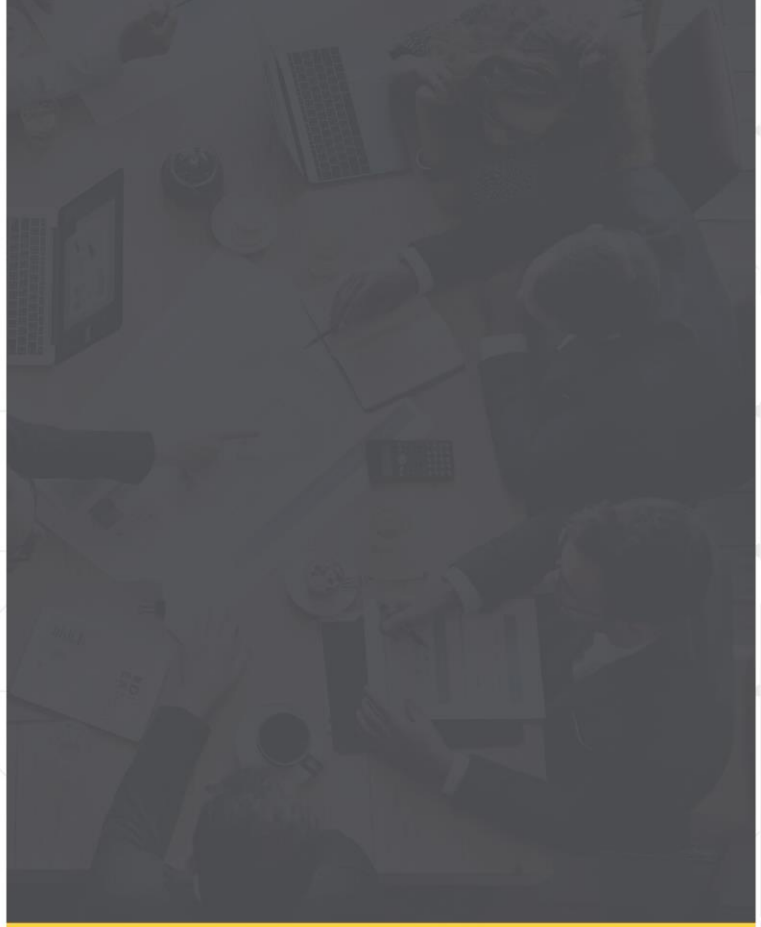

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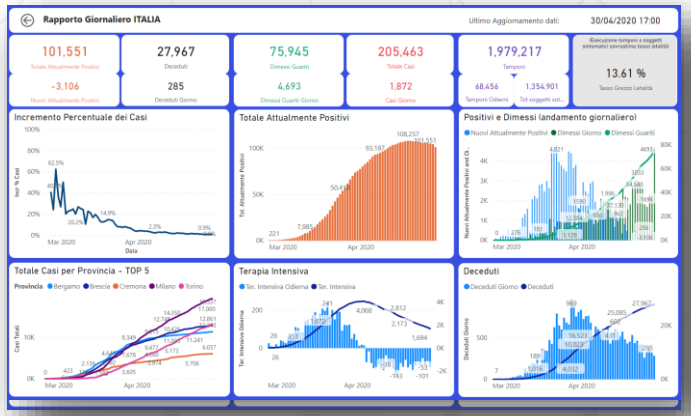
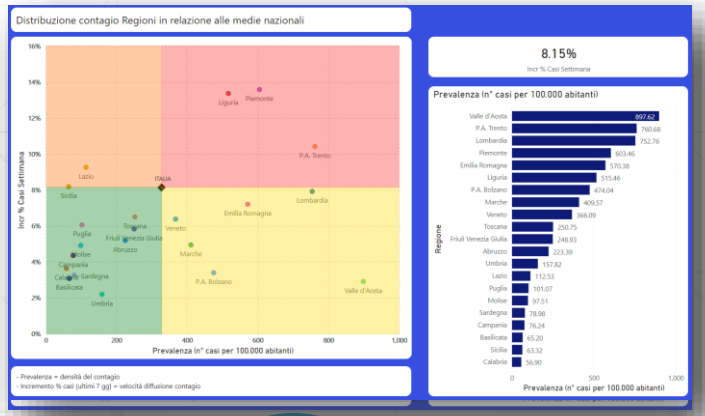
Power BI
Lesson Learned al tempo del Coronavirus

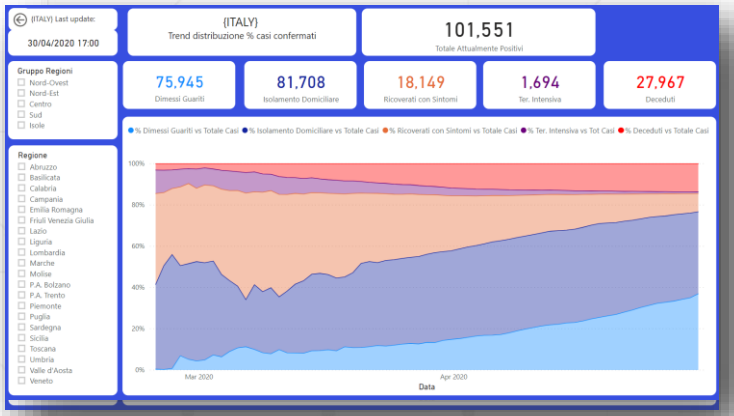
Andrea Benedetti

Sr. Cloud Architect | Data & AI Engineer

Microsoft







Andrea Benedetti

https://twitter.com/anBenedetti

https://github.com/anbened

https://www.linkedin.com/in/abenedetti/

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#MSBizAppsSummit

- «A data culture for everyone»
  - Satya Nadella, 2014.04.15 (qui)

- In less than 5 years Power BI
  - over 150,000 organizations
    - including 97% of Fortune 500 (!)
  - 2M developers use Power BI
  - over 45 PB of data to PBI every month
  - 40M reports & dashboards

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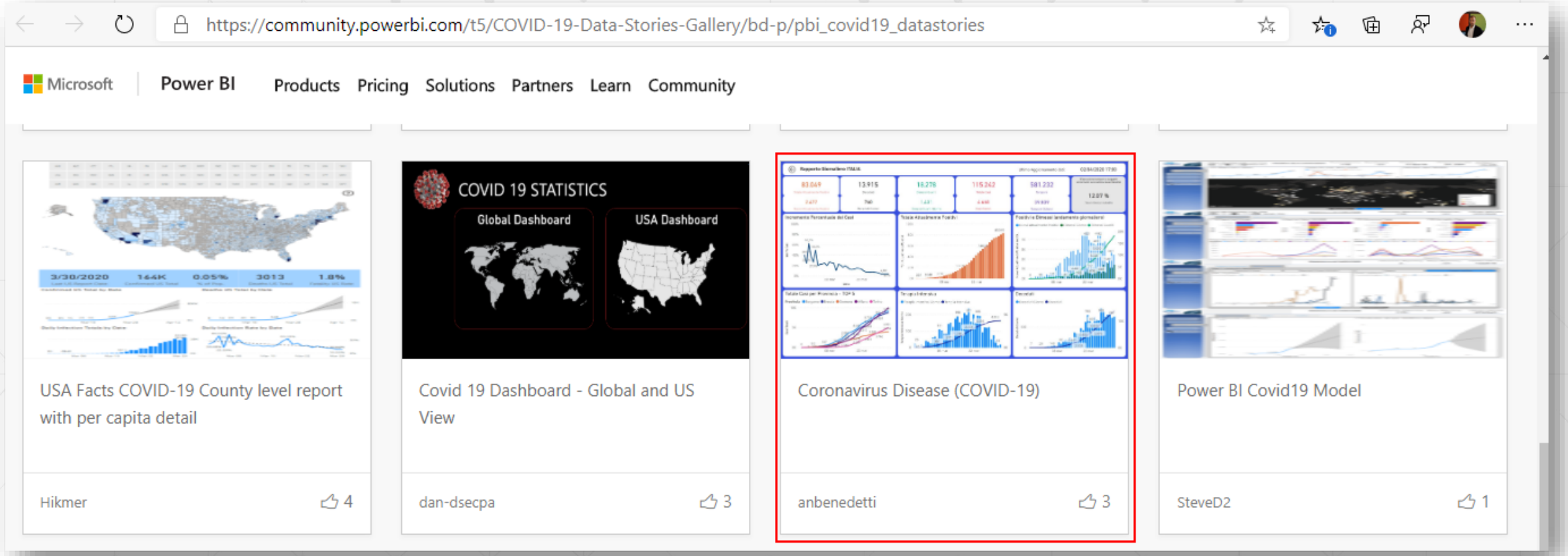

https://aka.ms/covidreport

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StartupItalia

Economia Digitale

Andrea Benedetti
@anBenedetti

Ultimo aggiornamento il 5 maggio 2020 alle 0:14

Data Culture e Coronavirus. Una proposta per un Data-Strategy manifesto

I dati, ce lo ripetiamo da giorni parlando delle fantomatiche 3-T, sono indispensabili per governare la fase 2. Ma cosa serve, davvero, per costruire un piano nazionale affidabile per tracciare e contenere il Covid19?

Per diversi motivi, **sto seguendo** la pandemia in corso praticamente da quando, a Codogno, si presentò il primo focolaio italiano. **Era il 21 febbraio 2020**. L'attenzione nacque principalmente dalla curiosità di capire cosa stesse succedendo e, grazie al prezioso lavoro della Protezione Civile, potendo disporre di dati giornalieri con diversi attributi d'interesse ho sviluppato un modello di analisi che mi permettesse da un lato di osservare il fenomeno, dall'altro di poter rispondere ad alcune domande che avevo in testa.

https://startupitalia.eu/128952-20200504-data-culture-e-coronavirus-una-proposta-per-un-data-strategy-manifesto

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«SPIEGARE LE BATTUTE E' COME SEZIONARE UNA RANA: A NESSUNO PIACE, E NEL PROCESSO LA RANA MUORE»

Agenda

- Questo talk NON è:
  - Introduzione Power BI
  - Tips avanzati DAX/M
  - Deep-dive di qualcosa
- Questo talk è:
  - Condivisione di lesson learned di un progetto reale
  - Condivisione di alcune tecniche utili con Power BI
  - Condivisione di alcuni tips di produttività

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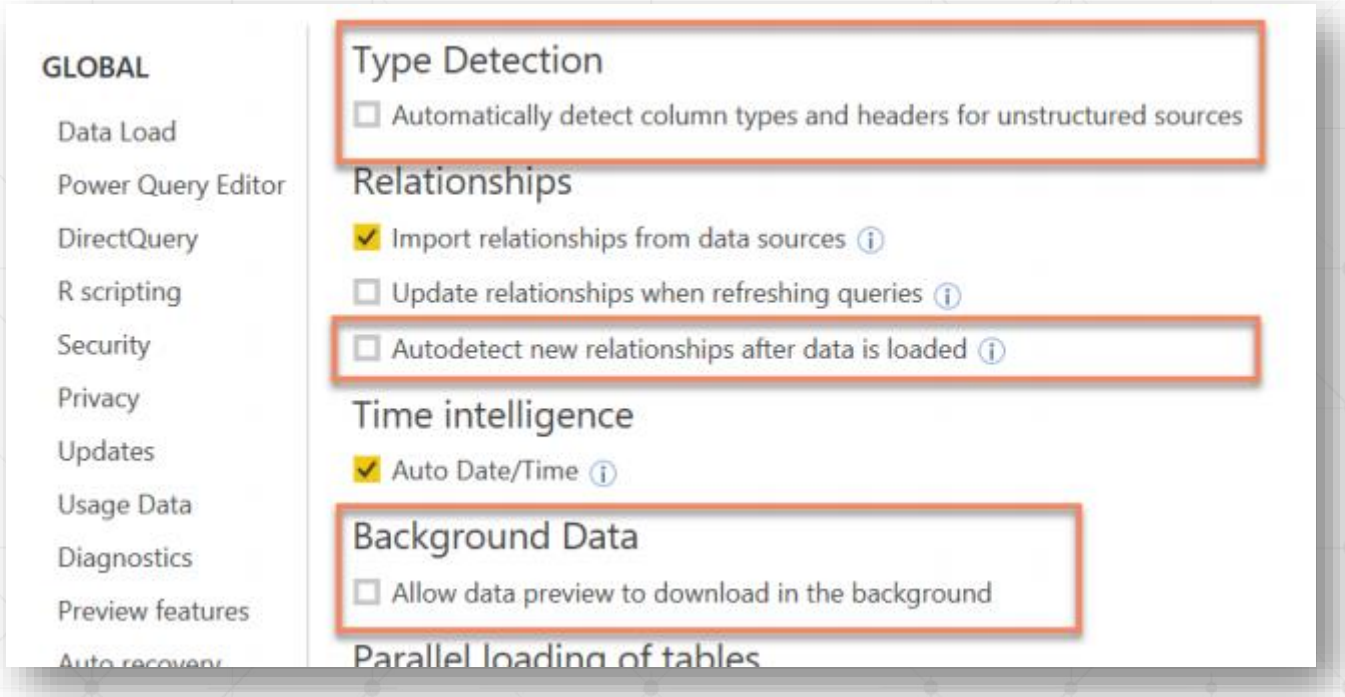
LE BASI

Attenzione impostazioni di default



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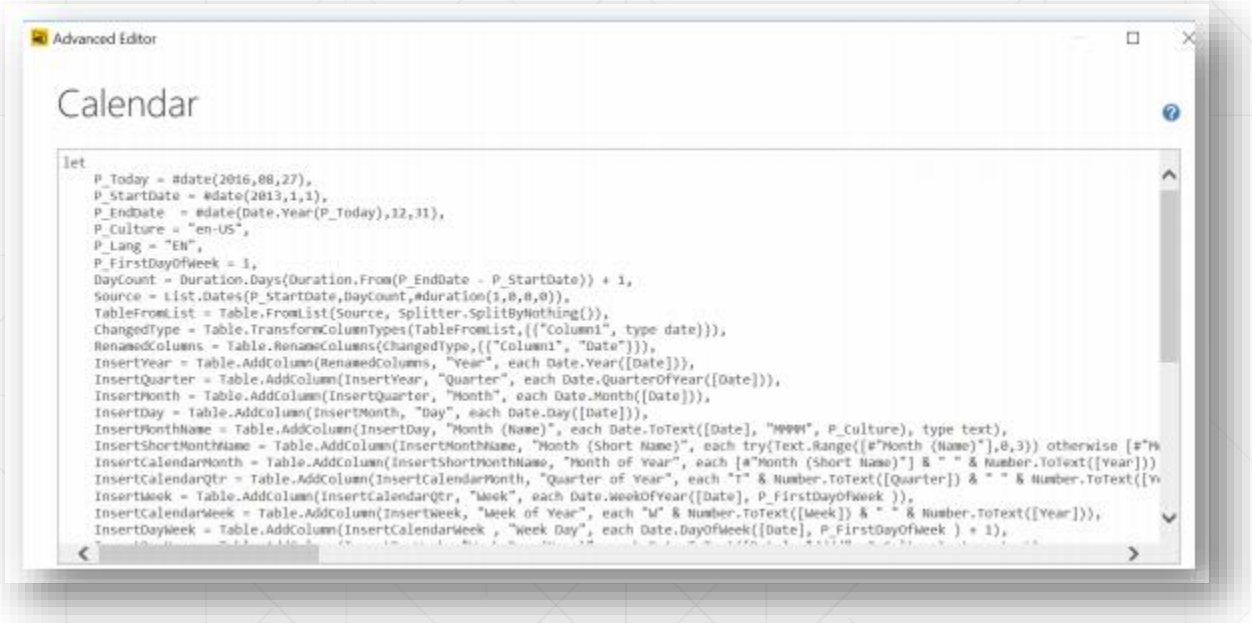
Date table



- Utilizza una TUA calendar table (M o DAX)
  - Es: https://www.sqlbi.com/articles/reference-date-table-in-dax-and-power-bi/

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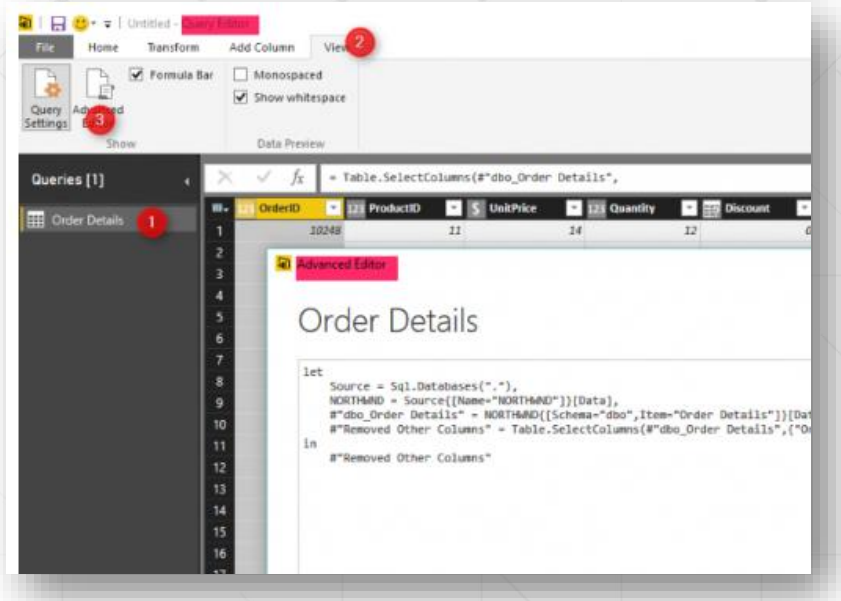
Advanced editor

> *Surprisingly, most people don't know about the Advanced Editor. It is because it's hidden away inside the Query Editor, which a lot of users don't utilize as much as they should.*



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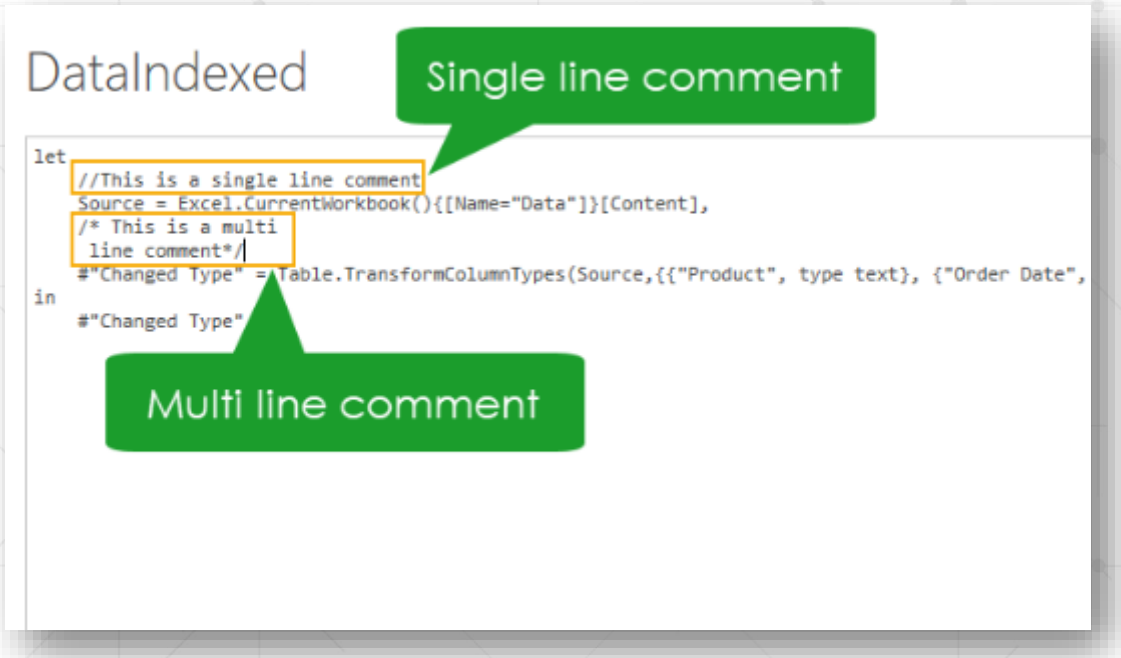
Commentare non è il male



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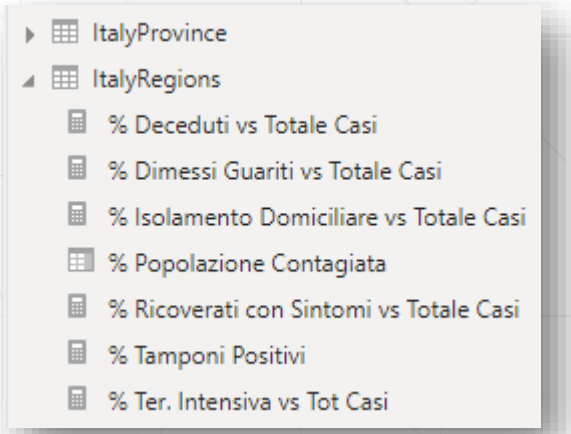
Partire con il piede giusto

- Carica solo quello di cui hai effettivamente bisogno
- Pensa alla tua naming convention e sii coerente
- Entità != Tabelle



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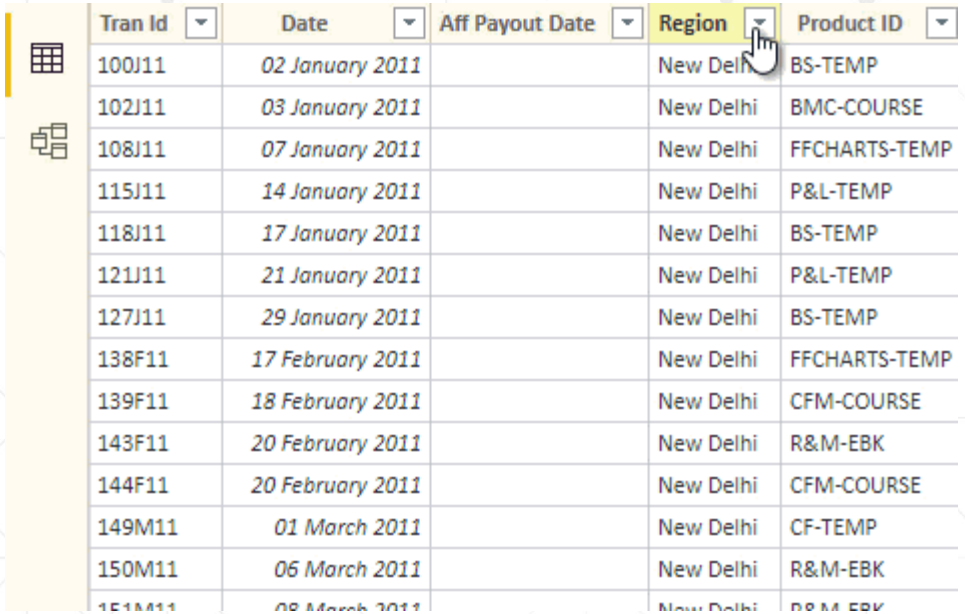
Copiare dati da power bi



Tran Id	Date	Aff Payout Date	Region	Product ID
100J11	*02 January 2011*		New Delhi	BS-TEMP
102J11	*03 January 2011*		New Delhi	BMC-COURSE
108J11	*07 January 2011*		New Delhi	FFCHARTS-TEMP
115J11	*14 January 2011*		New Delhi	P&L-TEMP
118J11	*17 January 2011*		New Delhi	BS-TEMP
121J11	*21 January 2011*		New Delhi	P&L-TEMP
127J11	*29 January 2011*		New Delhi	BS-TEMP
138F11	*17 February 2011*		New Delhi	FFCHARTS-TEMP
139F11	*18 February 2011*		New Delhi	CFM-COURSE
143F11	*20 February 2011*		New Delhi	R&M-EBK
144F11	*20 February 2011*		New Delhi	CFM-COURSE
149M11	*01 March 2011*		New Delhi	CF-TEMP
150M11	*06 March 2011*		New Delhi	R&M-EBK

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La data quality è *sempre* tua responsabilità

Data	Citta	Casi Confermati
01/05/2020	Brescia	12
01/05/2020	Bergamo	21
02/05/2020	Brescia	14
02/05/2020	Bergamo	21
02/05/2020	Brescia	14
03/05/2020	Brescia	16
03/05/2020	Bergamo	22

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La data quality è *sempre* tua responsabilità

Data	Citta	Casi Confermati
01/05/2020	Brescia	12
01/05/2020	Bergamo	21
02/05/2020	Brescia	14
02/05/2020	Bergamo	21
02/05/2020	Brescia	14
03/05/2020	Brescia	16
03/05/2020	Bergamo	22

```
1 COUNTIF for Duplicate Rows =
2 COUNTROWS(
3     FILTER(
4         ALL(ConfermatiCitta);
5         EARLIER(ConfermatiCitta[Data]) = ConfermatiCitta[Data] && EARLIER(ConfermatiCitta[Citta]) = ConfermatiCitta[Citta]
6     )
7 )
```

Data	Citta	Casi Confermati	COUNTIF for Duplicate Rows
venerdì 1 maggio 2020	Brescia	*12*	*1*
venerdì 1 maggio 2020	Bergamo	*21*	*1*
sabato 2 maggio 2020	Brescia	*14*	*2*
sabato 2 maggio 2020	Bergamo	*21*	*1*
sabato 2 maggio 2020	Brescia	*14*	*2*
domenica 3 maggio 2020	Brescia	*16*	*1*
domenica 3 maggio 2020	Bergamo	*22*	*1*

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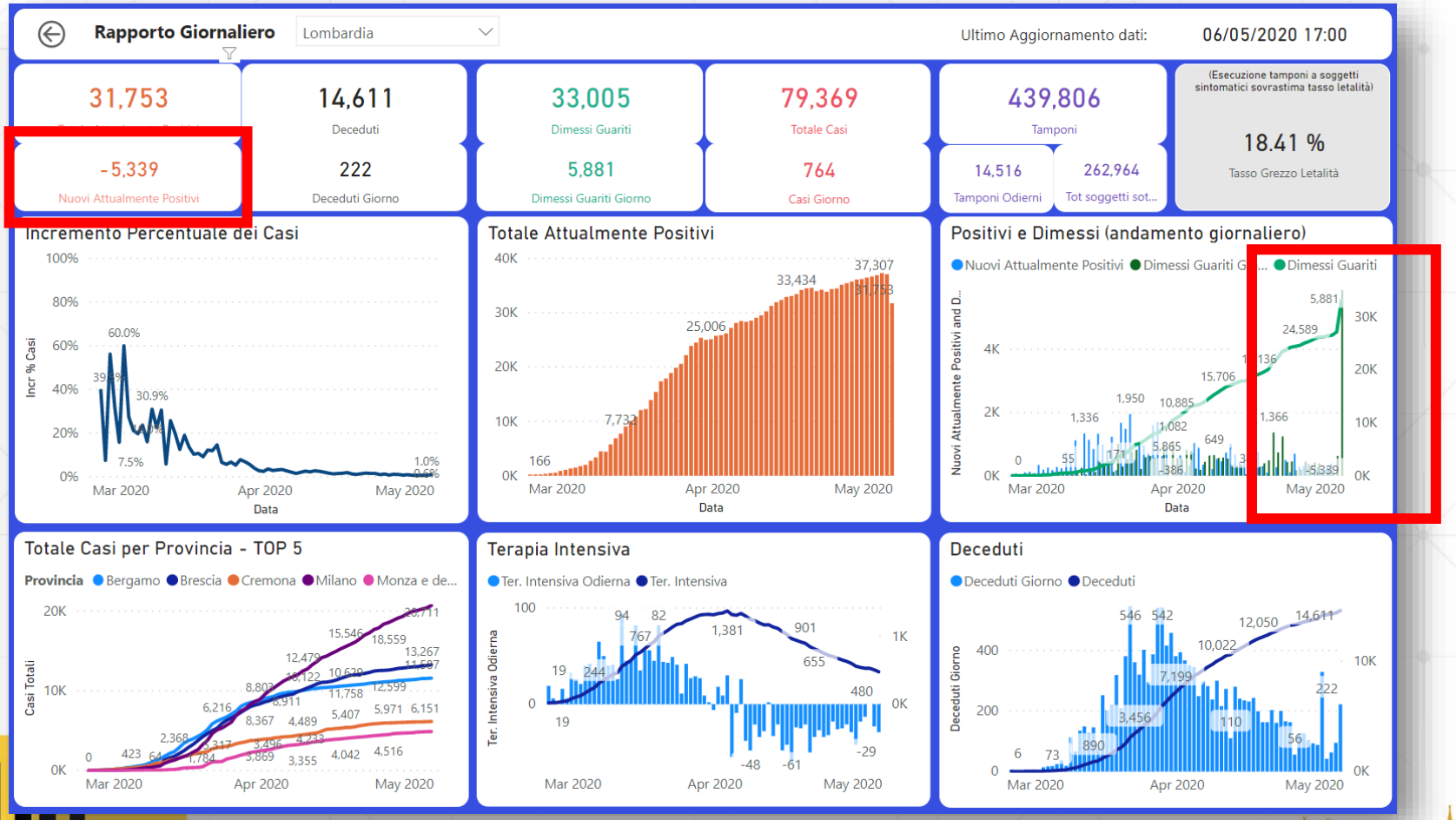
La data quality è *sempre* tua responsabilità... a volte è un sogno



DATASOURCE & SIMILARI

Matrici sorgenti: attenzione num colonne

267 lines (267 sloc) | 85.5 KB

Raw | Blame | History

Search this file...

	Province/State	Country/Region	Lat	Long	1/22/20	1/23/20	1/24/20	1/25/20	1/26/20	1/27/2
2		Afghanistan	33.0	65.0	0	0	0	0	0	0
3		Albania	41.1533	20.1683	0	0	0	0	0	0
4		Algeria	28.0339	1.6596	0	0	0	0	0	0
5		Andorra	42.5063	1.5218	0	0	0	0	0	0

```
let
    Source = Csv.Document(Web.Contents("https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_confirmed_global.csv"),[Delimiter=",", Columns=104, Encoding=6500
    #"Changed Type" = Table.TransformColumnTypes(Source,{{"Column1", type text}, {"Column2", type text}, {"Column3", type text}, {"Column4", type text}, {"Column5", type text}, {"Column6", type text}, {"Column7", type text}, {"Column8"
in
    #"Changed Type"
```

```
let
    Source = Csv.Document(Web.Contents("https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_confirmed_global.csv"),[Delimiter=",", Encoding=65001, QuoteStyl
    #"Filtered Rows" = Table.SelectRows(Source, each true),
    #"Changed Type" = Table.TransformColumnTypes(#"Filtered Rows",{{"Column1", type text}, {"Column2", type text}, {"Column3", type text}, {"Column4", type text}, {"Column5", type text}, {"Column6", type text}, {"Column7", type text},
    #"Promoted Headers" = Table.PromoteHeaders(#"Changed Type", [PromoteAllScalars=true]),
    #"Changed Type1" = Table.TransformColumnTypes(#"Promoted Headers",{{"Province/State", type text}, {"Country/Region", type text}, {"Lat", type text}, {"Long", type text}, {"1/22/20", Int64.Type}, {"1/23/20", Int64.Type}, {"1/24/20"
    #"Unpivoted Other Columns" = Table.UnpivotOtherColumns(#"Changed Type1", {"Long", "Lat", "Country/Region", "Province/State"}, "Attribute", "Value"),
```

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Abbiamo il file? Che tipo di file?

Download today's data on the geographic distribution of COVID-19 cases worldwide

Table

7 May 2020

The downloadable data file is updated daily and contains the latest available public data on COVID-19. Each row/entry contains the number of new cases reported per day and per country. You may use the data in line with ECDC's copyright policy.

Download

Download today's data on the geographic distribution of COVID-19 cases worldwide as of 7 May 2020 - EN - [XLSX-711.59 KB]

Download today's data on the geographic distribution of COVID-19 cases worldwide - EN - [XLSX-711.59 KB]

```
let

//provo a scaricare file XSL del giorno corrente
ewb0_xls_dataOdierna = try Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/defaul
        Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),0)),"YYYY-MM-DD") & ".xls"), nul
//provo a scaricare file XSLX del giorno corrente
ewb1_xlsx_dataOdierna = try Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/defau
        Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),0)),"YYYY-MM-DD") & ".xlsx"), nu
//provo a scaricare file XSL del giorno corrente -1
ewb2_xls_ieri = try Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/default/files,
        Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),-1)),"YYYY-MM-DD") & ".xls"), nu
//provo a scaricare file XSLX del giorno corrente -1
ewb3_xlsx_ieri = try Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/default/file
        Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),-1)),"YYYY-MM-DD") & ".xlsx"), n

//verifico cosa è andato in errore per prendere l'oggetto file corretto
oggettoExcel = if ( ewb0_xls_dataOdierna[HasError] ) then
        if (ewb1_xlsx_dataOdierna[HasError] ) then
            if (ewb2_xls_ieri[HasError] ) then
                if (ewb3_xlsx_ieri[HasError] ) then
                                ""
                else
                    Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/default/files,
                        Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),-1)),"YYYY-MM-DD
            else
              Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/default/files/docum
                Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),-1)),"YYYY-MM-DD") & ".x
        else
            Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/default/files/documen
                Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),0)),"YYYY-MM-DD") & ".xl
    else
        Excel.Workbook(Web.Contents("https://www.ecdc.europa.eu/sites/default/files/documents/C
            Date.ToText(Date.From(Date.AddDays(DateTime.LocalNow(),0)),"YYYY-MM-DD") & ".xls"),

// prelevo worksheet corretto
CSV_4_COMS1 = oggettoExcel{[Name="COVID-19-geographic-disbtributi"]}[Data],
```

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Static table 1/2

```
let
    Query1 = #table(
    type table
    [
    #"Gruppo Regioni"=text,
    #"Regione"=text,
    #"N"=Int64.Type
    ],
    {
        {"Nord-Ovest", "Piemonte", 1},
        {"Nord-Ovest", "Valle d'Aosta", 1},
        {"Nord-Ovest", "Liguria", 1},
        {"Nord-Ovest", "Lombardia", 1},
        {"Nord-Est", "P.A. Trento", 2},
        {"Nord-Est", "P.A. Bolzano", 2},
        {"Nord-Est", "Veneto", 2},
        {"Nord-Est", "Friuli Venezia Giulia", 2},
        {"Nord-Est", "Emilia Romagna", 2},
        {"Centro", "Toscana", 3},
        {"Centro", "Umbria", 3},
        {"Centro", "Marche", 3},
        {"Centro", "Lazio", 3},
        {"Sud", "Abruzzo", 4},
        {"Sud", "Molise", 4},
        {"Sud", "Campania", 4},
        {"Sud", "Puglia", 4},
        {"Sud", "Basilicata", 4},
        {"Sud", "Calabria", 4},
        {"Isole", "Sicilia", 5},
        {"Isole", "Sardegna", 5}
    }
    ),
    #"Added Custom" = Table.AddColumn(Query1, "OrderBy", each Number.ToText([N]) & "_" & [Regione])
in
    #"Added Custom"
```

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Static table 2/2

```
1   Segments_Datatable =
2   DATATABLE (
3       "Price Range", STRING,
4       "Min Price", CURRENCY,
5       "Max Price", CURRENCY,
6       {
7           { "Low", 0, 10 },
8           { "Medium", 10, 100 },
9           { "High", 100, 9999999 }
10      }
11  )
```

COPY DAX CONVENTIONS CODE #2 FORMAT CODE WITH DAX FORMATTER

https://www.sqlbi.com/articles/create-static-tables-in-dax-using-the-datatable-function/

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Introduction to m in power bi

Introduction to M in Power BI

Francesco
De Chirico

Attachment(s)

Introduction to M in Power BI.pdf

Uploaded - Apr 25, 2020

Download

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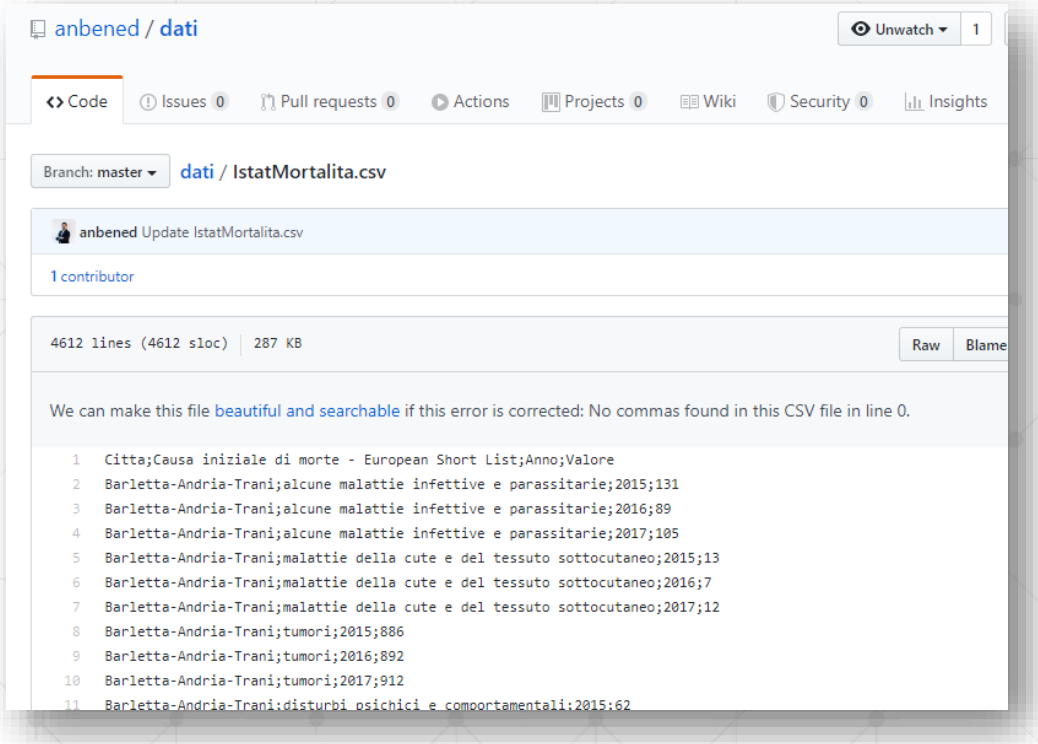
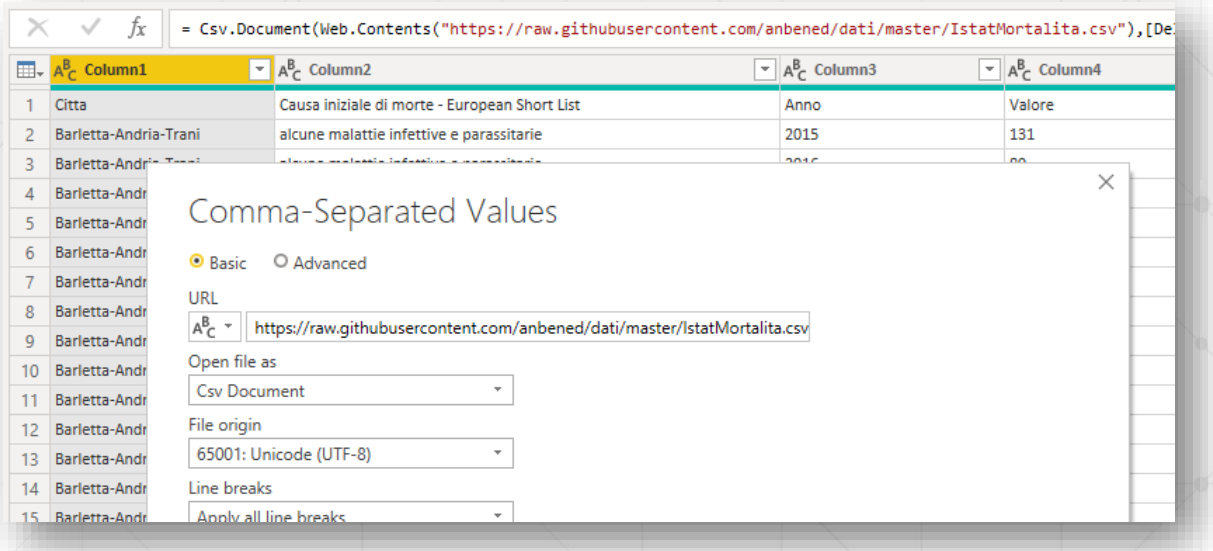
Github è tuo amico





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DATA MODELING

DAX Studio è tuo amico (sempre)

VertiPaq Analyzer Preview

Tables | Columns | Relationships | Summary

Name	Cardinality	Table	Col Size	Data	Dictionary	Hier Size	Encoding	Data Type	RI Violations	User Hier Size	Rel Size	% Table	% DB	Segm
ItalyRegions	1.407	607.115	607.043	138...	315.539	153.280	Many	-	-	0	72		1,77%	
ItalyProvince	7.169	1.118.511	1.116....	160...	811.727	144.224	Many	-	-	0	2.288		3,26%	
TimeSeriesUSA	101.108	1.540.086	1.540....	939...	496.790	103.856	Many	-	-	0	0		4,49%	
UKDailyConfirmedCases	74	54.626	54.626	552	52.626	1.448	Many	-	-	0	0		0,16%	
UKTotalCases	1	2.200	2.200	104	1.680	416	VALUE	-	-	0	0		0,01%	
UKNHSEnglandRegionsCases	7	17.676	17.676	16	17.516	144	Many	-	-	0	0		0,05%	
UKUTLACases	149	24.284	24.284	352	22.148	1.784	Many	-	-	0	0		0,07%	
Scenario	2	17.290	17.290	8	17.202	80	Many	-	-	0	0		0,05%	
ItalyRegionsGroup	21	1.101.398	1.101....	64	1.100.798	536	Many	-	-	0	0		3,21%	
ItalyNationalTrend	67	51.056	51.056	3.176	41.120	6.760	Many	-	-	0	0		0,15%	
ItalyISTAT	41.310	318.076	318.068	165...	90.788	61.984	Many	-	-	0	8		0,93%	
ItalyISTATIta	3	2.131.696	2.131....	32	2.131.504	160	Many	-	-	0	0		6,21%	
ItalyISTATArea	15	3.197.592	3.197....	88	3.197.192	304	Many	-	-	0	8		9,32%	
ItalyISTATRegione	21	4.263.928	4.263....	144	4.263.096	680	Many	-	-	0	8		12,43%	
ItalyISTATCitta	321	4.268.352	4.268....	1.936	4.263.824	2.584	Many	-	-	0	8		12,44%	
ItalyLatLong	7.978	1.275.522	1.259....	63....	940.290	255.424	Many	-	1	0	15.968		3,72%	
ItalyCities	7.979	1.620.555	1.604....	118...	1.188.651	297.112	Many	-	-	0	15.968		4,72%	
TimeSeries	26.600	6.460.708	6.460....	434...	5.862.716	163.376	Many	-	-	0	192		18,83%	
time_series_covid19_deaths_global	26.600	135.488	135.488	41....	82.736	11.568	Many	-	-	0	0		0,39%	
AreaCountry	249	81.562	81.562	808	77.306	3.448	Many	-	1	0	0		0,24%	
time_series_covid19_recovered_global	25.200	161.923	161.923	44....	99.667	17.856	Many	-	-	0	0		0,47%	
IstatMortalita	1.595	2.254.264	2.254....	15....	2.215.952	22.336	Many	-	-	0	104		6,57%	
Citta	107	1.067.584	1.067....	96	1.066.592	896	Many	-	-	0	0		3,11%	
ItalyGruppoRegioneRegioneProvincia	107	75.796	75.796	336	73.956	1.504	Many	-	1	0	0		0,22%	
PostiTerapiaIntensiva	21	1.067.928	1.067....	280	1.066.744	904	Many	-	-	0	0		3,11%	
TimeSeriesCountry	18.700	1.400.980	1.400....	194...	1.135.924	70.704	Many	-	-	0	0		4,08%	

4a225522-64f9-4027-a869-1b38c88fb834

Total Size	Last Data Refresh	Analysis Date
32,73 Mb	01/05/2020 11:32:02	01/05/2020 13:34:14

Compatibility	Tables	Columns	Server
1465	26	275	localhost:52289

- Focus su colonne con alta cardinalità
- Rimuovi colonne inutili
  - (carica solo quanto utile)
- Split colonna per ridurre valori distinti
  - Datetime → date e time

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DAX: variables to improve formulas

- Improve performance
- Improve readability
- Simplify debugging
- Reduce complexity

```
QTY DIFFERENCE =
VAR myindex = Sales[INDEX]
VAR mycustomer = Sales[CUSTOMER ID]
VAR previousindex =
    CALCULATE (
        MAX ( Sales[INDEX] ),
        FILTER ( Sales, Sales[CUSTOMER ID] = mycustomer && Sales[INDEX] < myindex )
    )
VAR previousqty =
    CALCULATE (
        MAX ( Sales[QTY] ),
        FILTER (
            Sales,
            Sales[INDEX] = previousindex
                && Sales[CUSTOMER ID] = mycustomer
        )
    )
RETURN
    IF ( previousqty, Sales[QTY] - previousqty )
```

https://docs.microsoft.com/en-us/power-bi/guidance/dax-variables

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Previous Row

data	stato	codice_regione	denominazione_regione	codice_provincia	denominazione_provincia	sigla_provincia	lat	long	totale_casi
2020-02-29T17:00:00	ITA	08	Emilia-Romagna	038	Ferrara	FE	44.83599085	11.61868934	0
2020-02-29T17:00:00	ITA	08	Emilia-Romagna	040	Forlì-Cesena	FC	44.22268559	12.04068608	0
2020-02-29T17:00:00	ITA	08	Emilia-Romagna	036	Modena	MO	44.64600009	10.92615487	22
2020-02-29T17:00:00	ITA	08	Emilia-Romagna	034	Parma	PR	44.80107394	10.32834985	35
2020-02-29T17:00:00	ITA	08	Emilia-Romagna	033	Piacenza	PC	45.05193462	9.692632596	138
2020-02-29T17:00:00	ITA	08	Emilia-Romagna	039	Ravenna	RA	44.41722493	12.19913936	1
2020-02-29T17:00:00	ITA	08	Emilia-Romagna	035	Reggio nell'Emilia	RE	44.69735289	10.63007973	4

```
Casi Giorno-1 =
    CALCULATE(
        MAX(ItalyProvince[Casi Giorno]);
        TOPN(1;
                    FILTER(
                        ALLSELECTED(ItalyProvince);
                        ItalyProvince[Data] < EARLIER(ItalyProvince[Data] ) && ItalyProvince[Regione] = EARLIER(ItalyProvince[Regione]) && ItalyProvince[Provincia] = EARLIER(ItalyProvince[Provincia])
                    );
                    ItalyProvince[Data];
                    DESC
        )
    )
```

```
Casi Settimana -1 =
    CALCULATE(
        MAX('ItalyProvince'[Casi Totali]);
        TOPN(1;
                    FILTER(
                        ALLSELECTED('ItalyProvince');
                        DATEADD('ItalyProvince'[data];7;DAY) = EARLIER('ItalyProvince'[data]) && 'ItalyProvince'[Provincia] = EARLIER('ItalyProvince'[Provincia])
                    );
                    'ItalyProvince'[data];
                    DESC
        )
    )
```

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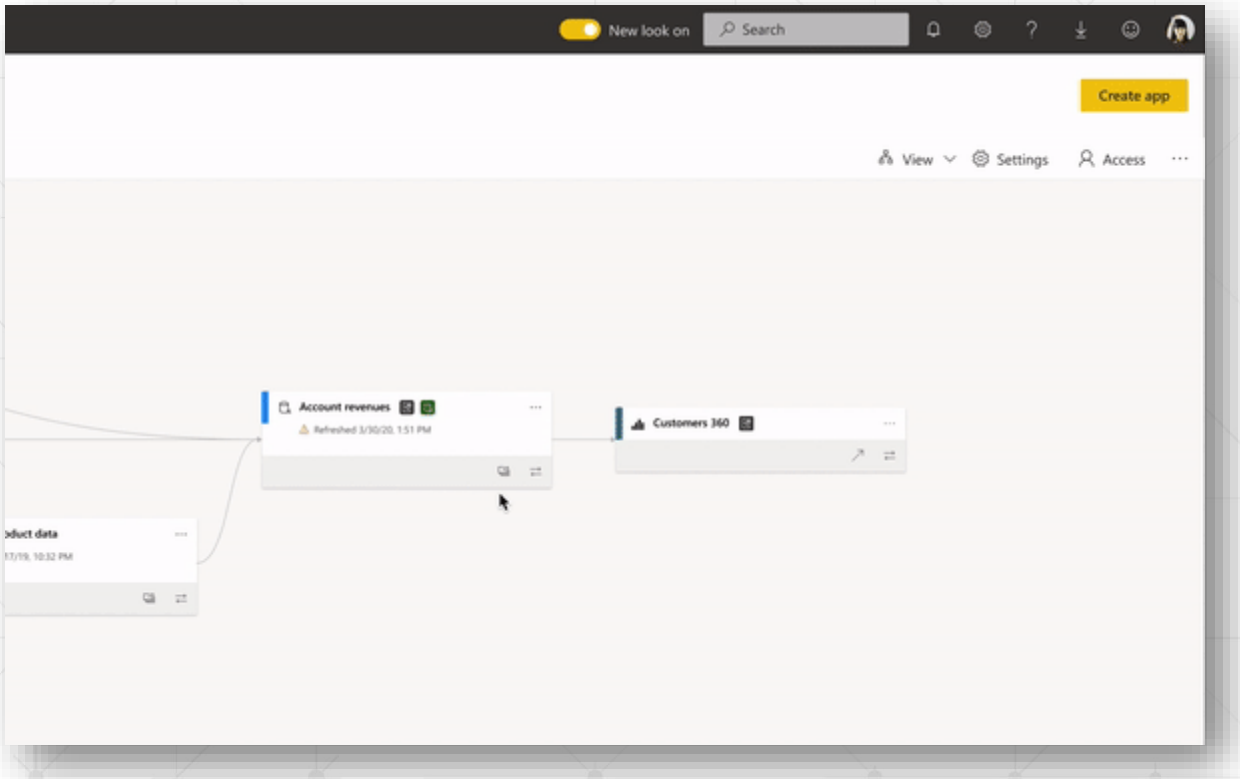
TIPS & TRICKS

Power bi lineage view in GA



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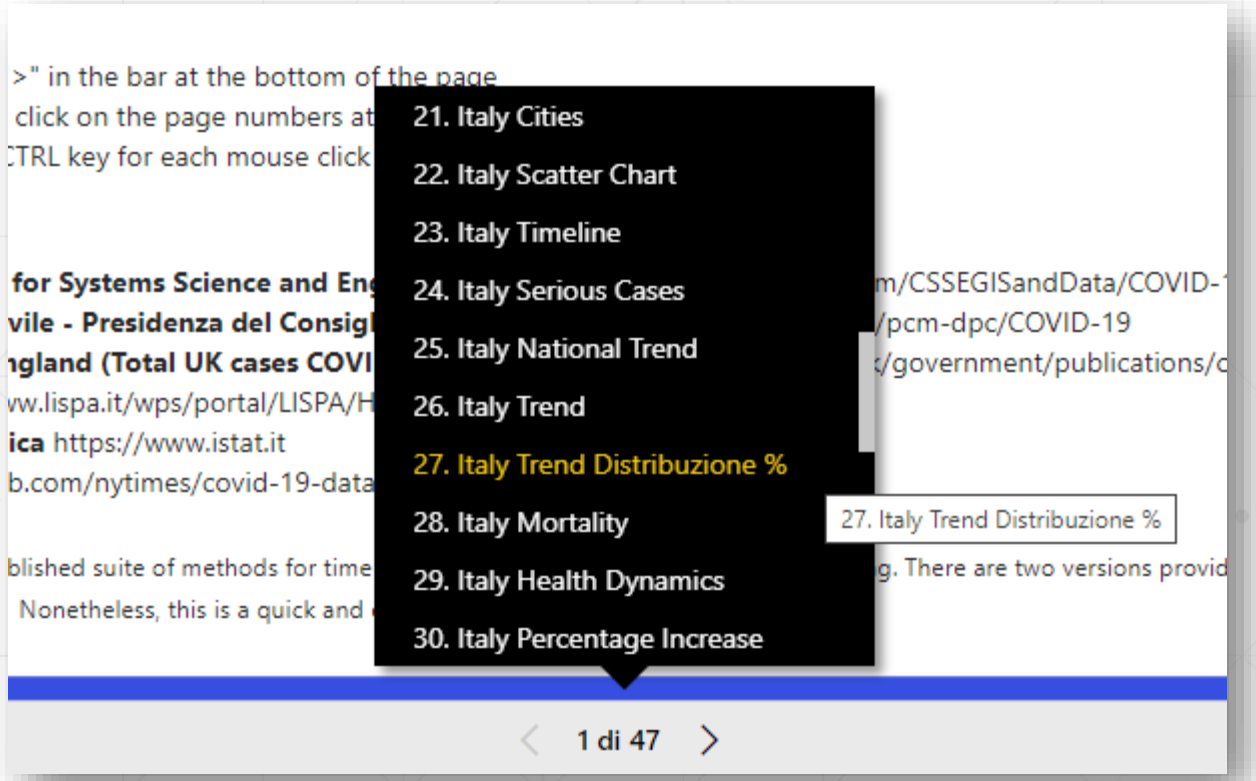
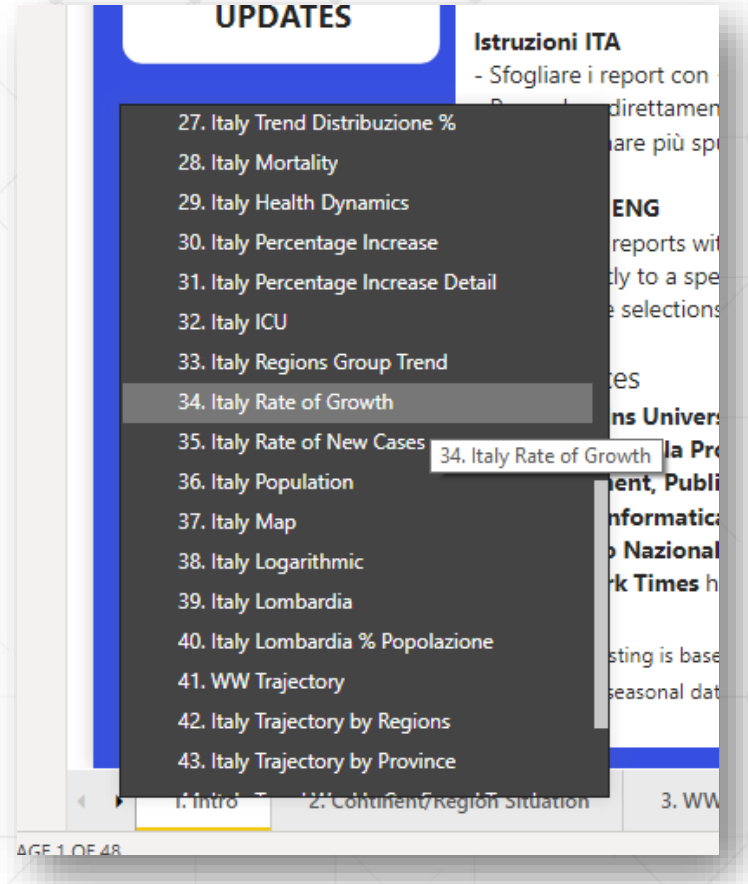
Report Quickly Switch





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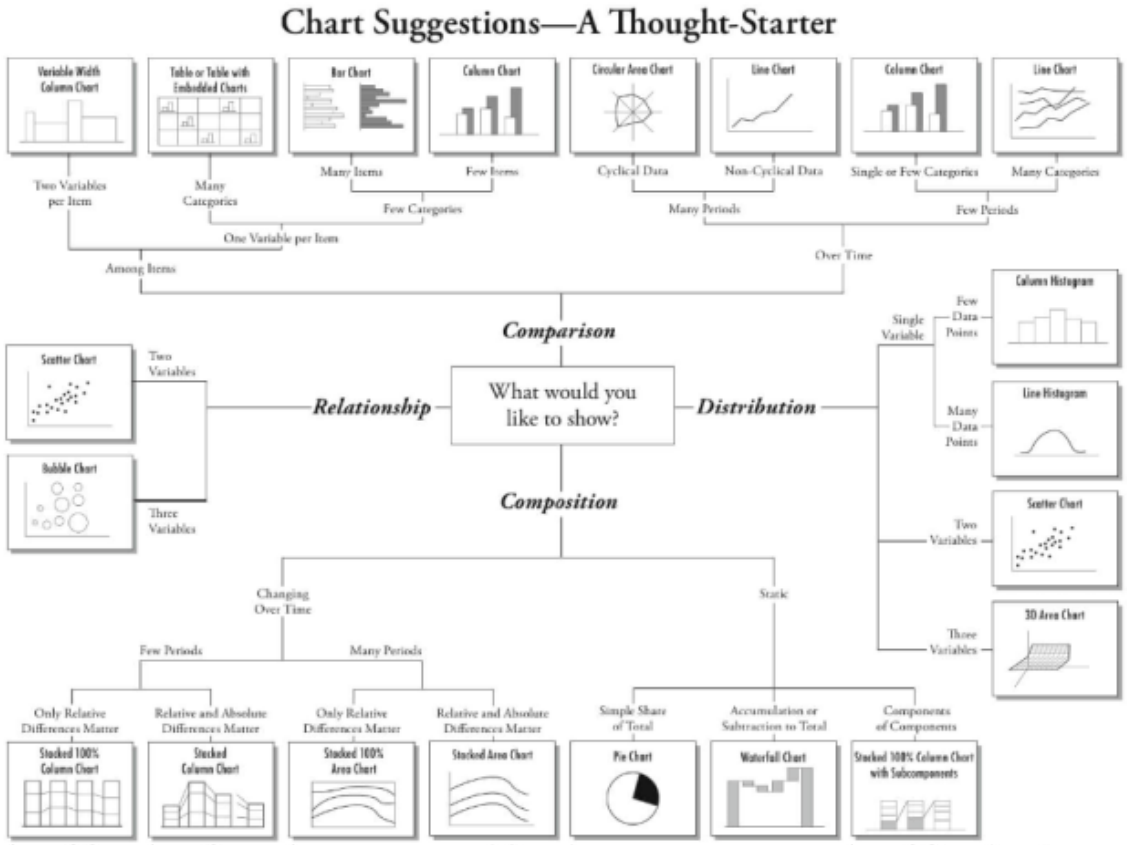
"With enough data, the numbers speak for themselves"



