1 to *
- Calendar (Date) to DOW (DOW): 1 to *
- Time (Hour) to CrimeWatch_2023 (Date): 1 to *
- Time (Hour) to Time Group (Hour): 1 to *

The Properties pane is open for the relationship between Time and Time Group. The relationship is active, and the cross filter direction is set to 'Single'. The cardinality is 'Many to one (":1)'. The relationship is highlighted with a red circle.

Properties

Relationship

Table	Column
Time	Hour (groups) (groups)

Cardinality: Many to one (":1)

Table	Column
Time Group	Rank

Make this relationship active: Yes

Cross filter direction: Single

Apply security filter in both directions: No

Apply changes
Open relationship editor

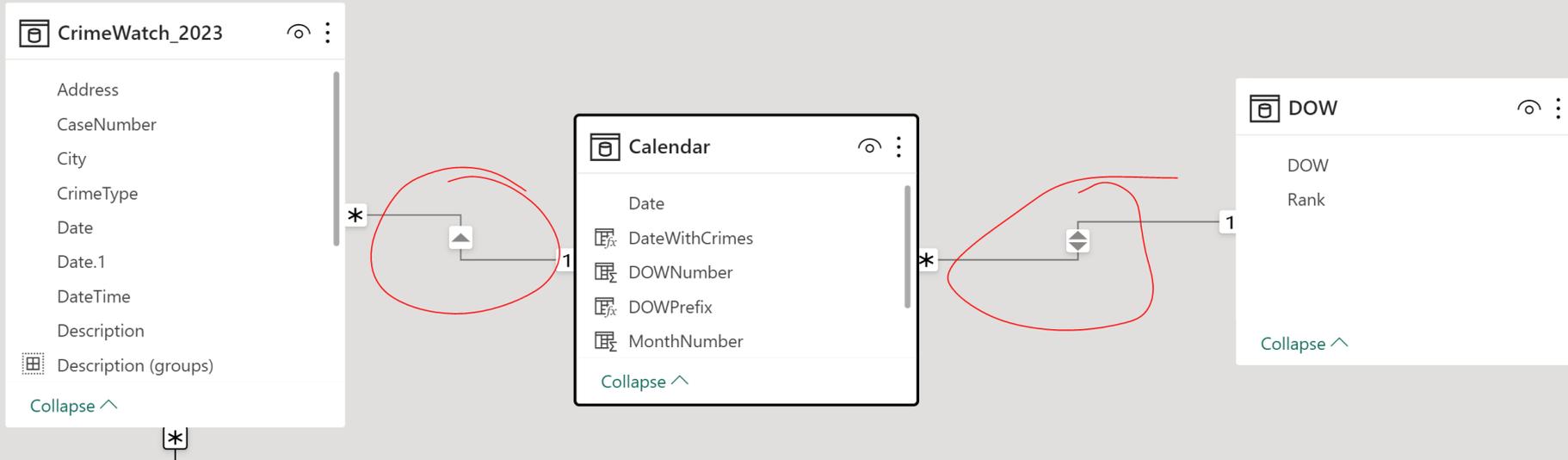
POWER BI – CROSS FILTER

Cross filter direction

▼ Single ▼

Single

Both



Home Insert Modeling View Optimize Help External tools **Format** Data / Drill

Apply drill down filters to Entire page

Bring forward Send backward Selection Align Group

Interactions

Count by Hour

DOWPrefix	2400 - 0359	0400 - 0759	0800 - 1159	1200 - 1559	1600 - 1959	2000 - 2359	Total
Sun	1	1				1	3
Mon			1				1
Tue			1		2		5
Wed			1		1		2
Thu				2		1	3
Fri	1		1	1			3
Sat			3	3			6
Total	2	1	7	6	3	4	23

Count by Hour

Hour

Page 2 of 2

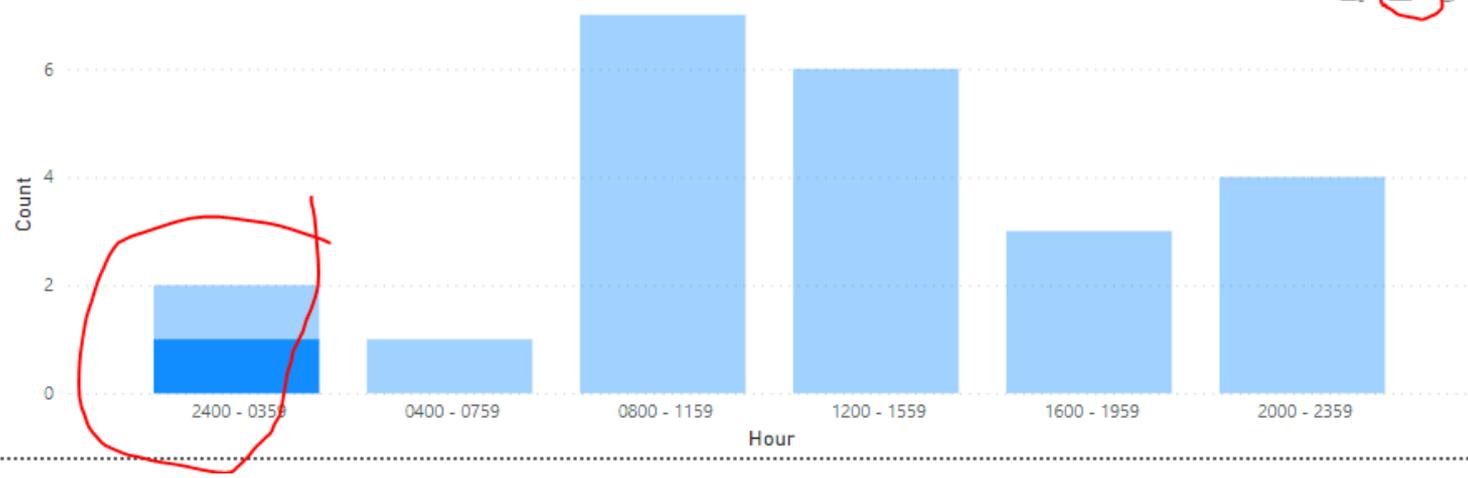
90% Update available (click to download)

