

Microsoft Power Tools for Data Analysis #22
Data Models: Power Query to Create Date & Time Dimension Table
Power BI to build Dashboard with Word Cloud
Notes from Video:

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1) Goals of Video:

i. Import CSV File into Power BI Desktop:

DowntimeID	Machine	DateTime	Duration	OperId	Spec	ReasonText
17	TBM112	11/1/17 13:56	10	2548	T922	Application Error
18	TBM112	11/1/17 14:46	3	2548	T922	Changover (ATOM)
19	TBM112	11/1/17 14:58	3	2548	T922	Changover (ATOM)
20	TBM112	11/1/17 15:05	6	2548	T922	Application Error
21	TBM112	11/2/17 10:50	4	2548	J906	Equipment Stopped
22	TBM112	11/2/17 20:02	6	1394	J906	Changover (ATOM)
23	TBM112	11/3/17 7:57	6	1540	T922	Unlisted Reason

ii. Use Power Query for Fact Table Data Modeling to get this:

Machine	DateID	Duration	ReasonText	HourID
TBM123	March 5, 2018	5	Changover (ATOM)	7
TBM123	March 10, 2018	5	Changover (ATOM)	7
TBM123	March 28, 2018	5	Changover (ATOM)	7
TBM123	April 3, 2018	5	Changover (ATOM)	7
TBM123	April 6, 2018	5	Changover (ATOM)	7
TBM123	April 11, 2018	5	Changover (ATOM)	7

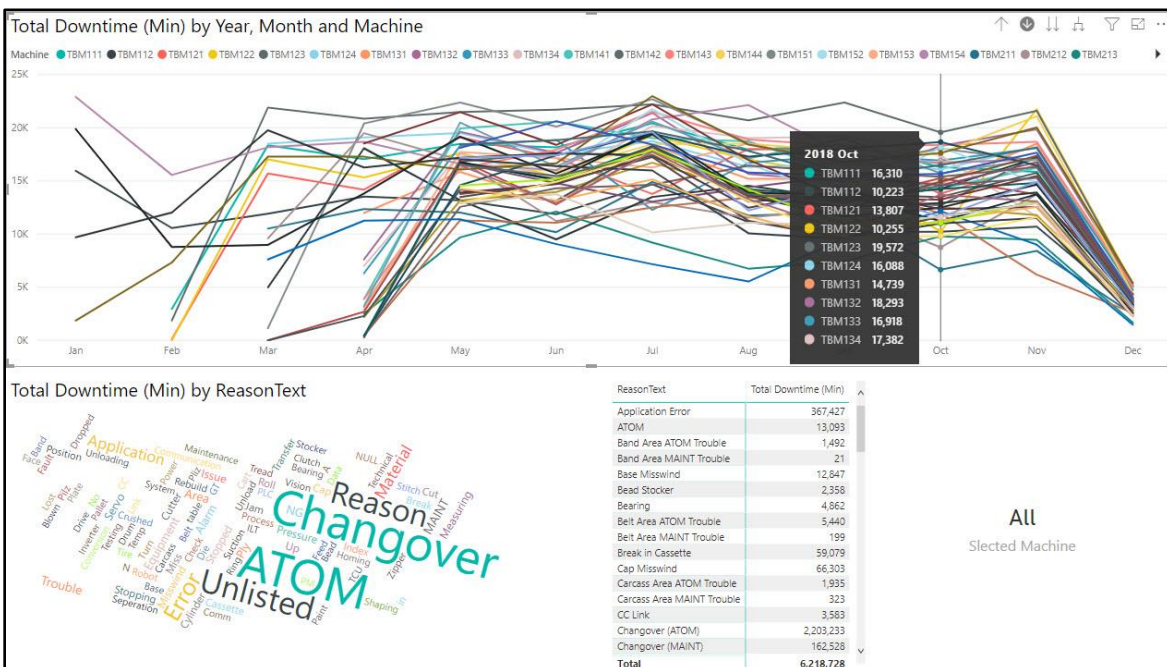
iii. Use DAX Formulas for Date Table Data Modeling to get this:

DateID	MonthNumber	Month	Year	Day
01/01/2017	1	Jan	2017	Sun 01/01/2017
01/02/2017	1	Jan	2017	Mon 01/02/2017
01/03/2017	1	Jan	2017	Tue 01/03/2017
01/04/2017	1	Jan	2017	Wed 01/04/2017
01/05/2017	1	Jan	2017	Thu 01/05/2017

iv. Use DAX Formulas for Time Table Data Modeling to get this:

HourID	SerialTime	Hour	Hour Increment
0	0	12 AM	12 AM up to 01 AM
1	0.0416666666666667	01 AM	01 AM up to 02 AM
2	0.0833333333333333	02 AM	02 AM up to 03 AM
3	0.125	03 AM	03 AM up to 04 AM
4	0.166666666666667	04 AM	04 AM up to 05 AM
5	0.208333333333333	05 AM	05 AM up to 06 AM

v. Final Report like this:



2) Steps in Video :

- i. Open Star File named "022-MSPTDA-DateTimeDimTable-Start.pbix".
- ii. Power Query to Import and Transform Fact Table. As we have done in earlier videos for this class, Use Power Query to import this CSV file named "021-MSPTDA-downtime.csv":

DowntimeID	Machine	DateTime	Duration	OperId	Spec	ReasonText
17	TBM112	11/1/17 13:56	10	2548	T922	Application Error
18	TBM112	11/1/17 14:46	3	2548	T922	Changover (ATOM)
19	TBM112	11/1/17 14:58	3	2548	T922	Changover (ATOM)

- iii. Using Power Query in Power BI Desktop, create this Fact Table using these Applied steps and this M Code:

1. Applied Steps:

The screenshot displays the Power BI Desktop interface. On the left, a table with 16 rows and 7 columns is visible. The columns are Machine, DowntimeID, Duration, ReasonText, and HourID. The right-hand pane shows the 'QUERY SETTINGS' for the 'Downtime' query. Under 'APPLIED STEPS', the following steps are listed: Source, Promoted Headers, Changed Type, Removed Other Columns, Inserted Hour, Renamed Columns, Extracted Date, Filtered Rows, and Renamed Columns1.

2. M Code:

```
let
    Source = Csv.Document(File.Contents("C:\Users\mgirvin\Desktop\MSPTDA-022\021-MSPTDA-downtime.csv"),[Delimiter=",", Columns=7, Encoding=65001, QuoteStyle=QuoteStyle.None]),
    #"Promoted Headers" = Table.PromoteHeaders(Source, [PromoteAllScalars=true]),
    #"Changed Type" = Table.TransformColumnTypes(#"Promoted Headers",{{"DowntimeID", Int64.Type}, {"Machine", type text}, {"DateTime", type datetime}, {"Duration", Int64.Type}, {"Removed Other Columns" = Table.SelectColumns(#"Changed Type",{"Machine", "DateTime", "Duration", "ReasonText"}),
    #"Inserted Hour" = Table.AddColumn(#"Removed Other Columns", "Hour", each Time.Hour([DateTime]), Int64.Type),
    #"Renamed Columns" = Table.RenameColumns(#"Inserted Hour",{"Hour", "HourID"}),
    #"Extracted Date" = Table.TransformColumns(#"Renamed Columns",{{"DateTime", DateTime.Date, type date}}),
    #"Filtered Rows" = Table.SelectRows(#"Extracted Date", each [DateTime] >= #date(2016, 1, 1) and [DateTime] < #date(2020, 1, 1)),
    #"Renamed Columns1" = Table.RenameColumns(#"Filtered Rows",{"DateTime", "DateID"})
in
    #"Renamed Columns1"
```

iv. **Date Dimension Table.** In Power BI Desktop, in the Data (Table) Area, we create these DAX Formulas to create this DAX Date Dimension Table:

1. Finished Date Table:

DateID	MonthNumber	Month	Year	Day
01/01/2017	1	Jan	2017	Sun 01/01/2017
01/02/2017	1	Jan	2017	Mon 01/02/2017
01/03/2017	1	Jan	2017	Tue 01/03/2017
01/04/2017	1	Jan	2017	Wed 01/04/2017

2. DAX Table Formula for DateID Column:

```
dDate = CALENDAR( DATE( YEAR( MIN( fDowntime[DateID] ) ), 1, 1 ), DATE( YEAR( Max( fDowntime[DateID] ) ), 12, 31 ) )
```