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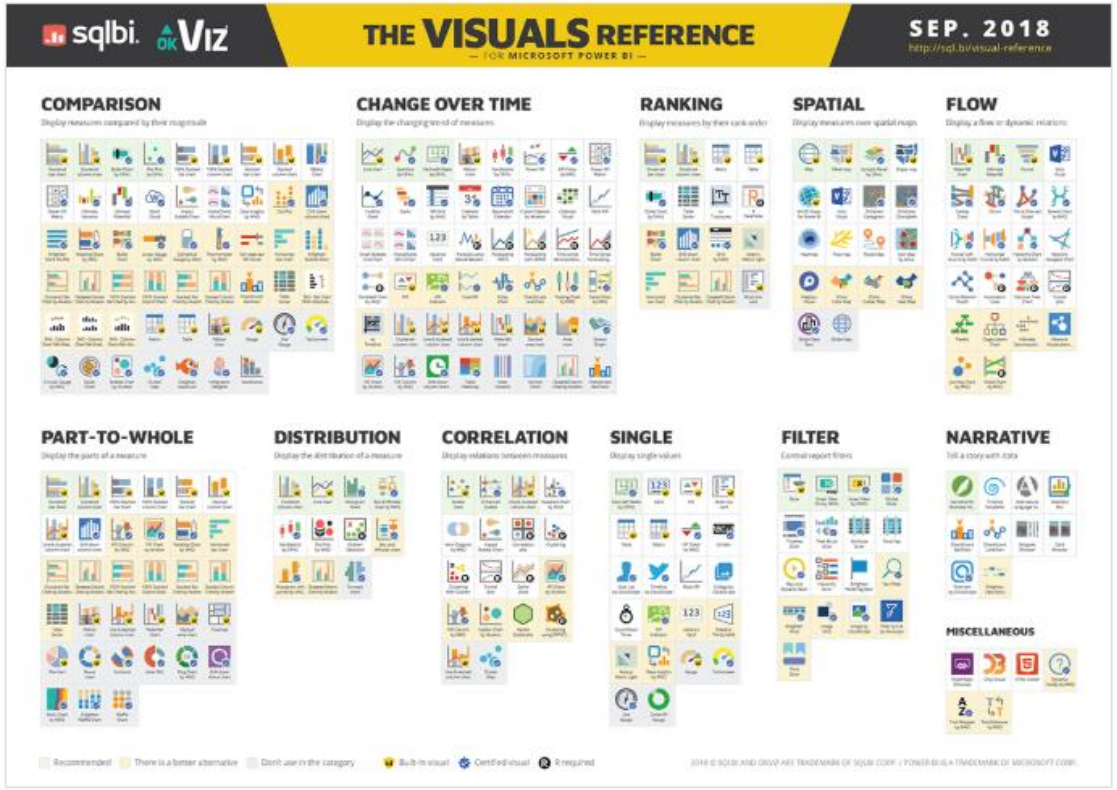
"With enough data, the numbers speak for themselves"



https://www.sqlbi.com/ref/power-bi-visuals-reference/

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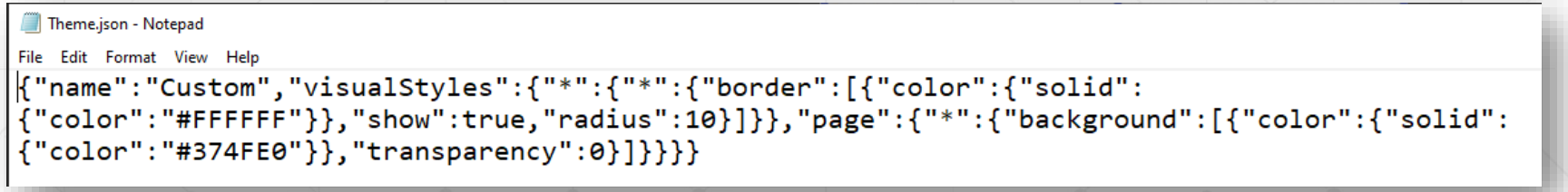
template



- September 2017 update for PBI desktop: Report Themes.
- Game changer for advanced Power BI user
- You must know how to write it all in JSON → https://powerbi.tips/tools/report-theme-generator-v3/

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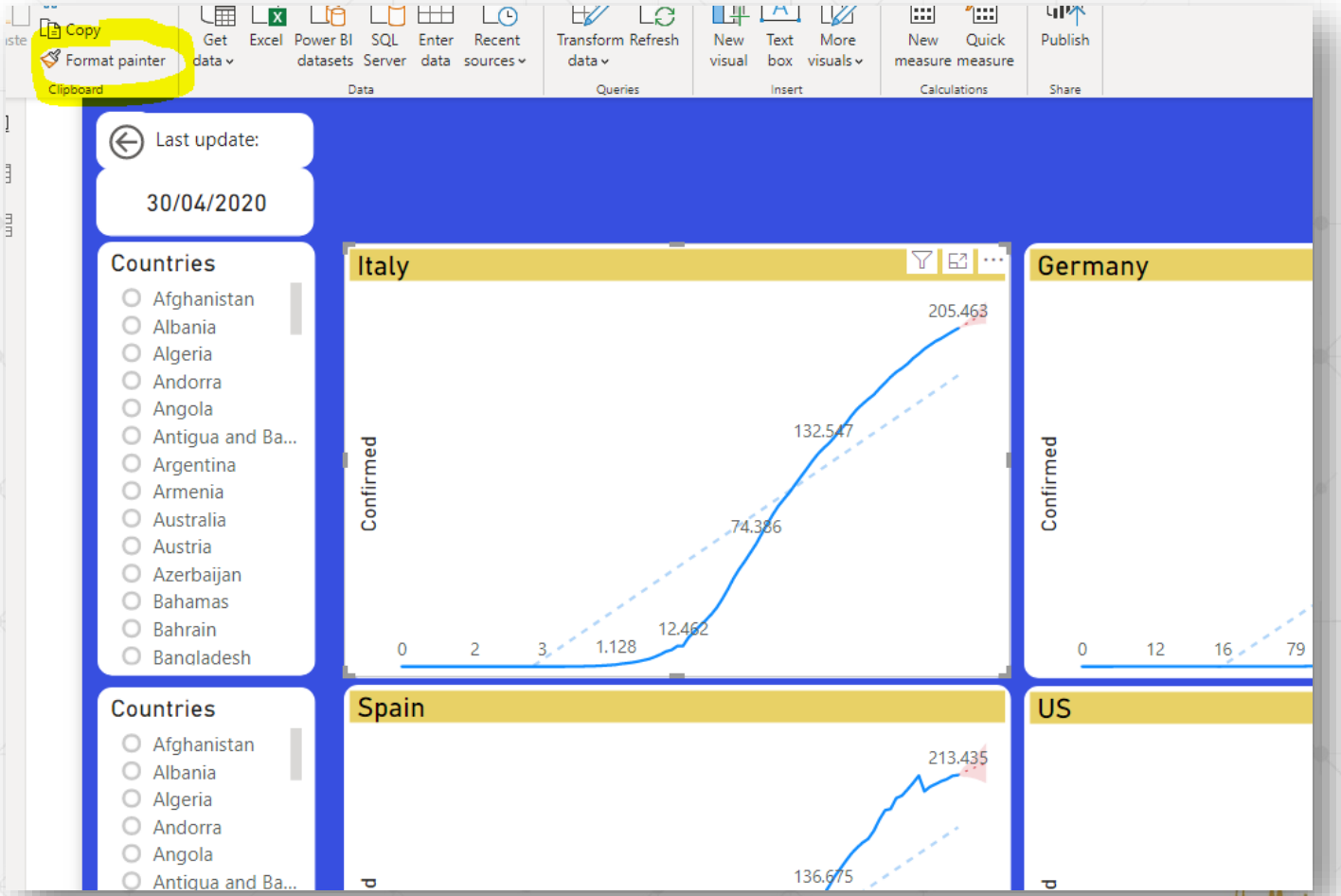
Design Tips

Format painter: click a visual, click format painter, then click on a same type of visualization to switch to former visual's forma



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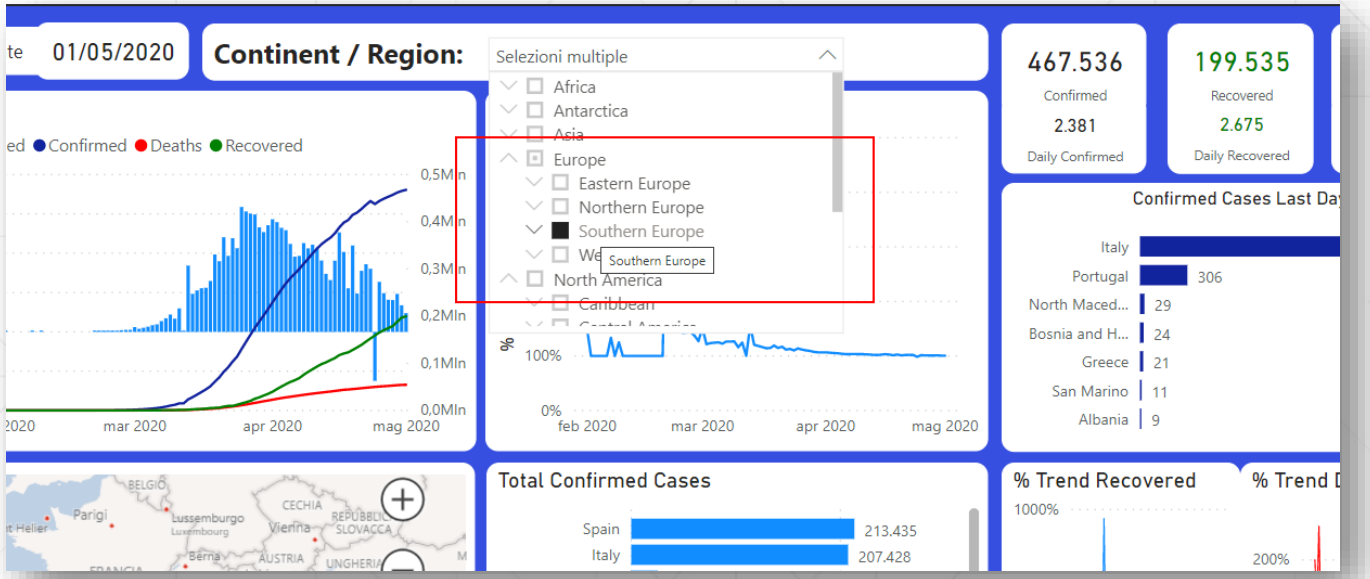
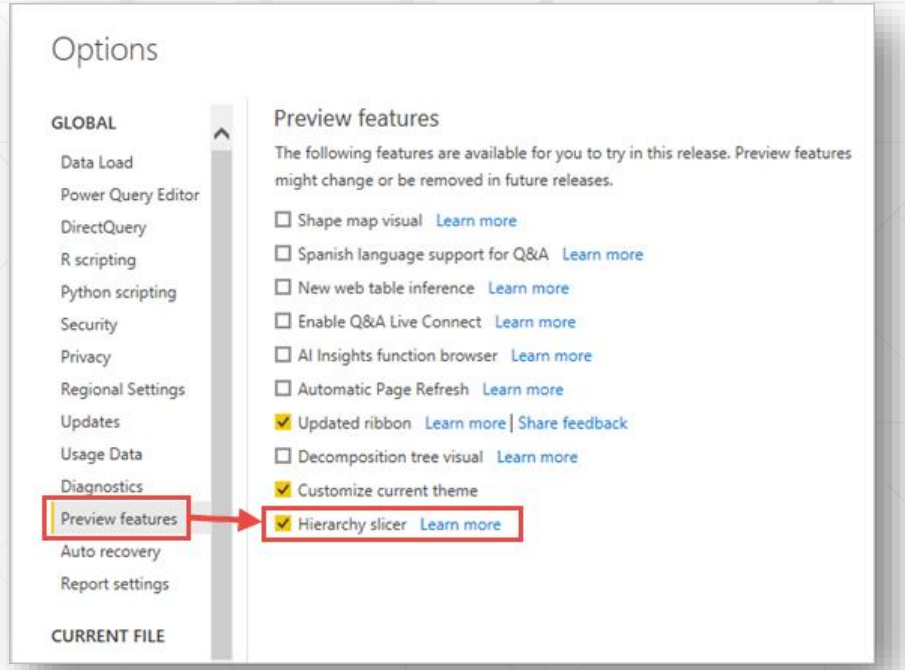
Preview features