TIPS

PC

DOWPrefix	2400 - 0359	0400 - 0759	0800 - 1159	1200 - 1559	1600 - 1959	2000 - 2359	Total
Sun	1	1				1	3
Mon			1				1
Tue			1		2		5
Wed			1		1		2
Thu				2		1	3
Fri	1		1	1			3
Sat			3	3			6
Total	2	1	7	6	3	4	23

Count by Hour

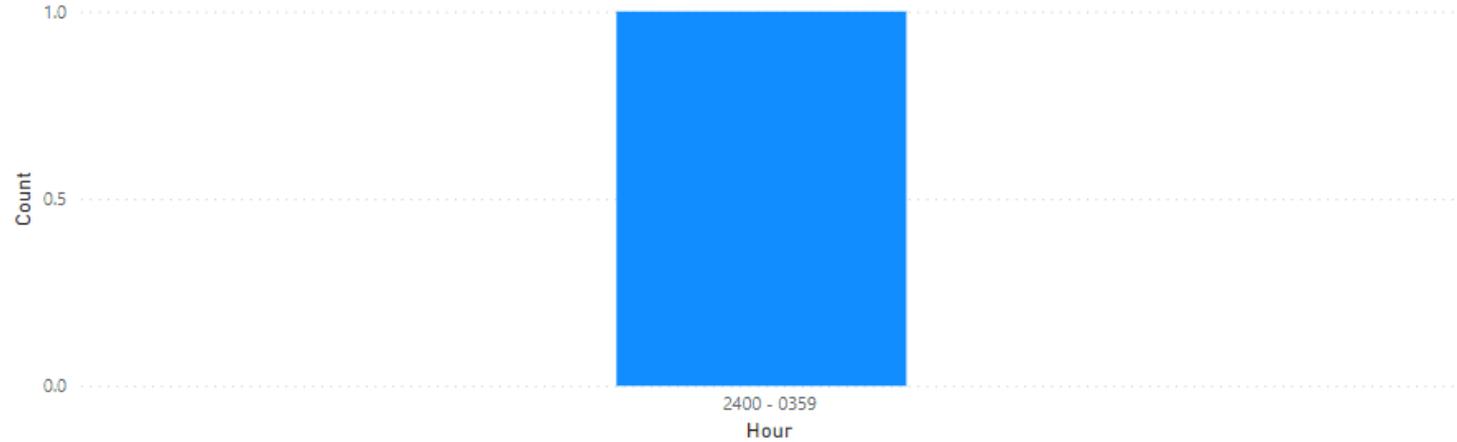


TIPS

A pivot table with 'DOWPrefix' as the row label and 'Total' as the column label. The columns represent time intervals: 2400 - 0359, 0400 - 0759, 0800 - 1159, 1200 - 1559, 1600 - 1959, and 2000 - 2359. The rows represent days of the week: Sun, Mon, Tue, Wed, Thu, Fri, and Sat. The total count for each day is shown in the 'Total' column. The table is styled with alternating row colors and blue bars representing the counts in each cell.

DOWPrefix	2400 - 0359	0400 - 0759	0800 - 1159	1200 - 1559	1600 - 1959	2000 - 2359	Total
Sun	1	1				1	3
Mon			1				1
Tue			1		2	2	5
Wed			1		1		2
Thu				2		1	3
Fri	1		1	1			3
Sat			3	3			6
Total	2	1	7	6	3	4	23