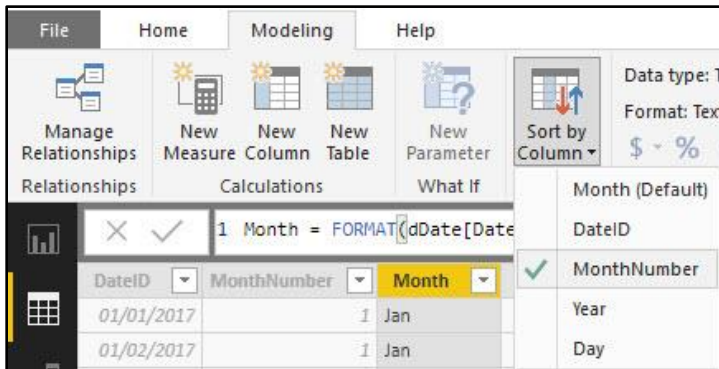
3. DAX Calculate Column Formula for MonthNumber Column:

```
MonthNumber = MONTH( dDate[DateID] )
```

4. DAX Calculate Column Formula for Month Column:

```
Month = FORMAT( dDate[DateID], "mmm" )
```

5. Use Sort By to sort Month by MonthNumber



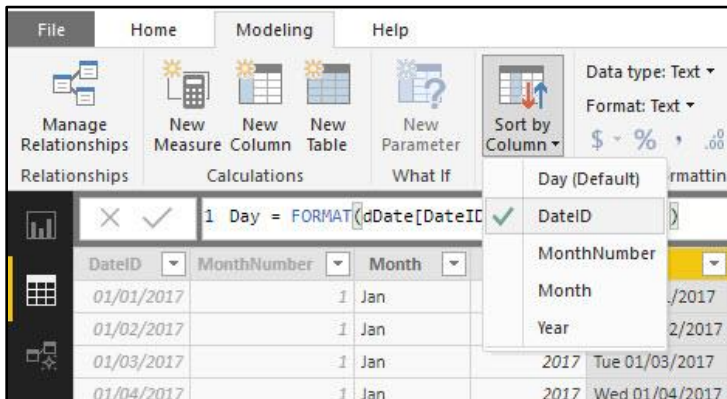
6. DAX Calculate Column Formula for Year Column:

```
Year = YEAR( dDate[DateID] )
```

7. DAX Calculate Column Formula for Day Column:

```
Day = FORMAT( dDate[DateID], "ddd mm/dd/yyyy" )
```

8. Use Sort By to sort Day by DateID



v. Time Dimension Table. In Power BI Desktop, in the Data (Table) Area, we create these DAX Formulas to create this DAX Time Dimension Table:

1. Finished Time Table:

HourID	SerialTime	Hour	Hour Increment
0	0	12 AM	12 AM up to 01 AM
1	0.041666666666667	01 AM	01 AM up to 02 AM
2	0.083333333333333	02 AM	02 AM up to 03 AM
3	0.125	03 AM	03 AM up to 04 AM
4	0.166666666666667	04 AM	04 AM up to 05 AM

2. DAX Table Formula for HourID Column:

```
dTime = GENERATESERIES(0,23,1)
```

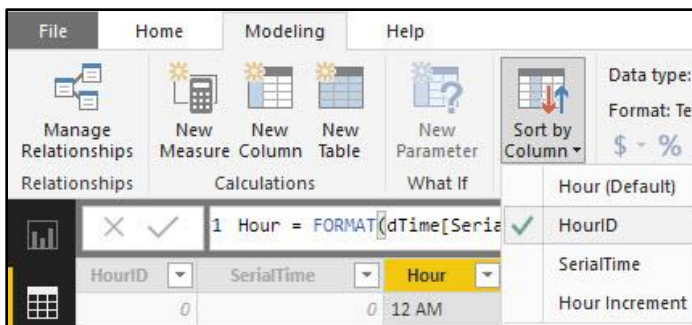
3. DAX Calculate Column Formula for SerialTime Column:

```
SerialTime = dTime[HourID]/24
```

