CODE PRESENTS

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BEST PRACTICES FOR OPTIMIZING POWER BI AND DAX MODELING

A webinar presented by Helen Wall and Andy Clark

Helen Wall
Linkedin instructor for Microsoft Power BI and AWS

Andy Clark
BI Project Manager

Kicking Things Off

Jim Duffy

- Director of Business Development
  CODE Magazine & Consulting
- Former Developer – Drawn to the Dark Side: Now Responsible for Marketing & Business Development
- jduffy@codemag.com / My Bio
- International Author and Speaker
- Former Microsoft RD (Regional Director) 9 years
- Former 11 time Microsoft Most Valuable Professional (MVP)
- Twitter: @jmduffy

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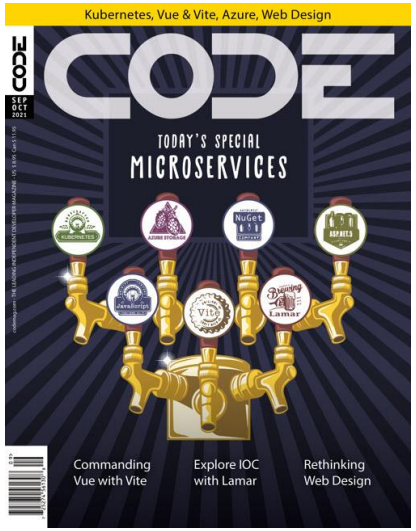

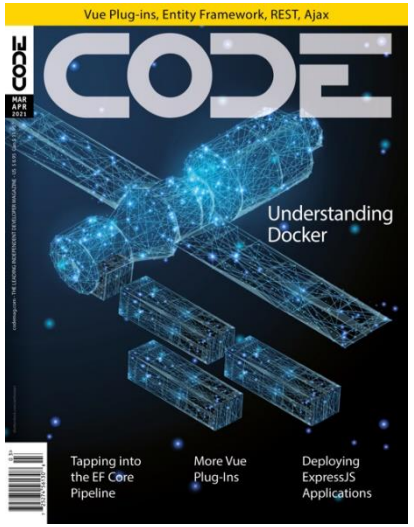

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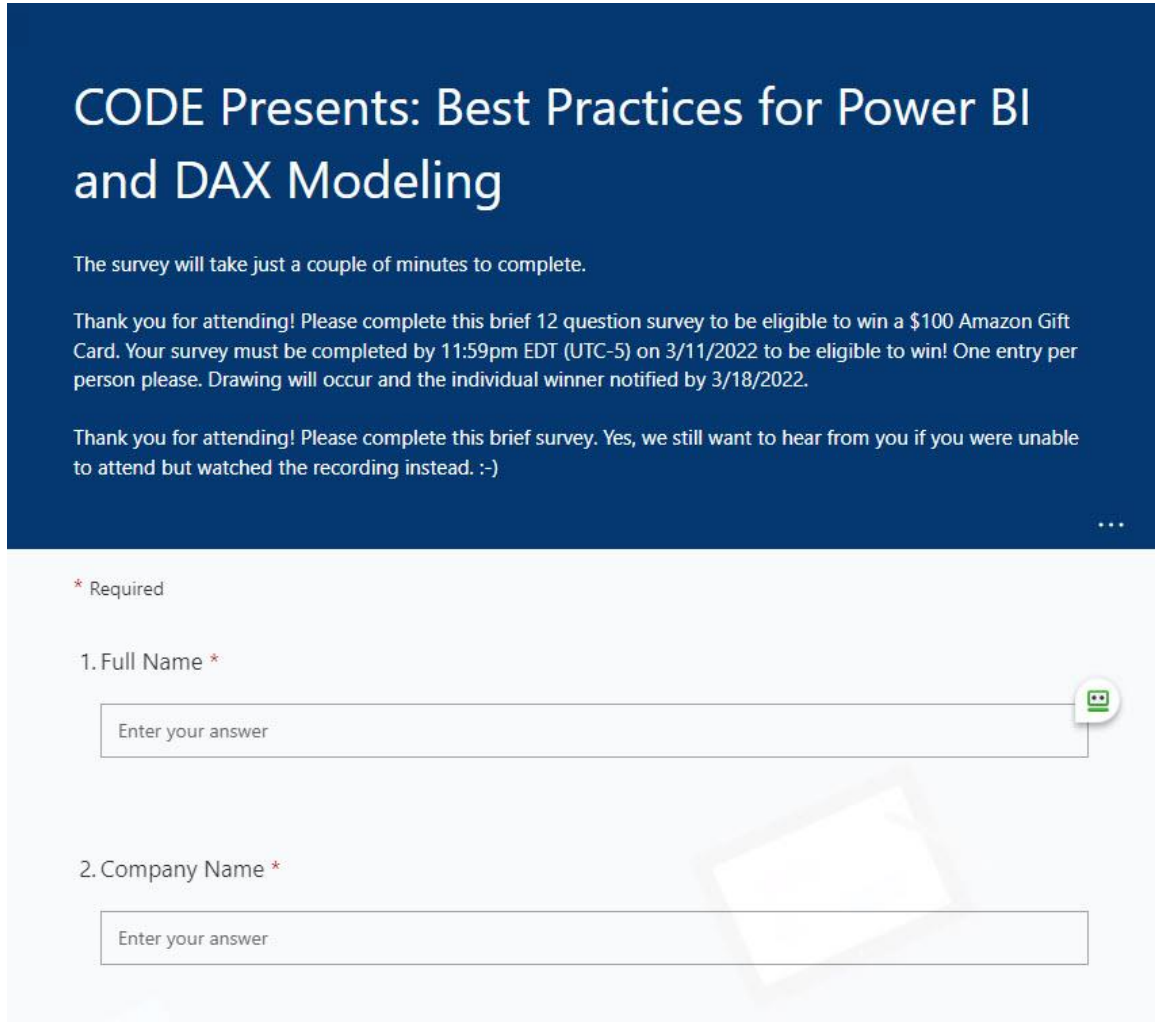