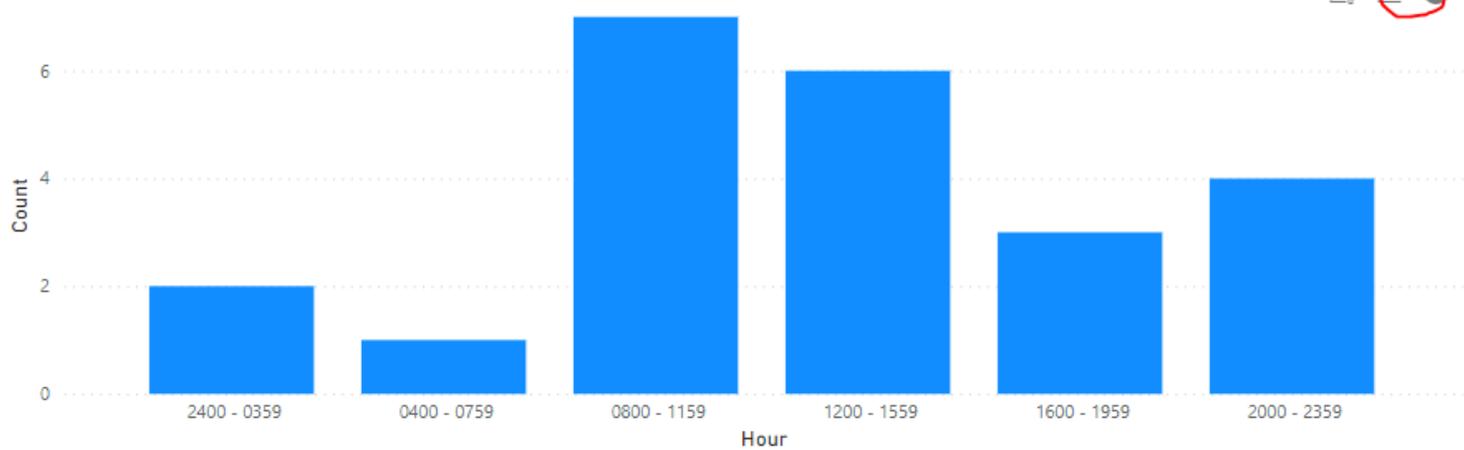
Count by Hour



TIPS

DOWPrefix	2400 - 0359	0400 - 0759	0800 - 1159	1200 - 1559	1600 - 1959	2000 - 2359	Total
Sun	1	1				1	3
Mon			1				1
Tue			1		2	2	5
Wed			1		1		2
Thu				2		1	3
Fri	1		1	1			3
Sat			3	3			6
Total	2	1	7	6	3	4	23

Count by Hour



CONDITIONAL FORMATTING FOR PIE CHART

File Home Insert Modeling View Optimize Help External tools **Format** Data / Drill Table tools Column tools

Name: Description (groups) Format: Text Summarization: Don't summarize Data category: Uncategorized

Data type: Text \$ % Auto

Sort by column: Sort Data groups: Groups Manage relationships: Relationships New column: Calculations

Structure: Count by Description (groups)

Description (groups)	Count	Percentage
Other	23K	77.64%
BURGLARY	5K	16.6%
ROBBERY	1K	4.38%
SHOOTING		

Visual Properties:

- Visual: Pie chart
- Suggest a type: Off
- Legend: Description (g... X | > +Add data
- Values: Count X | > +Add data
- Details: +Add data
- Tooltips: +Add data

Filters:

- Filters on this visual: Count is (All), Description (groups) is (All), Add data fields here
- Filters on this page: Add data fields here
- Filters on all pages: Add data fields here

Data:

- Calendar
- CrimeWatch
 - Address
 - CaseNumber
 - City
 - Count
 - CrimeType
 - Date
 - DateTime
 - Description
 - Description (gro...
 - Location
 - PoliceBeat
 - PYTDCount
 - State
 - Year
 - YOYD%
 - YOYDCount
 - YTDCount

CONDITIONAL FORMATTING FOR PIE CHART

Step 1. Covert to Stacked Column Chart

The screenshot displays the Microsoft Power BI Desktop interface. The main view shows a bar chart titled "Count by Description (groups)". The Y-axis is labeled "Count" and ranges from 0K to 20K. The X-axis is labeled "Description (groups)" and has four categories: "Other", "BURGLARY", "ROBBERY", and "SHOOTING". The bars are blue. The "Other" bar is the tallest, reaching approximately 20K. The "BURGLARY" bar is around 5K, "ROBBERY" is around 2K, and "SHOOTING" is around 1K.

The "Build a visual" task pane is open, showing the following settings:

- Visual types: Column chart
- Suggest a type: Off
- X-axis: Description (groups)
- Y-axis: Count
- Legend: +Add data
- Small multiples: +Add data
- Tooltips: +Add data

The "Filters" pane shows the following filters applied:

- Count is (All)
- Description (groups) is (All)

The "Data" pane shows the "CrimeWatch" table with the following fields:

- Address
- CaseNumber
- City
- Count
- CrimeType
- Date
- DateTime
- Description
- Description (groups)
- Location
- PoliceBeat
- PYTDCount
- State
- Year
- YOYD%
- YOYDCount
- YTDCount

CONDITIONAL FORMATTING FOR PIE CHART

Step 2. Open Format – Column Color

The screenshot displays the Microsoft Power BI Desktop interface. The main area shows a bar chart titled "Count by Description (groups)". The Y-axis is labeled "Count" and ranges from 0K to 20K. The X-axis is labeled "Description (groups)" and includes categories: Other, BURGLARY, ROBBERY, and SHOOTING. The bars are currently blue. An "Add to your visual" pane is open over the chart, showing options for Title, X-axis, Y-axis, Legend, Zoom slider, Data labels, and Total labels. The "Format" pane is open on the right, with the "Colors" section highlighted by a red circle. The "Colors" section shows a "Default" color selection dropdown set to blue and a "Show all" toggle set to "Off".

Description (groups)	Count
Other	~18,000
BURGLARY	~5,000
ROBBERY	~2,000
SHOOTING	~1,000

CONDITIONAL FORMATTING FOR PIE CHART

Step 3. Set Gradient Color

Default color - Columns - Colors

Format style: Gradient

What field should we base this on?: Count of Description (groups)

Summarization: Count

How should we format empty values?: As zero

Minimum: Custom, 0

Center: Custom, 1

Maximum: Highest value, Enter a value

Add a middle color



[Learn more about conditional formatting](#) OK Cancel

CONDITIONAL FORMATTING FOR PIE CHART

Step 4. Result for Bar Chart

The screenshot displays a Power BI bar chart titled "Count by Description (groups)". The Y-axis is labeled "Count" and ranges from 0K to 20K. The X-axis is labeled "Description (groups)" and includes categories: Other, BURGLARY, ROBBERY, and SHOOTING. The "Other" bar is significantly taller than the others, reaching approximately 23.2K. A red circle highlights the data label "23.2%" on the "Other" bar. To the right, the "Format" pane is open, showing the "Colors" section with "Default" selected, also circled in red. The "Add to your visual" pane shows that Title, X-axis, Y-axis, and Legend are checked.

Description (groups)	Count
Other	23.2K
BURGLARY	~5K
ROBBERY	~2K
SHOOTING	~1K

CONDITIONAL FORMATTING FOR PIE CHART

Step 5. Convert Back to Pie Chart

The screenshot shows the Microsoft Power BI Desktop interface. The main area displays a pie chart titled "Count by Description (groups)". The chart is divided into four segments: a large dark blue segment for "Other" (77.64%), a medium blue segment for "BURGLARY" (16.6%), a light blue segment for "ROBBERY" (4.38%), and a very small light blue segment for "SHOOTING" (1.37%). A legend to the right of the chart lists the categories with their corresponding colors. The top ribbon shows the "Format" and "Data / Drill" tabs. On the right side, the "Format" pane is open, showing the "Visual" tab with options for "Size and style", "Title", "Legend", "Slices", "Detail labels", and "Rotation". The "Detail labels" and "Rotation" options are currently turned on.

Description (groups)	Count	Percentage
Other	23K	77.64%
BURGLARY	5K	16.6%
ROBBERY	1K	4.38%
SHOOTING	0K	1.37%