4. DAX Calculate Column Formula for Hour Column:

```
Hour = FORMAT(dTime[SerialTime],"hh AM/PM")
```

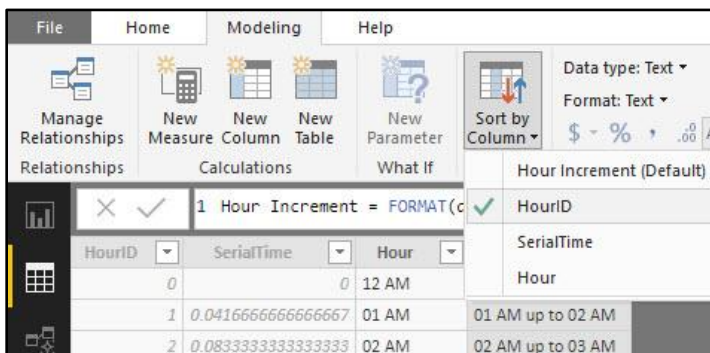
5. Use Sort By to sort Hour by HourID



6. DAX Calculate Column Formula for Hour Increment Column:

```
Hour Increment = FORMAT(dTime[SerialTime],"hh AM/PM")&" up to "&FORMAT(dTime[SerialTime]+1/24,"hh AM/PM")
```

7. Use Sort By to sort Hour Increment by HourID:



vi. **Create Measures.** In Power BI Desktop, in the Data (Table) Area, with the fDowntime Fact Table Selected, use the New Measure button in the Modeling Ribbon Tab, to create these two Measures:

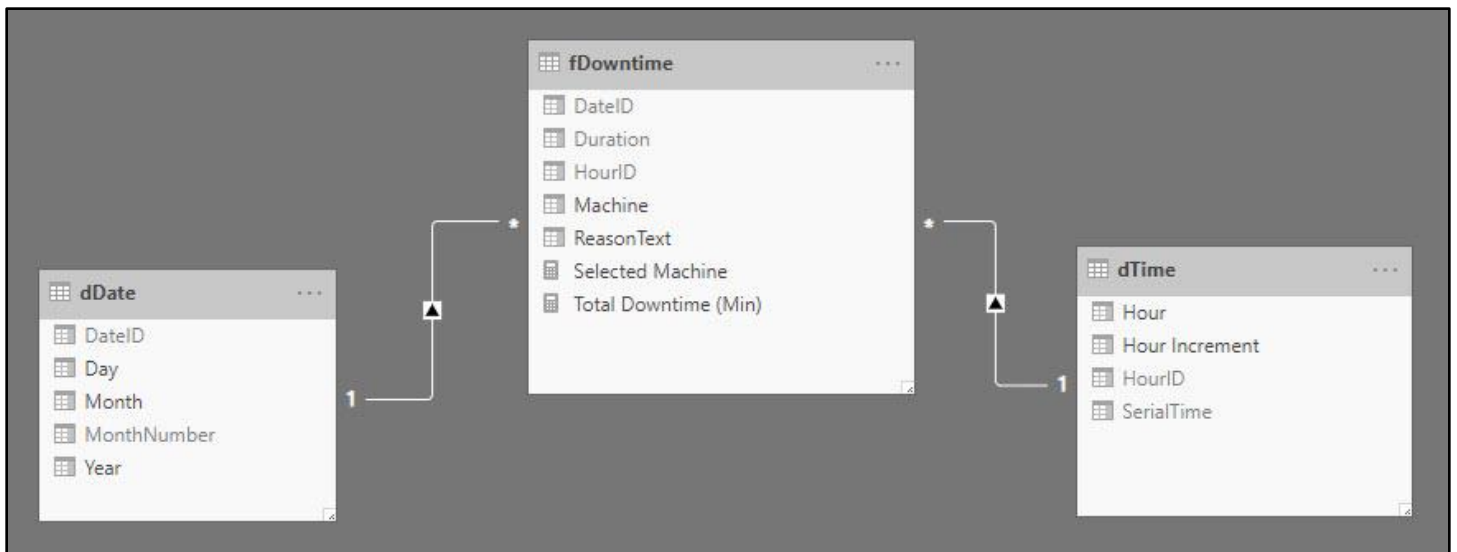
1. Total Downtime:

```
Total Downtime (Min) = SUM(fDowntime[Duration])
```

2. Machine Selected:

```
Selected Machine = SELECTEDVALUE(fDowntime[Machine], "All")
```

vii. **Relationships & Hide Columns.** In Power BI Desktop, in the Relationship Area, create the Relationships between the Fact Table and the two Dimension Tables, and then hide the columns that you do not want to see in the Reporting Area, as seen here:



viii. **Dashboard.** In Power BI Desktop Report View:

1. Create this Line Chart using the Fields and Measures as shown below:

Axis

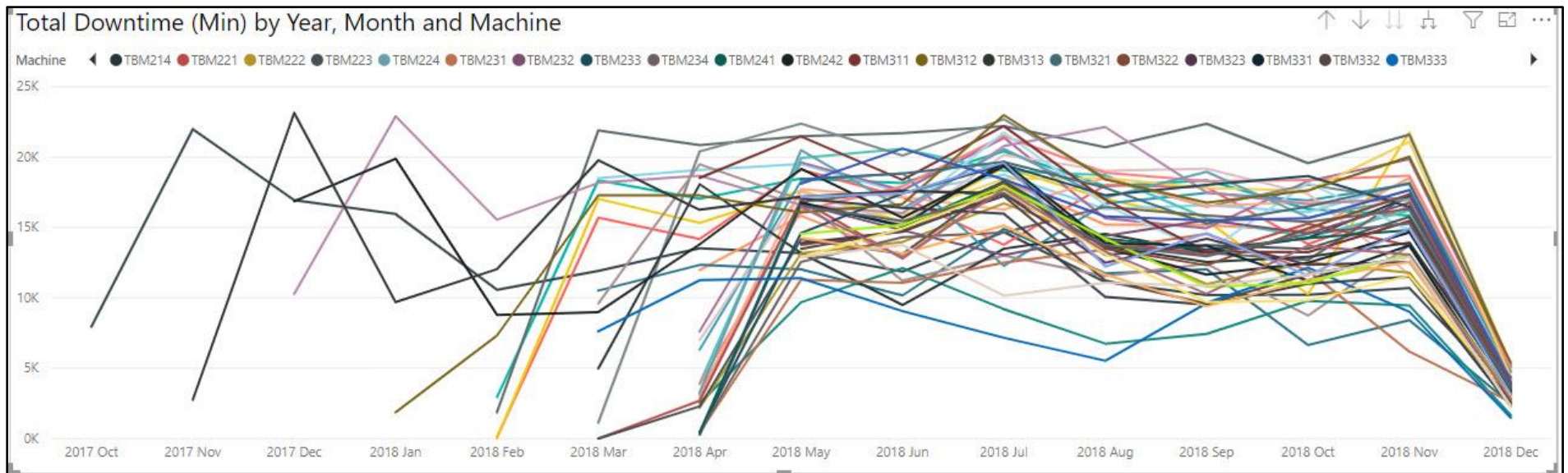
- Year
- Month
- Day
- Hour

Legend

- Machine

Values

- Total Downtime (Min)



2. Create this Matrix with this Field and Measure:

ReasonText	Total Downtime (Min)
Application Error	373,479
ATOM	13,152
Band Area ATOM Trouble	1,492
Band Area MAINT Trouble	21
Base Misswind	12,847
Bead Stocker	2,427
Bearing	5,060
Belt Area ATOM Trouble	5,443
Belt Area MAINT Trouble	199
Break in Cassette	59,079
Cap Misswind	66,303
Carcass Area ATOM Trouble	1,935
Carcass Area MAINT Trouble	323
CC Link	4,239
Changover (ATOM)	2,220,940
Changover (MAINT)	162,803
Total	6,318,660

Rows

ReasonText

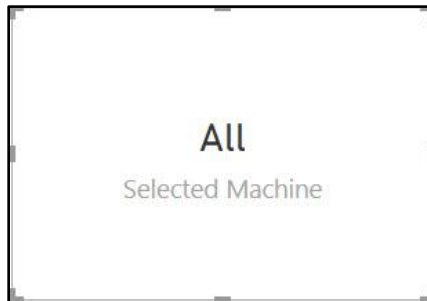
Columns

Add data fields here

Values

Total Downtime (Min)

3. Create this Card with these fields:



Fields

Selected Machine

4. Download Custom Visual for Word Cloud :

- i. In the Visualization Area, click the More Button, then click on the "Import from marketplace" option, as seen here:

VISUALIZATIONS

FIELD

Import from file

Import from marketplace

Delete a custom visual

6. The finished Dashboard looks like this:

