

<b>CORSO</b>	MOC - Power BI
<b>DOCUMENTO</b>	Power BI

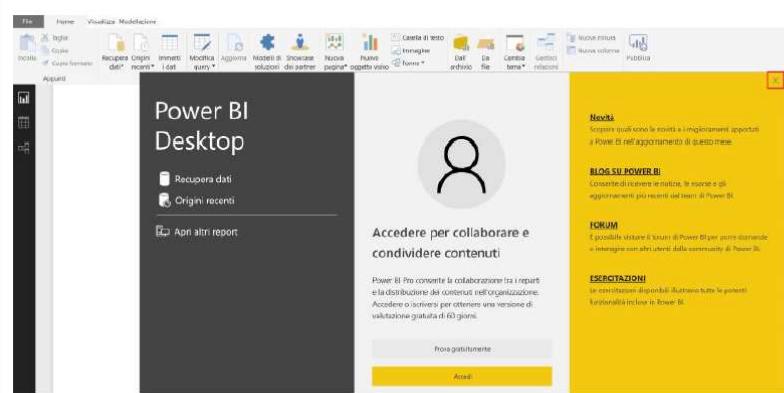
# Parlare di Power BI

Avviare la nuova istanza di Power BI

Desktop

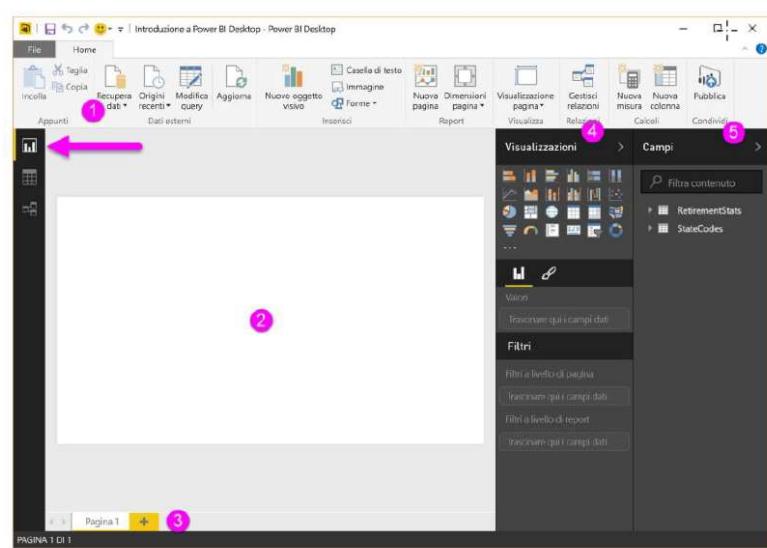
All'apertura di Power BI Desktop, viene aperta anche la schermata di avvio

Chiudere la schermata di avvio facendo clic su "x" in alto a destra



La vista **Report** include cinque aree principali:

1. La barra multifunzione, che visualizza le attività comuni associate ai report e alle visualizzazioni
2. La vista **Report**, o area di disegno, dove vengono create e disposte le visualizzazioni
3. La scheda **Pagine** nella parte inferiore, che consente di selezionare o aggiungere una pagina del report
4. Il riquadro **Visualizzazioni**, dove è possibile modificare le visualizzazioni, personalizzare i colori o gli assi, applicare filtri, trascinare i campi e altro ancora
5. Il riquadro **Campi** in cui gli elementi della query e i filtri possono essere trascinati nella vista **Report** oppure nell'area **Filtri** del riquadro **Visualizzazioni**

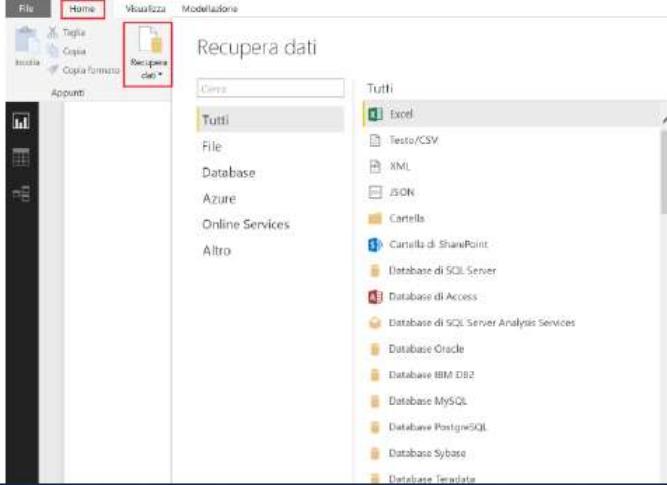


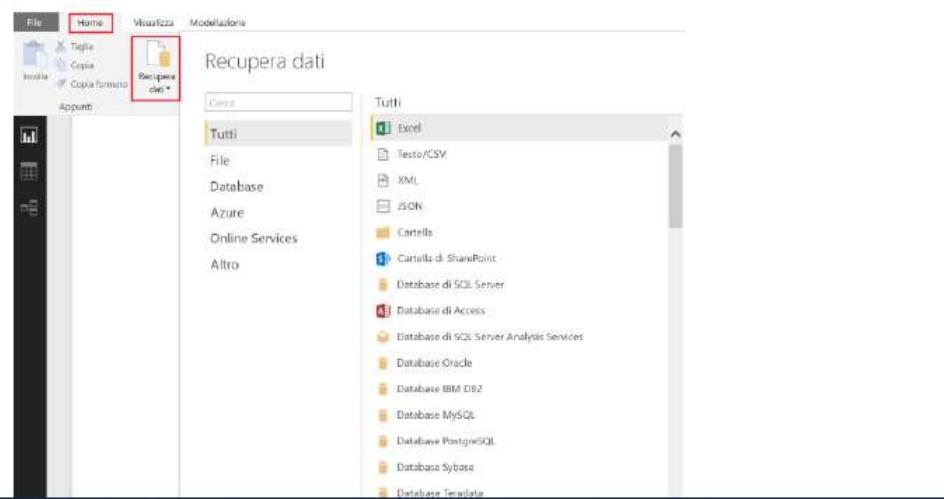
## Power BI Desktop si apre

Si noti che nella barra multifunzione sotto Home sono riportate le seguenti categorizzazioni

- Appunti
- Dati esterni: questa sezione è equivalente a Power Query per Excel. Viene usata per connettersi a origini dati diverse e trasformare i dati
- Inserimento: si usa per creare elementi nel report. Simile a Power View per Excel
- Vista: questa sezione consente di personalizzare la visualizzazione pagina
- Relazioni: questa sezione consente di creare/modificare le relazioni nel modello di dati. È simile a Power Pivot per Excel
- Calcoli: questa sezione viene usata per creare/modificare misure e colonne calcolate. È simile a Power Pivot per Excel



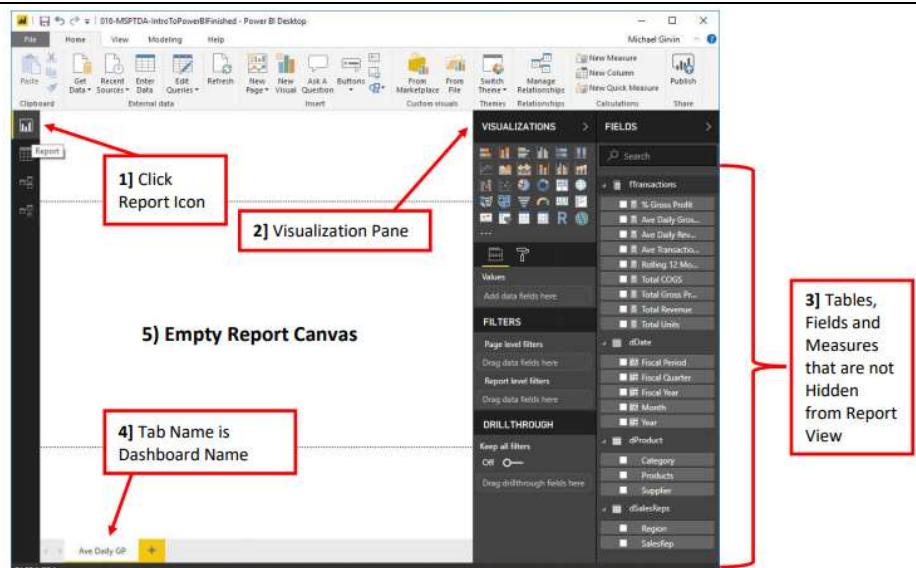
<ul style="list-style-type: none"> <li>○ Condivisione: si usa per pubblicare il modello di dati nel servizio Power BI</li> </ul> <p>Si noti che nel riquadro di sinistra sono presenti le sezioni di report, dati e relazioni. Queste viste consentono di visualizzare i dati e le relazioni tra tabelle</p> <p>Il pannello centrale è l'area di disegno usata per creare oggetti visivi o visualizzare i dati</p> <p>Il pannello destro viene usato per aggiungere o modificare gli elementi del report</p> <p>Si noti inoltre l'opzione Modellazione della barra multifunzione, che consente di aggiungere colonne, aggiungere misure e usare altre opzioni di modellazione</p>	
<p>Nella barra multifunzione selezionare Home -&gt; Recupera dati -&gt; Altro...</p> <p>Descrivere la varietà di origini supportate</p> <ul style="list-style-type: none"> <li>• File</li> <li>• Database</li> <li>• Azure</li> <li>• Altro</li> </ul>	



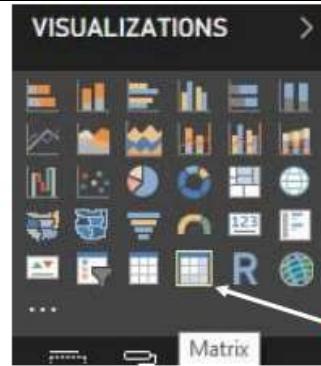
# Laboratorio 0-PBI (assieme in classe)



- Dobbiamo utilizzare il file **0-PBI-Overview.pbix** nella cartella dei laboratori
- (Descrittiva) All'estrema sinistra nella finestra di Power BI Desktop, fare clic sull'icona **Report**.
- (Descrittiva) Sulla destra possiamo vedere il riquadro di visualizzazione.
- (Descrittiva) Nel riquadro Campi è possibile visualizzare tutte le tabelle, i campi e le misure che non sono nascosti dalla vista report.
- Nella parte inferiore facciamo doppio clic sulla scheda e denominiamo la scheda "**Ave Daily GP**".
- (Descrittiva) L'area bianca è l'area di disegno vuota in cui è possibile aggiungere visualizzazioni alla nostra scheda



6. Dal riquadro di visualizzazione, facciamo clic sull'opzione Matrix.



7. Dal riquadro Campi, selezionare la misura del profitto lordo giornaliero (**Ave Daily Gross Profit**) sotto la tabella **fTransactions** e il campo prodotto(**Products**) dalla tabella **dProduct**.
8. Ridimensiona la visualizzazione secondo necessità.

9. Con la matrice selezionata, sopra nel riquadro di visualizzazione, fare clic sull'icona "Rullo di vernice" o sull'icona Formato. Esistono molte opzioni per la formattazione. Spesso dobbiamo fare clic per cercare di trovare quello che vogliamo.
10. Fai clic sul menu a discesa grid.
11. Quindi **modificare la dimensione del testo** in 10.
12. Fare clic sul menu a discesa Formattazione condizionale.
13. Utilizzare la barra di scorrimento per attivare le "Barre dati".

14. (Descrittiva) Il risultato può essere visto sotto. Le ragioni per cui abbiamo scelto questa visualizzazione sono:

- 1) Abbiamo usato una matrice perché volevamo vedere i dettagli del numero specifico.
- 2) Abbiamo utilizzato la formattazione condizionale della barra dei dati per ottenere un'impressione visiva rapida.



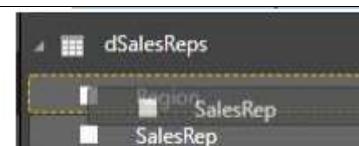
14] Matrix Visualization for Ave Daily Gross Profit by Product

15. Gerarchie. Prima di creare la nostra prossima visualizzazione, **dobbiamo creare una Gerarchia**. Le gerarchie sono più campi raggruppati insieme, ad esempio regione e rappresentanti di vendita all'interno di ciascuna regione. I vantaggi delle Gerarchie sono:

- Con le Gerarchie possiamo anche approfondire le visualizzazioni.

16. Vogliamo che i due settori SalesRep e Region diventino una gerarchia.

17. Per creare una gerarchia in SalesRep con all'interno la Region, fare clic e trascinare SalesRep sopra la Region quindi rilasciare il campo SalesRep. Immediatamente hai creato una Gerarchia



17] Click & Drag Sales Rep Field over Region, then drop to create a Hierarchy

18. Come visto di seguito, la "Gerarchia delle regioni" è ora un singolo elemento che può essere utilizzato nelle visualizzazioni

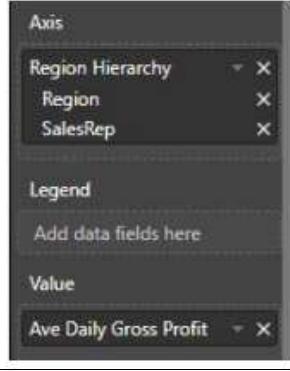
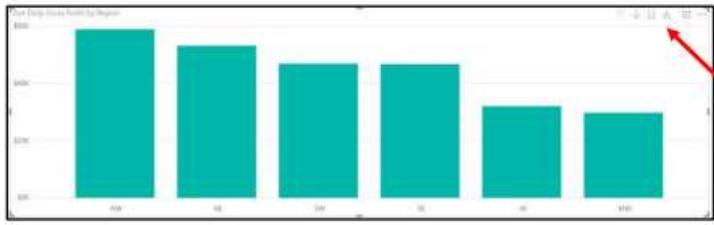
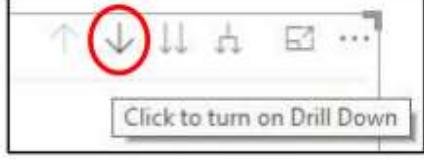
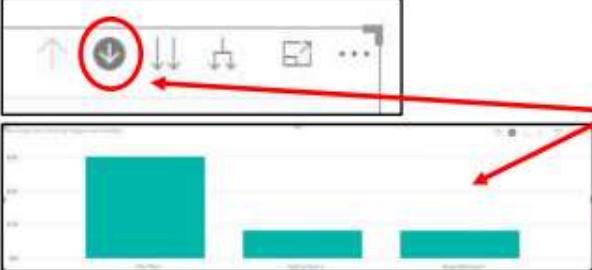
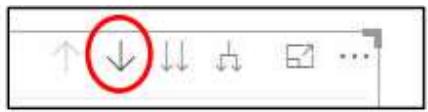


18] "Region Hierarchy" can be used in Visualizations

19. Fare clic indietro nell'area bianca dell'area di disegno del report, quindi fare clic sull'icona Clustered Column pulsante.



19] Clustered Column Chart

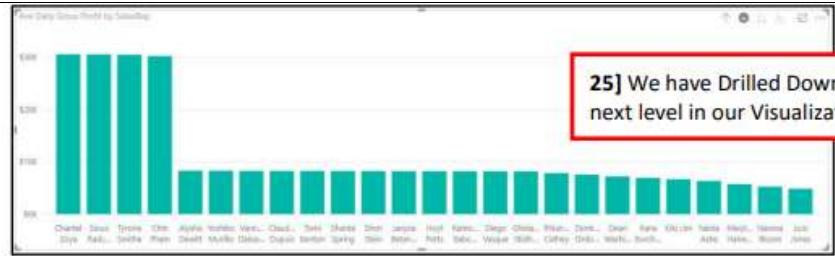
20. dal riquadro Campi, trascinare la Gerarchia della regione( <b>Region Hierarchy</b> ) nell'area dell'Asse e la Misura del profitto lordo giornaliero ( <b>Ave Daily Gross Profit</b> ) nell'area Valori.	 <p><b>20] Region Hierarchy to Axis. Ave Daily Gross Profit Measure to Values.</b></p>
21. Il Clustered Column Chart è mostrato a lato. Si noti che viene mostrata solo la regione( <b>region</b> ). Per eseguire il drill-down al successivo livello, rappresentante di vendita (SalesRep), dobbiamo dare un'occhiata più da vicino ai pulsanti icona nell'angolo in alto a destra del grafico	 <p><b>21] Drill Down Icons in upper right of Clustered Column Chart</b></p>
22. La prima freccia è disattivata perché il grafico mostra il livello più alto, il livello Regione( <b>Region</b> ). La seconda freccia da sinistra è l'icona Drill Down "Attiva o Disattiva". Questa opzione di drill down ti consentirà di eseguire il drill-down al livello inferiore nella gerarchia.	 <p><b>22] "Turn On or Off" Drill Down Icon</b></p>
<p>23. Dopo aver fatto clic su "Attiva drill down", il pulsante diventa di colore grigio scuro.</p> <ol style="list-style-type: none"> <li>1) Se questa opzione è ATTIVATA, verrà eseguito il drill down di un "clic su una colonna nel grafico" livello successivo. Ad esempio, se facciamo clic sulla colonna SE, vedremmo solo le colonne per il SalesRep nella SE Region.</li> <li>2) Se questa opzione è disattivata, non è possibile eseguire il drill down in una colonna specifica. Con questa opzione disattivata, facendo clic su una colonna verranno filtrate solo le altre visualizzazioni nella Dashboard.</li> </ol>	 <p><b>23.1] Drill Down is "On". If we click SE Column, we see 3 columns for the 3 SalesReps in the SE Region.</b></p>  <p><b>23.2] Drill Down is "Off"</b></p>

24. Con la freccia "Drill Down" (seconda da sinistra) disattivata E con il grafico che mostra solo la regione, se facciamo clic sulla doppia freccia verso il basso (terza freccia da sinistra), passeremo al livello successivo per mostrare tutte le colonne per tutti i rappresentanti di vendita (**SalesRep**).



**24] Go To Next Level button**

25. Con il grafico a colonne che mostra tutte le regioni, dopo aver fatto clic sul pulsante "Vai al livello successivo", il grafico mostra gli importi SalesRep.



**25] We have Drilled Down to the next level in our Visualization.**

26. Dopo aver eseguito Drill Down, il primo pulsante a sinistra, il pulsante "Drill Up", non è più disattivato. Clicca il pulsante Drill Up per salire di livello nella Gerarchia.



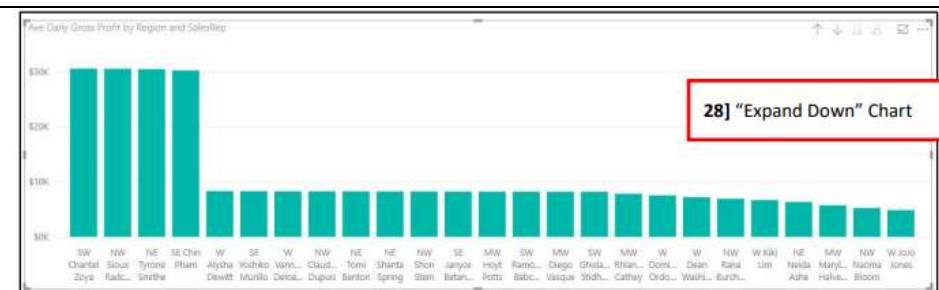
**26] "Drill Up" Icon**

27. Se facciamo clic sull'icona "Espandi verso il basso" (4a icona da sinistra), vedremo entrambe le etichette nell'asse



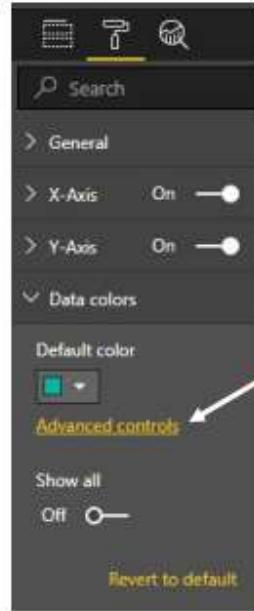
**27] "Expand Down" Icon**

28. Dopo aver fatto clic sull'icona "Espandi verso il basso", il grafico mostra le etichette per entrambi i campi sull'asse orizzontale



**28] "Expand Down" Chart**

29. Successivamente, vogliamo aggiungere una regola di formattazione condizionale alle colonne. Per fare ciò, facciamo clic su "Paint Roller", quindi fare clic sulla freccia a discesa **"Data Colors"**, quindi fare clic sui "puntini a destra".



**29]** To access Conditional Formatting, click the "Advanced controls"

30. Per aggiungere un colore di riempimento per "Utile lordo giornaliero" (**Ave Daily Gross Profit**) importi maggiori o uguali a 20.000 e inferiori o uguali a 50.000, creare la regola come mostrato nella foto a lato.

Default color - Data colors

Format by **Rules** Learn more

Based on field **Ave Daily Gross Profit**

Rules

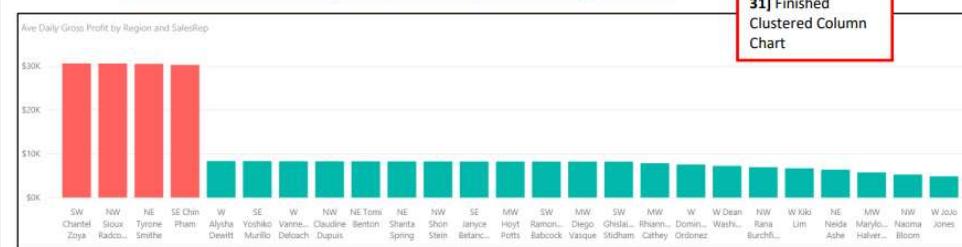
If value is greater than or equal to 20000 and is less than 50000 then **[Color Box]**

+ Add

**30]** Conditional Formatting Rule for our Chart Columns

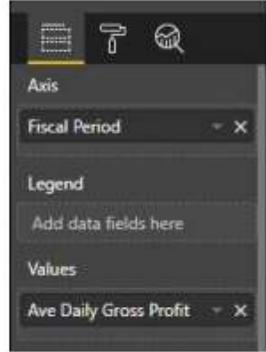
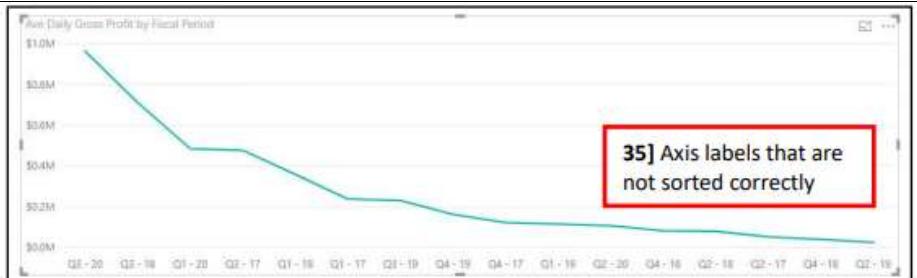
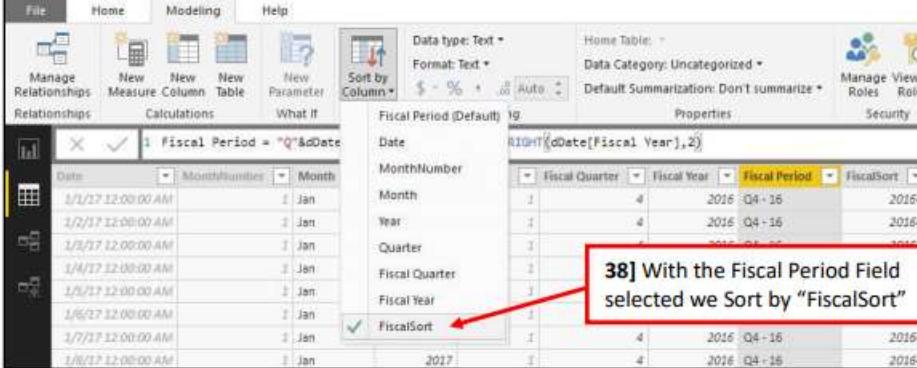
31. Il diagramma a colonne raggruppate finito può essere visualizzato di seguito. **Le ragioni per cui abbiamo scelto questa visualizzazione sono:**

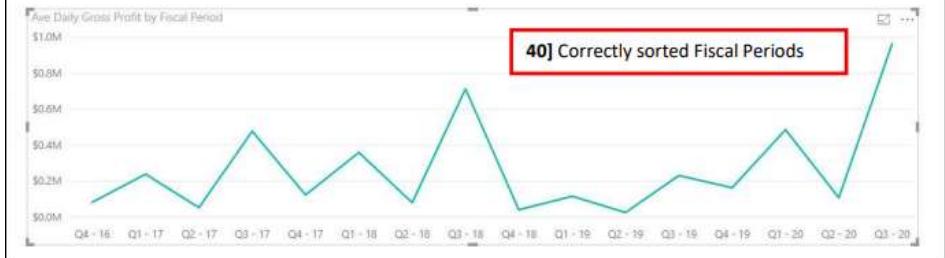
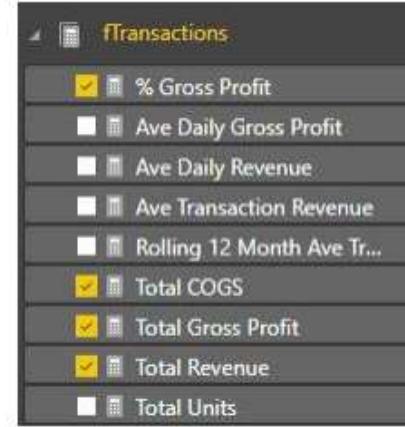
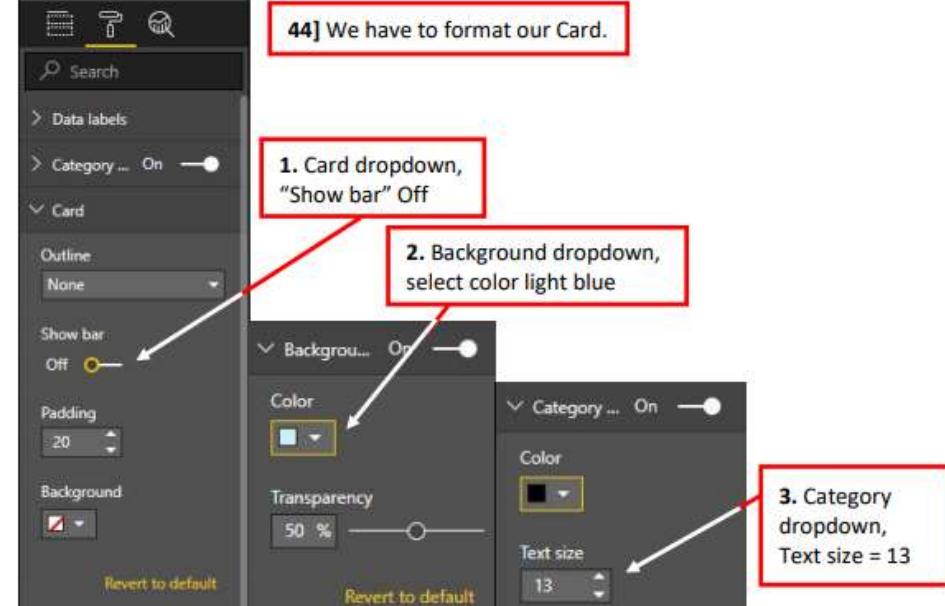
- 1) Con il grafico a colonne possiamo facilmente confrontare gli importi tra le categorie.
- 2) Possiamo anche eseguire il drill down o il drill up per visualizzare solo gli importi dei rappresentanti di vendita o gli importi delle regioni



**31]** Finished Clustered Column Chart

32. Il nostro prossimo obiettivo è quello di aggiungere un grafico a line (Line Chart) che mostri la variazione dell' "Utile lordo giornaliero" (**Ave Daily Gross Profit**) rispetto ad un periodo Fiscale (**Fiscal Period**). Tuttavia, incontreremo un problema che dovremo affrontare.