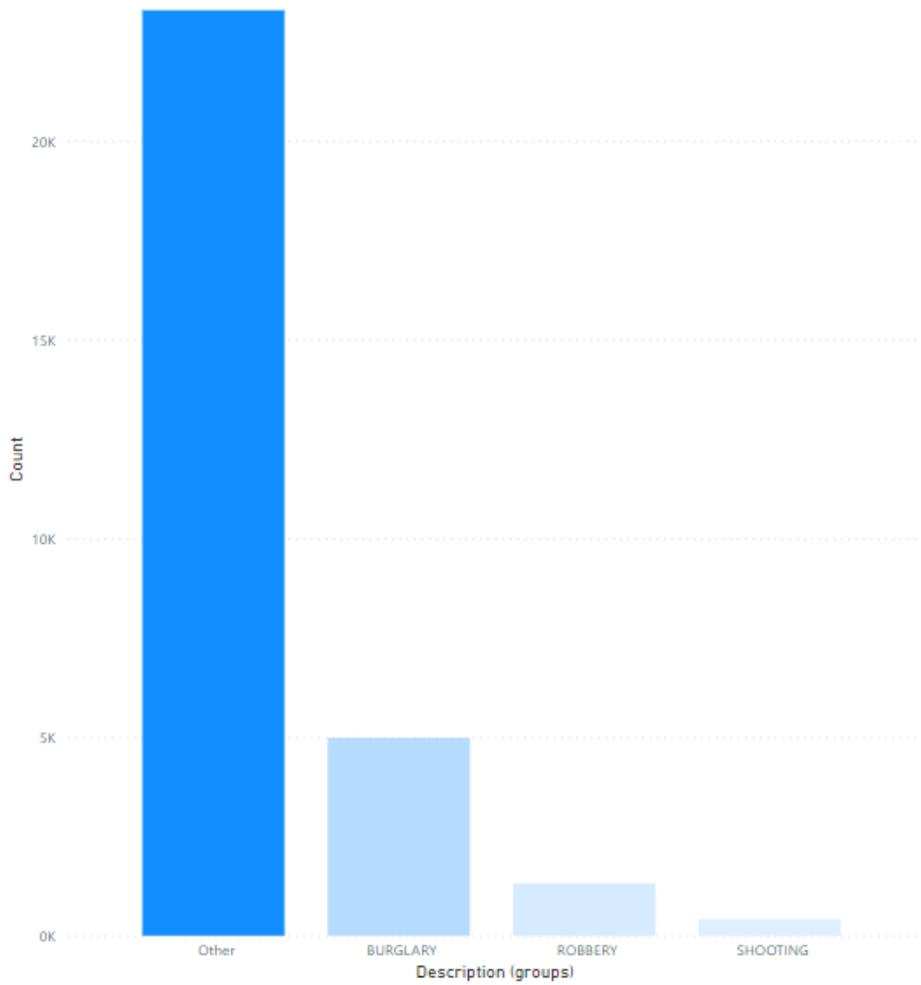
SELECTION



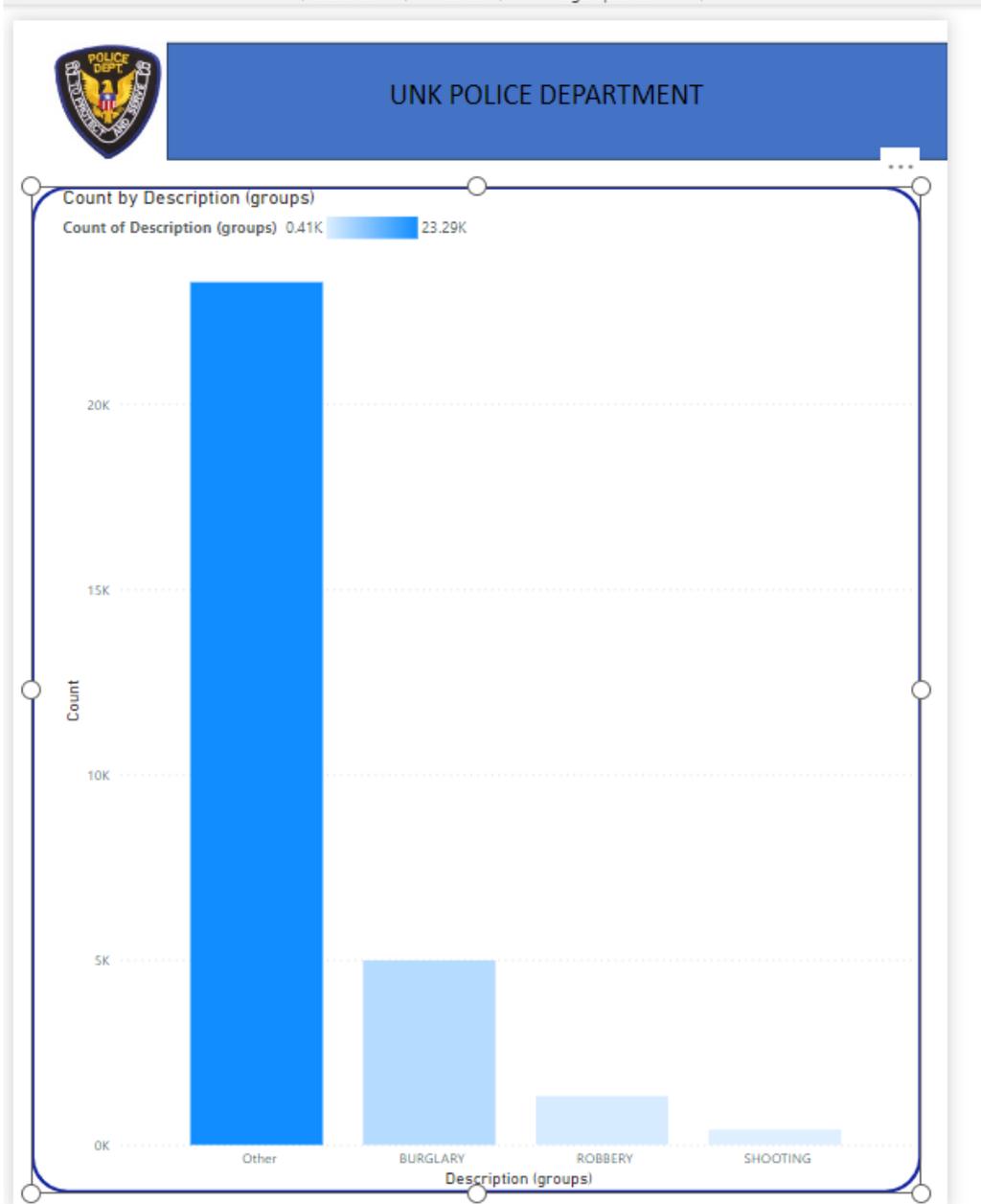
UNK POLICE DEPARTMENT

Count by Description (groups)

Count of Description (groups) 0.41K 23.29K



SELECTION – ADDED NEW VISUAL



SELECTION – OPEN LAYER ORDER

The screenshot displays a software interface with a top menu bar (File, Home, Insert, Modeling, View, Optimize, Help, External tools) and a toolbar containing various icons. The main workspace shows a bar chart titled 'UNK POLICE DEPARTMENT' with the subtitle 'Count by Description (groups)'. The chart has a y-axis labeled 'Count' ranging from 0K to 20K and an x-axis labeled 'Description (groups)' with categories: Other, BURGLARY, ROBBERY, and SHOOTING. A legend indicates 'Count of Description (groups) 0.41K' with a blue bar representing 23.29K. On the right side, a 'Selection' pane is open, showing 'Layer order' and 'Tab order' tabs. The 'Layer order' list includes 'Shape' and 'Count by Description (groups)'. Red circles highlight the 'Selection' button in the top toolbar and the 'Count by Description (groups)' entry in the Selection pane.