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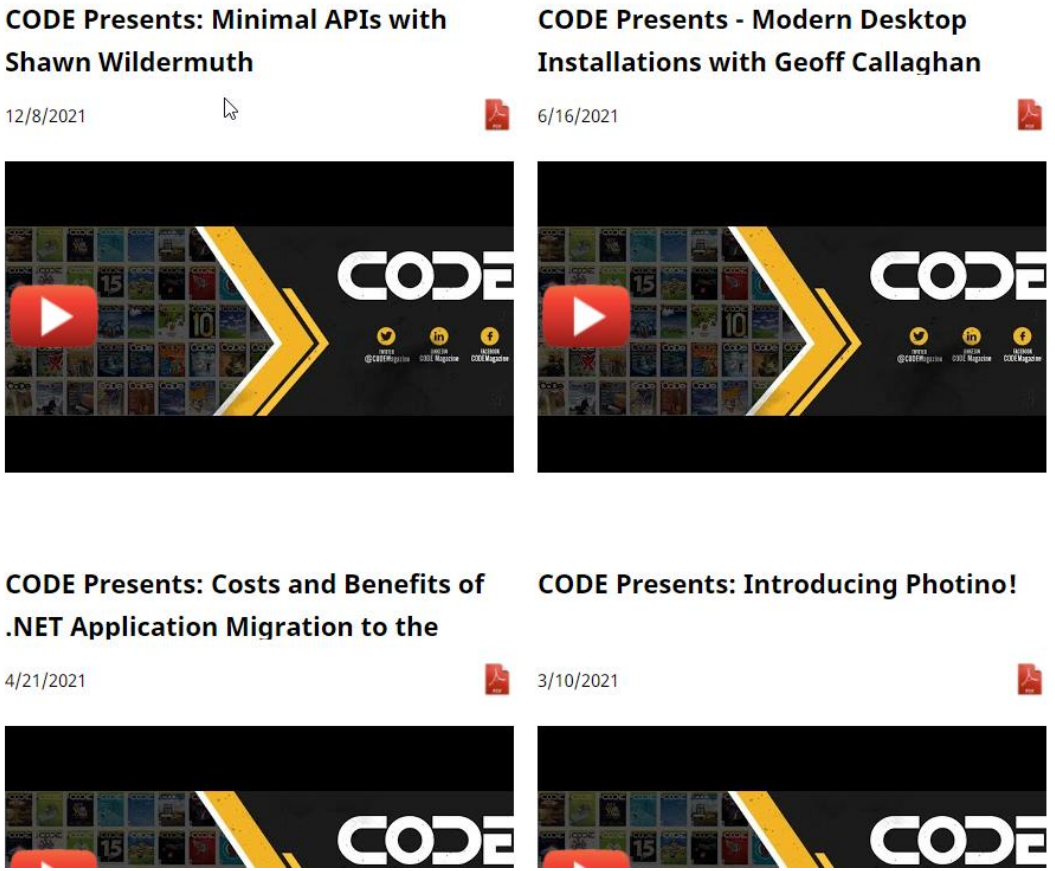
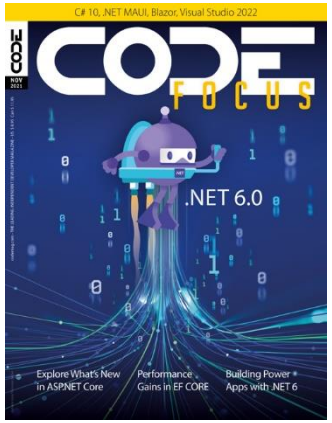
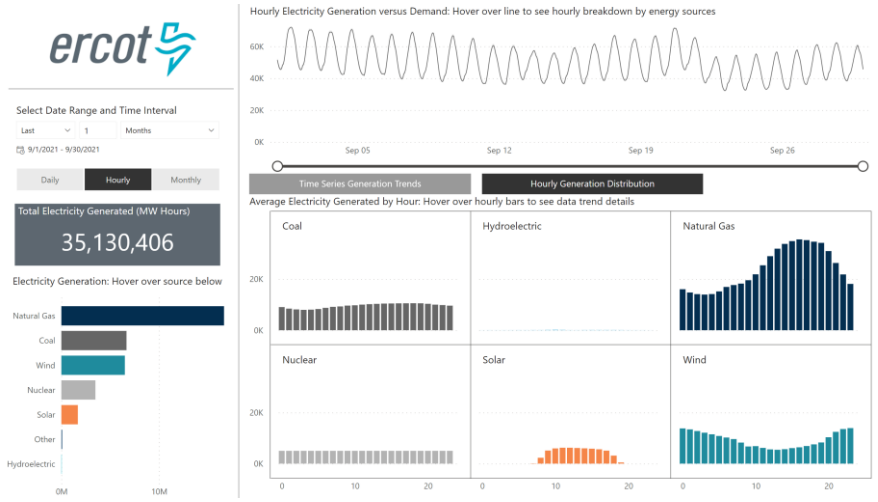
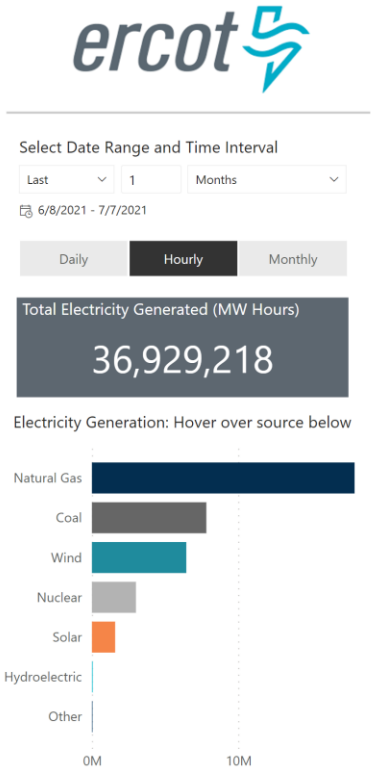


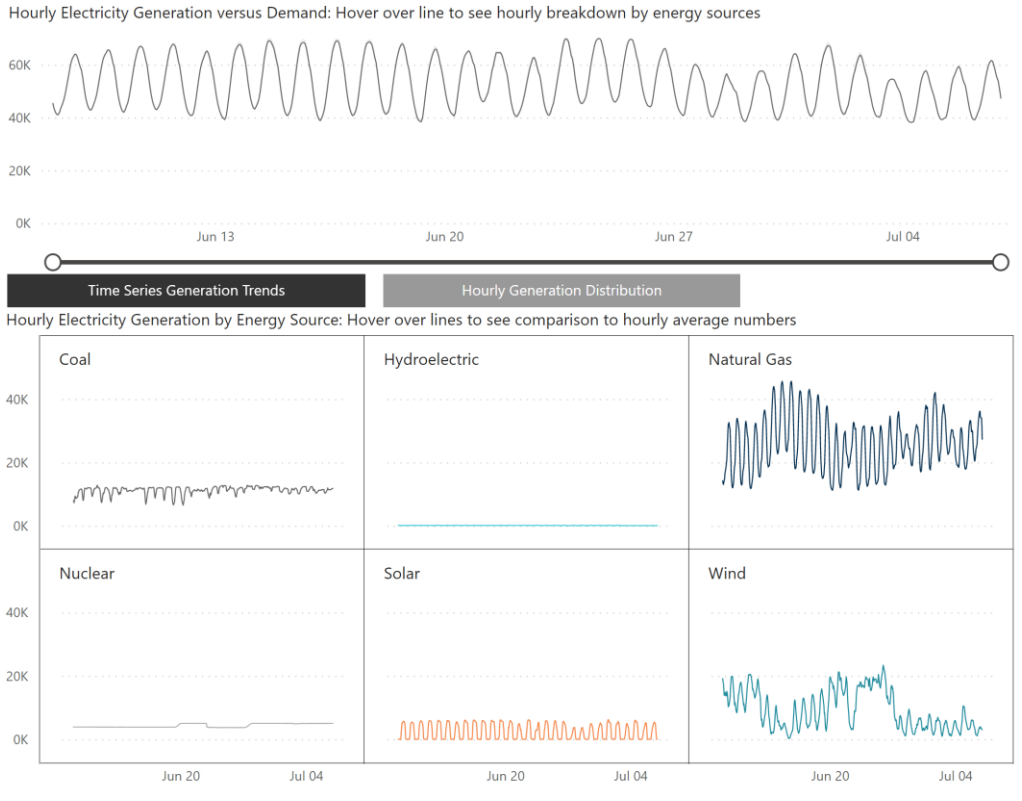
About the Presenters

- **Helen Wall**
  - LinkedIn instructor for
    - Microsoft Power BI, Excel, R
- **Andy Clark**
  - BI Project Manager



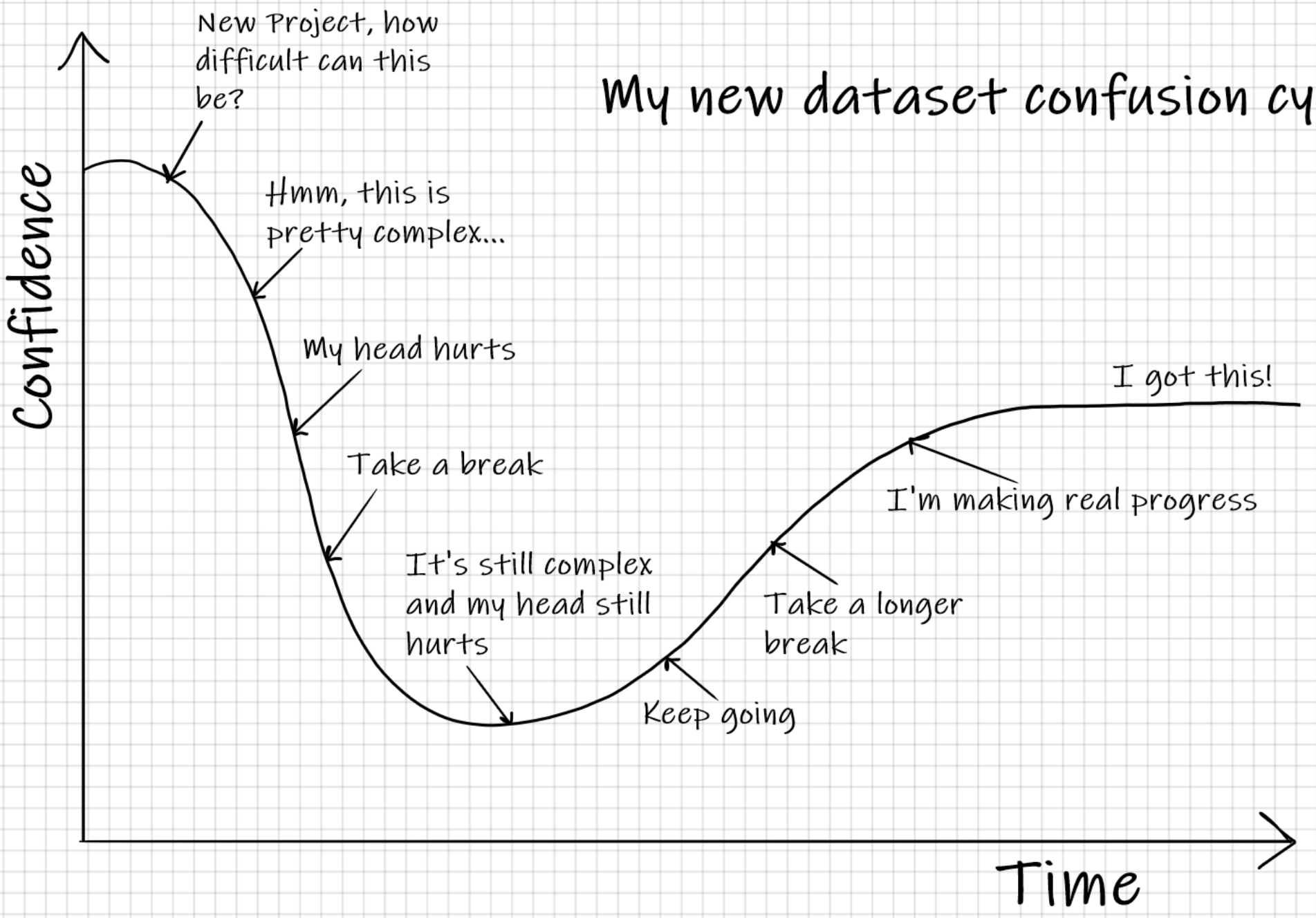

ercot
Select Date Range and Time Interval
Last
1
Months
9/1/2021 - 9/30/2021
Daily
Hourly
Monthly
Total Electricity Generated (MW Hours)
35,130,406
Electricity Generation: Hover over source below
Natural Gas
Coal
Wind
Nuclear
Solar
Other
Hydroelectric
0M
10M
Hourly Electricity Generation versus Demand: Hover over line to see hourly breakdown by energy sources
60K
40K
20K
0K
Sep 05
Sep 12
Sep 19
Sep 26
Time Series Generation Trends
Hourly Generation Distribution
Average Electricity Generated by Hour: Hover over hourly bars to see data trend details
Coal
Hydroelectric
Natural Gas
Nuclear
Solar
Wind
0
10
20


ercot
Select Date Range and Time Interval
Last
1
Months
6/8/2021 - 7/7/2021
Daily
Hourly
Monthly
Total Electricity Generated (MW Hours)
36,929,218
Electricity Generation: Hover over source below
Natural Gas
Coal
Wind
Nuclear
Solar
Hydroelectric
Other
0M
10M

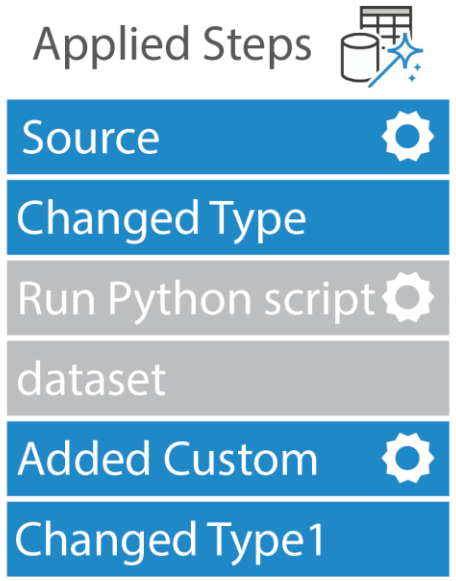

Hourly Electricity Generation versus Demand: Hover over line to see hourly breakdown by energy sources
60K
40K
20K
0K
Jun 13
Jun 20
Jun 27
Jul 04
Time Series Generation Trends
Hourly Generation Distribution
Hourly Electricity Generation by Energy Source: Hover over lines to see comparison to hourly average numbers
Coal
Hydroelectric
Natural Gas
Nuclear
Solar
Wind
40K
20K
0K
Jun 20
Jul 04

All the potential data for the analysis

The data we should start with


My new dataset confusion cycle
Confidence
New Project, how difficult can this be?
Hmm, this is pretty complex...
My head hurts
Take a break
It's still complex and my head still hurts
Keep going
Take a longer break
I'm making real progress
I got this!
Time

Incorporate a model from a Python script into Power BI!



Power Query passes the 'dataset' dataframe variable into the Python script, which contains the transformed data up to that point in the query

```
# 'dataset' holds the input data for this script
from sklearn.linear_model import LogisticRegression

logit = LogisticRegression()
logit.fit(dataset[['x']], dataset['y'])
dataset['Pred'] = logit.predict(dataset[['x']])
```

After running a logistic regression model Python script, it passes the transformed 'dataset' table back into Power Query and we can drill into it

Alternatively, here's where the fields from the final table object (after running a logistic regression model with the x and y fields) that we load into Power BI Desktop come from...

x	y	Pred	Match
1	0	0	Yes
2	0	0	Yes
3	1	0	No
4	0	1	No
5	1	1	Yes

Incorporate a model from an R script into Power BI!

Applied Steps

- Source
- Changed Type
- Run R script
- output
- Added Custom
- Changed Type1

Power Query passes the 'dataset' dataframe variable into R script, which contains the transformed data up to that point

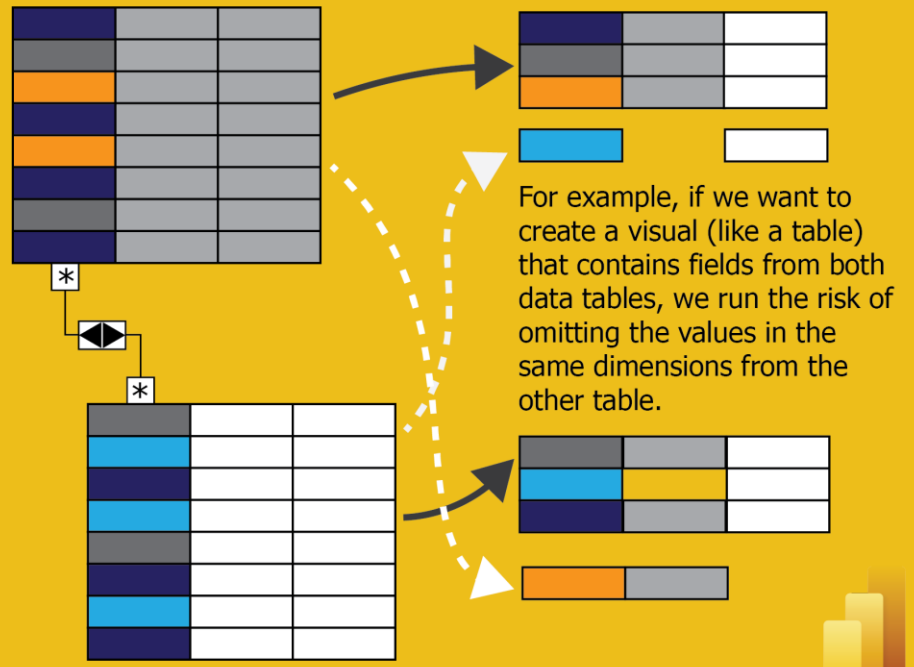
```
# 'dataset' holds the input data for this script
m <- lm(y ~ x, data = dataset)
dataset$Fit <- predict(m)
output <- dataset
```

After running the R script, it passes the transformed 'dataset' back into Power Query as the 'output' table object that we can then drill into

Alternatively, here's where the fields from the final table object that we load into Power BI Desktop come from...

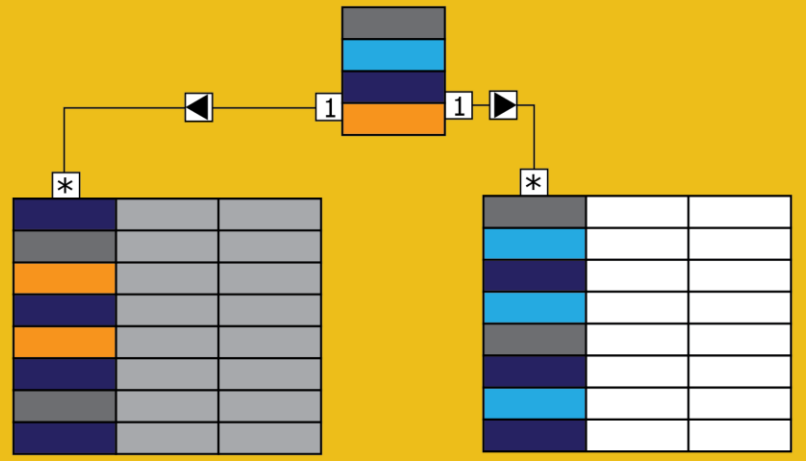
x	y	Fit	Dist
1	2.2	2.24	0.04
2	3.5	3.22	0.28
3	3.9	4.2	0.3
4	5.1	5.18	0.08
5	6.3	6.16	0.14

While many-to-many table joins in Power BI can fix issues that arise from connecting tables together by quickly hiding them in the model view, they can also lead to much bigger issues later when we create visuals...

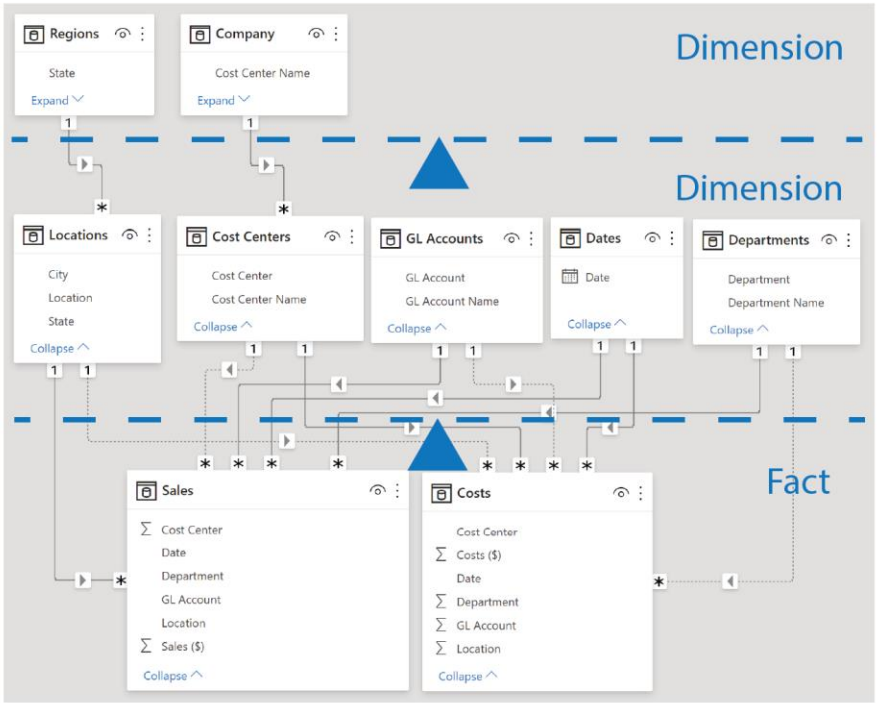


For example, if we want to create a visual (like a table) that contains fields from both data tables, we run the risk of omitting the values in the same dimensions from the other table.

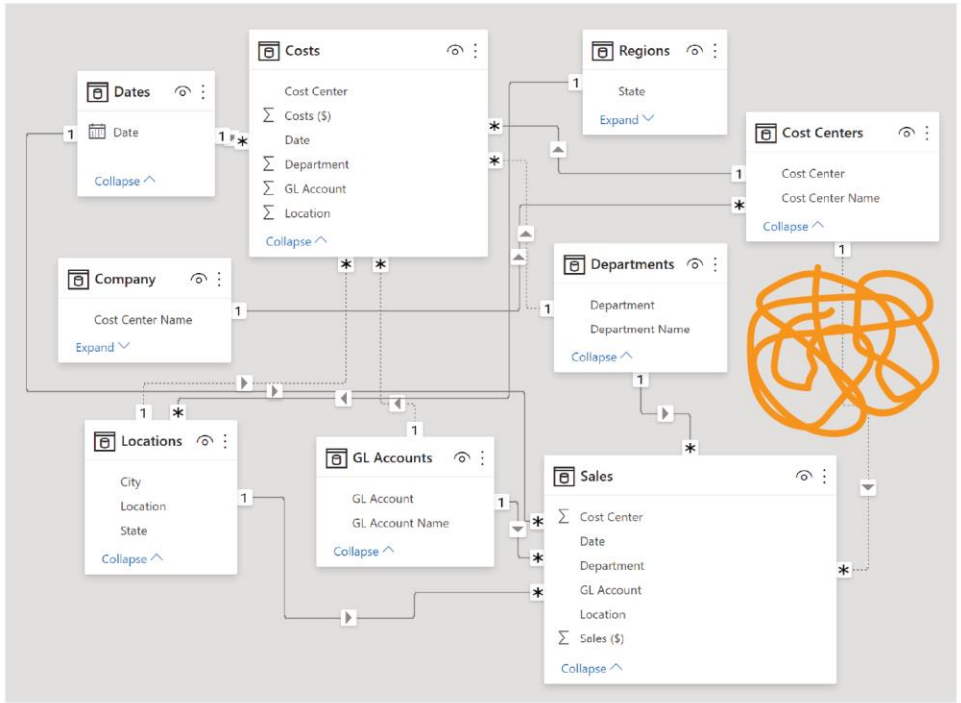
Instead, try creating a separate dimension table that serves as a key to store all these dimensions values that both tables can connect to!



Organized Star Schema

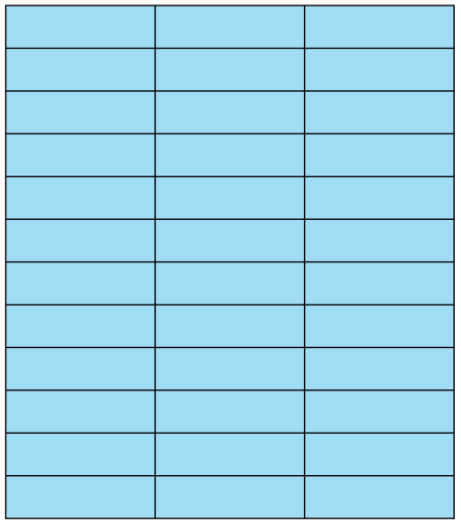


vs. Spagetti Star Schema

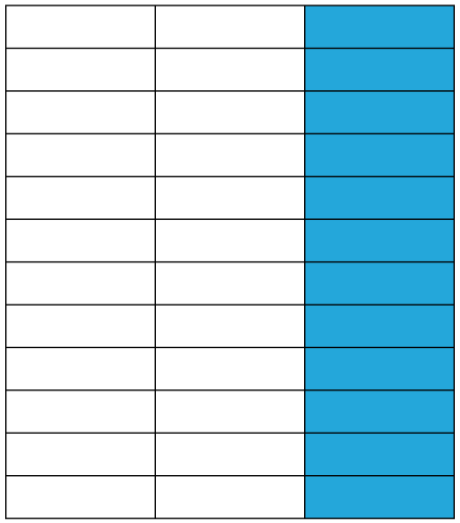


What can we create with DAX functions?

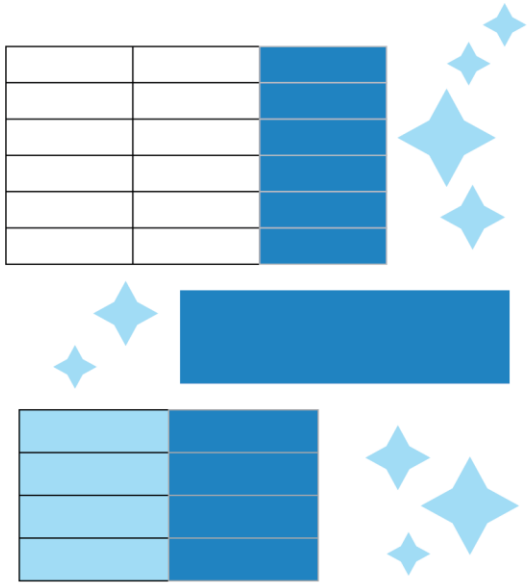
1 Tables



2 Columns



3 Measures



We can think of date filters in DAX measures like a ruler

1. It can move the evaluation context to another date

FIRSTDATE	ENDOFYEAR	NEXTQUARTER
LASTDATE	STARTOFQUARTER	PREVIOUSQUARTER
STARTOFMONTH	ENDOFQUARTER	NEXTYEAR
ENDOFMONTH	NEXTDAY	PREVIOUSYEAR
STARTOFYEAR	PREVIOUSDAY	DATEADD

2. It can expand the existing date range coordinates

DATESMTD	TOTALMTD	DATESBETWEEN
DATESQTD	TOTALQTD	DATESINPERIOD
DATESYTD	TOTALYTD	PARALLELPERIOD

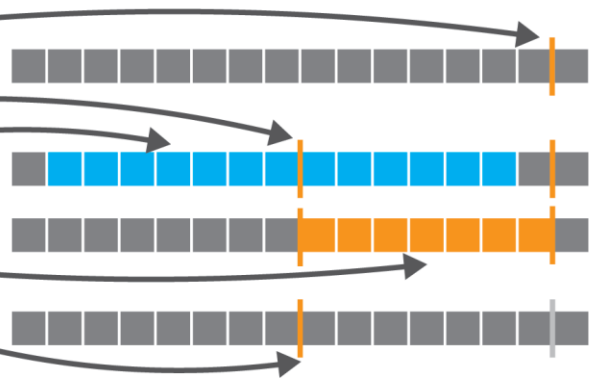
Days since previous week	Date	Rate	Previous Week's Rate
	11/7/2019	3.69%	3.78%
7	11/14/2019	3.75%	3.69%
7	11/21/2019	3.66%	3.75%
6	11/27/2019	3.68%	3.66%
8	12/5/2019	3.68%	3.68%
7	12/12/2019	3.73%	3.68%
7	12/19/2019	3.73%	3.73%
7	12/26/2019	3.74%	3.73%

High level ordered steps to creating DAX measures

1. Filter data table
2. Calculate results over this filtered data

Try this out in Power BI!

```
1  Previous Week's Rate =
2  VAR current_date =
3      CALCULATE(LASTDATE('Mortgage Rates'[Date]))
4  VAR previous_weeks_date =
5      CALCULATE(LASTDATE('Mortgage Rates'[Date]),
6          DATESBETWEEN('Mortgage Rates'[Date],current_date-14,current_date-1))
7  VAR days_since_previous_week =
8      DATEDIFF(previous_weeks_date,current_date,DAY)
9  RETURN
10     CALCULATE(AVERAGE('Mortgage Rates'[Rate]),
11         DATEADD('Mortgage Rates'[Date],-1*days_since_previous_week,DAY))
```



Create measure for each value in the date dimension

Expand date filter to previous 14 days (excluding current date), then determine most recent of these dates

Calculate number of days between dates as a measure using DATEDIFF

Move date filter to previous week's date using DATEADD, then calculate rate at this new date using AVERAGE

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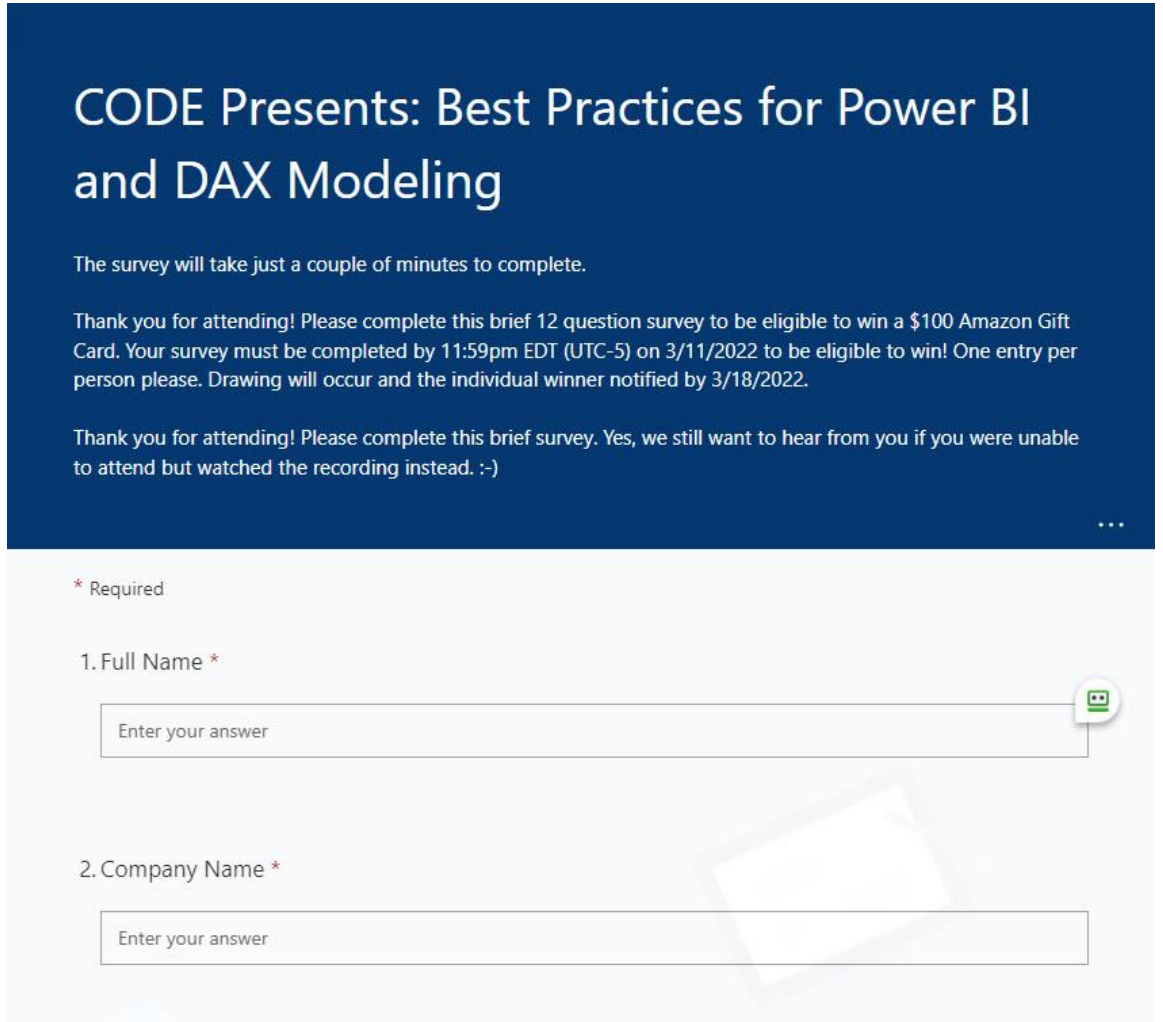