<p>33. Fare clic di nuovo nell'area bianca dell'area di disegno del report, quindi fare clic sul pulsante di visualizzazione "Grafico a linee"(Line Chart).</p>	 <p><b>33] Click Line Chart</b></p>
<p>34. Dal riquadro Campi, trascinare il campo Periodo fiscal(Fiscal Period) nell'area Asse e la Misura del profitto lordo giornaliero (Ave Daily Gross Profit) nell'area Valori.</p>	 <p><b>34] Fiscal Period to Axis. Ave Daily Gross Profit Measure to Values.</b></p>
<p>35. Il grafico a linee risultante contiene etichette degli assi che non sono ordinate correttamente.      36. Dobbiamo tornare alla Data delle dimensioni e correggere questo problema di ordinamento.      37. Accertandosi che la colonna "Periodo fiscale" sia selezionata, nella scheda Ribbon modeling.</p>	 <p><b>35] Axis labels that are not sorted correctly</b></p>
<p>38. Nel gruppo Ordina utilizzare la funzione "Ordina per colonna" per ordinare in base alla colonna "FiscalSort" selezionando prima la Colonna "Fiscal Period"</p>	 <p><b>38] With the Fiscal Period Field selected we Sort by "FiscalSort"</b></p>
<p>39. Perché la colonna "FiscalSort" è una colonna di supporto che utilizziamo nel modello di dati ma che non è necessaria      Nel report quindi, fare clic con il tasto destro del mouse sull'intestazione di colonna "FiscalSort" e fare clic su "Nascondi nella vista rapporto"(Hide in Report View).</p>	

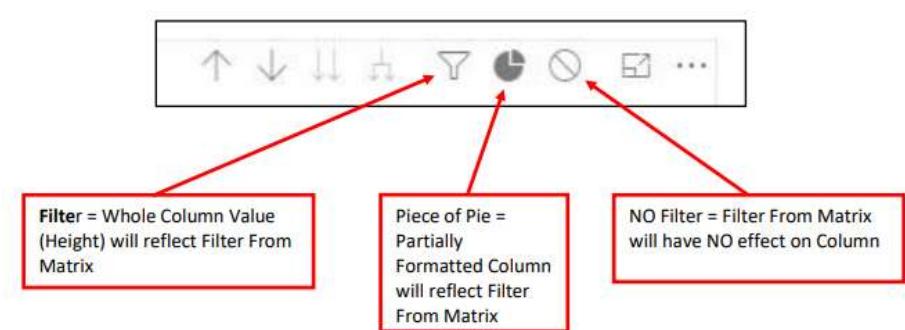
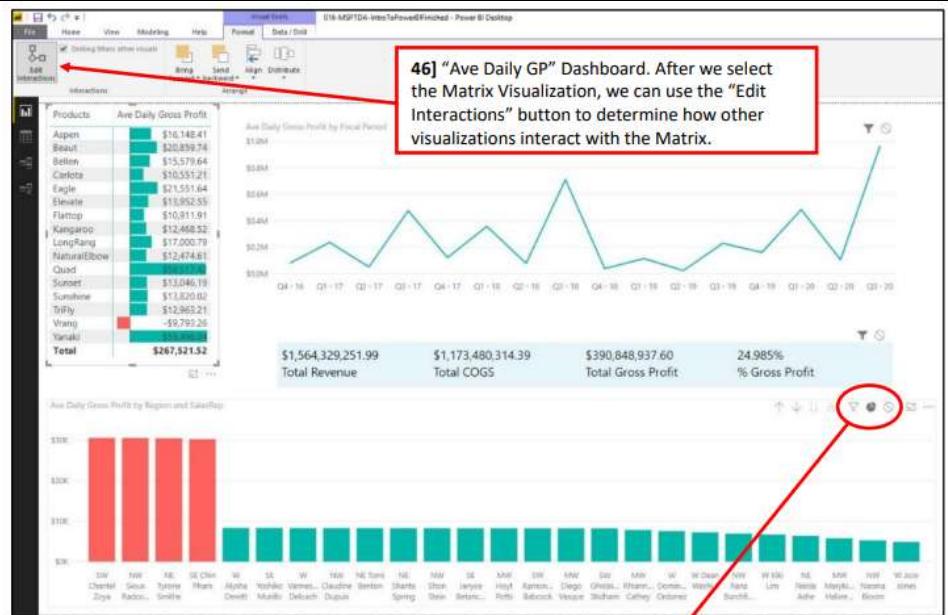
<p>40. Ora, il grafico a linee mostra i periodi fiscali correttamente ordinati lungo l'asse orizzontale, come mostrato di seguito. Le ragioni per cui abbiamo scelto questa visualizzazione sono:</p> <ol style="list-style-type: none"> <li>1) Volevamo vedere la tendenza o il pattern nel tempo.</li> </ol>	 <div style="border: 1px solid red; padding: 5px; position: absolute; top: 10px; right: 10px;">40] Correctly sorted Fiscal Periods</div>
<p>41. Il nostro elemento finale nella nostra dashboard è una carta che mostrerà i valori di una "Scheda multi-riga".</p>	
<p>42. Fare clic di nuovo nell'area bianca dell'area di disegno del report, quindi fare clic sulla visualizzazione "Scheda multi-riga".</p>	 <div style="border: 1px solid red; padding: 5px; position: absolute; top: 10px; right: 10px;">42] click on the "Multi-row card" visualization</div>
<p>43. Con la scheda selezionata, controlla le misure come mostrato nell'immagine a lato</p>	 <div style="border: 1px solid red; padding: 5px; position: absolute; top: 10px; right: 10px;">43] Check the Measures: 1. Total Revenue 2. Total COGS 3. Total Gross Profit 4. % Gross Profit</div>
<p>44. Con la scheda selezionata, formattare la scheda nei seguenti modi:</p> <ol style="list-style-type: none"> <li>1) Menu a discesa della card, "Mostra barra" disattivato.</li> <li>2) Menu a discesa Sfondo, selezionare il colore azzurro.</li> <li>3) Elenco a discesa categoria, Dimensione testo = 13.</li> </ol>	 <div style="border: 1px solid red; padding: 5px; position: absolute; top: 10px; right: 10px;">44] We have to format our Card.</div> <div style="border: 1px solid red; padding: 5px; position: absolute; top: 10px; left: 50%;">1. Card dropdown, "Show bar" Off</div> <div style="border: 1px solid red; padding: 5px; position: absolute; top: 10px; left: 60%;">2. Background dropdown, select color light blue</div> <div style="border: 1px solid red; padding: 5px; position: absolute; top: 10px; left: 80%;">3. Category dropdown, Text size = 13</div>

45. Dopo aver ridimensionato e riposizionato la scheda, la nostra dashboard "Ave Daily GP" è quasi completa, come si vede nell'immagine qui a lato.

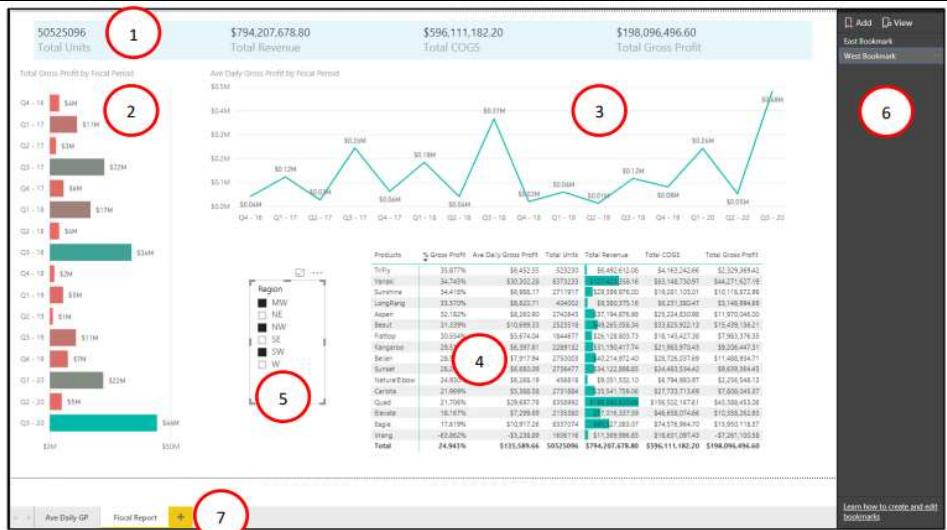
46. L'attività finale di questo pannello è modificare le interazioni di filtro tra le diverse visualizzazioni. Con la matrice selezionata, fai clic sulla scheda "Format Ribbon", quindi fai clic sul pulsante "Edit Interactions". Questo ci permetterà di modificare le altre visualizzazioni (non Matrix) e di determinare come interagiscono con Matrix quando facciamo clic su un elemento in Matrix.

47. Un primo piano delle Opzioni di filtro che determinano il modo in cui il diagramma a colonne cluster interagirà con la matrice quando si fa clic su un elemento in Visualizzazione a matrice. Fare clic per selezionare l'opzione. Quando si fa clic per selezionare, l'icona diventa grigia.

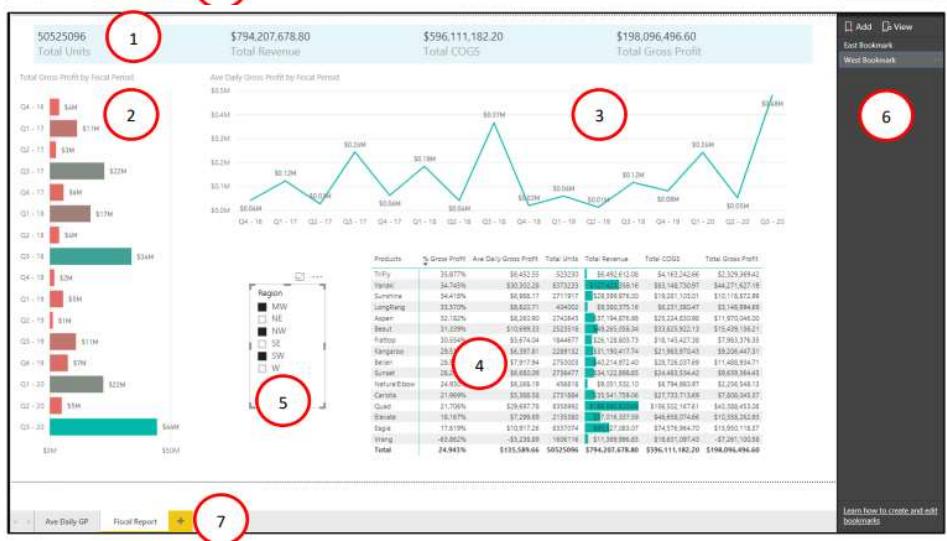
48. Cruscotto finale "Ave Daily GP" come mostrato di seguito con il prodotto "Yanaki" selezionato nella visualizzazione Matrix:



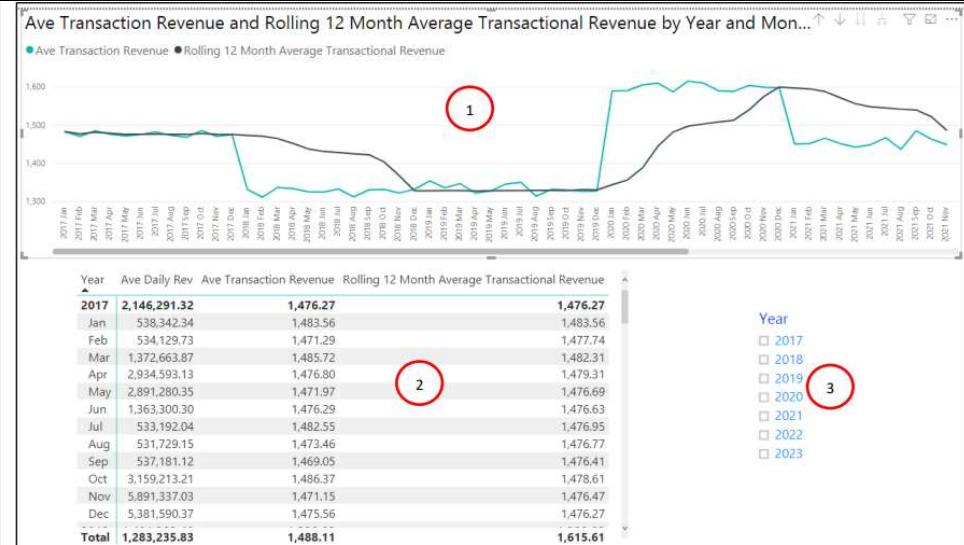
## CREAZIONE DI UN NUOVO REPORT (FISCAL REPORT) creando una nuova scheda "Fiscal Report"



- Aggiungi una "Multi-row card" con le misure (**Total Units**, **Total Revenue**, **Total COGS**, **Total Gross Profit**).
- Aggiungere **Clustered Bar Chart** for **Total Gross Profit by Fiscal Period**. E per utilizzare il "Rullo di vernice" per formattare, aggiungere etichette dati e colori dati fai clic su **Controlli avanzati** e scegli **Scala colore per la misura del (Total Gross Profit)**.
- Aggiungi un grafico a linee che mostri "**Ave Daily Gross Profit**" by **Fiscal period** e attivare **Data Labels**.
- Aggiungi una matrice con i **Product** elencati nell'area delle righe e che elenca le misure **% Gross Profit**, **Ave Daily Gross Profit**, **Total Units**, **Total Revenue**, **Total COGS** and **Total Gross Profit**. Quindi aggiungere **Formatting-Data Bars condizionale** alla **Total Revenue**. Infine ordina il **% Gross Profit** dal più grande al più piccolo.
- Aggiungi un slicer (dal riquadro di visualizzazione) su **Region**
- Usando lo slicer per filtrare le regioni aggiungere due **bookmark** uno per NE (North View) e SE (South View) Region, quindi un secondo segnalibro per le restanti Regioni.
- Denominare la scheda "**Fiscal Report**".



CREAZIONE DI UN NUOVO REPORT (Ave last 12 Months) creando una nuova scheda "last 12 Months"



- Aggiungi un grafico a linee con i due campi **Year** e **Month** nell'asse

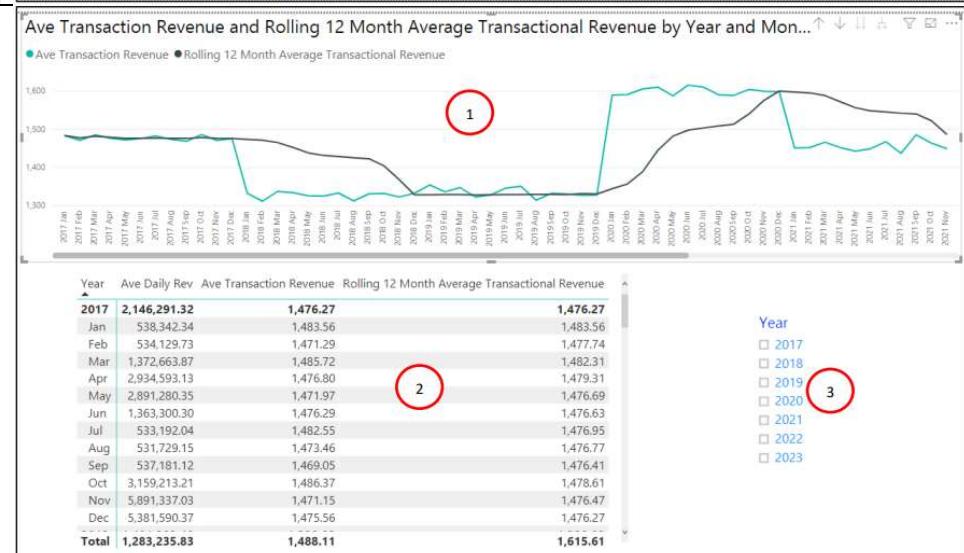
e poi espandere con e due misure (**Ave Transaction Revenue** e **Rolling 12 Month Average Transactional Revenue**) nell'area Valori. Sia per il titolo che per la legenda, formattali per avere una dimensione del carattere di **12 e grassetto**.

- Aggiungi una matrice con l'**Year** e il **month** nelle Row e poi

espandere con e le misure **Ave Daily Rev**, **Revenue Transaction Revenue** e **Rolling Media 12 mesi** nel campo Valori.

Utilizzare l'icona l'anno che il mese nella matrice.

- Aggiungi uno slicer per year. Nell'angolo in alto a sinistra, utilizzare il menu a discesa per fare in modo che Slicer mostri gli Anni come elenco.



CREAZIONE DI UN NUOVO REPORT ("Question") creando una nuova scheda " "Question"

The screenshot shows the Power BI Desktop interface. The ribbon bar at the top has several tabs: File, Home, View, Modeling, and Help. Under the Home tab, there are buttons for Cut, Copy, Paste, Get Data, Recent, Enter Data, Edit Queries, Refresh, New Page, New Visual, Ask A Question, Insert, Text box, Buttons, Image, Shapes, From Marketplace, From File, Themes, Manage Relationships, New Measure, New Column, New Quick Measure, Calculations, and Publish. The 'Ask A Question' button is highlighted with a red circle.

SalesRep	Aspen	Beaufort	Bellini	Carlota	Eagle	Elevate	Flattop	Kangaroo	LongRang	NaturalElbow
Alysha Dewitt	\$4,246,485.48	\$5,810,083.68	\$4,679,596.75	\$4,114,242.10	\$10,899,204.53	\$7,229,032.50	\$3,424,965.85	\$1,866,592.07	\$2,319,488.72	\$2,230,769.
Chantel Zoya	\$15,870,859.79	\$21,680,690.59	\$17,380,207.35	\$16,922,767.91	\$27,903,833.28	\$14,458,454.57	\$8,975,560.49	\$8,767,755.		
Chin Pham	\$16,093,733.59	\$21,777,736.04	\$17,121,199.65	\$15,202,919.49	\$17,193,771,781	\$27,516,234.83	\$12,750,632.78	\$14,376,655.00	\$8,286,831.00	\$8,503,619.
Claudine Dupuis	\$4,205,531.11	\$5,790,724.64	\$4,474,111.80	\$3,885,307.62	\$10,918,878.05	\$7,229,032.50	\$3,424,965.85	\$1,866,592.07	\$2,319,488.72	\$2,230,769.
Darnell Spring	\$1,413,441.96	\$1,993,504.88	\$1,618,553.25	\$1,351,460.63	\$1,878,976.11	\$1,519,221.49	\$1,428,926.58	\$1,342,847.92	\$1,571,142.	
Diego Venpus	\$4,345,165.58	\$5,986,629.89	\$4,693,087.16	\$4,104,674.33	\$11,104,641.73	\$7,239,352.03	\$3,381,150.79	\$8,812,555.91	\$2,223,786.69	\$2,106,460.
Dominica Ordonez	\$3,988,489.05	\$5,418,460.35	\$4,288,670.02	\$3,823,356.42	\$10,657,894.19	\$3,190,342.27	\$3,612,800.52	\$2,277,786.39	\$2,287,445.	
Ghislaine Stidham	\$4,109,444.60	\$5,770,593.76	\$4,523,733.46	\$4,100,824.20	\$10,782,043.31	\$7,452,140.88	\$3,330,749.64	\$3,952,170.75	\$2,243,774.	
Hoyt Potts	\$4,285,226.39	\$5,628,591.58	\$4,548,703.05	\$4,069,259.69	\$10,888,023.95	\$7,194,930.85	\$3,254,638.88	\$8,888,564.04	\$2,423,958.82	\$2,160,774.
Janyce Betancourt	\$4,310,055.33	\$5,562,329.16	\$4,538,454.14	\$4,141,062.46	\$10,851,051.60	\$7,243,275.08	\$3,409,748.97	\$3,914,573.62	\$2,173,684.96	\$2,144,439.
Jojo Jones	\$2,547,302.82	\$2,597,407.02	\$2,632,405.63	\$2,213,479.57	\$6,421,162.03	\$4,372,809.59	\$1,978,725.27	\$2,257,104.69	\$1,278,914.61	\$1,423,821.
Kiki Lim	\$13,304,496.58	\$18,840,076.30	\$13,389,365.20	\$12,605,115.98	\$3,718,376.34	\$2,353,705.82	\$1,181,937.23	\$1,311,429.44	\$1,150,790.43	\$1,217,809.
Marylouise Halverson	\$3,041,732.90	\$4,246,012.44	\$3,129,290.02	\$2,922,872.37	\$7,894,007.10	\$5,297,955.82	\$2,450,141.77	\$2,052,969.50	\$1,798,853.64	\$1,596,167.
Naomi Bloom	\$2,770,216.85	\$3,908,292.94	\$3,012,856.40	\$3,817,216.60	\$7,110,790.39	\$4,773,007.40	\$2,309,320.16	\$2,464,701.47	\$1,392,896.70	\$1,584,905.
Neida Ashe	\$3,236,876.50	\$4,601,170.09	\$3,648,759.19	\$3,257,342.66	\$8,592,364.79	\$5,665,518.16	\$2,735,759.54	\$3,101,391.82	\$1,886,477.19	\$1,793,944.
Ramona Babcock	\$4,094,219.14	\$5,773,795.27	\$4,656,932.28	\$4,191,304.73	\$10,997,852.78	\$7,505,145.45	\$3,372,068.28	\$3,872,842.90	\$2,187,152.95	\$2,121,724.
Rana Burchfield	\$3,646,564.51	\$4,908,196.40	\$3,855,106.69	\$3,553,852.45	\$9,494,429.00	\$6,629,512.02	\$2,695,345.29	\$3,306,206.11	\$2,151,102.16	\$2,126,640.
Rhiannon Cathey	\$9,425,360.86	\$5,704,665.90	\$4,356,662.07	\$3,804,719.72	\$10,587,402.21	\$6,978,488.34	\$3,286,668.12	\$3,804,685.39	\$2,348,508.99	\$2,211,982.
Shanta Spring	\$2,125,922.16	\$5,962,076.42	\$4,651,174.81	\$3,987,411.32	\$10,910,560.39	\$6,862,362.98	\$3,501,917.84	\$3,829,510.65	\$2,401,605.62	\$2,133,468.
Shon Stein	\$9,424,330.68	\$5,715,925.71	\$4,612,573.02	\$4,087,881.64	\$10,612,885.30	\$7,331,064.59	\$3,424,024.30	\$3,844,978.35	\$2,136,361.90	\$2,109,757.
Sioux Radcolinato	\$15,766,072.53	\$22,230,029.95	\$17,159,213.73	\$15,192,991.72	\$41,044,713.54	\$27,903,357.83	\$12,750,169.22	\$14,622,926.26	\$8,641,437.01	\$8,688,800.
Tomi Benton	\$4,168,641.04	\$5,774,600.08	\$4,392,076.12	\$4,062,900.60	\$11,053,307.08	\$7,222,039.09	\$3,155,013.97	\$4,036,155.90	\$2,206,863.64	\$2,238,736.
Tyrone Smith	\$16,339,253.45	\$21,884,972.60	\$17,267,037.42	\$15,603,264.08	\$41,447,113.54	\$27,796,998.21	\$12,750,169.22	\$14,622,926.26	\$8,441,539.67	\$8,450,737.
Vannessa Deloach	\$4,205,531.11	\$5,842,207.51	\$4,574,185.86	\$4,064,244.08	\$10,842,688.56	\$7,396,057.82	\$3,461,027.80	\$3,955,987.11	\$2,225,128.57	\$2,238,362.
Yoshiko Murillo	\$4,210,217.72	\$5,592,509.49	\$4,559,114.60	\$4,087,577.95	\$10,837,865.71	\$7,264,803.17	\$3,496,033.87	\$3,899,576.17		
Total	\$140,411,138.67	\$192,760,111.69	\$151,774,713.00	\$135,125,097.63	\$363,321,357.01	\$244,226,824.84	\$113,984,473.84	\$129,380,115.08	\$77,267,752.49	\$76,057,880.

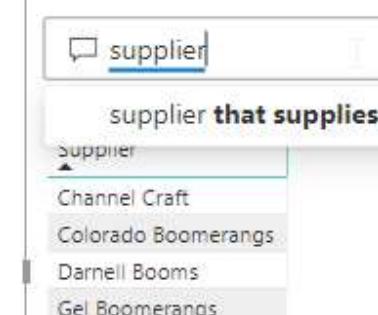
- Vediamo come utilizzare l'opzione "**Ask A Question**" facendo doppio click sul canvas bianco . Abbiamo scritto queste due domande:

- a. **"Matrix**  
**Total Revenue**  
**Product by SalesRep**"
- b. **"Supplier".**

Quindi abbiamo aggiunto un po 'di formattazione.

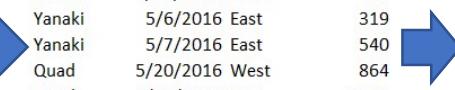
The screenshot shows a matrix visual titled "Matrix Total Revenue Product by SalesRep". The matrix has SalesRep as the column header and SalesRep as the row header. The cells contain numerical values representing revenue. The matrix is surrounded by a green header bar.

Matrix Total Revenue Product by SalesRep	
SalesRep	SalesRep
Sioux Radcolinato	\$15,766,072.53
Tyrone Smith	\$16,039,255.45
Chantel Zoya	\$15,870,859.79
Chin Pham	\$16,093,733.59
Alysha Dewitt	\$4,246,485.48
Vannessa Deloach	\$4,205,531.11
Tomi Benton	\$4,168,641.04
Tyrone Smith	\$16,339,253.45
Yoshiko Murillo	\$4,210,217.72
Claudine Dupuis	\$3,992,561.93
Total	\$140,411,138.67



# Demo 0: Primi passi

8. Dobbiamo passare da una versione sporca di una tabella ad una tabella ripulita che poi verrà utilizzata per visualizzare i dati in una tabella pivot. (0-Primi passi.xlsx)



Description	Amount
Carlota / 05/05/2016 / West	485
Aspen / 04/02/2016 / South	804
Yanaki / 05/02/2016 / South	790
FlatTop / 04/11/2016 / South	965
Carlota / 05/21/2016 / South	620
Carlota / 05/15/2016 / East	305
Carlota / 05/19/2016 / West	426
Yanaki / 05/06/2016 / East	319
Yanaki / 05/07/2016 / East	540
Quad / 05/20/2016 / West	864
Quad / 04/29/2016 / East	1083
Quad / 04/18/2016 / South	636
FlatTop / 04/25/2016 / West	1200
Yanaki / 05/30/2016 / South	563
Carlota / 05/04/2016 / East	1219
Carlota / 05/18/2016 / West	736
FlatTop / 04/09/2016 / West	895

Product	Date	Region	Amount
Carlota	5/5/2016	West	485
Aspen	4/2/2016	South	804
Yanaki	5/2/2016	South	790
FlatTop	4/11/2016	South	965
Carlota	5/21/2016	South	620
Carlota	5/15/2016	East	305
Carlota	5/19/2016	West	426
Yanaki	5/6/2016	East	319
Yanaki	5/7/2016	East	540
Quad	5/20/2016	West	864
Quad	4/29/2016	East	1083
Quad	4/18/2016	South	636
FlatTop	4/25/2016	West	1200
Yanaki	5/30/2016	South	563
Carlota	5/4/2016	East	1219
Carlota	5/18/2016	West	736
FlatTop	4/9/2016	West	895
Quad	5/6/2016	South	785
Quad	5/22/2016	East	942
FlatTop	4/28/2016	West	1086

Sum of Revenue	Region				
Months	Product	East	South	West	Grand Total
Apr	Aspen	\$7,913	\$11,219	\$9,171	\$28,303
	Carlota	\$11,489	\$2,636	\$7,704	\$21,829
	FlatTop	\$7,783	\$8,324	\$10,077	\$26,184
	Quad	\$6,339	\$10,154	\$8,304	\$24,797
	Sunset	\$6,095	\$12,394	\$6,254	\$24,743
	Yanaki	\$8,074	\$3,792	\$6,609	\$18,475
May	Aspen	\$8,791	\$7,547	\$10,616	\$26,954
	Carlota	\$8,407	\$6,012	\$2,639	\$17,058
	FlatTop	\$5,098	\$5,942	\$3,613	\$14,653
	Quad	\$8,475	\$9,117	\$10,724	\$28,316
	Sunset	\$3,233	\$6,307	\$8,537	\$18,077
	Yanaki	\$4,751	\$9,135	\$4,377	\$18,263
Jun	Aspen	\$683	\$2,364	\$1,963	\$5,010
	Carlota	\$4,264	\$1,659	\$4,091	\$10,014
	FlatTop	\$817	\$2,728	\$1,646	\$5,191
	Quad	\$3,092	\$4,872	\$3,492	\$11,456
	Sunset	\$2,276	\$2,611	\$439	\$5,326
	Yanaki	\$3,893	\$1,041	\$2,103	\$7,037
Jul	Aspen	\$1,945	\$2,472	\$3,615	\$8,032
	Carlota	\$1,472	\$2,902	\$1,446	\$5,820
	FlatTop	\$1,756	\$4,734	\$1,063	\$7,553
	Quad	\$2,995	\$2,016	\$2,591	\$7,602
	Sunset	\$1,171	\$827	\$3,060	\$5,058
	Yanaki	\$2,247	\$4,194	\$3,517	\$9,958
Grand Total		\$113,059	\$124,999	\$117,651	\$355,709

9. In excel come abbiamo sempre fatto?

Semplicemente abbiamo utilizzato le formule di excel per trasformare il testo. In particolare abbiamo usato la seguente formula per la colonna Product

=LEFT(A3,SEARCH("/",A3)-1)

Product	D
Carlota	

La seguente formula per la colonna Date

=LEFT(REPLACE(A3,1,SEARCH("/",A3)+1,""),10)+0

Date
5/5/2016

Ecc.....