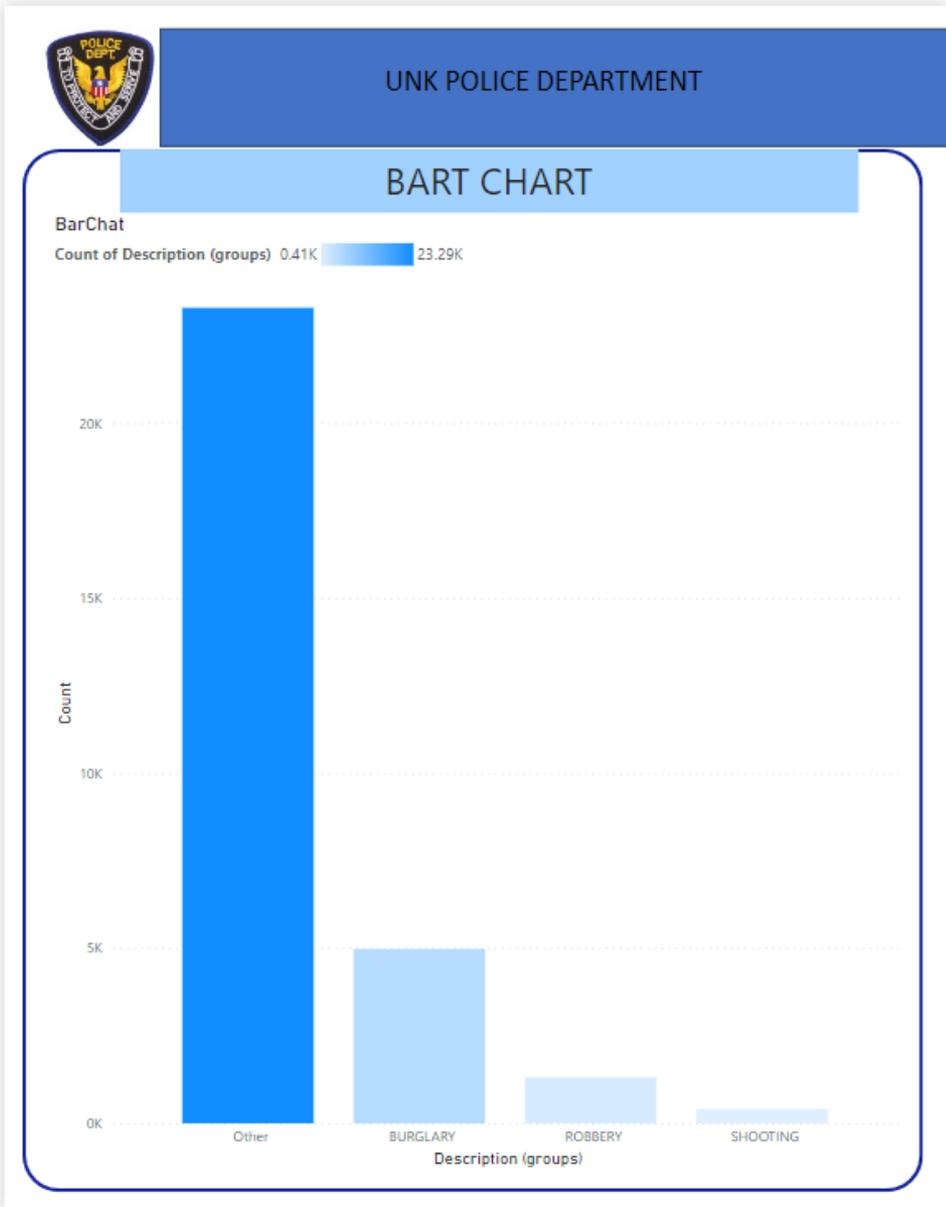
Description (groups)	Count
Other	23.29K
BURGLARY	~5K
ROBBERY	~2K
SHOOTING	~1K

SELECTION – WORKING WITH LAYER ORDER

The screenshot displays a software interface with a top menu bar (File, Home, Insert, Modeling, View, Optimize, Help, External tools) and a toolbar with various icons. The main workspace contains a visualization titled "UNK POLICE DEPARTMENT" featuring a bar chart. The chart's y-axis is labeled "Count" and ranges from 0K to 20K. The x-axis is labeled "Description (groups)" and includes categories: Other, BURGLARY, ROBBERY, and SHOOTING. The "Other" category has the highest count, exceeding 20K. A legend at the top of the chart indicates a range from 0.41K to 23.29K. On the right side, a "Selection" panel is open, showing a list of elements: "BarChat" and "Frame". The "BarChat" element is circled in red, indicating it is the selected object.