- Hierarchy slicer
  - https://docs.microsoft.com/en-us/power-bi/create-reports/power-bi-slicer-hierarchy-multiple-fields

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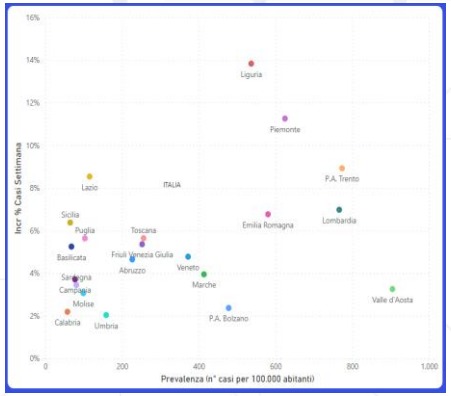
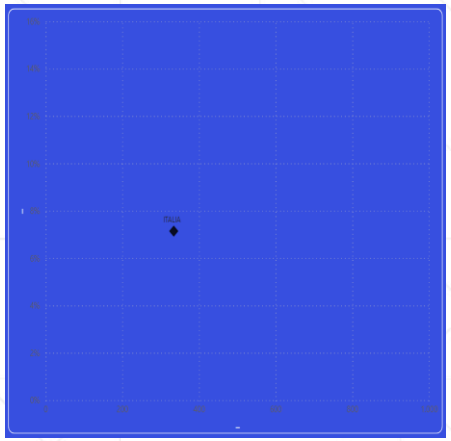
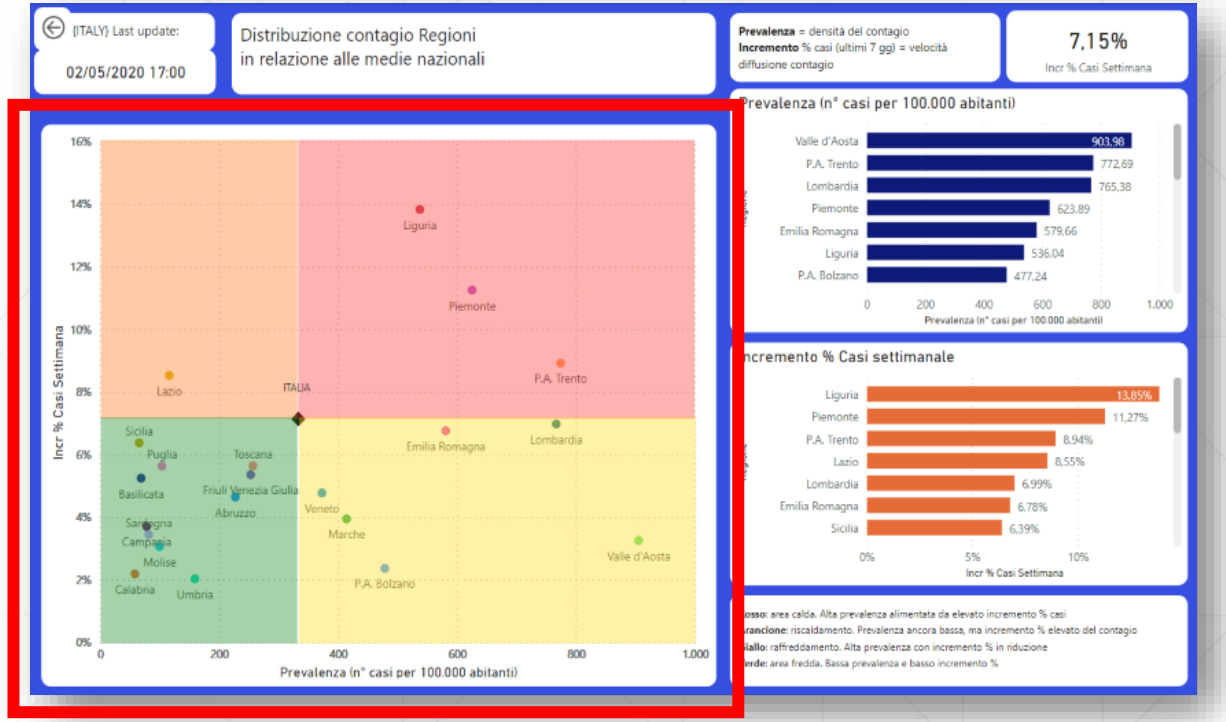
Usate la fantasia...







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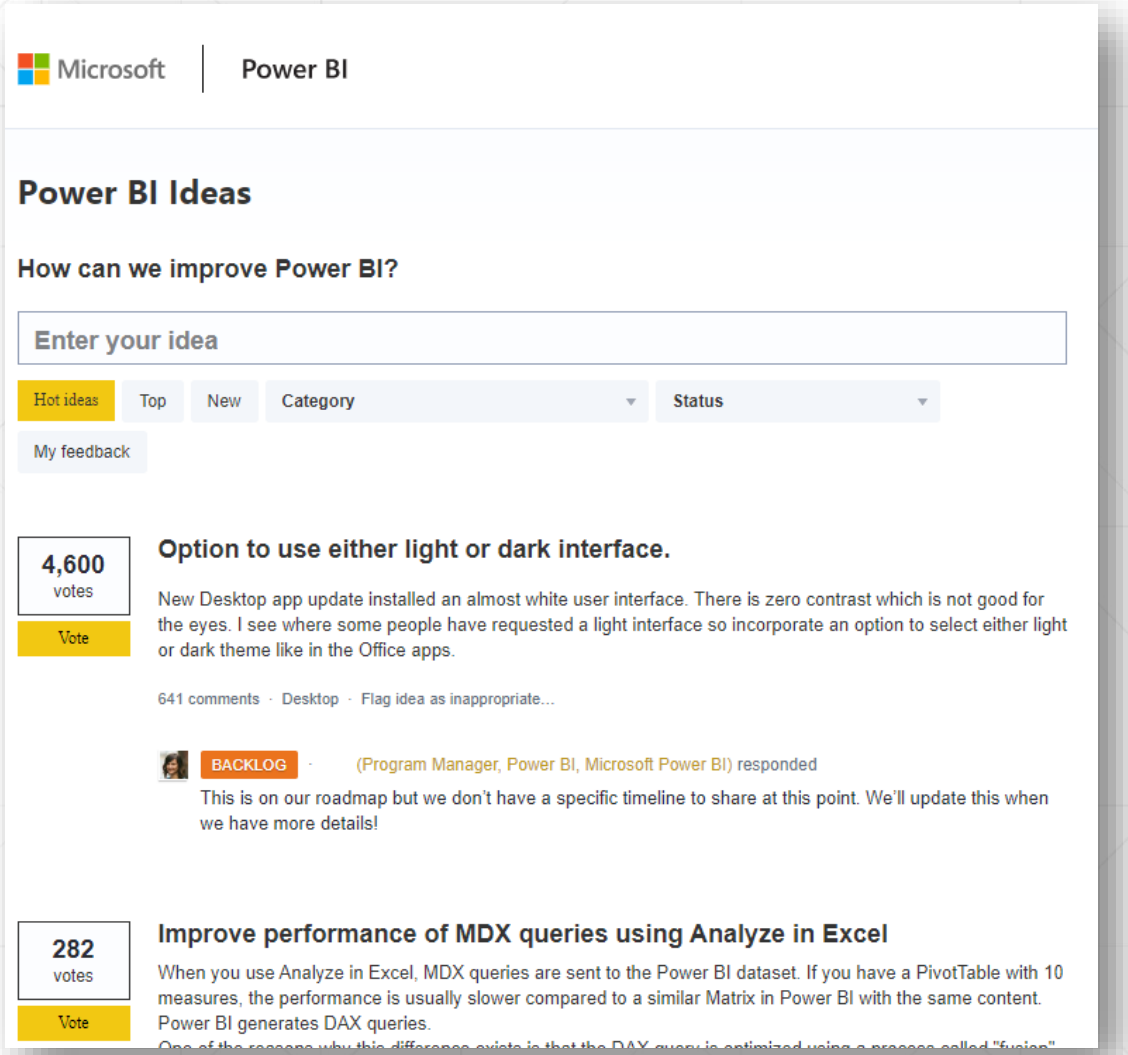
… e power bi ideas

- https://ideas.powerbi.com/



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Disegno e colori

- Color Codes (PBI uses Hex#)
  - http://www.december.com/html/spec/colorcodes.html
- Help with determining complementary colors, etc.
  - http://paletton.com

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Domande?

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