10. Come facciamo con Power Query?

1) Intanto bisogna dare un nome alla tabellina per poterla identificare "StartSales"

Table Name:  
StartSales

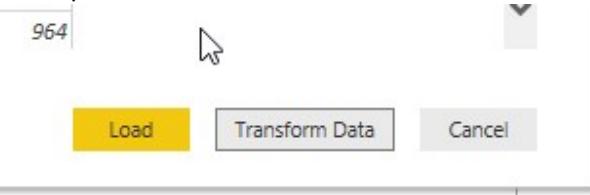
2) Poi apriamo power bi desktop e importiamo la tabella del file excel

### Navigator

The screenshot shows the Power BI Desktop interface with the 'Navigator' tab selected. A table named 'StartSales' is displayed with the following data:

Description	Amount
Carlota / 05/05/2016 / West	485
Aspen / 04/02/2016 / South	804
Yanaki / 05/02/2016 / South	790
FlatTop / 04/11/2016 / South	965

3) Premiamo poi su "Transform Data"



Spiegare tutte le parti di power Query

The screenshot shows the Power Query Editor window with the following numbered labels:

- 1) Power Query Editor
- 2) Ribbon Tabs
- 3) List of all Queries
- 4) # of Columns and Rows
- 5) Imported Data
- 6) Download Time
- 7) Applied Steps is the list of each Step in the Transformation. These Steps can be Deleted, Edited, or you can add New Steps at a Later Time.
- 8) Name of Query. Name it something different than the Source Data Excel Table Name.
- 9) Preview
- 10) Formula Bar

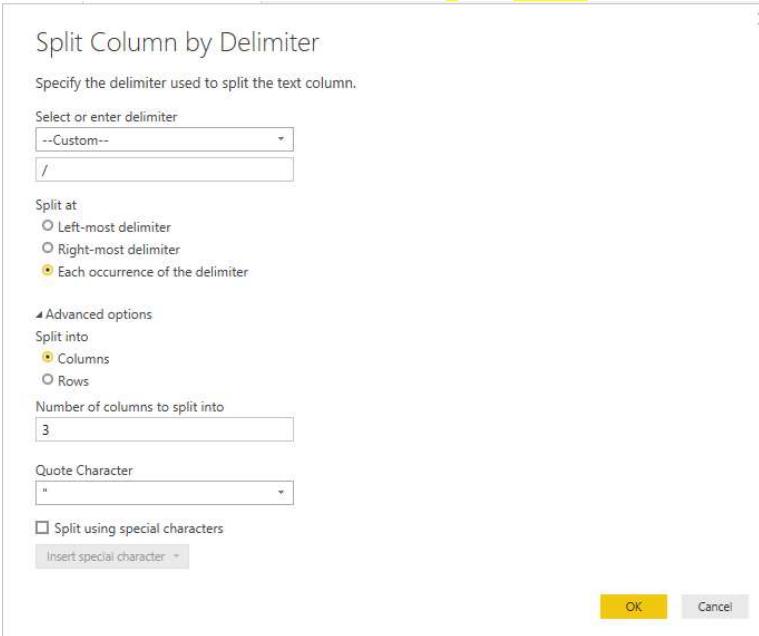
The 'Applied Steps' pane on the right shows a step named 'Changed Type'.

- 4) Ora che abbiamo caricato la tabella dobbiamo incominciare a trasformarla

	Description	Amount
1	Carlota / 05/05/2016 / West	485
2	Aspen / 04/02/2016 / South	804
3	Yanaki / 05/02/2016 / South	790
4	FlatTop / 04/11/2016 / South	965
5	Carlota / 05/21/2016 / South	620
6	Carlota / 05/15/2016 / East	305
7	Carlota / 05/19/2016 / West	426
8	Yanaki / 05/06/2016 / East	319
9	Yanaki / 05/07/2016 / East	540
10	Quad / 05/20/2016 / West	864
11	Quad / 04/29/2016 / East	1083
12	Quad / 04/18/2016 / South	636
13	FlatTop / 04/25/2016 / West	1200
14	Yanaki / 05/30/2016 / South	563

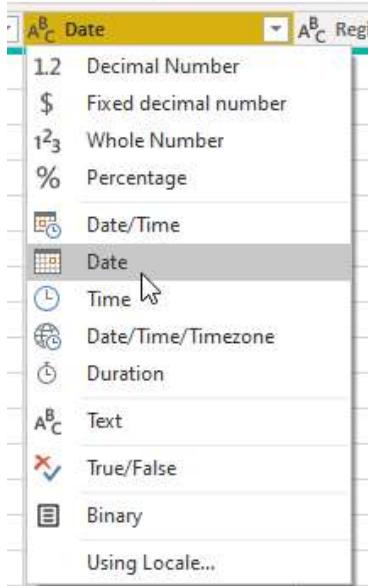
- 5) Puntiamo sulla colonna e con il tasto destro del mouse scegliamo di spartire la colonna description usando il comando “split column by delimiter”.

i. Usiamo come carattere custom la / e lo spazio



- 6) Rinominiamo le colonne come **Product** , **Date** e **Region**

- 7) Cambiamo il tipo della colonna data da testo a date



- 8) Ora che abbiamo terminato le trasformazioni premiamo



- 9) Possiamo creare una tabella pivot con la visualizzazione a matrice per rendere uguale a quello che avremmo ottenuto in Excel con la Tabella Pivot

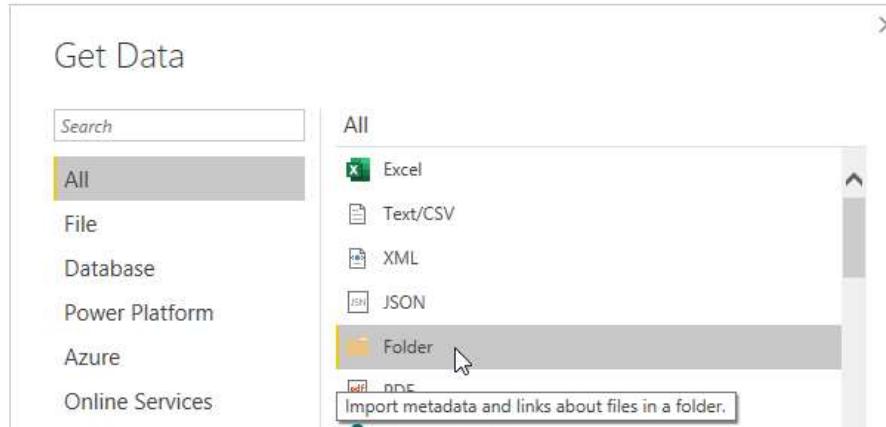
Month	Aspen	Carlota	FlatTop	Quad	Sunset	Yanaki	Total
April	28303	21829	26184	24797	24743	18475	144331
South	11219	2636	8324	10154	12394	3792	48519
West	9171	7704	10077	8304	6254	6609	48119
East	7913	11489	7783	6339	6095	8074	47693
May	26954	17058	14653	28316	18077	18263	123321
South	7547	6012	5942	9117	6307	9135	44060
West	10616	2639	3613	10724	8537	4377	40506
East	8791	8407	5098	8475	3233	4751	38755
Total	55257	38887	40837	53113	42820	36738	267652

- 10) Salviamo il file Power BI con il nome **0-Primi passi(Finale).pbix**

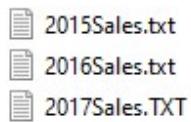
## 11. Proviamo ora ad importare dati da un folder

- 11) Apriamo un nuovo file di Power BI Desktop

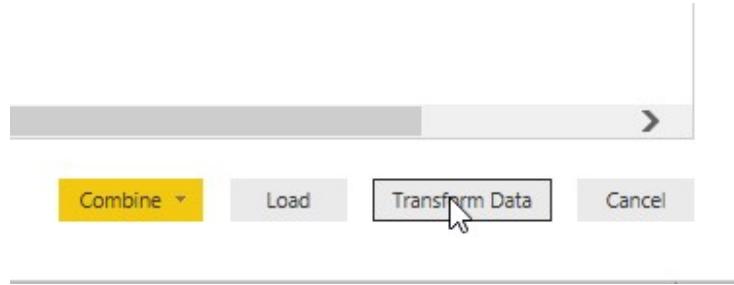
12) Carichiamo i dati da un folder “0-Folder”



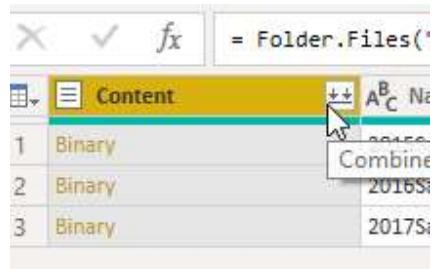
13) Dentro ci sono file di testo



14) Selezionara “Transform Data”



15) Cliccare sul tasto “combine” per combinare assieme i file di testo



16) Si passa poi alla schermata successiva che ci chiede se ci va bene la preview dei dati della combinazione

## Combine Files

Specify the settings for each file. [Learn more](#)

Sample File:

First file

File Origin		Delimiter		Data Type Detection	
1252: Western European (Windows)	Tab	Based on first 200 rows			
11/28/2015	2160SU/Novelty	60	522	360	162
8/13/2015	2280YA/Intermediate	2	51.98	20.04	31.94
11/19/2015	1800PH/Intermediate	84	1307.88	911.4	396.48
2/22/2015	840DA/Beginner	84	602.28	441	161.28
12/19/2015	1800QU/Freestyle	120	2831.63	1920	911.63
10/21/2015	360BE/Beginner	1	26.99	10.75	16.24
10/10/2015	720CR/Intermediate	60	718.2	510	208.2
9/27/2015	1200FU/Beginner	4	27.96	13	14.96
6/18/2015	840DA/Beginner	6	71.7	31.5	40.2
10/18/2015	1800QU/Freestyle	2	83.9	32	51.9
3/24/2015	360BE/Beginner	156	2368.37	1677	691.37
6/21/2015	1440MA/Intermediate	2	57.9	22.98	34.92
3/26/2015	2280YA/Intermediate	1	25.99	10.02	15.97
1/6/2015	1200FU/Beginner	2	13.98	6.5	7.48
12/11/2015	1680MA/Competition	144	9882	7168.32	2713.68
9/5/2015	2280YA/Intermediate	1	25.99	10.02	15.97
11/28/2015	2040SU/Beginner	4	87.8	34.6	53.2

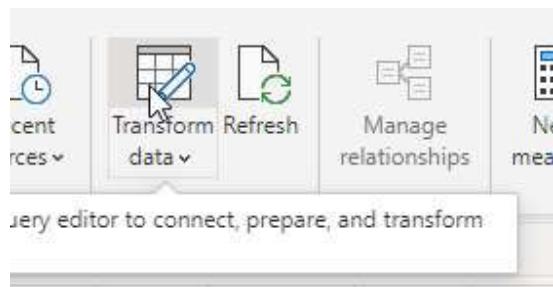
17) Ora che abbiamo terminato le trasformazioni premiamo



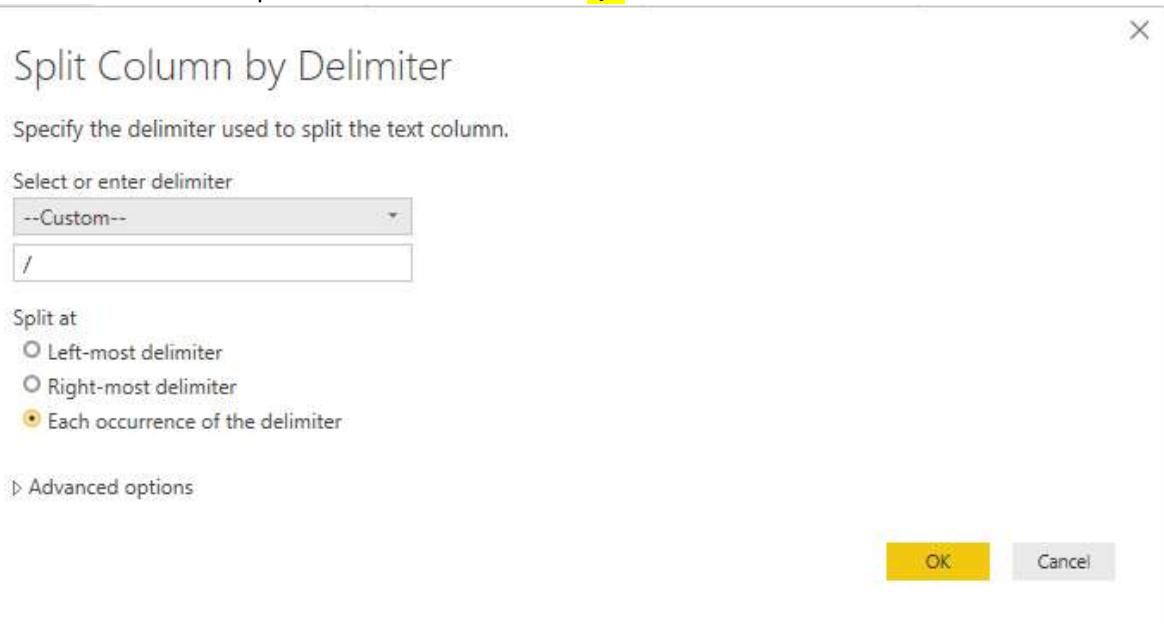
18) Ora tornati fuori da Power Query andiamo a vedere il contenuto della tabella nel data view

Source.Name	Date	ProductID/Category	Units	Revenue	COGS	Profit
2017Sales.TXT	Wednesday, December 20, 2017	1200FU/Beginner	1	7.16	3.2	3.96
2017Sales.TXT	Wednesday, December 20, 2017	1200FU/Beginner	1	7.16	3.2	3.96
2017Sales.TXT	Wednesday, December 20, 2017	1200FU/Beginner	1	7.16	3.2	3.96
2017Sales.TXT	Wednesday, December 20, 2017	1200FU/Beginner	1	7.16	3.2	3.96
2017Sales.TXT	Wednesday, December 20, 2017	1200FU/Beginner	1	7.16	3.2	3.96
2017Sales.TXT	Wednesday, December 20, 2017	1200FU/Beginner	1	7.16	3.2	3.96

19) Ci accorgiamo che la terza colonna riporta due informazioni sia di categoria che di prodotto allora  
dobbiamo andare di nuovo in “Power Query” e modificare le trasformazioni per dividere la colonna.  
Cliccando sul tasto di “trasformazione dei dati” si ritorna in power query



- 20) Ora andiamo nella colonna incriminata e applichiamo la stessa trasformazione che è stata fatta precedentemente cioè “split column” con il carattere “/”



- 21) Usando la formula bar di power query modificare il nome delle colonne in “ProductID” e “Category”

```
= Table.SplitColumn(#"Changed Type", "ProductID/Category", Splitter.SplitTextByDelimiter("/", QuoteStyle.Csv), {"ProductID/Category.1", "ProductID/Category.2"})
```

- 22) Salviamo il file ottenuto con il nome di **0-Folder(Finale).pbix**

- 12. Ora vediamo altre funzioni di power query e come queste agevolano il lavoro che si dovrebbe fare in Excel.**

23) Supponiamo di voler calcolare il numero di valori distinti di una colonna (file 0-ValoriDistinti.xlsx)

Date	SalesRep	Product	Sales	Count Unique
1/6/2018	Tyrone	Aspen	1307.53	4
1/8/2018	Sioux	Aspen	707.67	
1/9/2018	Gigi	Sunshine	1110.98	SalesRep
1/12/2018	Sioux	Sunshine	1507.46	Gigi
1/14/2018	June	Sunshine	764.09	June
1/16/2018	Tyrone	Yanaki	1113.06	Sioux
1/18/2018	June	Sunshine	202.51	Tyrone
1/19/2018	Gigi	Quad	964.89	
1/19/2018	June	Aspen	227.67	
1/23/2018	Tyrone	Aspen	957.71	
1/23/2018	Tyrone	Sunshine	592.96	
1/23/2018	Gigi	Quad	1070.7	
1/24/2018	Gigi	Aspen	1478.25	
1/28/2018	Gigi	Quad	897.92	
1/31/2018	June	Sunshine	287.86	
2/3/2018	Sioux	Aspen	925.32	
2/6/2018	June	Sunshine	568.94	
2/10/2018	June	Quad	924.7	
2/14/2018	Tyrone	Aspen	1125.03	

24) La formula in Excel per calcolare i valori distinti della colonna SalesRep dovrebbe essere la seguente

```
=IF(ROWS(G$9:G9)>G$6,"",INDEX(fSales[SalesRep],MATCH(MIN(IF(ISNA(MATCH(fSales[SalesRep],G$8:G8,0)),MMULT(--(IF(fSales[SalesRep]<>"",fSales[SalesRep])>TRANSPOSE(IF(fSales[SalesRep]<>"",fSales[SalesRep]))),ROW(fSales[SalesRep])^0))),MMULT(--(IF(fSales[SalesRep]<>"",fSales[SalesRep])>TRANSPOSE(IF(fSales[SalesRep]<>"",fSales[SalesRep]))),ROW(fSales[SalesRep])^0,0,0)))
```

SalesRep
Gigi
June
Sioux
Tyrone

E per il conteggio la seguente:

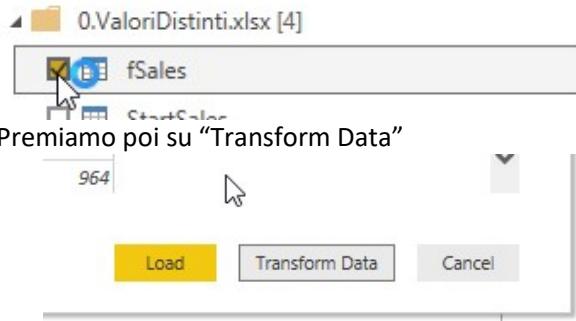
```
=SUM(IF(FREQUENCY(IF(fSales[SalesRep]<>"",MATCH(fSales[SalesRep],fSales[SalesRep],0)),ROW(fSales[SalesRep])-ROW(fSales[[#Headers],[SalesRep]])),1))
```

Count Unique
4

25) Intanto bisogna dare un nome alla tabellina per poterla identificare "fSales"



26) Poi apriamo power bi desktop e importiamo la tabella del file excel



27) Premiamo poi su "Transform Data"

28) Ora che abbiamo caricato i dati in Power Query dobbiamo eliminare tutte le altre colonne e lasciare solo la colonna "SalesRep". Per fare questo dobbiamo fare dasto destro con il mouse sopra la colonna e scegliere "Remove Other Columns"

	A <sup>B</sup> SalesRep	A <sup>B</sup> Product
1/6/2018	Tyrone	
1/8/2018	Sioux	
1/9/2018	Gigi	
1/12/2018	Sioux	
1/14/2018	June	
1/16/2018	Tyrone	
1/18/2018	June	
1/19/2018	Gigi	
1/19/2018	June	
1/23/2018	Tyrone	
1/23/2018	Tyrone	

A context menu is open over the "SalesRep" column header. The "Remove Other Columns" option is highlighted.

29) Ora dobbiamo rimuovere i duplicati e quindi clicchiamo sulla colonna e scegliamo "Remove Duplicates"

	A <sup>B</sup> SalesRep
1	Tyrone
2	Sioux
3	Gigi
4	Sioux
5	June
6	Tyrone
7	June
8	Gigi
9	June

A context menu is open over the "SalesRep" column header. The "Remove Duplicates" option is highlighted.

30) Ora che abbiamo terminato le trasformazioni premiamo



31) Salviamo il file con il nome **0-ValoriDistinti(Finale).pbix**

# Demo 1: Shaping data con Query Editor (unpivot)

1. Aprire Power BI Desktop window, click Edit Queries
2. Cliccare su nuova sorgente
3. Nel dialog box scegliamo il connettore Excel.
4. Scegliere il file **1-Unpivot.xlsx**.
5. Apri la tabella “**GradeTable**”

The screenshot shows the Power BI Query Editor interface. On the left, there's a tree view of the Excel file "1-Unpivot.xlsx [2]" with "GradeTable" selected. On the right, a preview pane shows the contents of the "GradeTable". The table has columns: Student, Quantitative Class, and Value. The preview pane also displays the first few rows of data.

6. Cliaccare con il tasto destroy sulla prima colonna e selezionare la voce “**unpivot other columns**”

The screenshot shows the Power BI Query Editor with the context menu open over the first column of the "GradeTable". The menu path "GradeTable > A\_B Student/Quantitative Class" is highlighted. The "Unpivot Other Columns" option is clearly visible in the list of options.

7. Otteniamo così il risultato che si vede sotto:

	A_B Student/Quantitative Class	A_B Attribute	1.2 Value
1	Abdi Hyde	Busn 216	3.7
2	Abdi Hyde	Busn135	3
3	Abdi Hyde	Busn218	3.9
4	Abdi Hyde	BI 348	3.6
5	Abdi Hyde	Math 148	2.4
6	Abdi Hyde	Math 111	3
7	Abdi Hyde	Busn 210	2.6
8	Tyrone Lord	Busn 216	3.6
9	Tyrone Lord	Busn135	3.4
10	Tyrone Lord	Busn218	4

8. Ora basta rinominare con i nomi **Student**, **Class**, **Grade** le colonne e abbiamo completato

	A_B Student	A_B Class	1.2 Grade
1	Abdi Hyde	Busn 216	3.7
2	Abdi Hyde	Busn135	3
3	Abdi Hyde	Busn218	3.9
4	Abdi Hyde	BI 348	3.6
5	Abdi Hyde	Math 148	2.4

# Demo 1: Shaping data con Query Editor (transpose)

9. In the **Power BI Desktop** window, click **Edit Queries**
10. Click on **New Source**
11. In the dialog box, click **Excel**.
12. In the **Open** file **1-Transpose.xlsx**, and then click **Open**.

The screenshot shows the Power BI Navigator dialog box. On the left, there is a tree view under 'Display Options' with 'Sales Matrix.xlsx [1]' expanded, showing 'Sales' selected. On the right, a preview of the 'Sales' table is displayed with the following data:

Column1	Column2	Column3	Column4	Column5	Column6
null	Australia	null	null	UK	
null	Bikes	Clothing	Accessories	Bikes	Clothing
2005	1309047.198	2482.39	235.64	291590.5194	76
2006	2154284.884	15321.14	37359.48	591586.854	112
2007	2947789.483	28613.26	57381.47	1251079.528	146
2008	81309.16	41646.69	81309.16	1148585.76	182

13. In the Navigator dialog box, select the Sales check box, and then click **Load**.
14. On the **Transform** ribbon, click **Transpose**.

The screenshot shows the Power Query Editor window with the 'Transform' ribbon selected. Under the 'Transpose' section, the 'Transpose' button is highlighted. Below it, the 'Queries [4]' list shows 'Sales' selected. The main area displays the transposed data:

Column1	Column2	Column3	Column4
null	Australia	null	null
null	Bikes	Clothing	Accessories
2005	1309047.198	2482.39	235.64
2006	2154284.884	15321.14	37359.48
2007	2947789.483	28613.26	57381.47
2008	81309.16	41646.69	81309.16

15. Click the table icon in the top left-hand corner of the table, and click **Use First Row As Headers**.

The screenshot shows the Power Query Editor window with the 'Home' ribbon selected. The 'Use First Row As Headers' button in the 'Group By' section is highlighted with a yellow arrow. Below it, the 'Queries [4]' list shows 'Sales' selected. The main area displays the data with the first row as headers:

Column1	Column2	Column3	Column4
null	Australia	null	2005
Australia	Bikes	2154284.884	1309047.198

16. Right-click **Column1**, click **Rename**, type **Country**, and then press Enter.
17. Right-click **Column2**, click **Rename**, type **Category**, and then press Enter.
18. Click the **Country** column, and on the ribbon, in the **Any Column** group, click **Fill**, and then click **Down**. The null values are replaced.

A screenshot of the Power BI desktop interface. The ribbon at the top has 'Column' selected. In the 'Any Column' group, the 'Fill' button is highlighted. A context menu is open over the 'Country' column header, with 'Down' being the selected option. Below the ribbon, a table view shows five rows. The first row has 'Australia' in the 'Country' column and 'Bike' in the 'Category' column. Rows 2 and 3 have 'null' in the 'Category' column. The fourth row has 'UK' in the 'Country' column and 'Bike' in the 'Category' column. The fifth row has 'null' in the 'Category' column.

19. Select the **2005** column, hold down the **Ctrl** key and select the **2006**, **2007**, and **2008** columns. Right-click any of the selected column headers, and then click **Unpivot Columns**.

A screenshot of the Power BI desktop interface. The ribbon at the top has 'Column' selected. In the 'Text Column' group, the 'Unpivot Columns' button is highlighted. Below the ribbon, a table view shows 12 rows. The columns are labeled 'Country', 'Category', '2005', '2006', '2007', and '2008'. The '2005' column contains values like '1309047.198', '2482.39', etc. The '2006' column contains values like '2154284.884', '15321.14', etc. The '2007' column contains values like '2947789.483', '28613.26', etc. The '2008' column contains values like '81309.16', '41646.69', etc. The 'Unpivot Columns' option is visible in the context menu above the table.

20. Note that the names of the columns are **Attribute** and **Value** for the attribute-value pairing.

	Country	Category	Attribute	Value
1	Australia	Bikes	2005	1309047.198
2	Australia	Bikes	2006	2154284.884
3	Australia	Bikes	2007	2947789.483
4	Australia	Bikes	2008	81309.16
5	Australia	Clothing	2005	2482.39
6	Australia	Clothing	2006	15321.14
7	Australia	Clothing	2007	28613.26

21. Right-click the **Attribute** column, click **Rename**, type **Year**, and then press Enter.
22. Right-click the **Value** column, click **Rename**, type **Sales**, and then press Enter.
23. On the **File** menu, click **Close & Apply**.

## Demo 1: Shaping data con Query Editor (Trim-Split-Replace)

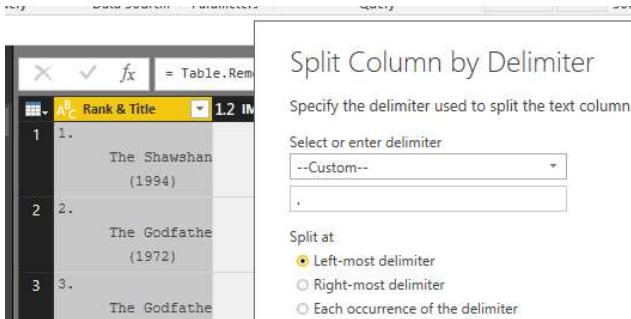
### Demonstration Steps

1. In the **Get Data** dialog box, click **Web**, and then click **Connect**.
2. In the **From Web** dialog box, in the **URL** box, type <http://www.imdb.com/chart/top>, and then click **OK**.
3. In the Navigator window, select the **Table 0** check box, and then click **Edit**.
4. In the **Untitled - Query Editor** window, right-click the left-most empty column, and click **Remove**.

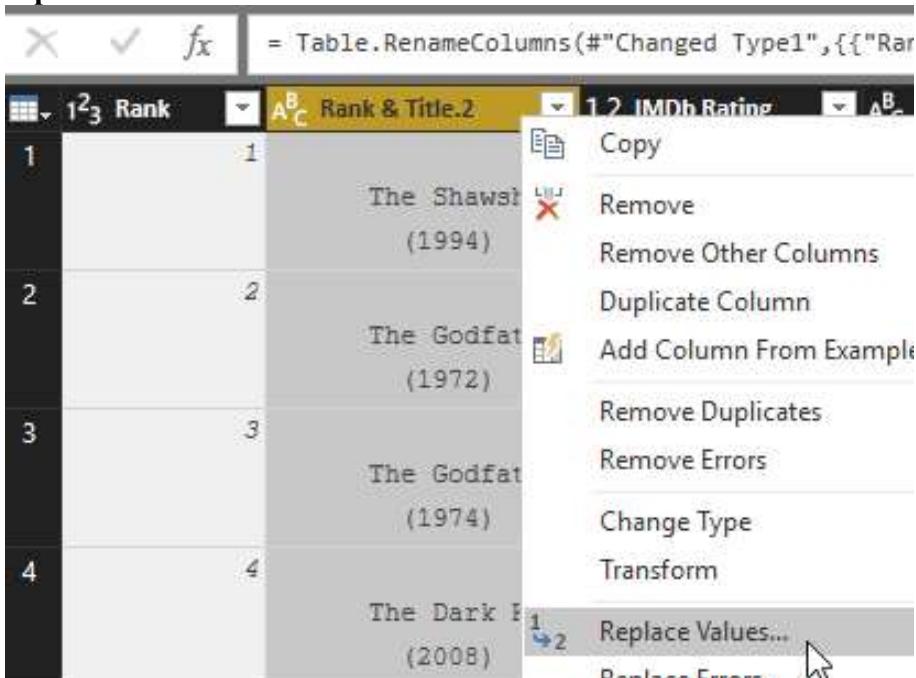
5. Right-click the right-most empty column, and click **Remove**.
6. Right-click the **Your Rating** column, and click **Remove**.

7. Note that these steps have been grouped together in the **Applied Steps** list as **Removed Columns**.
8. Click the **Rank & Title** column, and then on the **Home** tab, in the **Transform** group, click **Split Column**, and then click **By Delimiter**.

9. In the **Split Column by Delimiter** dialog box, in the **Select or enter delimiter** list, click **--Custom--**, and then type a period (.) in the box. Under **Split**, click **At the left-most delimiter**, and then click **OK**.



10. The Rank data now shows in its own column. Right-click the **Rank & Title.1** column, click **Rename**, type **Rank**, and then press Enter.
11. Click the **Rank & Title.2** column, and on the **Transform** ribbon, in the **Any Column** group, click **Replace Values**.



15. In the **Replace Values** dialog box, in the **Value to Find** box, type **(**, and then click **OK**.
16. With focus on the **Rank & Title.2** column, from the **Any Column** group, click **Replace Values**.
17. In the **Replace Values** dialog box, in the **Value to Find** box, type **)**, and then click **OK**.
18. With focus on the **Rank & Title.2** column, in the **Text Column** group, click **Split Column**, and then click **By Number of Characters**. In the **Split Column by Number of Characters** dialog box, in the **Number of characters** box, type **4**. Under **Split**, click **Once, as far right as possible**, and then click **OK**.

The Shawshank  
1994

The Godfather  
1972

The Godfather  
1974

The Dark Knight  
2008

**Split Column by Number of Characters**

Specify the number of characters used to split the text column.

Number of characters

4

Split

Once, as far left as possible

Once, as far right as possible

Repeatedly

Advanced options

19. Right-click the **Rank & Title.2.1** column, click **Rename**, type **Title**, and then press Enter.
20. In the **Text Column** group, click **Format**, and then click **Trim**. The white space around the titles is removed.

Table.Renamecolumns#\_changed\_typez\_11 Rank &

A<sup>B</sup> Title

Copy

Remove

Remove Other Columns

Duplicate Column

Add Column From Examples...

Remove Duplicates

Remove Errors

Change Type

Transform

Trim

lowercase

UPPERCASE

Capitalize E...

Replace Values...

Replace Errors...

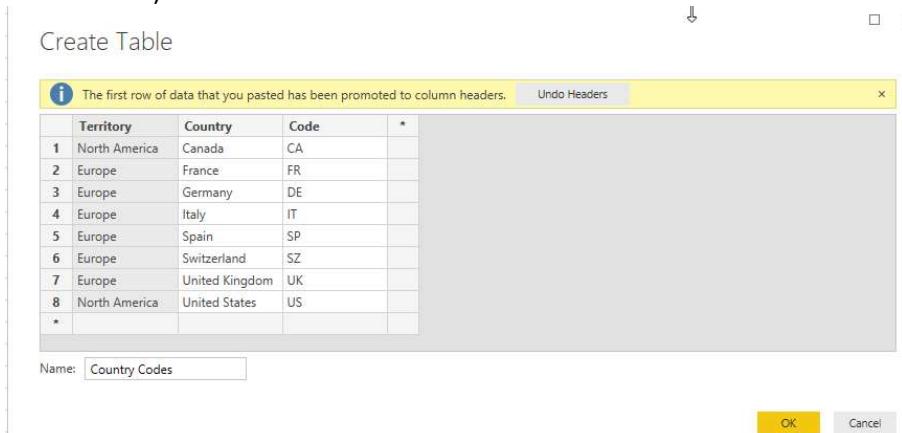
Split Column

21. Right-click the **Rank & Title.2.2** column, click **Rename**, type **Year**, and then press Enter.
22. In the **Query Settings** pane, under **Properties**, in the **Name** box, type **IMDB Top 250 Movies**, and then press Enter.
23. On the **File** menu, click **Close & Apply**.
24. In Power BI Desktop, on the **File** menu, click **Exit**. If prompted to save your changes as **IMDB Top 250 Movies**, and then click **Save**.
36. Save the file report as **Trim-Split-Replace(Finale).pbix**
37. Close Power BI Desktop

## Demo 2: Shaping e Combining dei dati (Append-Merge)

1. In Power BI Desktop, open the **1-AppendMerge-Sales - Europe.xlsx**
2. In Power BI Desktop, Open **1-AppendMerge-Sales - North America.xlsx**,
3. Select **Europe** in the Queries pane.
4. Click **Append Queries**, and combine the North America data with the Europe data.
5. Use the selection menu on the Country column header to check that the data has loaded in.
6. **Disable** North America queries
7. Open the **1-AppendMerge-Country Codes.xlsx**.

8. In Power BI Desktop, click **Enter Data**, and paste in the copied data. (ATTENZIONE USARE IL COMANDO ENTER DATA)!!!



9. Name the table **Country Codes**.  
 10. Select **Europe** in the Queries pane.  
 11. **Merge the Country Codes table with the Europe table.**

Merge

Select a table and matching columns to create a merged ta

Europe

SalesTerritoryCountry	1 SalesTerritoryGroup	2 SalesOrderNur
France	Europe	SO43698
United Kingdom	Europe	SO43708
Germany	Europe	SO43712
United Kingdom	Europe	SO43714
Germany	Europe	SO43720

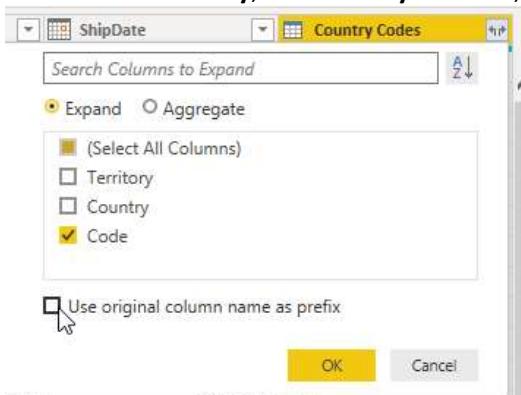
Country Codes

Territory	2 Country	1 Code
North America	Canada	CA
Europe	France	FR
Europe	Germany	DE
Europe	Italy	IT
Europe	Spain	SP

Join Kind

Left Outer (all from first, matching from second)

12. Exclude the **Territory**, and **Country** columns, and clear the **Use original column name as prefix** setting.



13. Move the **Code** column to the beginning of the table.  
 14. Rename the **Code** column as **Country Code**

15. **Disable Country Codes** queries

- Europe
- North America
- Country Codes

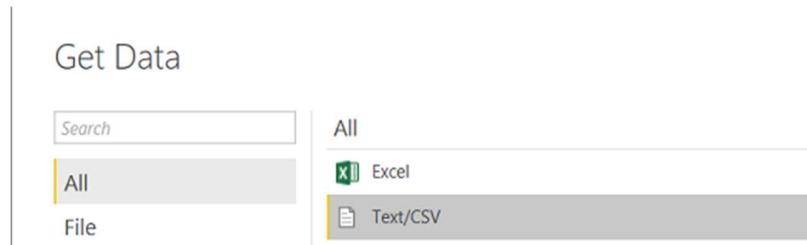
16. Save all into **2-AppendMerge.pbix**

17. Apply the changes.

# Demo Mappe – Bubble

For a complete demo of bubble map, I want to use some airports data collected from *Openflights.org* a free database with airports and airlines data. Click [here](#),

(<https://raw.githubusercontent.com/jpatokal/openflights/master/data/airports.dat>) to download the full dataset with over 12000 rows of data. Download the file in either .dat or .csv format. Alternatively, I prepared a smaller .csv dataset with the 50 world's busiest airports that you can find at the end of the article, accompanied by the .pbix created for the demo. After downloading, open Power BI Desktop and create a new empty report. **Click Get Data -> Text/CSV. (Top\_world\_airports.csv)**



Click Connect and choose the location of your file. Power BI loads the file and shows you a data preview, based on file code page and delimiter.

The screenshot shows the Power BI data preview interface for the 'Top\_world\_airports.csv' file. At the top, there are settings for 'File Origin' (1252: Western European (Windows)), 'Delimiter' (Semicolon), and 'Data Type Detection' (Based on first 200 rows). Below this is a large table with 50 rows of airport data. The columns are: IATA\_FAAC, ICAO, AirportName, AirportCity, AirportCountry, Latitude, Longitude, and Altitude. The table includes data for major airports like YYZ, FRA, MUC, LGW, LHR, AMS, BCN, MAD, CDG, FCO, IST, MEX, DXB, DOH, TPE, NRT, HND, MNL, BOM, and HKG. At the bottom of the preview, there is a note: 'The data in the preview has been truncated due to size limits.' At the very bottom, there are buttons for 'Skip files with errors', 'Load' (highlighted in yellow), 'Edit', and 'Cancel'.

IATA_FAAC	ICAO	AirportName	AirportCity	AirportCountry	Latitude	Longitude	Altitude
YYZ	CYYZ	Lester B Pearson Intl	Toronto	Canada	43,677223	-79,630556	569
FRA	EDDF	Frankfurt Main	Frankfurt	Germany	50,026421	8,543125	364
MUC	EDDM	Franz Josef Strauss	Munich	Germany	48,353783	11,786086	1487
LGW	EGKK	Gatwick	London	United Kingdom	51,148056	-0,190278	202
LHR	EGLL	Heathrow	London	United Kingdom	51,4775	-0,461389	83
AMS	EHAM	Schiphol	Amsterdam	Netherlands	52,308613	4,763889	-11
BCN	LEBL	Barcelona	Barcelona	Spain	41,297078	2,078464	12
MAD	LEMD	Barajas	Madrid	Spain	40,493556	-3,566764	2000
CDG	LFPG	Charles De Gaulle	Paris	France	49,012779	2,55	392
FCO	LIRF	Fiumicino	Rome	Italy	41,804475	12,250797	15
IST	LTBA	Ataturk	Istanbul	Turkey	40,976922	28,814606	163
MEX	MMMX	Licenciado Benito Juarez Intl	Mexico City	Mexico	19,436303	-99,072097	7316
DXB	OMDB	Dubai Intl	Dubai	United Arab Emirates	25,252778	55,364444	62
DOH	OTBD	Doha Intl	Doha	Qatar	25,261125	51,565056	35
TPE	RCTP	Taoyuan Intl	Taipei	Taiwan	25,077731	121,232822	106
NRT	RJAA	Narita Intl	Tokyo	Japan	35,764722	140,386389	141
HND	RTTT	Tokyo Intl	Tokyo	Japan	35,552258	139,779694	35
MNL	RPLL	Ninoy Aquino Intl	Manila	Philippines	14,508647	121,019581	75
BOM	VABB	Chhatrapati Shivaji Intl	Mumbai	India	19,088686	72,867919	37
HKG	VHHH	Hong Kong Intl	Hong Kong	Hong Kong	22,308919	113,914603	28

Choose **Load** if you want to import data into Power BI, **Edit** if you need to do some transformation before using it. For this demo click **Load** and the dataset is imported into Power BI.

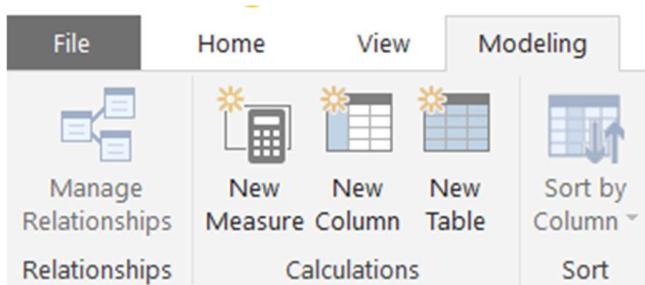
For each airport, the dataset contains geographic coordinates; latitude and longitude. To be sure that Power BI recognizes correctly the data, let's force the data category.

In the dataset, click on the *Latitude* field:

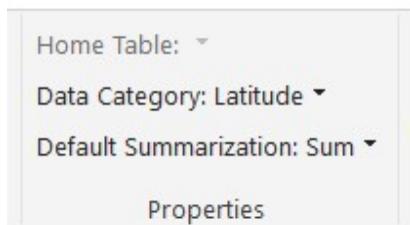
The screenshot shows the 'Top\_world\_airports' dataset in the Fields pane. The fields listed are: AirportCity, AirportCountry, AirportName, Altitude, IATA\_FAAC, ICAO, Latitude, and Longitude. The 'Latitude' field is highlighted with a yellow border.

The  $\Sigma$  symbol beside the field name means that a datatype is a number.

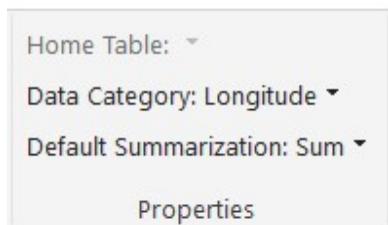
Then click the *Modeling* tab



In the drop-down menu *Data Category*: select *Latitude*:



Repeat the same operation for the *Longitude* field:

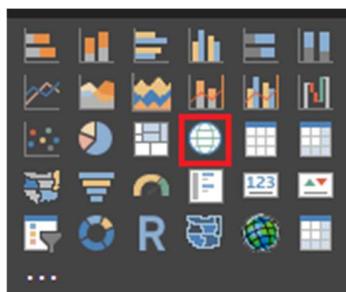


When finished, you should notice the world symbol, next to the fields' name:

Top_world_airports
AirportCity
AirportCountry
AirportName
Σ Altitude
IATA_FAAC
ICAO
Latitude
Longitude

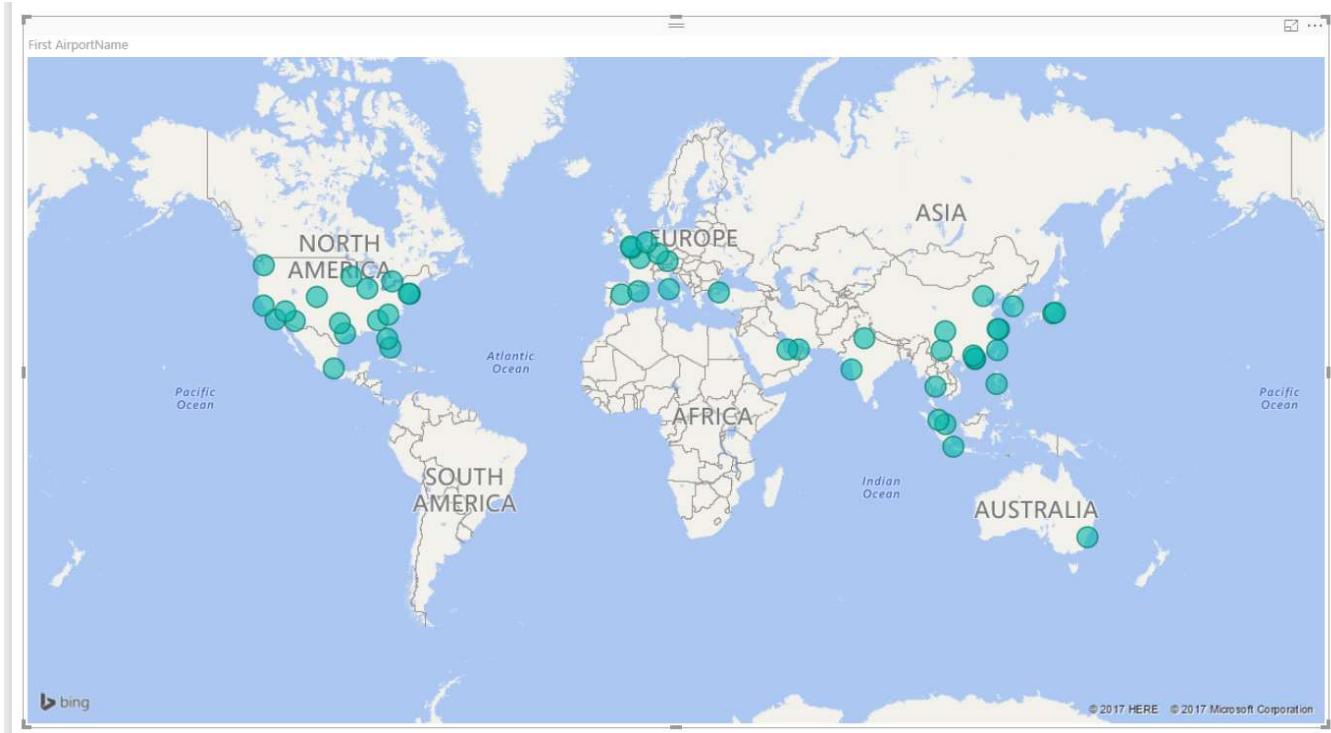
Power BI marked the contents of the fields as geographic values. So we are sure that data format is correctly evaluated by the Bing map.

In the *Visualizations* pane, select the map visual. Enlarge the visual to fit the page size.



Drag and drop *Latitude* and *Longitude* data fields to create bubble map, into the visual's matching fields and you can see the data point plotted on the map.

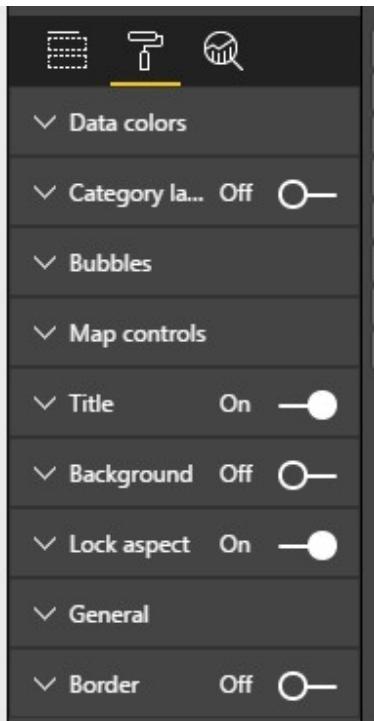
Fields
Search
2014 statistics
2015 statistics
2016 preliminary st...
Top_world_airports
AirportCity
AirportCountry
<input checked="" type="checkbox"/> AirportName
Σ Altitude
IATA_FAAC
ICAO
<input checked="" type="checkbox"/> Latitude
<input checked="" type="checkbox"/> Longitude



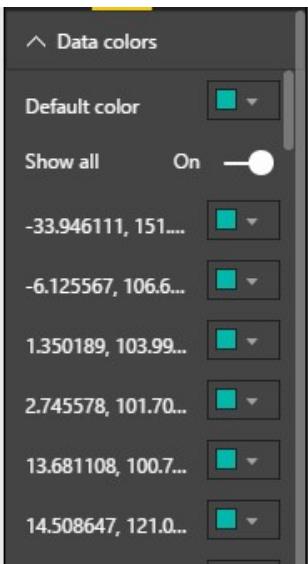
Passing the mouse over the points in the bubble map gives you the coordinates. If you want to have more details, for example, the airport name, add the *AirportName* field to the tooltip or the legend in the visualization toolbox.

The visual behaves like a Bing map. You can zoom in and out or scroll around the world, but you can't change the map type.

There are few settings worth to mention; if you click on the *Format* icon you have the option to set on or off auto zoom.



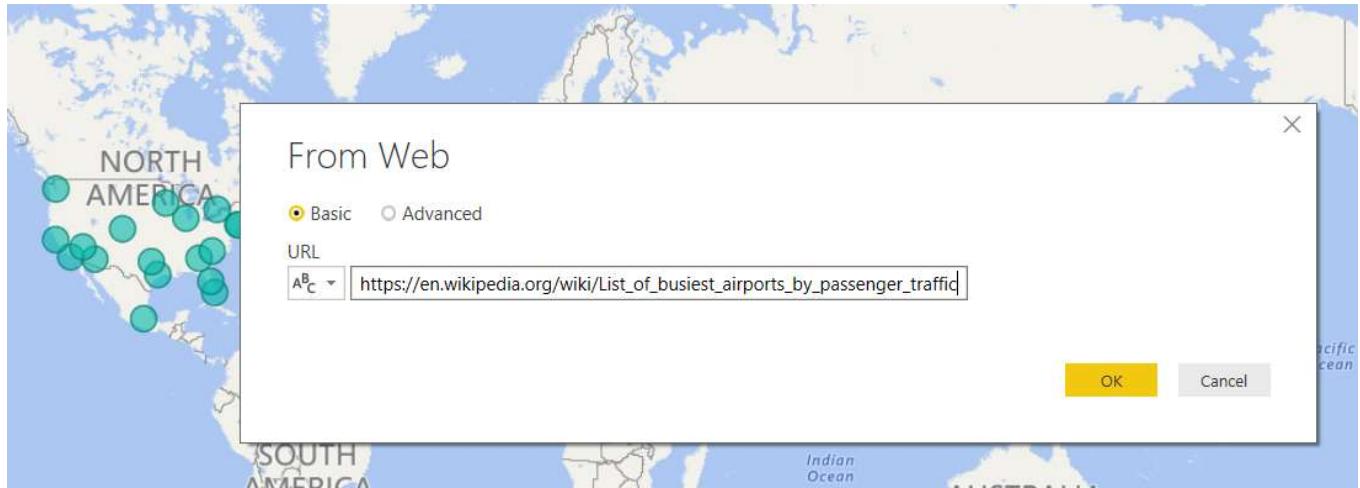
By exploding *Data Colors*, you can set the standard color for every point, or you can decide to assign manually a distinct color for each one.



Our first bubble map was very simple; few points plotted onto the world with the same size and same color.

Now it's time to get more info from our bubble map. Let's say we want to know which is the world's busiest airport and the amount of passenger traffic for each one in our list. Wikipedia provides the info we need.

In the Power BI menu select *Get Data -> Web*. In the pop-up window insert the following URL [https://en.wikipedia.org/wiki/List\\_of\\_busiest\\_airports\\_by\\_passenger\\_traffic](https://en.wikipedia.org/wiki/List_of_busiest_airports_by_passenger_traffic) and press OK. (**passengers traffic statistics 2016.csv**)



In the Navigator panel, select *2016 preliminary statistics* (at the time of writing).

## Navigator

Rank	Airport	Location	Country	Code
1	Hartsfield-Jackson Atlanta International Airport	Atlanta, Georgia	United States	ATL/KATL
2	Beijing Capital International Airport	Chaoyang-Shunyi, Beijing	China	PEK/ZBAA
3	Dubai International Airport	Garhoud, Dubai	United Arab Emirates	DXB/OMDB
4	Los Angeles International Airport	Los Angeles, California	United States	LAX/KLAX
5	Tokyo Haneda Airport	Ōta, Tokyo	Japan	HND/RJTT
6	O'Hare International Airport	Chicago, Illinois	United States	ORD/KORD
7	London Heathrow Airport	Hillingdon, London	United Kingdom	LHR/EGLL
8	Hong Kong International Airport	Chek Lap Kok, Hong Kong	China	HKG/VHHH
9	Shanghai Pudong International Airport	Pudong, Shanghai	China	PVG/ZSPD
10	Paris-Charles de Gaulle Airport	Roissy-en-France, Île-de-France	France	CDG/LFPG
11	Dallas/Fort Worth International Airport	Dallas-Fort Worth, Texas	United States	DFW/KDFW
12	Amsterdam Airport Schiphol	Haarlemmermeer, North Holland	The Netherlands	AMS/EHAM
13	Frankfurt Airport	Frankfurt, Hesse	Germany	FRA/EDDF
14	Istanbul Atatürk Airport	Yeşilköy, Istanbul	Turkey	IST/LTBA
15	Guangzhou Baiyun International Airport	Baiyun-Huadu, Guangzhou, Guangdong	China	CAN/ZGGG
16	John F. Kennedy International Airport	Queens, New York, New York	United States	JFK/KJFK
17	Singapore Changi Airport	Changi	Singapore	SIN/WSSS
18	Denver International Airport	Denver, Colorado	United States	DEN/KDEN
19	Seoul Incheon International Airport	Incheon	Republic of Korea	ICN/RKSI
20	Suvarnabhumi Airport	Bang Phli, Samut Prakan	Thailand	BKK/VTBS
21	Indira Gandhi International Airport	Delhi	India	DEL/VIDP

Power BI shows up a preview of the table with 2016 passengers traffic data. Click *Load* to import data into your model. **To correctly identify each airport, we need three-letter code (the IATA code), but in the Wikipedia table, both IATA and ICAO codes are merged into the same column.**

A	B	C	Code (IA...	D
			ATL/KATL	
			PEK/ZBAA	
			DXB/OMDB	
			LAX/KLAX	
			HND/RJTT	
			ORD/KORD	
			LHR/EGLL	
			HKG/VHHH	
			PVG/ZSPD	
			CDG/LFPG	
			DFW/KDFW	
			AMS/EHAM	
			FRA/EDDF	
			IST/LTBA	
			CAN/ZGGG	
			JFK/KJFK	
			SIN/WSSS	

Click *Edit Queries* to open the Power BI Query Editor then select the Code (IATA/ICAO) column from the dataset. Click *Transform -> Split Column -> By delimiter*. In the dialog window select *Custom* as the delimiter and insert the "/" symbol into the empty field. Leave the selection for "At each occurrence of the delimiter" and click OK.

## Split Column by Delimiter

Specify the delimiter used to split the text column.

Select or enter delimiter

--Custom-- ▼

Split

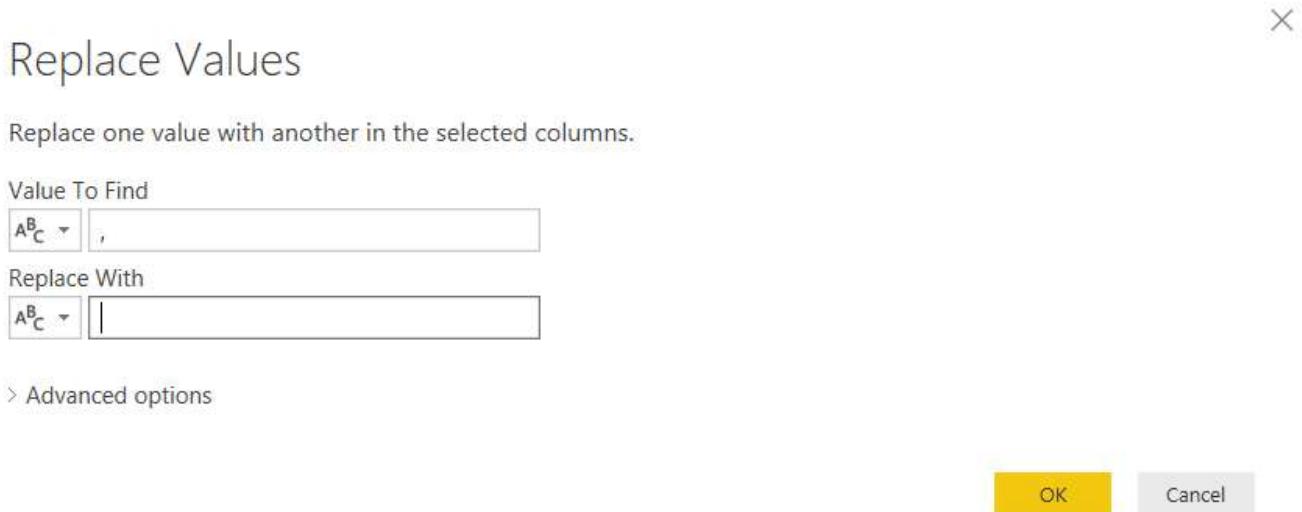
- At the left-most delimiter
- At the right-most delimiter
- At each occurrence of the delimiter

> Advanced options

OK Cancel

Power BI splits the columns by code. Rename both columns by right-clicking on the heading and choosing **Rename ... Call the first column CodeIATA, the second CodeICAO**. If you wish, you can change the name of the table, by clicking in the **Name** field under the **PROPERTIES** window. I called mine "**passengers traffic statistics**".

Depending on your PC settings, you could need another transformation regarding the *Total passenger* field. Numbers from the Wikipedia page are formatted in the English notation, with commas as the thousands separator. But my operating system, for example, is set to Italian and comma is the decimal delimiter. So Power BI treats the field as a text. If you are in the same situation, select the column *Total passengers*, click on the **Transform tab** and choose **Replace values. Replace the comma with an empty space** as shown in the figure and click OK.



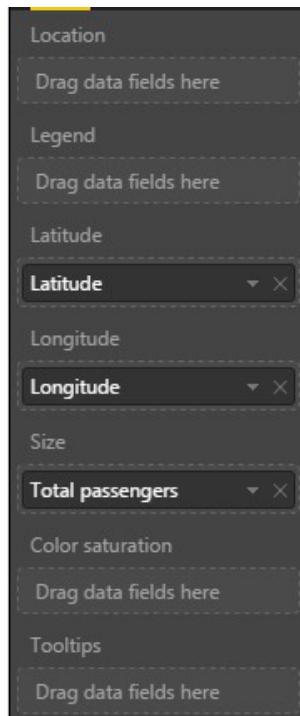
Power BI removes the commas from the data. In order to convert it to a number click on **Data Type- > Whole Number**. The symbol in the column heading switches to a number, meaning that Power BI has changed the data type.



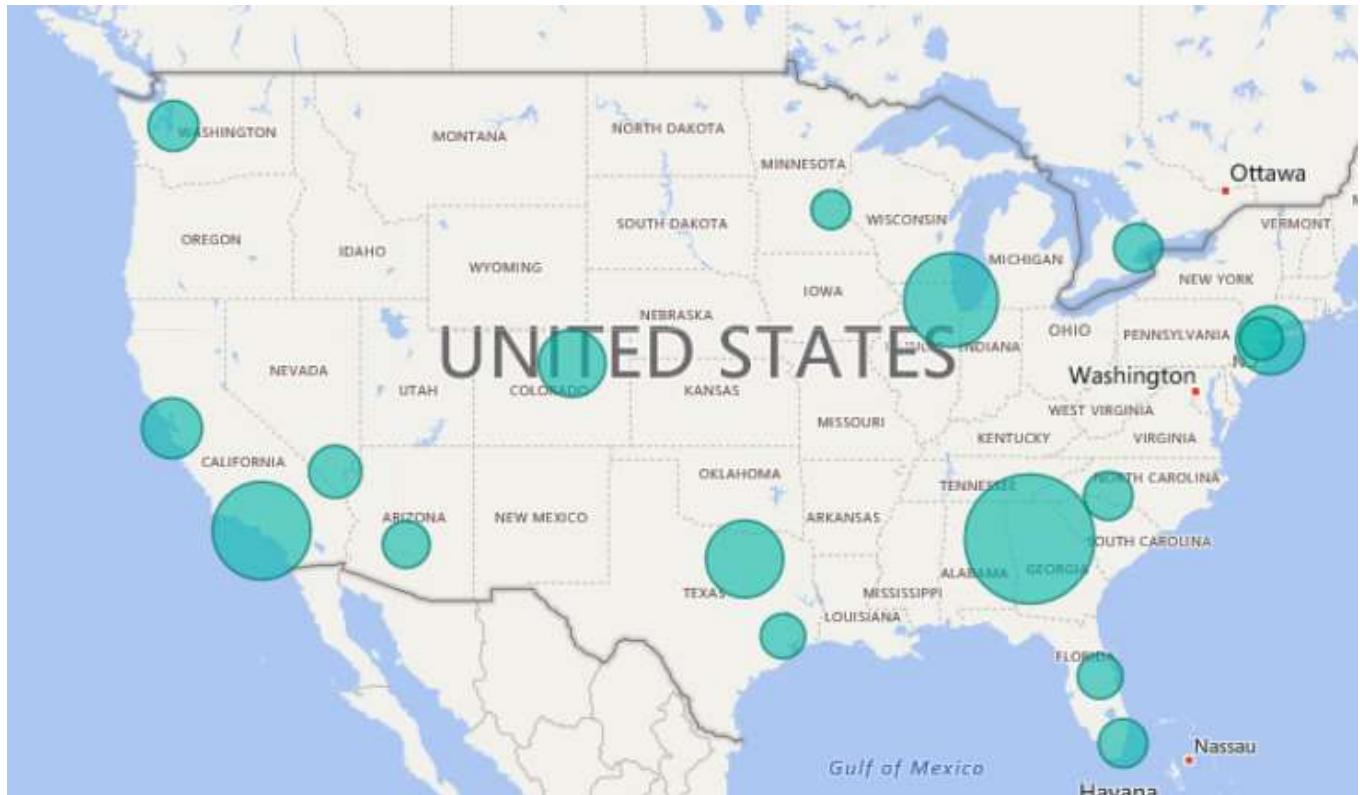
Fare il merge delle due tabelle sul campo *IATA\_FAA* di "**Top\_world\_airports**", e *CodeIATA* di "**passengers traffic statistics**"

Finally, click back to the *Home* tab and select **Close&Apply** to apply changes to your model.

Switch to the report panel, select the bubble map visual, expand the “**passengers traffic statistics**” dataset and drop **Total passengers** to the Size box.



The bubbles size varies according to the number of passengers for each airport, giving an immediate perception of passengers flows in bubble map.

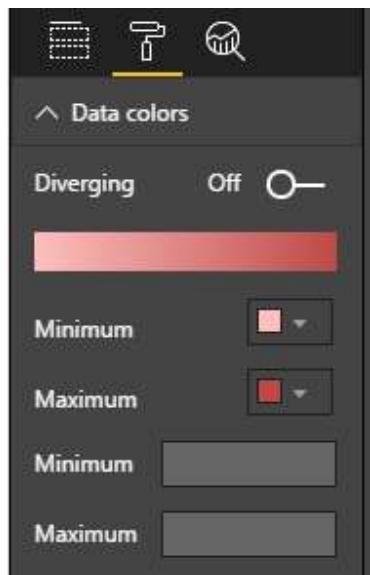


With the same principle you can set up a filling scale, **dragging Total passengers into the Color saturation box in bubble map**. Now the bubbles are filled with a lighter or darker color, based on the passengers number.



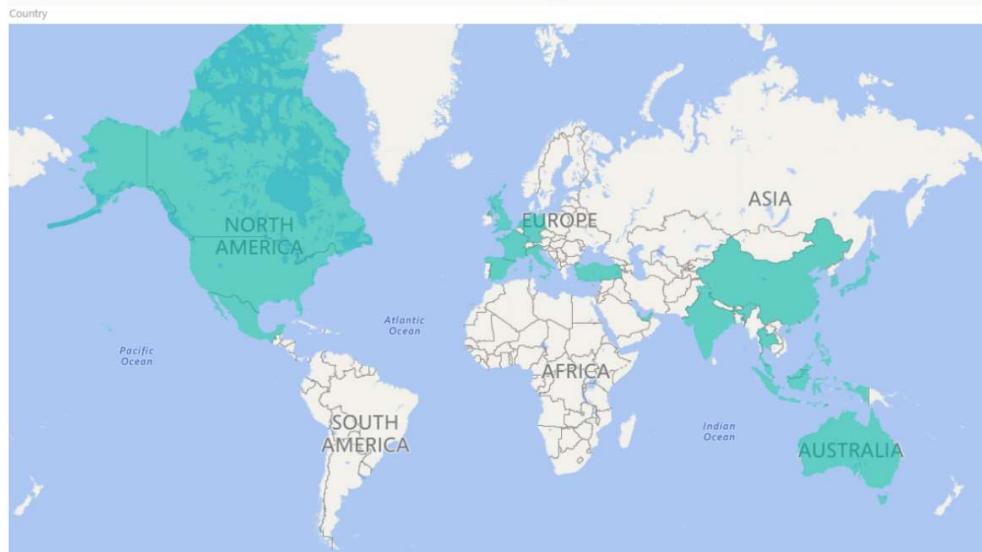
Colors can be customized by selecting the visual's Format icon.

In the Data colors menu of bubble map, you can pick up the minimum and maximum color for your scale.



# Demo Mappe – Filled

Add a new page to your previous Power BI file, by clicking the yellow + symbol at the bottom of the report. Make sure that the field *Country* in the dataset “*passengers traffic statistics*” is selected. Click *Modeling tab -> Data category -> Country*. Power BI marks the country name as geographic spot. Click the *Filled map visual*  to create a new map in your report. Expand the dataset “*passengers traffic statistics*” and add the field *Country* to the Location bucket. Power BI recognizes the countries and displays the filled regions on the map.



Now add **Total passengers to Color saturation**. As in the previous example, you got a color saturation scale. Note that Power BI automatically groups and sums the total number of passengers by country, so you don't have to perform aggregations before plotting data.



As with bubble maps, likewise, you can change colors and few other settings through the Format icon.

# Demo Mappe – Shaped Maps

The shape map visual has been available in Power BI for several months, but it's still in preview (at the time of writing). So, you need to enable it in Power BI Desktop.

Select *File > Options and settings > Options > Preview features* then select the "Shape map visual" check box and click OK. You need to close and restart Power BI Desktop to make the change effective.

## Options

**GLOBAL**

- Data Load
- Query Editor
- DirectQuery
- R scripting
- Security
- Privacy
- Updates
- Usage Data
- Diagnostics
- Preview features**
- Auto recovery

**CURRENT FILE**

- Data Load
- Regional Settings
- Privacy
- Auto recovery

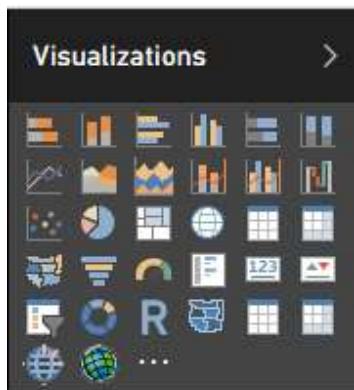
**Preview features**

The following features are available for you to try in this release. Preview features might change or be removed in future releases.

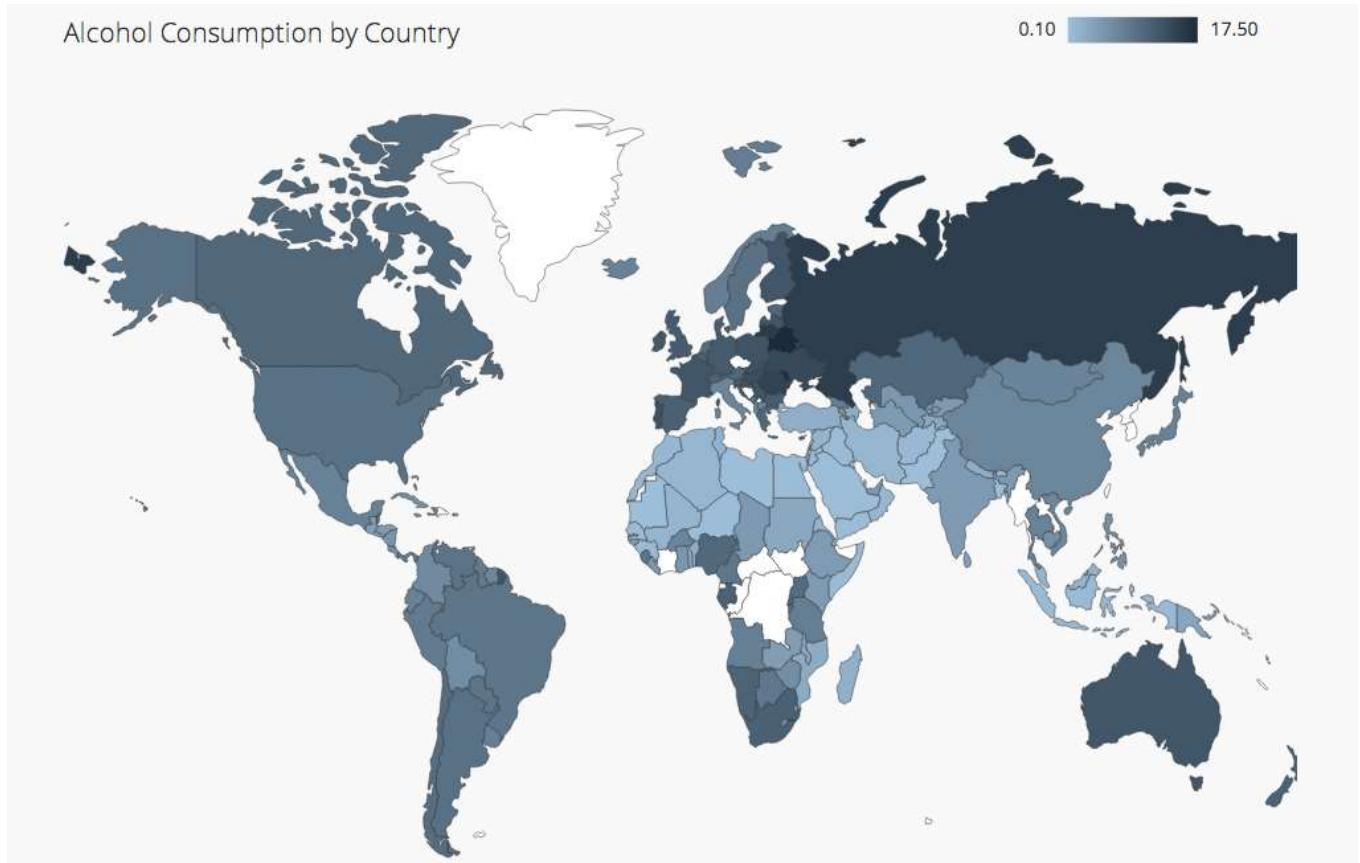
- Impala [Learn more](#)
- Snowflake [Learn more](#)
- Shape map visual [Learn more](#)
- Custom report themes [Learn more](#)
- Enable cross filtering in both directions for DirectQuery [Learn more](#)
- ArcGIS Maps for Power BI [Learn more](#)
- New table and matrix visuals [Learn more](#)
- Numeric range slicer [Learn more](#)
- Spanish language support for Power BI Q&A [Learn more](#)
- Power BI Service Live Connection [Learn more](#)
- Quick measures [Learn more](#)
- Relative date slicer [Learn more](#)

OK Cancel

After restarting, you'll find the visual into the "Visualizations" toolbox.



Shape maps are usually made of filled regions with delimited borders, that are used to compare values in different regions based on a color range. For example, you can show the distribution of the population in the world countries with different shades of the same color, according to the value intensity. This is how a typical shape map looks like:



Shape maps are based on the concept of **shapefile** a storage format developed by **Esri** (Environmental System Research Institute), nowadays universally recognized as standard for storing geospatial information. A shapefile format spatially describes vector features: points, lines, polygons. It is therefore commonly used for representing geographic locations for data and its attributes. Storing together data and attributes allows the representation of geographic data on a map and makes some calculations possible. A shapefile isn't a "single" file but rather is a collection of files stored in the same directory. A shapefile at least must be made of three files each with a common name and different extensions. The mandatory files are:

- .shp (the proper) shapefile;
- .shx shape index format;
- .dbf a table description for each shape.

Other common (optional) files are:

- .prj projection format;
- .sbn, .sbx spatial index;
- .ain, .aix attribute index of the active fields in a table;
- .shp.xml geospatial metadata in xml format;

But in Power BI you can't use directly shapefiles as the visual supports only **TopoJSON** files. TopoJSON format comes from **GeoJSON** the most common open standard format designed for representing geographical features, based on JavaScript Object Notation.

TopoJSON inherits GeoJSON features and includes geospatial topology. Also, TopoJSON files are typically much smaller, up to 80% of the original size.

TopoJSON files are not very common. You can create your own file, converting from other formats (shapefile, geojson, ecc.), using, for instance, an online tool such as **MapShaper** ([mapshaper.org](http://mapshaper.org)). I'll explain how-to-do later when talking about custom maps.

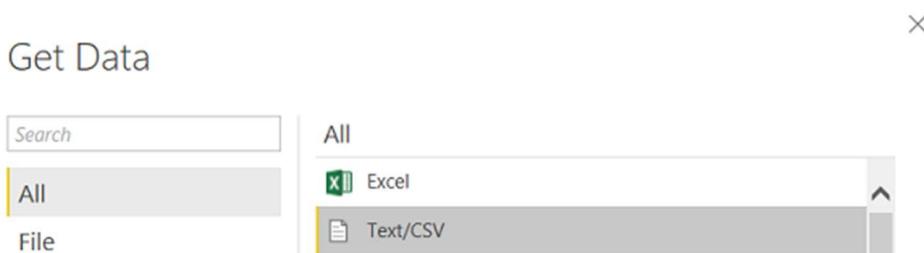
The shape map visual allows two different uses:

1. **Default built-in maps**
2. **Custom maps**

## Default built-in maps

First of all, we need a dataset. You can download an example from the bottom of the page. It is called **ItalianRegions.csv** and contains few quantitative data for the 20 Italian administrative regions (population, surface, a number of provinces inside the regions, a number of municipalities).

After downloading the dataset open a new empty report in Power BI Desktop. Select the menu *Get Data* and then *Text/CSV*.



Click *Connect* and pick up the downloaded file. Power BI loads the .csv and shows you a data preview.



ItalianRegions.csv

File Origin      Delimiter      Data Type Detection

1252: Western European (Windows)      Semicolon      Based on first 200 rows

Code	Region	Population	Surface km2	Number municipalities	Number province
IT-72	Campania	5850850	13670,95	550	5
IT-25	Lombardia	10008349	23863,65	1524	12
IT-62	Lazio	5888472	17232,29	378	5
IT-42	Liguria	1571053	5416,21	235	4
IT-34	Veneto	4915123	18407,42	576	7
IT-75	Puglia	4077166	19540,9	258	6
IT-45	Emilia-Romagna	4448146	22452,78	333	9
IT-82	Sicilia	5074261	25832,39	390	9
IT-21	Piemonte	4404246	25387,07	1201	8
IT-57	Marche	1543752	9401,38	229	5
IT-52	Toscana	3744398	22987,04	276	10
IT-36	Friuli Venezia Giulia	1221218	7862,3	216	4
IT-78	Calabria	1970521	15221,9	409	5
IT-65	Abruzzo	1326513	10831,84	305	4
IT-55	Umbria	891181	8464,33	92	2
IT-32	Trentino-Alto Adige	1059114	13605,5	293	2
IT-67	Molise	312027	4460,65	136	2
IT-88	Sardegna	1658138	24100,02	377	8
IT-77	Basilicata	573694	10073,32	131	2
IT-23	Valle d'Aosta	127329	3260,9	74	1

Load      Edit      Cancel

For this first demo we don't need to do some transformations. Simply click *Load* and the dataset is imported into Power BI. In the left tool bar select the *Data* icon.



Power BI Desktop opens the dataset. Take a look at the first column; it contains the code for every region. This value is the key for matching your data with the shape map definition as we'll see shortly.

Code	Region	Population	Surface km2	Number municipalities	Number province
IT-72	Campania	5850850	13670,95	550	5
IT-25	Lombardia	10008349	23863,65	1524	12
IT-62	Lazio	5888472	17232,29	378	5
IT-42	Liguria	1571053	5416,21	235	4
IT-34	Veneto	4915123	18407,42	576	7
IT-75	Puglia	4077166	19540,9	258	6
IT-45	Emilia-Romagna	4448146	22452,78	333	9
IT-82	Sicilia	5074261	25832,39	390	9
IT-21	Piemonte	4404246	25387,07	1201	8
IT-57	Marche	1543752	9401,38	229	5
IT-52	Toscana	3744398	22987,04	276	10
IT-36	Friuli Venezia Giulia	1221218	7862,3	216	4
IT-78	Calabria	1970521	15221,9	409	5
IT-65	Abruzzo	1326513	10831,84	305	4
IT-55	Umbria	891181	8464,33	92	2
IT-32	Trentino-Alto Adige	1059114	13605,5	293	2
IT-67	Molise	312027	4460,65	136	2
IT-88	Sardegna	1658138	24100,02	377	8
IT-77	Basilicata	573694	10073,32	131	2
IT-23	Valle d'Aosta	127329	3260,9	74	1

Once loaded the dataset we can create our maps. Select the Shape map visual from the *Visualization tools*.

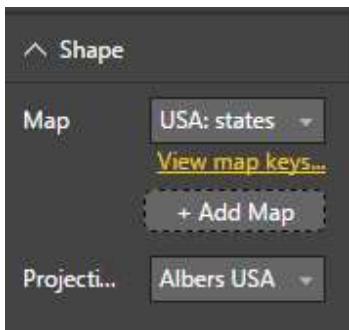


Power BI shows an empty object on the report. Move the *Code* field into the *Location* bucket and *Population* into *Color saturation*. Now a grey map of United States shows up.



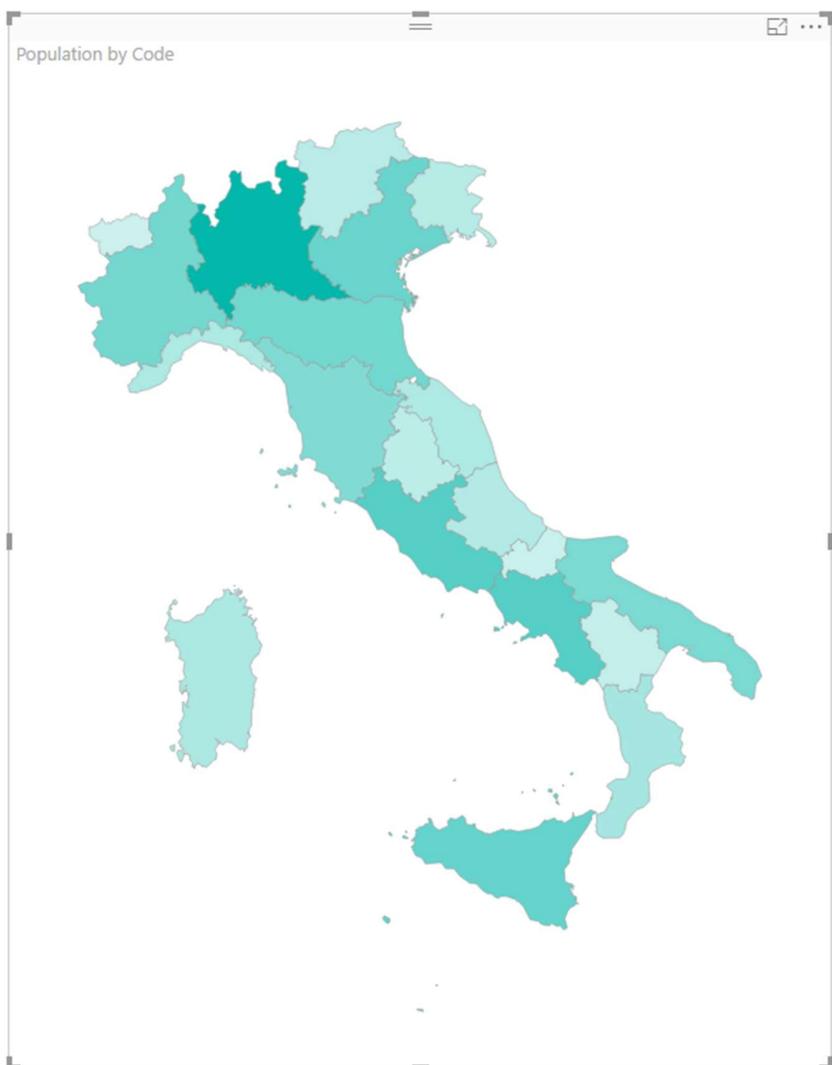
This isn't what we expected. To get the desired map click the *Format* icon for the selected visual.

A new menu is available. Click to enlarge the *Shape* item.



Power BI prompts as default the USA states map. Click the down arrow and look at the other options available. These are built-map to use in our reports.

Select *Italy: regions* and notice that the visual on the reports immediately gets colored according to population values.



Why has this happened? Because we've correctly defined the match between the map and the dataset. To understand what I mean, click on *View map keys...*

A new window opens to display the key codes for this map. These are the inside values used by the shapefile as a key for geographical attributes of data. If you scroll laterally you can see all the existing fields.

The screenshot shows a modal dialog box titled "Map keys". Inside the dialog is a table with columns "id", "iso", "name", and "name". The table lists 14 regions of Italy, each with a unique ID, ISO code, name, and a color-coded name. The colors correspond to the regions: Veneto (light red), Valle d'Aosta (light blue), Umbria (light green), Trentino-Alto Adige (light orange), Toscana (light purple), Sicilia (light pink), Sardegna (light yellow), Piemonte (light teal), Molise (light grey), Marche (light brown), Lombardia (light peach), and Liguria (light lime). A "Close" button is at the bottom right of the dialog.

id	iso	name	name
it-vn	IT-34	Veneto	Ver
it-vd	IT-23	Valle d'Aosta	Ao
it-um	IT-55	Umbria	Um
it-tt	IT-32	Trentino-Alto Adige	Tre
it-tc	IT-52	Toscana	Tus
it-sc	IT-82	Sicilia	Sici
it-sd	IT-88	Sardegna	Sar
it-pm	IT-21	Piemonte	Pie
it-ml	IT-67	Molise	Mo
it-mh	IT-57	Marche	Ma
it-lm	IT-25	Lombardia	Lor
it-lg	IT-42	Liguria	Ligi

At least one of the fields of your dataset must match to one key values field. In my case I preferred to use the ISO coding for Italian regions, to stick to standard values.

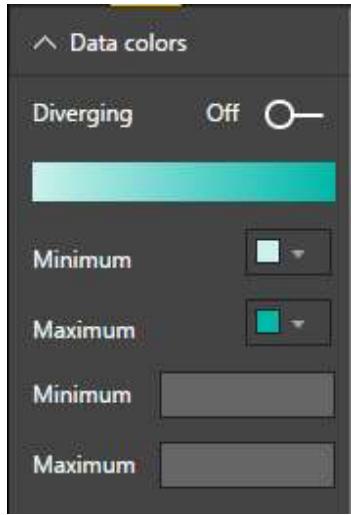
This means that before building a dataset, you must know which are the keys defined in the shape map in order to correctly join your data to the shapefile's definition.

If the shape map doesn't find any match, the filled regions remain empty.

In case you're wondering how to get values, in the article "[Shape Maps in Power BI Desktop \(Preview\)](#)" are reported all the key codes for built-in shape maps in Power BI.

Now that we have drawn a shape map, let's explore some of the helpful options in the visual.

The "Data colors" menu allows changing the default colors; it's possible to set the colors for the visualization range, by picking up one of the theme colors or creating a new one at your choice.



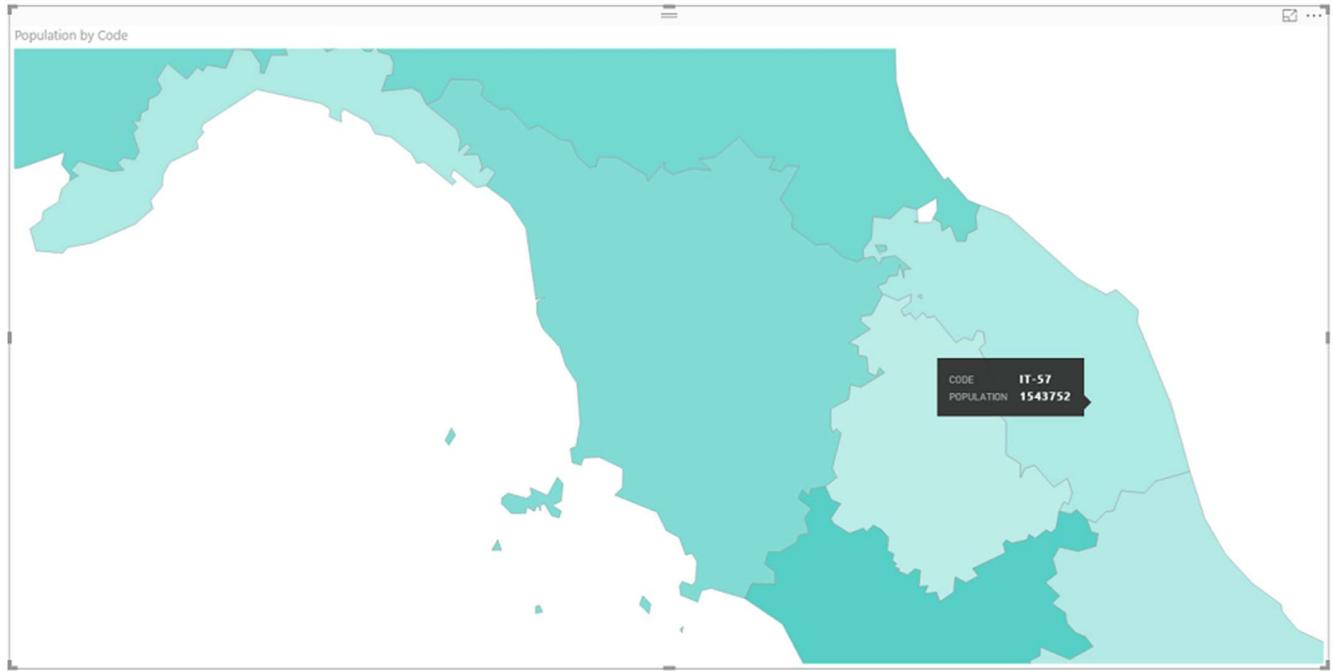
There are three types of projection available: 1) *Equirectangular* 2) *Mercator* 3) Orthographic.



None of these is the "right" projection. It depends on your needs, the extension of your map and the data you want to represent. Please refer to the articles linked in the Reference section, for more details.

Usually, a "Mercator" projection is a good compromise for showing flat data on the Earth's curved surface.

Expand the "Zoom" area. I'll explain the behavior of the three filters by practical example. For now, switch *Selection Zoom* to *On*. Go back to the map and select any one of the regions. The zoom changes according to your selection.



Switch the *Selection Zoom* to *Off* and the map returns to natural size.

If you want to add legend, swap to the *Field* icon:



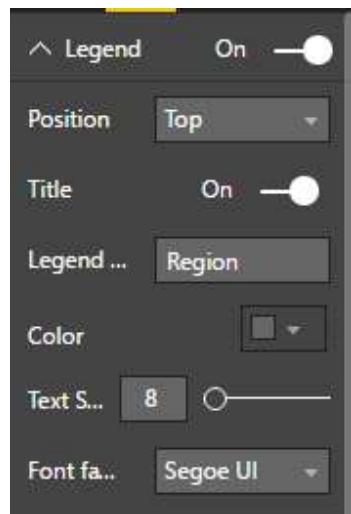
drag the *Region* field from the dataset and copy it into the *Legend* bucket.

Population by Code and Region

Region Abruzzo Basilicata Calabria Campania Emilia-Rom... Friuli Venezia... Lazio Liguria Lombardia Marche Molise Piemonte Puglia Sardegna ►



The legend appears as a row in the upper side of the visual. To change its settings, go to the *Format* icon and you find the new *Legend* menu, where you can set up *Position*, *Title*, *Color*, *Text Font*.

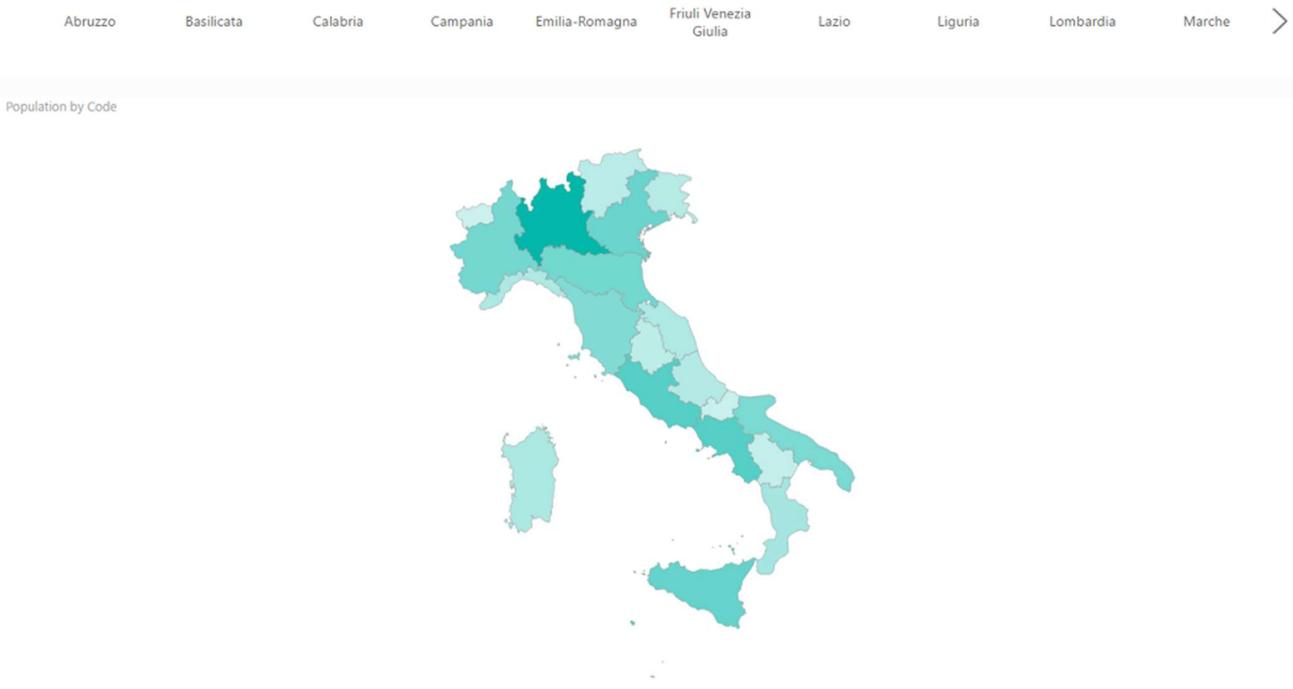


Bear in mind that the visual is full interactive that is data changes according to selections or filter you put in your report. For example, try to add a slicer and see what happens.

From the visual menu drag a slicer into your report then add *Region* to the Field bucket. I draw my slicer horizontally for the width of the page, over the map.

Keep sure the slicer is selected and select *Format > General > Orientation > Horizontal*.

The outcome should look like the picture below.



Now select the map visual, swap to *Format > Default Color > Color* and choose a light grey or whatever color you prefer. This is the color of the areas where there is no match to the dataset, i.e. the areas with no data.

Back to the report and select one region of your choice. The highlighted regions show up, while the others get the background color. Try to select another one or more regions (using CTRL) to have evidence of the interactivity between the visuals in the report.

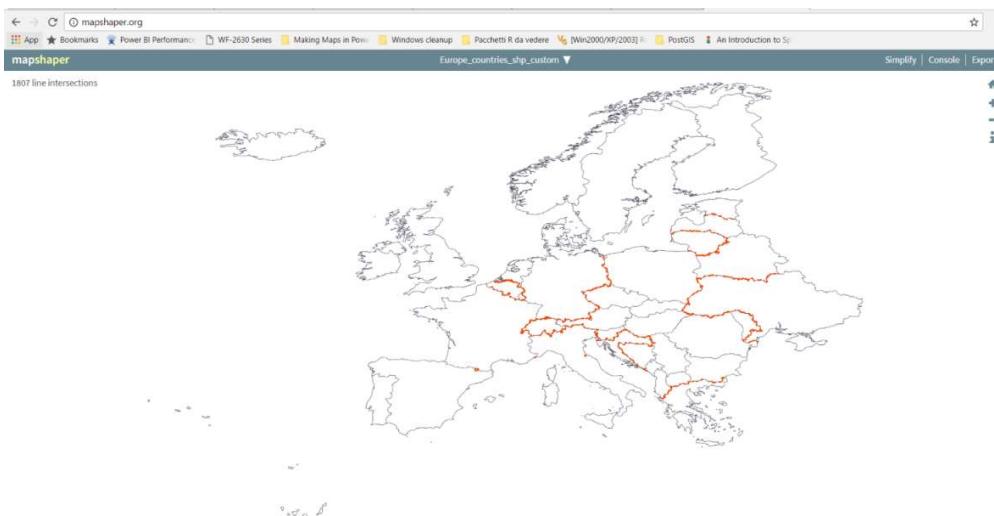


# Demo Mappe – Custom Shaped Maps

In order to use custom shape maps the same rule as built-in applies: there must be a matching field between data and maps attributes. It means that you must know the data definition under the hood of your maps or at least you must be capable of opening and reading a shape map's data table. To demonstrate custom shape maps let's say we want to display the number of airport passengers in Europe, ranked by country. First thing we need a shape map. You can download a sample from the bottom of the page; a .zip file called ***Europe\_countries\_shp\_custom.zip***. Unzip the archive and use Excel (or another spreadsheet) to open the file ***Europe\_countries\_shp\_custom.dbf***. It is the table file for the shape that encodes all data description.

ISO2	ISO3	UN	NAME
AL	ALB	8	Albania
BA	BIH	70	Bosnia and Herzegovina
BG	BGR	100	Bulgaria
DK	DNK	208	Denmark
IE	IRL	372	Ireland
EE	EST	233	Estonia
AT	AUT	40	Austria
CZ	CZE	203	Czech Republic
FI	FIN	246	Finland
FR	FRA	250	France
DE	DEU	276	Germany
GR	GRC	300	Greece
HR	HRV	191	Croatia
HU	HUN	348	Hungary
IS	ISL	352	Iceland
IT	ITA	380	Italy
LV	LVA	428	Latvia
BY	BLR	112	Belarus
LT	LTU	440	Lithuania
SK	SVK	703	Slovakia

Columns ISO2 and ISO3 are the most interesting as they contain the ISO code for every country. Rather than the country name, we must take care that in our dataset there's a field with the same ISO code. The .zip archive holds the shapefile definition, but we need a TopoJSON file for using in Power BI. Open a browser and go to [www.mapshaper.org](http://www.mapshaper.org) an online converter. Click on the word *select* in the page box and pick up the .zip shapefile you want to convert, then click *Import*. Remember: the whole .zip archive not only the .shp file. Mapshaper imports the file and shows you a preview.



Click *Export* and choose the *TopoJSON* format. Save the *.json* file on your hard disk. A good reference for where to find out shape maps, is [Christopher Finlan's blog](#). He created some geographic maps to use for Mobile Report Publisher. But they can apply to Power BI as well, once converted to TopoJSON. Alternatively, there are some TopoJSON map already formatted from [David Eldersveld](#). He started creating and collecting some maps for the community. You can download them from his [GitHub repository](#). Ok, up to this point we've got a map: now we need some data and we collect them from Wikipedia.

First step, the list of top 100 busiest airports in Europe. Open Power BI then select *Get Data > Web*. In the window insert the following URL: [List of the busiest airports in Europe](#) In the preview window select *2016 statistics (provisional) [edit]* and then click *Load* to import the table in Power BI.

Rank	Country	Airport
1	United Kingdom	Heathrow Airport
2	France	Charles de Gaulle Air
3	Netherlands	Amsterdam Airport S
4	Germany	Frankfurt Airport
5	Turkey	Istanbul Ataturk Airp
6	Spain	Adolfo Suárez Madrid
7	Spain	Barcelona El Prat Air
8	United Kingdom	London-Gatwick Airp
9	Germany	Munich Airport
10	Italy	Leonardo da Vinci-Fi
11	Russia	Sheremetyevo Intern
12	France	Paris-Orly Airport
13	Turkey	Sabiha Gökçen Airpo
14	Denmark	Copenhagen Airport
15	Russia	Domodedovo Interna
16	Ireland	Dublin Airport
17	Switzerland	Zürich Airport
18	Spain	Palma de Mallorca A
19	Norway	Oslo Airport, Garder
20	United Kingdom	Manchester Airport
21	Sweden	Stockholm-Arlanda A

The dataset must be edited before using it; click *Edit Queries* and do some changes.

Maybe you want to modify the name; I called mine *2016 statistics*. On the left side of the page right-click the dataset and choose *Rename*.

The fields *Passengers 2015* and *Passengers 2016* are imported as text, but we want them as number, because we are going to do some calculations. Open the dataset. In the upper menu click *Transform > Replace Values*.

In *Value To Find* write a comma (,) and leave blank *Replace With*. Click *OK*.

## Replace Values

X

Replace one value with another in the selected columns.

Value To Find

Replace With

> Advanced options

OK

Cancel

Repeat the operation for both fields *Passengers 2015* and *2016*. After that, modify the data type. Go to *Data Type* and select *Whole Number*. Repeat for both fields.

Select the whole column *Rank change 2015-16*, right-click > *Remove*.

Then we must perform some data cleansing. Scroll the dataset up to row 67, Mulhouse. The country is tripled, but the correct one is France. Highlight the cell.

67	France Switzerland Germany	EuroAirport Basel-Mulhouse-Freiburg	Basel / Mulhouse / Freiburg i...	7061059	7314269	3.6%
----	----------------------------------	-------------------------------------	----------------------------------	---------	---------	------

*Transform > Replace Values* and replace the string

"France#(cr)#(lf)#(lf)Switzerland#(cr)#(lf)#(lf)Germany" simply with "France".

There's another wrong value in the country from row 86.

86	Ukraine/Russia	Simferopol International Airport
----	----------------	----------------------------------

Ukraine/Russia must be converted in Ukraine with *Replace Values*. Once you've completed the transformations *Home > Close and Apply*, then save the Power BI file. Now we are ready to import the second dataset we need: the ISO Country mapping list. Select *Get Data > Web* and insert the following URL:  
[https://en.wikipedia.org/wiki/ISO\\_3166-1](https://en.wikipedia.org/wiki/ISO_3166-1)

In the preview window select the table *Officially assigned code elements [edit]* and click *Load*.

## Navigator

The screenshot shows the Navigator application interface. On the left, there's a sidebar with a search bar and 'Display Options' dropdown. Below that is a tree view of datasets under 'https://en.wikipedia.org/wiki/ISO\_3166-1 [7]'. The 'Officially assigned code elements[edit]' node is selected and highlighted with a yellow background. To the right, a preview window titled 'Officially assigned code elements[edit]' displays a table with columns: English short name (upper/lower case), Alpha-2 code, Alpha-3 code, and Numeric code. The table lists various countries with their corresponding codes. At the bottom of the preview window are navigation arrows and buttons labeled 'Load' (yellow), 'Edit', and 'Cancel'.

English short name (upper/lower case)	Alpha-2 code	Alpha-3 code	Numeric code
Afghanistan	AF	AFG	
Åland Islands	AX	ALA	
Albania	AL	ALB	
Algeria	DZ	DZA	
American Samoa	AS	ASM	
Andorra	AD	AND	
Angola	AO	AGO	
Anguilla	AI	AIA	
Antarctica	AQ	ATA	
Antigua and Barbuda	AG	ATG	
Argentina	AR	ARG	
Armenia	AM	ARM	
Aruba	AW	ABW	
Australia	AU	AUS	
Austria	AT	AUT	
Azerbaijan	AZ	AZE	
Bahamas	BS	BHS	
Bahrain	BH	BHR	
Bangladesh	BD	BGD	
Barbados	BB	BRB	
Belarus	BY	BLR	

This table needs some modifications, too. Click *Edit Queries*.

As you can see, the dataset contains a country name and country ISO code. The key codes are Alpha2 and Alpha3 ISO standard definition of 2 or 3 characters for a country. If you wish, change the name of the dataset: I turned mine into *CountryCodeISO*. Select the whole column *Link to ISO 3166-2 subdivision codes* right-click > *Remove*. Do the same for column *Independent*. Select the column *English short name (upper/lower case)* right-click > *Rename ...* and change the name into *Country*. There are some countries names that don't match to other datasets; we need to modify them.

Make sure you selected the *Country* column; then from the menu bar *Transform > Replace Values > Value To Find*: "United Kingdom of Great Britain and Northern Ireland" / *Replace With*: "United Kingdom".

Same pattern for "Russian Federation" > to replace with "Russia" and for "Czechia" > to replace with "Czech Republic".

Now the *CountryCodeISO* dataset is ready and can be bind to the *2016 statistics*. Menu *Home > Merge Queries > Merge Queries as new*

Merge two datasets as shown in the picture below: *2016 statistics CountryCodeISO* bound by country. Choose *Inner Join* as kind of join.

X

## Merge

Select tables and matching columns to create a merged table.

2016 statistics							
Rank 2016	Country	Airport	City served	Passengers 2015	Passengers 2016	Change	
1	United Kingdom	Heathrow Airport	London	74985475	75711130	1.0%	
2	France	Charles de Gaulle Airport	Paris	65766986	65933145	0.3%	
3	Netherlands	Amsterdam Airport Schiphol	Amsterdam	58284848	63625664	9.2%	
4	Germany	Frankfurt Airport	Frankfurt	61032022	60786937	0.4%	
5	Turkey	Istanbul Atatürk Airport	Istanbul	61322729	60119215	2.0%	

CountryCodeISO			
Country	Alpha-2 code	Alpha-3 code	Numeric code
Afghanistan	AF	AFG	4
Åland Islands	AX	ALA	248
Albania	AL	ALB	8
Algeria	DZ	DZA	12
American Samoa	AS	ASM	16

Join Kind

Inner (only matching rows)

✓ The selection has matched 100 out of the first 100 rows.

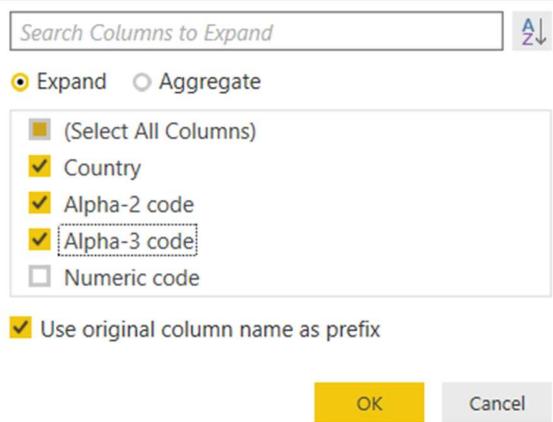
OK

Cancel

In this way we get a new dataset; call it *EU\_2016\_passengers\_stats*. If you scroll the dataset to the right you can notice a new column called generically *table*.

NewColumn	418
Table	

Click on the double-arrow icon to expand the table and you can see the list of the new columns added from the joined dataset. Select the columns you want to keep and click OK.



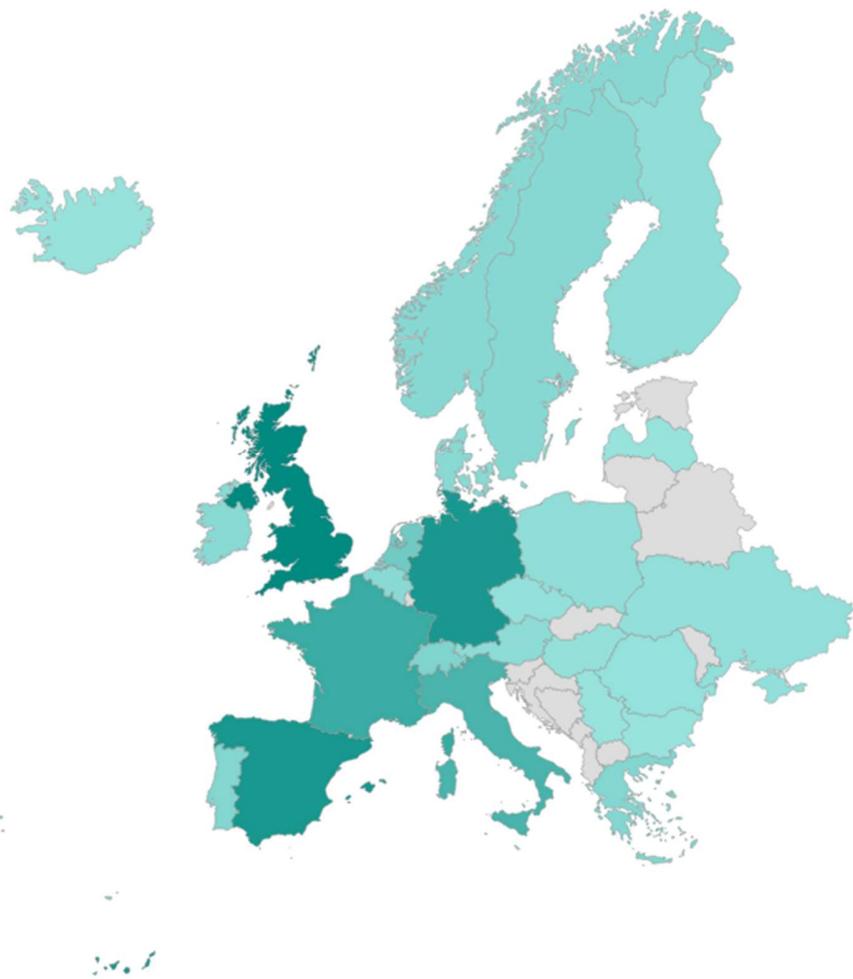
The lately fields have a *NewColumn.* prefix in their names. Cut off the prefix by renaming the two columns for Alpha code:

*NewColumn.Alpha-2 code* > *Alpha-2 code*.

*NewColumn.Alpha-3 code* > *Alpha-3 code*.

When finished *Home* > *Close & Apply* and save the file.

After long preparation, we are ready to create a custom shape map. Go to the report visualization drag and drop the Shape map visual onto the page. From the dataset *EU\_2016\_passengers\_stats* put the field *Alpha-3 code* into the *Location* box and the *Passenger2016* field into *Color saturation*. Swap to the format menu *Shape* > *Map* > + *Add Map*. In the dialog window select the TopoJSON EU file we've created before and press Open. The map shows up on the screen with different color saturation per country, according to the total number of passengers.



Stay on the visual's format menu; under Map select *View map keys ...* A pop-up window opens showing the key values for our TopoJSON map.

As I already mentioned, at least one of these keys must have a corresponding value in the dataset. In my example, the matching field is the three-letters country code. The countries where there isn't any correspondence are in light-grey. It can depend on:

- a) there aren't rows for that value in the dataset;
- b) there's no match among the country code and the dataset.

You should be aware of this potential issue and prepare accurately your datasets.

X

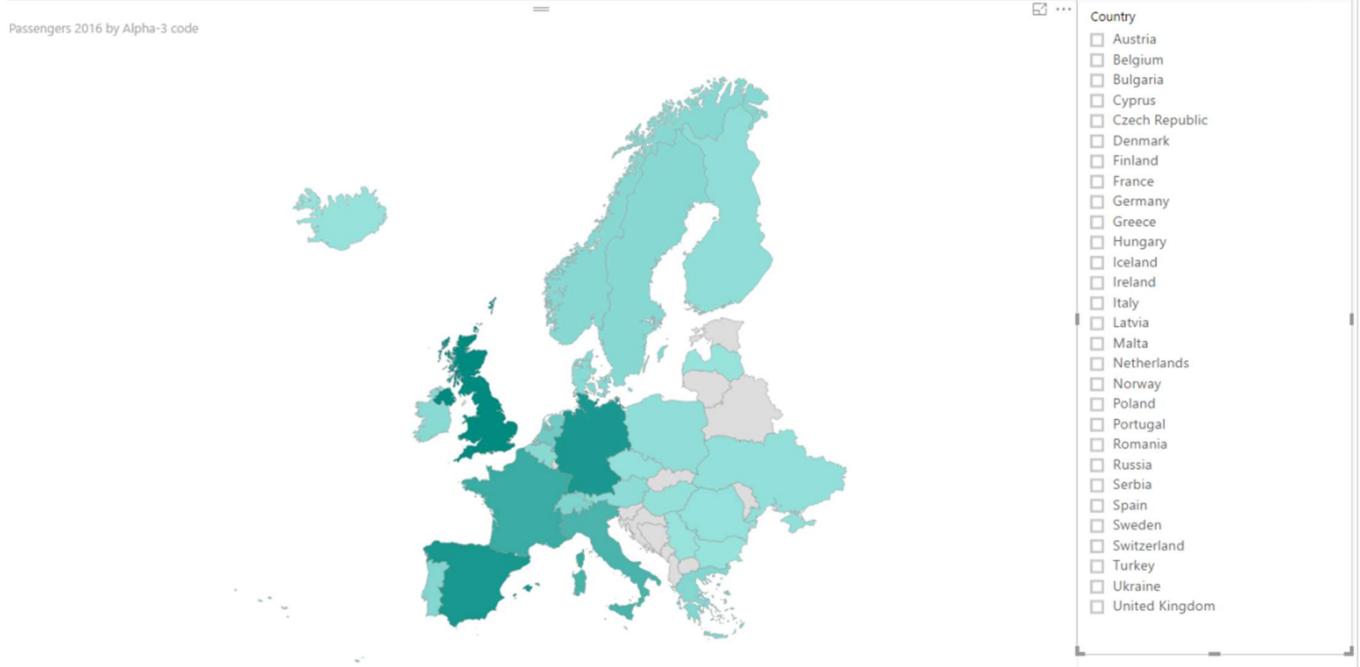
## Map keys

ISO2	ISO3	LAT	LON	NAME
AL	ALB	41.143	20.068	Albania
BA	BIH	44.169	17.786	Bosnia and Herzegovina
BG	BGR	42.761	25.231	Bulgaria
DK	DNK	56.058	9.264	Denmark
IE	IRL	53.177	-8.152	Ireland
EE	EST	58.674	25.793	Estonia
AT	AUT	47.683	14.912	Austria
CZ	CZE	49.743	15.338	Czech Republic
FI	FIN	64.504	26.272	Finland
FR	FRA	46.565	2.55	France
DE	DEU	51.11	9.851	Germany
GR	GRC	39.666	21.766	Greece

[Close](#)

If you want to change the appearance for non-matching countries, expand the *Default Color* menu in the *Format* section for the visual. Switch *Show On* or *Off* to display or not the non-matching countries. *Color* sets the background color and *Border Color* and *Border* define the settings for the countries border line.

Remember that the map is fully interactive; it reacts to the selection made in the other visuals of the report. Create a slicer and put in the *Field* box the *Country* from the dataset *EU\_2016\_passengers\_stats*. Your report should look like this:



Try to select one or more country (by pressing CTRL when selecting a country) and notice how the map adapts based on the selection you made.

As for the built-in maps if you switch *On* the option *Zoom > Selection zoom*, the focus moves on the selected country.





Now you know how to create and import a custom shape map. What If you want to add more customizations? There are some features that aren't available in Power BI, but you can get what you want by some workarounds. For complex layouts, you should use an external software for shape file manipulation, such as ArcGIS Desktop or QGIS.

Let's have a simple example of what I mean. Say you want to add a legend with color ranges and countries grouped by passenger number intervals. It isn't a feature available in Power BI, but there's a way to get the result. You can create a new column in the dataset, with a series of nested IF to evaluate for every value in which interval it falls.

First of all, we need to group the original dataset by countries. For every country, we must have a single row with the total number of passengers in 2016. So let's create a new dataset based on the previous one.

Click *Home* > *Edit Queries* > *Edit Queries*.

Right-click on dataset *EU\_2016\_passenger\_stats* > *Duplicate*. Rename the new dataset: *EU\_2016\_pass\_grp*.

Go to *Transform* > *Group By* > *Advanced*. In the Group By Window set the following options:

*Group By* > *Alpha-3 Code* then *Add grouping* > *Country*. *New column name* > *TotPass2016ByCountry*. *Operation* > *Sum*. *Column* > *Passengers 2016*.

## Group By

Basic  Advanced

Specify the columns to group by and one or more outputs.

Group by

Alpha-3 code

Country

Add grouping

New column name

TotPass2016ByCountry

Operation

Sum

Column

Passengers 2016

Add aggregation

OK

Cancel

Click to *Home* > *Close & Apply*. Save your file.

Switch to Data tab. Select the dataset *EU\_2016\_pass\_grp* then *Modeling* > *New Column*.

In the formula bar insert the following function:

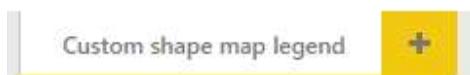
```
Range = IF(EU_2016_pass_grp[TotPass2016ByCountry] < 10000000;"a) < 10 millions";IF(AND(EU_2016_pass_grp[TotPass2016ByCountry] >= 10000000;EU_2016_pass_grp[TotPass2016ByCountry] < 50000000);"b) between 10 and 50 million";IF(AND(EU_2016_pass_grp[TotPass2016ByCountry] >= 50000000;EU_2016_pass_grp[TotPass2016ByCountry] <100000000);"c) between 50 and 100 millions";IF(AND(EU_2016_pass_grp[TotPass2016ByCountry] >= 100000000;EU_2016_pass_grp[TotPass2016ByCountry] <= 200000000);"d) between 100 and 200 millions";"e) > 200 millions")))
```

```
Range = IF(EU_2016_pass_grp[TotPass2016ByCountry] < 10000000;"a) < 10 millions";IF(AND(EU_2016_pass_grp[TotPass2016ByCountry] >= 10000000;EU_2016_pass_grp[TotPass2016ByCountry] < 50000000);"b) between 10 and 50 millions";IF(AND(EU_2016_pass_grp[TotPass2016ByCountry] >= 50000000;EU_2016_pass_grp[TotPass2016ByCountry] <100000000);"c) between 50 and 100 millions";IF(AND(EU_2016_pass_grp[TotPass2016ByCountry] >= 100000000;EU_2016_pass_grp[TotPass2016ByCountry] <= 200000000);"d) between 100 and 200 millions";"e) > 200 millions")))
```

Review the dataset. For every row, you've a calculated interval in the *Range* column.

Country	TotPass2016ByCountry	Range	Alpha-3 code
France	153581480	d) between 100 and 200 millions	FRA
Germany	203646582	e) > 200 millions	DEU
Denmark	29043287	b) between 10 and 50 millions	DNK
Austria	23352016	b) between 10 and 50 millions	AUT
Belgium	29122138	b) between 10 and 50 millions	BEL
Greece	37389987	b) between 10 and 50 millions	GRC
Finland	17184681	b) between 10 and 50 millions	FIN
Bulgaria	4980387	a) < 10 millions	BGR
Czech Republic	13074517	b) between 10 and 50 millions	CZE
Hungary	11441999	b) between 10 and 50 millions	HUN
Cyprus	6637692	a) < 10 millions	CYP
Iceland	6821358	a) < 10 millions	ISL
Ireland	27907384	b) between 10 and 50 millions	IRL
Italy	129713953	d) between 100 and 200 millions	ITA
Latvia	5400243	a) < 10 millions	LVA
Malta	5080071	a) < 10 millions	MLT
Netherlands	68361869	c) between 50 and 100 millions	NLD
Norway	31736751	b) between 10 and 50 millions	NOR
Poland	17819205	b) between 10 and 50 millions	POL
Portugal	39458280	b) between 10 and 50 millions	PRT
Romania	10982967	b) between 10 and 50 millions	ROU
Russia	94616389	c) between 50 and 100 millions	RUS
Serbia	4924992	a) < 10 millions	SRB
Spain	207201486	e) > 200 millions	ESP
Sweden	31051862	b) between 10 and 50 millions	SWE
Switzerland	44199118	b) between 10 and 50 millions	CHE
Turkey	139101207	d) between 100 and 200 millions	TUR
Ukraine	13851690	b) between 10 and 50 millions	UKR
United Kingdom	243753443	e) > 200 millions	GBR

Back to the report visualization. Add a new report page to your PBI file. I called mine *Custom shape map legend*.



Create a new shape map. In the *Location* box put the field *Alpha-3 code*. In the *Legend* box drag and drop *Range*.

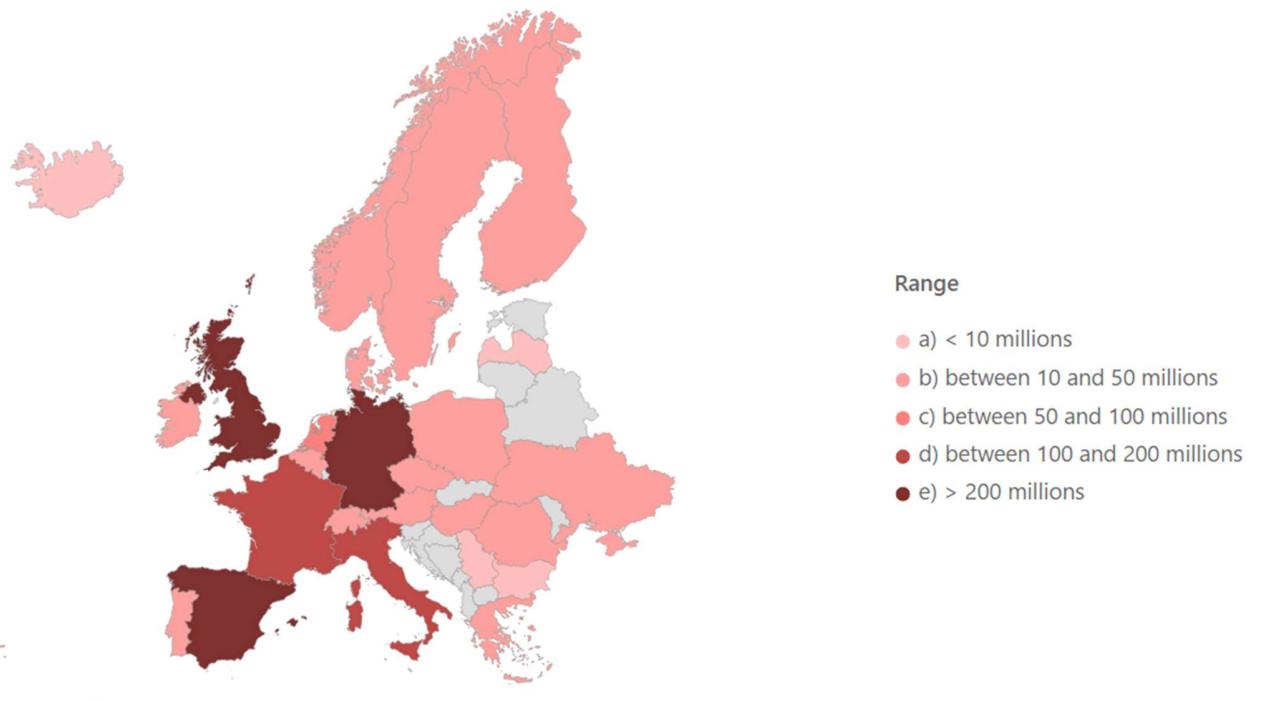
Move to Format menu for the visual. Expand *Shape* > *Add map* and select again the custom TopoJSON file *Europe\_countries\_shp\_custom.json*

Expand *Legend* and set the position you prefer, for example *Center Right*. You can switch title on or off.

Expand *Data Colors* and select a custom color for every interval in the range. By default, Power BI plots colors which are not correlated, but probably you want to set different shades of the same color.

Once you've done back to *Fields* menu for the visual and add *TotPass2016ByCountry* to the *Color Saturation* box.

The final outcome should look like this:



Now you've drawn a custom shape map with a custom legend. If you pass the mouse over a country, you can notice a tooltip with code, value, and range.

The map keeps its interactivity. Try to add a slicer and select one or more countries. Remark that the legend changes according to your selection.



## Different formats for shape files

When I introduced shape files, I mentioned that they are vectors. It means that basically they are made of lines and points. Although a shape file is usually used for showing filled areas, you could draw lines, points, etc. for describing geographic attributes for relevant hotspots.

Just to give you an example, I prepared a different kind of shape file to import into Power BI; the map of main European cities represented as points. The file EuropeanCities.json is available as a download at the end of the article.

Open a new report page. I called mine *Custom shape map points*.



Add a new shape map. The dataset to refer to is *EU\_2016\_passengers\_stats*. In the *Location* box drag and drop the field *City served*. Optionally, you can add the field *Passenger 2016* to the *Color saturation* box. Go to *Format > Shape > Add map* and select the map you've downloaded before: EuropeanCities.json. If you prefer, change the default color for the points.

The new map should look like this one:

City served



Maybe you can recognize the silhouette of Europe through its main cities. The colored spots are those with a correspondence among the dataset and the map keys; for the gray ones either we don't have data or the keys don't match. Try to move the mouse over the point to show up tooltips displaying data.

If you want to know which are the value keys used on the map, click on *View map keys*, to open the pop-up windows with keys. The cities names in your dataset must be equal to the column *NAME* in the map, in order to show some data.

X

## Map keys

CAPITAL	COUNTRY	NAME
N	Poland	Gdansk
N	Germany	Hamburg
Y	Ireland	Dublin
N	Germany	Bremen
Y	Germany	Berlin
Y	Poland	Warsaw
N	Poland	Lodz
N	Germany	Dortmund
N	Germany	Duisburg
N	Germany	Essen
N	Germany	Leipzig
N	Belgium	Antwerpen

Close

Expand *Zoom* and set *Manual zoom* to *On*; you realize that you can move the shape map with the mouse or you can zoom in or out by turning the mouse wheel.

This is just a simple example of a different shape map type you can display in Power BI.

I bet you are wondering whether you can overlay two or more layers in a single shape map. Let's say we would like to bind together the European countries boundaries map with the point cities map.

Well, the answer is no. At least not in Power BI. You might use a GIS tool such as QGIS or ArcGIS Desktop to add layers into a map project, merge as a single object and then export it as shape file to be converted in TopoJSON format before using it in Power BI.

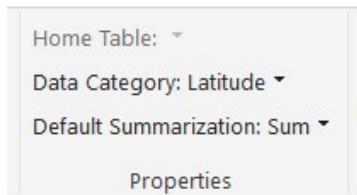
# What is a GIS?

Un GIS (Geographical Information System) è uno strumento informatico che analizza, memorizza, manipola e visualizza le informazioni geografiche su una mappa. Lo scopo principale del GIS è mostrare la correlazione tra i dati spaziali, analizzare le informazioni spaziali, interrogare i dati geografici e mostrare i risultati sotto forma di report, mappe, tabelle o qualsiasi altro output adatto a te. L'analisi GIS può essere utilizzata in vari campi di attività in quanto è abbastanza potente e flessibile da soddisfare molte esigenze in diverse discipline. Solo per citare alcuni esempi: affari, trasporti pubblici e privati, istruzione, valutazione dei rischi naturali, salute pubblica, ottimizzazione delle risorse ...

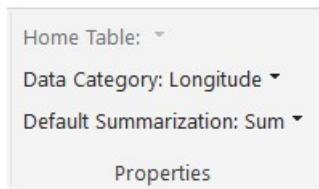
To start with demo, as usual we need some data. Download the same .csv dataset with 50 world's busiest airports we used in the first article. You can find at the end of the article.

Once downloaded, start Power BI open a new report and **click Get Data > Text/CSV**. Select the location for the dataset and then in the dialog click **Load** to import it. Partiamo dal modello dati della **Demo di Bubble Maps**

Select the field *Latitude* then in the menu bar click *Modeling > Data Category > Latitude*



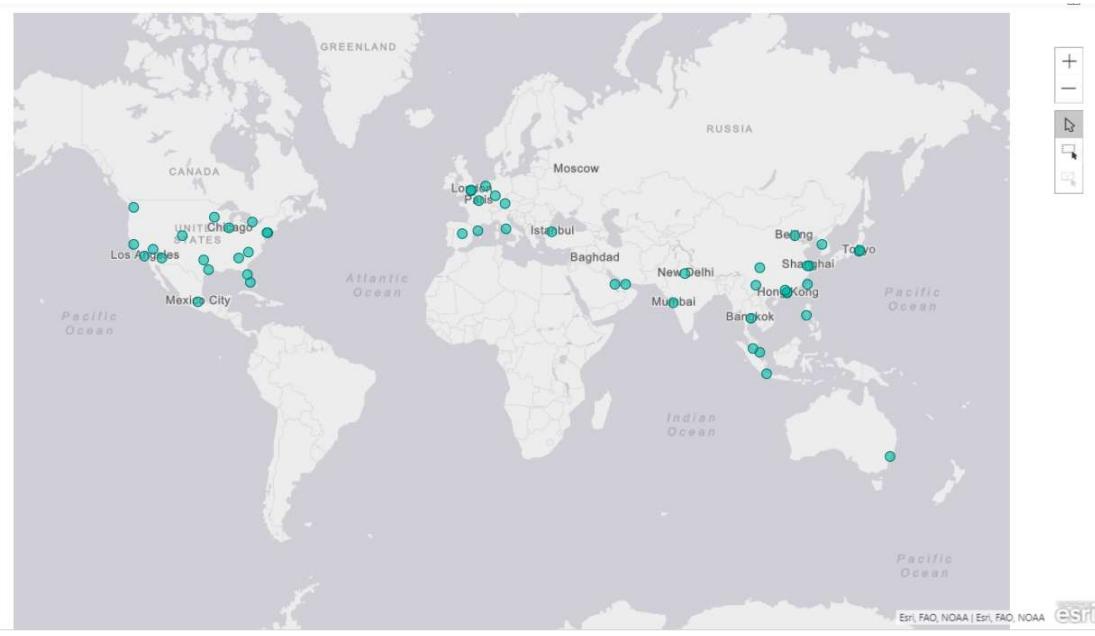
Repeat the same steps for the field *Longitude*.



Notice the globe sign beside the fields' name.



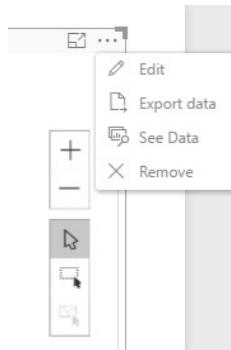
Now that we have some data, let's see the visual in action. Click on the ArcGIS map icon  and a blank object appears onto the canvas. Drag and drop *Latitude* and *Longitude* from "Top\_world\_airports" into the respective boxes; a simple world maps shows up where the points represent the airports location.



If you don't have the coordinates, you can insert your data into the *Location* box, as it is a relevant geographic attribute that ArcGIS is capable of geocoding (a country, a city, a zip code, etc.). As mentioned before, my advice is to try to always use the pair Latitude/Longitude. If they aren't available, be sure that your values are correctly categorized in Power BI. Bear in mind that this map is powered by Esri and is therefore totally different from Bing's map. It offers much more features and capabilities that we're going to explore. If you want to have evidence of the relative amount of traffic for each airport, drop the *Total passengers* value into the *Size* box. Every bubble gets a different size according to the value, as we've seen for bubble maps visual. But there's much more. For instance, you can visually cluster the data by category. Drag the *Country* field and drop it into the *Color* bucket. The bubbles color changes for every country making it easy to identify each of them at a glance.



The default basemap is based on a light grey canvas, but there are other backgrounds available. Select the visual, click the ellipse (...) on the upper right side and select *Edit*



This command opens the map's editor where you can set up many settings for customization or spatial analysis.

Click on **Basemap** and you can choose among four different canvas: Dark Grey, Light Grey, OpenStreetMap, Streets



Dark Gray Canvas



Light Gray Canvas



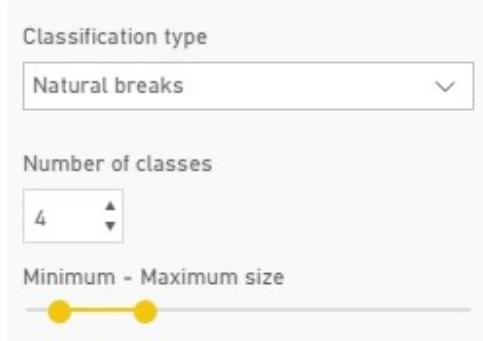
OpenStreetMap



**Map theme**  option sets the way the “bubbles” are represented on the map:

- *Location only* -> Small points on the same size and color
- *Heat map* -> color gradient showing the relative density of points on a map, ranging from cold colors (low density) to hot (high density). Especially useful when the points are close together or overlapping.
- *Size* -> points of the same color and different size according to the measure, in our example *Total passengers*.
- *Color* -> points of the same size and different color according to the category, in our example *Country*.
- *Size & Color* -> points of different sizes and colors according to measure and category, as we set up in the example
- *Clustering* -> another visualization mode when points are very close and it's hard to distinguish the exact location. Points are grouped together into a circle which shows the number of occurrences in the area.

The *Symbol style* menu lets customize the look of the map markers: dimension, shape, transparency, etc. It is worth spending a word about *Classification type*, i.e. the way ArcGIS creates clusters from your data.



You can choose the classification type, the number of classes in which every measure falls, and the relative dimension for your bubbles by setting up graphically the minimum and maximum size.

**Pins**  menu allows to add some interactivity to our map and to perform some sort of spatial analysis.

Let's say you're a sports enthusiast and you want to go London to visit some “sports temples”: Wembley for football, Twickenham for rugby and Wimbledon for tennis.

As you know, London is served by many airports. Which one is best located with respect to your destinations? Here's where ArcGIS can help you.

First of all, let's place the airports on a map. I prepared a small dataset with London airports name and coordinates. You can download it from the bottom of the article. Import the dataset in Power BI as usual as *Text/CSV*. Then, select the *Latitude* field got to *Modeling > Data Category > Latitude*. Do the same for *Longitude*.

Now plot the points on the map. Click on the ArcGIS visual and an empty rectangle shows up on the canvas. Drag and drop *Latitude* and *Longitude* from the dataset to their respective boxes and you'll have the airports on the map. Add *Airport* to *Location*, just for having the airport's name as well.

But the points are too small; we want to make them bigger. Click *Edit* and in the map's menu select *Symbol style*. set the *Symbol size* to 30px. The next step is to add the relevant points on the map, in order to have a visual

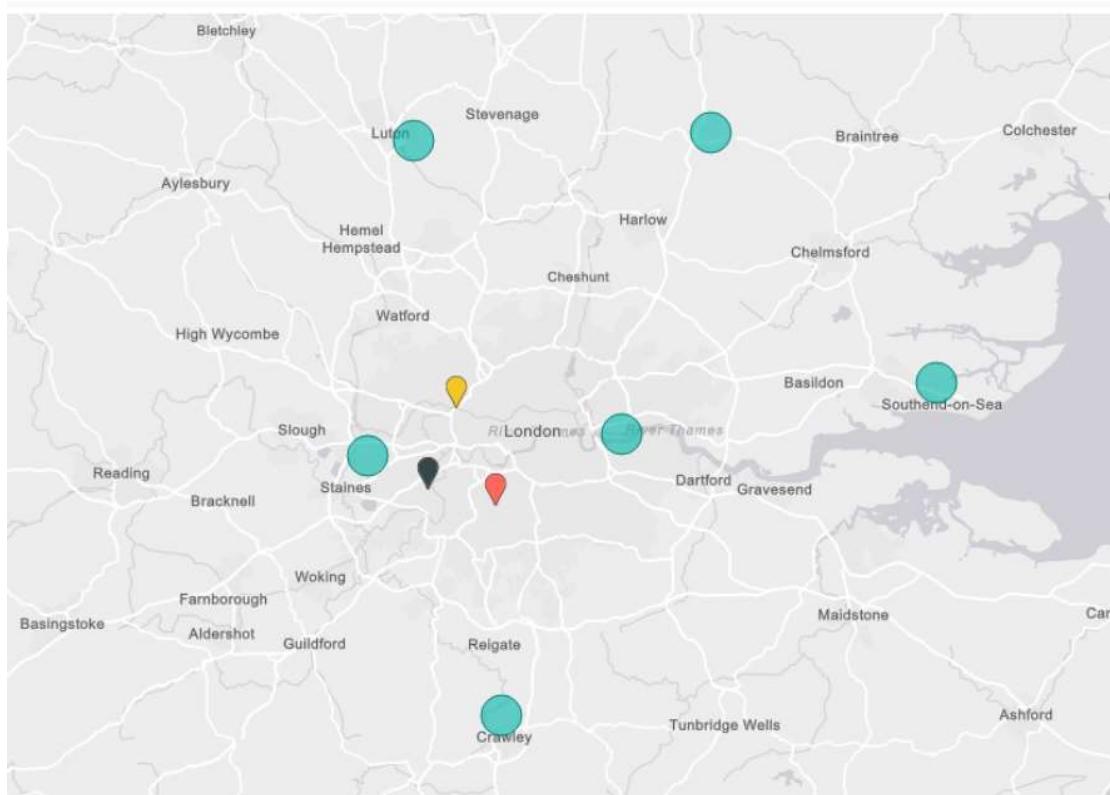
comparison. In the map's menu select *Pins*. With this feature you can find some POI (points of interest) and place them as markers on the map.

In the box *Search for locations*  start typing the first POI: Wimbledon.

Write Wimbledon and the combo suggests you some results: the right one is "Wimbledon Park Tennis Court, Home Park Road, London, England, SW19 7, GBR". Select it from the dropdown and you'll see a red marker placed on the map. Do the same search for

- Twickenham Rugby Ground, Rugby Road, Twickenham Middlesex, England, TW1 1 GBR
- Wembley Stadium, Olympic Way, Wembley, Middlesex, England, HA9 0, GBR

The final outcome is a map with three markers showing the position of our destinations compared to airports. Turns out that the closest airport to all sites is Heathrow, which should be our first choice when planning the trip.



With the **Drive time**  menu item you can create a search area for features that are either drive-time or distance areas from a selected POI.

To continue with the previous example, after visiting sporting spots, you are tired and thirsty. What's better than visiting a brewery to get some rest and taste a good craft beer?

The file LondonBrewery.txt lists some breweries in London and surroundings. How many of them fall within a driving distance of 30 minutes or a radius of 3 km?

Let's start getting some data. Import the file LondonBrewery.txt as Txt/CSV. Note that the file has a custom pipe symbol as delimiter. While importing select *Edit*, we have to make some changes. Power BI opens the file in the Query Editor. In the *Home* ribbon select *Use First Rows as Headers*. The file is made of four columns: *companynname*, *address*, *city* and *Country*. In order to pass geographical location to ArcGIS, we need to gather all infos in one single column. Click *Add Column > Custom Column*. In the dialog Add Custom Colom rename the column as *FullAddress*. In the *Custom column formula* box enter the following formula:

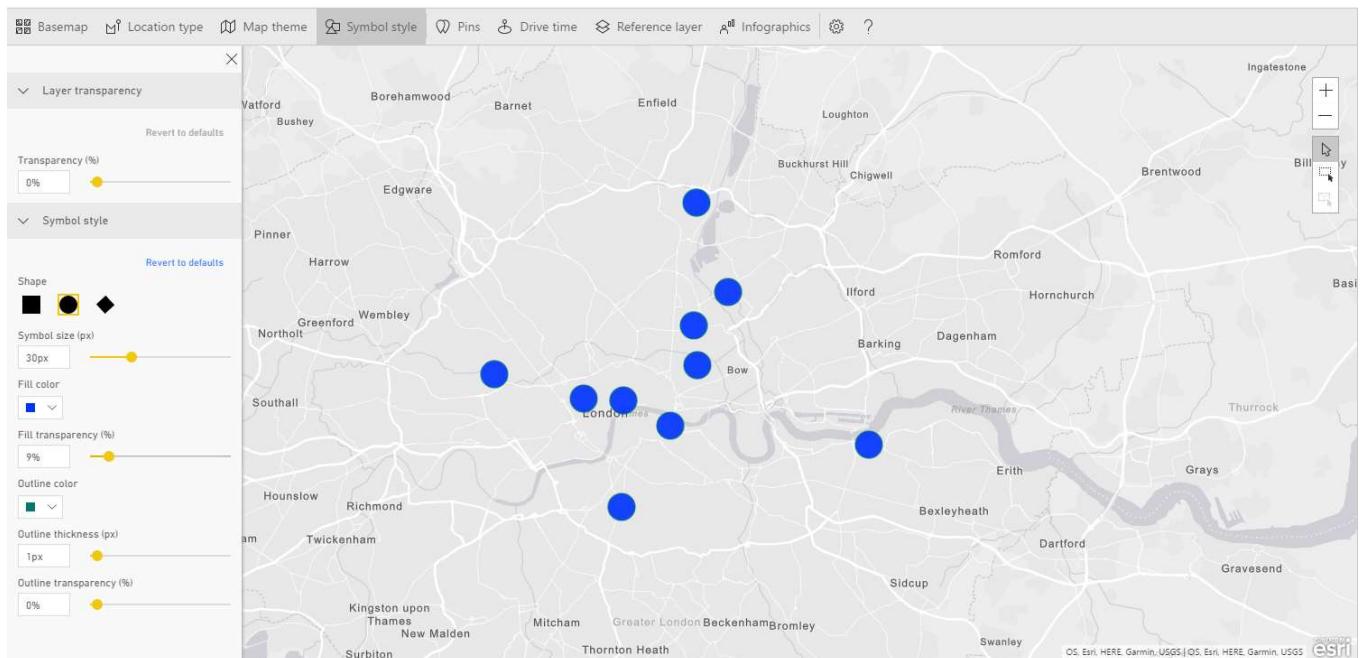
[address] & ", " & [city] & ", " & [Country]

This creates a new column with the full address for every row in the dataset.