Description (groups)	Count
Other	23.29K
BURGLARY	5K
ROBBERY	2K
SHOOTING	1K

SELECTION – WORKING WITH LAYER ORDER



Selection

Layer order Tab order

Filters

Show Hide

- text box
- BarChat
- Frame

SELECTION – WORKING WITH GROUPING LAYERS

The screenshot displays the Power BI Desktop interface. The ribbon at the top includes 'File', 'Home', 'Insert', 'Modeling', 'View', 'Optimize', 'Help', 'External tools', 'Format', and 'Data / Drill'. The 'Insert' tab is active, showing various visualization options. The main workspace contains a report with a blue header 'UNK POLICE DEPARTMENT' and a bar chart titled 'BART CHART'. The bar chart shows the 'Count of Description (groups)' with categories: Other (23.29K), BURGLARY (5K), ROBBERY (2K), and SHOOTING (1K). A red circle highlights the context menu on the top right of the chart. On the right, the 'Selection' pane is open, showing a list of layers: 'BarChart', 'Frame', and 'Title'. The 'Frame' and 'Title' layers are circled in red, indicating they are selected.

Description (groups)	Count
Other	23.29K
BURGLARY	5K
ROBBERY	2K
SHOOTING	1K

SELECTION – WORKING WITH GROUPING LAYERS

The screenshot displays the Microsoft Power BI interface. The main area shows a report page with a blue header titled "UNK POLICE DEPARTMENT" and a bar chart titled "BART CHART". The bar chart displays the "Count of Description (groups)" with categories: Other (23.29K), BURGLARY (0.41K), ROBBERY, and SHOOTING. The Selection pane on the right lists the report's layers: BarChart, Frame, and Title. Red circles highlight the 'Frame' and 'Title' layers in the Selection pane, and the top-right corner of the chart area in the main view.

Description (groups)	Count
Other	23.29K
BURGLARY	0.41K
ROBBERY	
SHOOTING	

SELECTION – WORKING WITH GROUPING LAYERS

The screenshot displays the Microsoft Power BI interface. The top ribbon includes tabs for File, Home, Insert, Modeling, View, Optimize, Help, External tools, Format, and Data / Drill. The main workspace contains a report titled 'UNK POLICE DEPARTMENT' with a 'BART CHART' visualization. The chart is a bar chart showing the 'Count of Description (groups)' for four categories: 'Other', 'BURGLARY', 'ROBBERY', and 'SHOOTING'. The y-axis is labeled 'Count' and ranges from 0K to 20K. The 'Other' category has the highest count, exceeding 20K. A context menu is open over the chart, with the 'Group' option circled in red. The 'Selection' pane on the right shows the chart is selected and the 'Group' option is also circled in red.

Description (groups)	Count
Other	23.29K
BURGLARY	5K
ROBBERY	2K
SHOOTING	1K

SELECTION – WORKING WITH GROUPING LAYERS

The screenshot displays the Microsoft Power BI Desktop interface. The top ribbon includes tabs for File, Home, Insert, Modeling, View, Optimize, Help, External tools, Format, and Data / Drill. The main workspace contains a report page titled 'UNK POLICE DEPARTMENT' with a 'BART CHART' visualization. The chart is a bar chart showing the count of description groups. The y-axis is labeled 'Count' and ranges from 0K to 20K. The x-axis is labeled 'Description (groups)' and includes categories: Other, BURGLARY, ROBBERY, and SHOOTING. A legend indicates 'Count of Description (groups)' with a value of 0.41K and a color scale up to 23.29K. The Selection pane on the right is open, showing a list of elements: Frame and Title, Frame, Title, and BarChat. A red circle highlights the 'Frame and Title' element, indicating it is the selected element.

Description (groups)	Count
Other	23.29K
BURGLARY	5K
ROBBERY	2K
SHOOTING	1K

EDIT THE SAME TYPE OF VISUALS

The screenshot shows the Power BI Desktop interface with two table visualizations. The left table is titled 'Table' and has columns: Description (groups), YTDCount, PYTDCount, and YOYTD%. The right table is also titled 'Table' and has columns: Date, YTDCount, PYTDCount, and YOYTD%. The Format pane on the right is open, showing options for Visual, Properties, Title, Text, Heading, Font, Text color, and Background color.

Description (groups)	YTDCount	PYTDCount	YOYTD%
BURGLARY	66	144	-54%
Other	381	435	-12%
ROBBERY	17	44	-61%
SHOOTING	10	7	43%
Total	474	630	-25%

Date	YTDCount	PYTDCount	YOYTD%
01/08/2023	112	139	-19%
01/09/2023	122	150	-19%
01/10/2023	141	166	-15%
01/11/2023	149	183	-19%
01/12/2023	169	199	-15%
01/13/2023	183	212	-14%
01/14/2023	198	231	-14%
01/15/2023	211	243	-13%
01/16/2023	223	262	-15%
01/17/2023	239	273	-12%
01/18/2023	265	291	-9%
01/19/2023	288	305	-6%
01/20/2023	298	321	-7%
01/21/2023	313	342	-8%
01/22/2023	326	349	-7%
01/23/2023	345	360	-4%
01/24/2023	361	385	-6%
01/25/2023	381	402	-5%
01/26/2023	389	425	-8%
01/27/2023	396	441	-10%
01/28/2023	415	468	-11%
01/29/2023	426	477	-11%
01/30/2023	433	491	-12%
Total	474	630	-25%

Format

Visual Properties

Transparency: 0%

Visual border: Off

Shadow: Off

Reset to default

Title: On

Title: Table

Heading: Heading 3

Font: DIN 16

Text color: Black

Background color: Orange

EDIT THE SAME OR DIFFERENT TYPE OF VISUALS

Like the formatting of something in your document? Use Format painter to apply that look to other content. 1. Select content with formatting you like. 2. On the Home tab, choose Format painter. 3. Select something else to apply the formatting.

Date	YTDCount	PYTDCount	YOYTD%
01/08/2023	112	139	-19%
01/09/2023	122	150	-19%
01/10/2023	141	166	-15%
01/11/2023	149	183	-19%
01/12/2023	169	199	-15%
01/13/2023	183	212	-14%
01/14/2023	198	231	-14%
01/15/2023	211	243	-13%
01/16/2023	223	262	-15%
01/17/2023	239	273	-12%
01/18/2023	265	291	-9%
01/19/2023	288	305	-6%
01/20/2023	298	321	-7%
01/21/2023	313	342	-8%
01/22/2023	326	349	-7%
01/23/2023	345	360	-4%
01/24/2023	361	385	-6%
01/25/2023	381	402	-5%
01/26/2023	389	425	-8%
01/27/2023	396	441	-10%
01/28/2023	415	468	-11%
01/29/2023	426	477	-11%
01/30/2023	433	491	-12%
01/31/2023	447	509	-12%
02/01/2023	455	524	-13%
Total	474	630	-25%

	YTDCount	PYTDCount	YOYTD%
ROBBERY	17	44	-61%
SHOOTING	10	7	43%
Total	474	630	-25%

Format pane settings:

- Visual Properties: Size and style
- Size and position: Size and position
- Padding: Padding
- Background: On
- Color: #E67E22
- Transparency: 0%
- Visual border: Off
- Shadow: Off
- Reset to default

EDIT THE SAME OR DIFFERENT TYPE OF VISUALS

Some formatting will be applied, but not additional features like title.

The screenshot displays the Microsoft Power BI Desktop interface. The ribbon at the top includes File, Home, Insert, Modeling, View, Optimize, Help, External tools, Format, and Data / Drill. The 'Format' pane is open on the right, showing options for 'Visual' and 'Properties'. The 'Background' section is expanded, showing 'Color' (a light orange swatch) and 'Transparency' (set to 0%).

Two tables are visible in the workspace:

Description (groups)	YTDCCount	PYTDCCount	YOYTD%
BURGLARY	66	144	-54%
Other	381	435	-12%
ROBBERY	17	44	-61%
SHOOTING	10	7	43%
Total	474	630	-25%

Date	YTDCCount	PYTDCCount	YOYTD%
01/08/2023	112	139	-19%
01/09/2023	122	150	-19%
01/10/2023	141	166	-15%
01/11/2023	149	183	-19%
01/12/2023	169	199	-15%
01/13/2023	183	212	-14%
01/14/2023	198	231	-14%
01/15/2023	211	243	-13%
01/16/2023	223	262	-15%
01/17/2023	239	273	-12%
01/18/2023	265	291	-9%
01/19/2023	288	305	-6%
01/20/2023	298	321	-7%
01/21/2023	313	342	-8%
01/22/2023	326	349	-7%
01/23/2023	345	360	-4%
01/24/2023	361	385	-6%
01/25/2023	381	402	-5%
01/26/2023	389	425	-8%
01/27/2023	396	441	-10%
01/28/2023	415	468	-11%
01/29/2023	426	477	-11%
01/30/2023	433	491	-12%
01/31/2023	447	509	-12%
Total	474	630	-25%

ADDITIONAL INFORMATION (BOOKS)

✓ **Power Query**

- ✓ *Collect, Combine, and Transform Data Using Power Query in Excel and Power BI* (2018) by Gil Raviv

✓ **Entry Level**

- ✓ *Learn Power BI: Step by Step Guide to Building Your Own Reports* (2022) by Derek Wilson
- ✓ *Power BI - Business Intelligence Clinic: Create and Learn* Paperback (2018) by Roger F. Silva
- ✓ *Microsoft Power BI Dashboards Step by Step* (2018) by Errin O'Connor

✓ **Advance Level**

- ✓ *Analyzing Data with Power BI and Power Pivot for Excel* (2017), Marco Russo and Alberto Ferrari
- ✓ *The Definitive Guide to DAX: Business Intelligence for Microsoft Power BI, SQL Server Analysis Services, and Excel* (2019) by Marco Russo and Alberto Ferrari

ADDITIONAL INFORMATION (LINKS)

- ✓ Websites, Blogs, and YouTube channels
 - ✓ Power Query documentation
<https://docs.microsoft.com/en-us/power-query>
 - ✓ Power BI documentation
<https://docs.microsoft.com/en-us/power-bi/>
 - ✓ Power BI Tips
<https://powerbi.tips/>
 - ✓ RADACAD
<https://radacad.com/>
 - ✓ SQLBI
<https://www.sqlbi.com/>
 - ✓ Guy in a Cube
<https://guyinacube.com/>
 - ✓ Curbal
<https://www.youtube.com/channel/UCJ7UhloHSA4wAqPzyi6TOkw>

NEXT WEBINAR

Introduction to the DAX

- ✓ *Introduction*
- ✓ *Simple Formulas*
- ✓ *Examples of Advanced Formulas*

CONCLUSIONS & QUESTIONS

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