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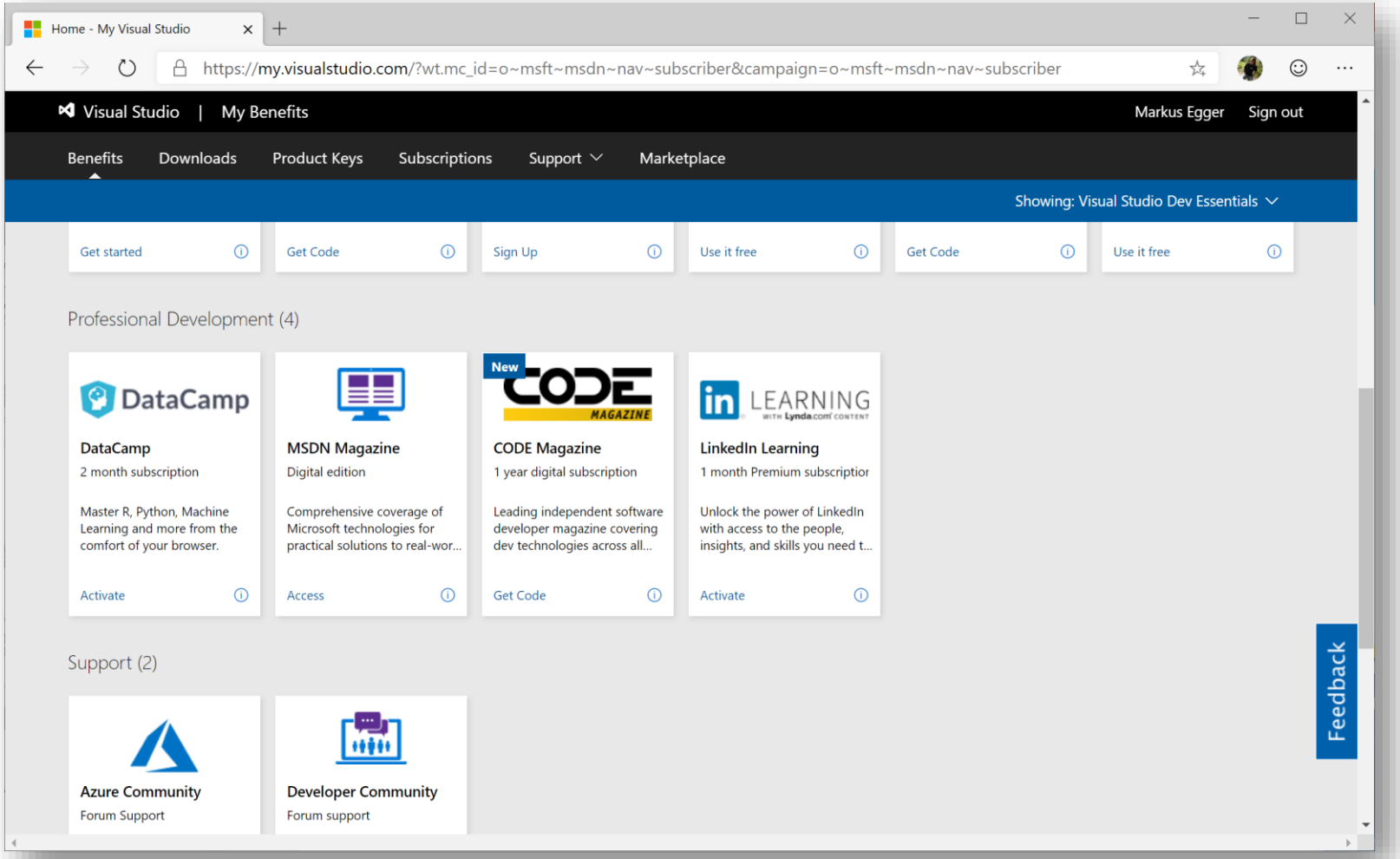

Q&A

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