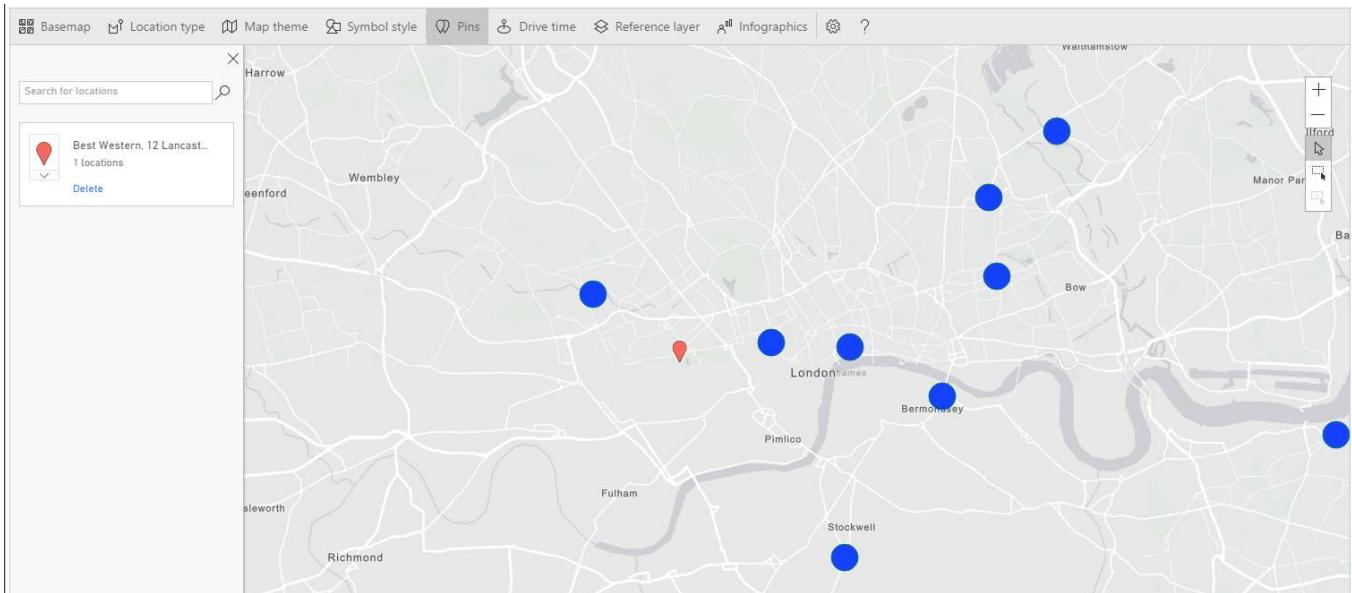
	A <sup>B</sup> <sub>C</sub> companyname	A <sup>B</sup> <sub>C</sub> address	A <sup>B</sup> <sub>C</sub> city	A <sup>B</sup> <sub>C</sub> Country	A <sup>B</sup> <sub>C</sub> FullAddress
1	Customer HFBZG	7890 Hanover Square	London	United Kingdom	7890 Hanover Square, London, United Kingdom
2	Redemption Brewing Company	16, Compass West Estate, West Rd	London	United Kingdom	16, Compass West Estate, West Rd, London, United Kingdom
3	The Five Points Brewing Company	3 Institute Pl, Hackney	London	United Kingdom	3 Institute Pl, Hackney, London, United Kingdom
4	Brixton Brewery	Arch 547, Brixton Station Rd, Brixton	London	United Kingdom	Arch 547, Brixton Station Rd, Brixton, London, United Kingdom
5	Hop Stuff Brewery	Gunnery House, Cornwallis Rd, Woolwich	London	United Kingdom	Gunnery House, Cornwallis Rd, Woolwich, London, United Kingdom
6	East London Brewing Co Ltd	Fairways Business Park, Lammes Rd	London	United Kingdom	Fairways Business Park, Lammes Rd, London, United Kingdom
7	Redchurch Brewery	275-276 Poyer St	London	United Kingdom	275-276 Poyer St, London, United Kingdom
8	Southwark Brewing Company	46 Druid St	London	United Kingdom	46 Druid St, London, United Kingdom
9	Monacada Brewery	Unit 1, Middle Row	London	United Kingdom	Unit 1, Middle Row, London, United Kingdom
10	Temple Brew House	46 Essex St	London	United Kingdom	46 Essex St, London, United Kingdom

Save your changes. Then click *Home > Close & Apply*. Create a new page in your report and click the ArcGIS visual. This time we don't have coordinates, but addresses to pass to the geocoding engine. If the address is properly formatted, ArcGIS can geocode it. Drag and drop *FullAddress* into *Location*. Some points are plotted onto the map. Just for knowing the brewery name, drag and drop *companynname* into *Tooltips*.

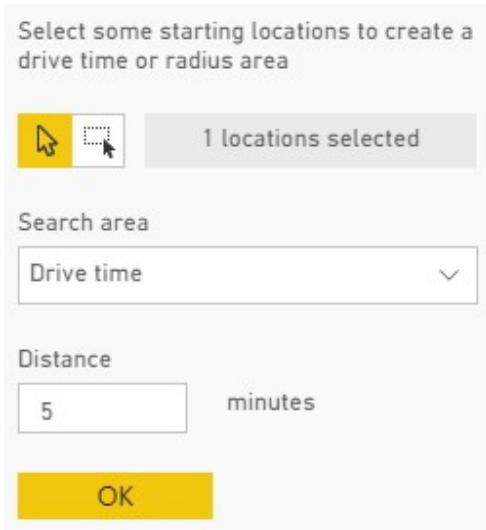
The points are too small. We want to enlarge them and to change the default color. Click *Edit > Symbol style* and set the dimension to 30px. Then on *Fill color* set the color you want. I've chosen a deep blue, with no transparency.



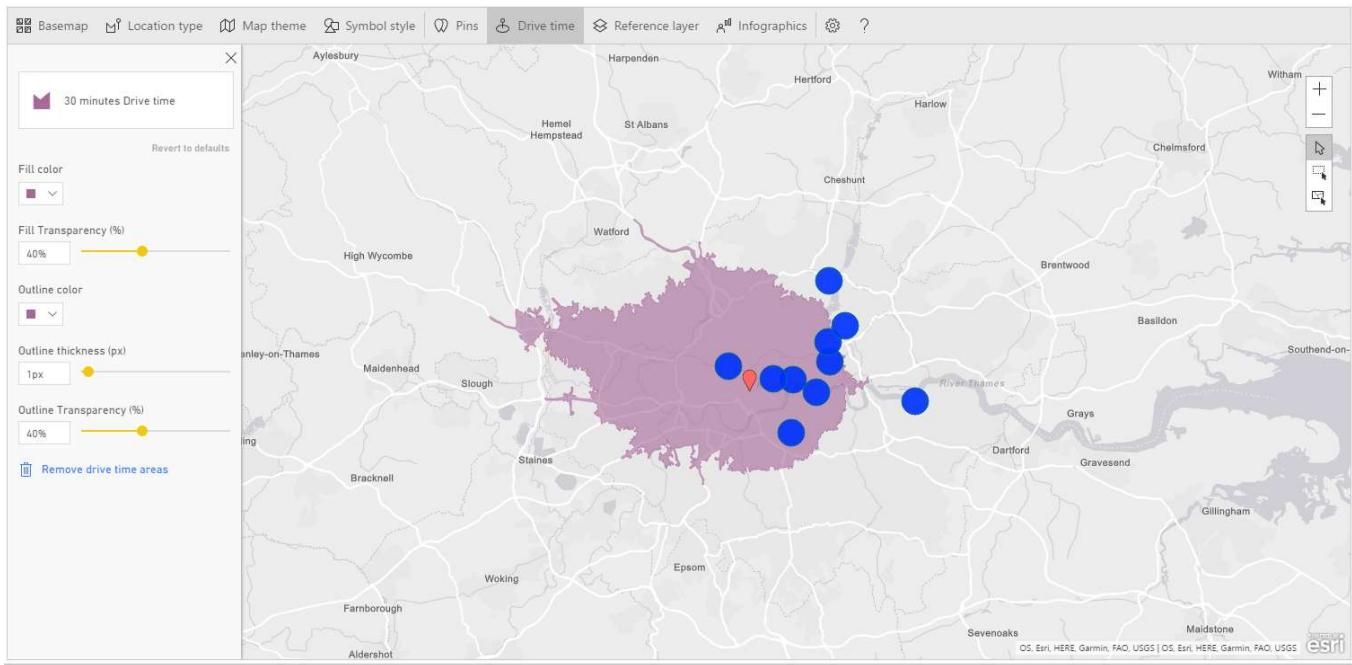
Now we got destinations; what is the starting point? Suppose, for instance, that you're based in a Best Western hotel in Lancaster Gate. Select *Pins* on the map's menu and start typing Best Western Lancaster Gate. ArcGIS should find for you the following address: "Best Western, 12 Lancaster Gate, London, England, W2 3, GBR". Select the hotel and a red marker appears on your map.



This is the starting point. Select the menu item Drive Time, and then select the marker on the map. When one point is selected the menu on the left changes.

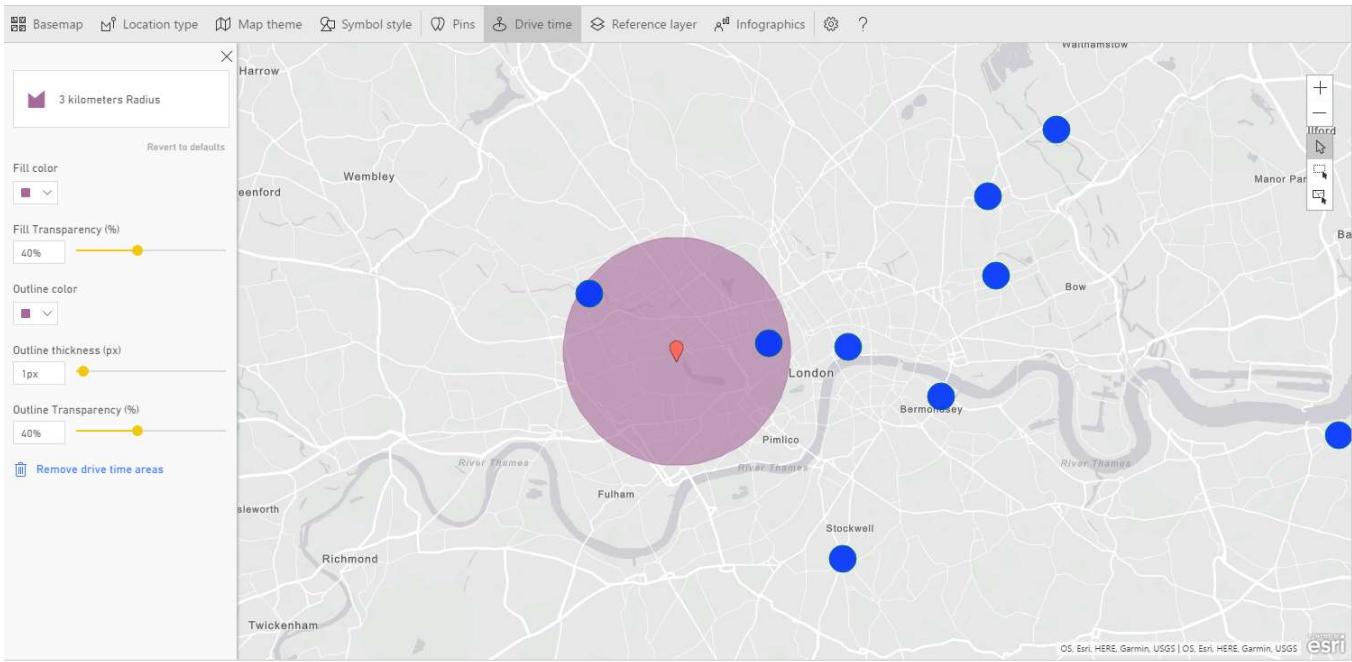


You can choose among *Drive time* or *Radius*. Write 30 instead of 5 in the white box and press OK. ArcGIS displays a filled area representing all the streets within a 30 minutes driving distance from the starting point. As you can see, some breweries are inside the highlighted zone, some aren't. This gives us a clear understanding of accessibility for the sites, based not only on their spatial location, but also on journey calculation.

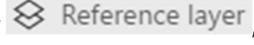


The other available option is about geographic distance. Click *Remove drive time areas* to reset the map and select again the red marker.

This time choose a radius of 3 kilometers (note you have many options as measure unit) and press OK. Note the different outcome. This is the circumference around your starting point inside the set radius.



According to the type of analysis you're performing, you can prefer one or the other visualization.

Another powerful feature of ArcGIS is **Reference Layer** , which allows you to add a layer to a map. This is a key feature, as layering is a very effective way to visualize and compare data. Just figure out that you can overlap filled areas along with points to show how continuous and discrete distributions are correlated.

Open a new Power BI Desktop report, or add a new page to an existing one. Click on the ArcGIS visual and add it to the canvas. Drag and drop the following fields into the visual's boxes:

Dataset *Top\_world\_airports*:

*Latitude* > *Latitude*

*Longitude* > *Longitude*

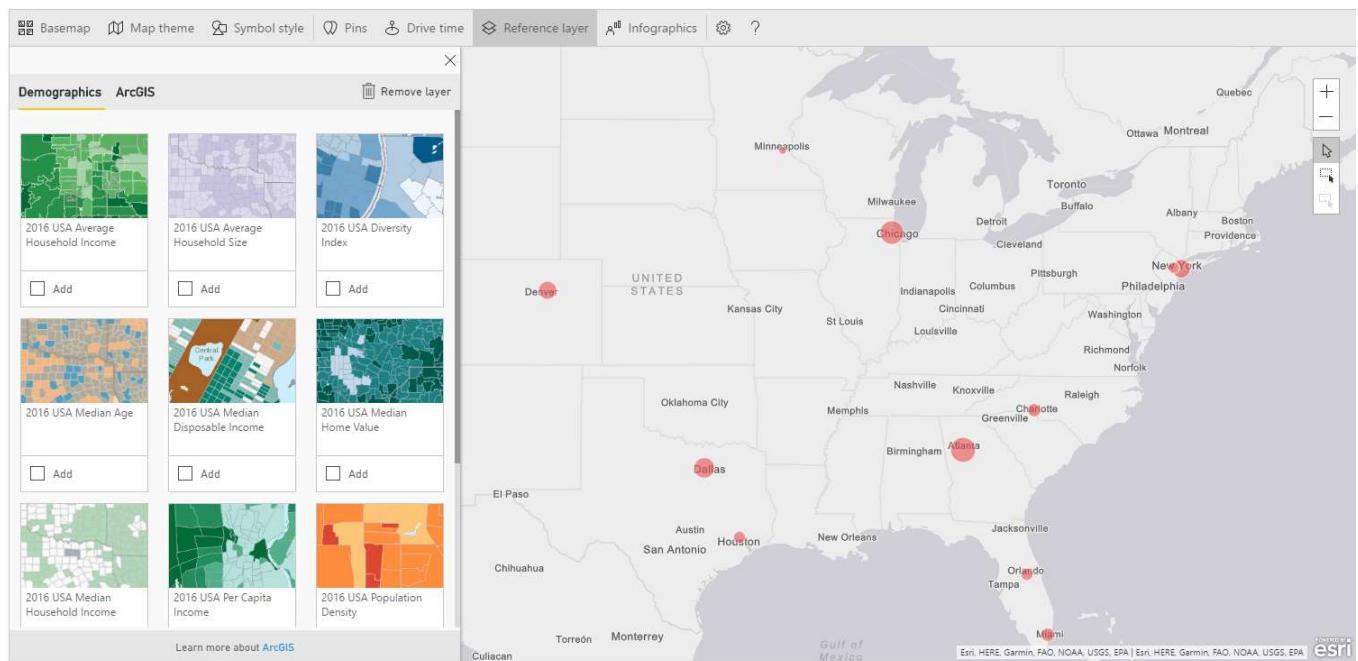
Dataset *passengers traffic statistic 2016*

*Total passengers* > *size*

*Country* > *Color*

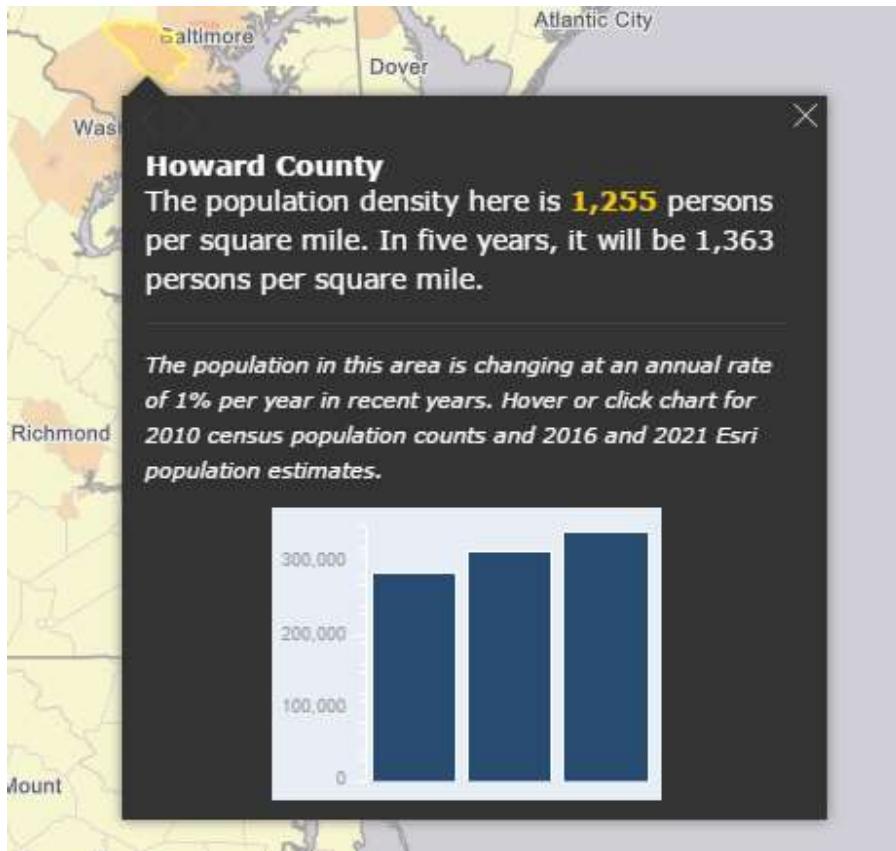
For a better understanding of the example, filter the map only for USA. Scroll down the *Filters* menu, expand *Country* and check the voice *United States*.

Now edit the visual and click on *Reference Layer*. It shows up a lateral frame with two options: *Demographic* and *ArcGIS*. *Demographic* refers to a series of ready-made layers from Esri with data such as income, population, density, education etc.

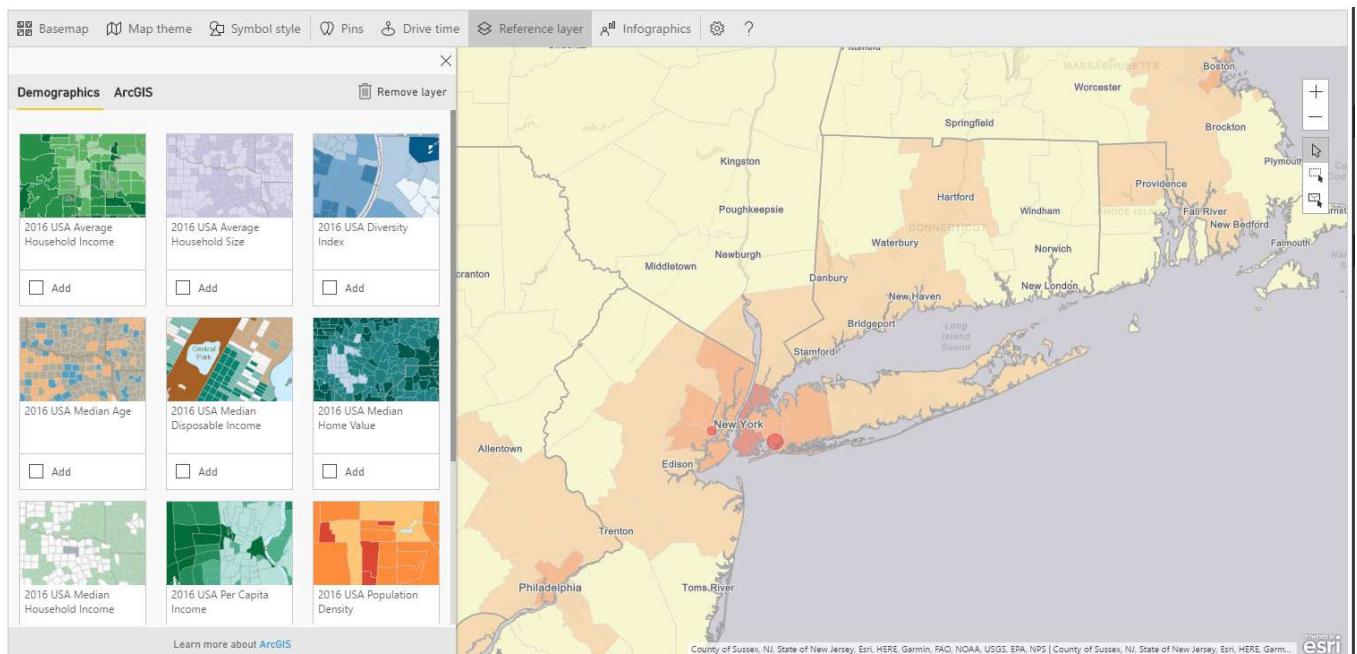


Let's say we want to compare the number of passengers to the population distribution to get evidence of any correlation. Scroll the layers until the one called "*2016 USA Population Density*" and click *Add*.

A new layer is added to the map showing population density for every county in USA. Color ranges from yellow (lower density) to dark orange (higher density). By clicking on a single county, you get population related data.



If you zoom into the airports surrounding areas (i.e. New York), you can actually see that the counties are darker, showing a direct correlation between airport traffic and population.



More or less, we have got the same outcome adding the "2016 USA Average Household Income" layer, from which we can see that wealth is mainly distributed around big cities.

Take into account that you can display only a layer at time. Furthermore, built-in data are available only for USA. If you wish to add a different layer you can turn to ArcGIS Community and Reference Layers.

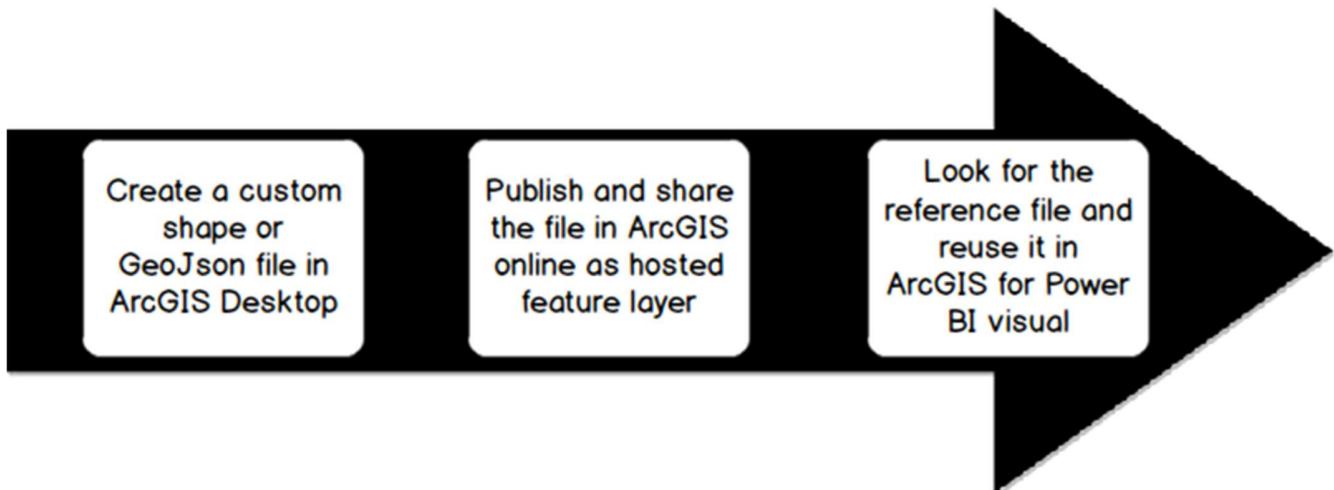
To delete a layer simply click *Remove Layer*  Remove layer

The other *Reference Layer's* option *ArcGIS* allows you to search for publicly shared feature layers on ArcGIS Online. These are layers created by users and made available for the community by publishing them on ArcGIS Online. Custom reference layers can contain any kind of geographical information in any format (shape file, GeoJson, etc.). If you aim to add more than two layers to your visualization, this is the only way. But, of course, you must be capable of manipulating files using a GIS tools (ArcGIS Desktop, QGIS....).

Once you've created the layer, you can import it into ArcGIS Online and share it. Another downside is that you need an ArcGIS account and you have to pay for it.

If you want to try, you can sign up for a free 60 days demo. Once the period is expired, the account becomes unavailable unless it is turned into a paid subscription.

Just to give you a quick recap, these are the steps for creating a custom reference layer.



For the demo of the custom reference layer, let's move to Europe. Create a new report with the same settings as below:

Dataset *Top\_world\_airports*:  
*Latitude* > *Latitude*  
*Longitude* > *Longitude*  
Dataset *passengers traffic statistic 2016*  
*Total passengers* > *size*  
*Country* > *Color*

And filter for European countries: France, Germany, Italy, Spain, The Netherlands, Turkey, United Kingdom.

**Filters**

Visual level filters

Country  
is France, Germany, It... ◇

Filter Type

Basic filtering ▾

Country	Count
Republic of Korea	1
Singapore	1
<input checked="" type="checkbox"/> Spain	2
Taiwan	1
Thailand	1
<input checked="" type="checkbox"/> The Netherlands	1
<input checked="" type="checkbox"/> Turkey	1
<input type="checkbox"/> United Arab Emir...	1
<input checked="" type="checkbox"/> United Kingdom	2
<input type="checkbox"/> United States	16

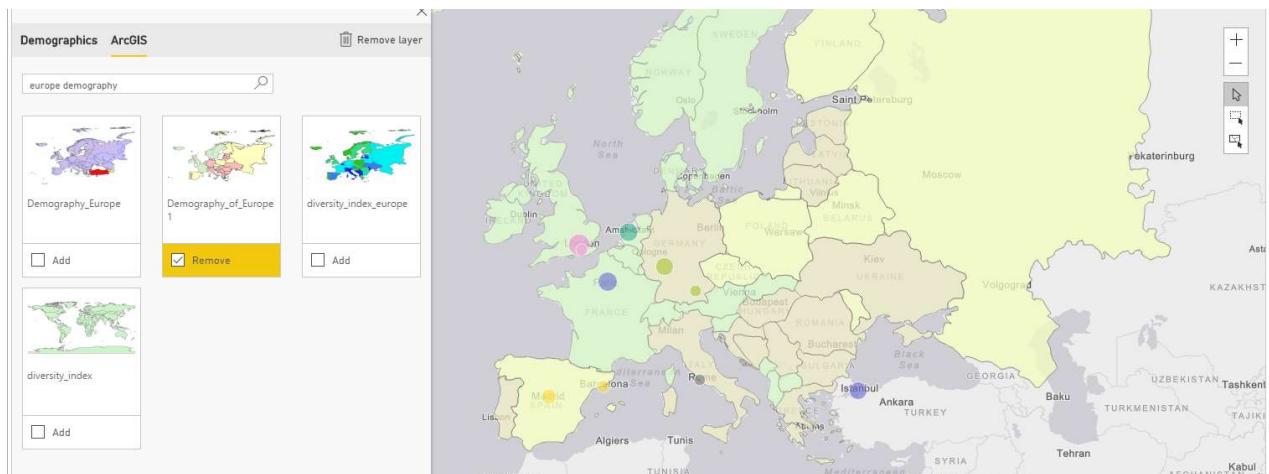
Edit the map click *Reference Layer > ArcGIS*. You'll be prompted to a search window.

**Demographics ArcGIS** Remove layer

Search ArcGIS

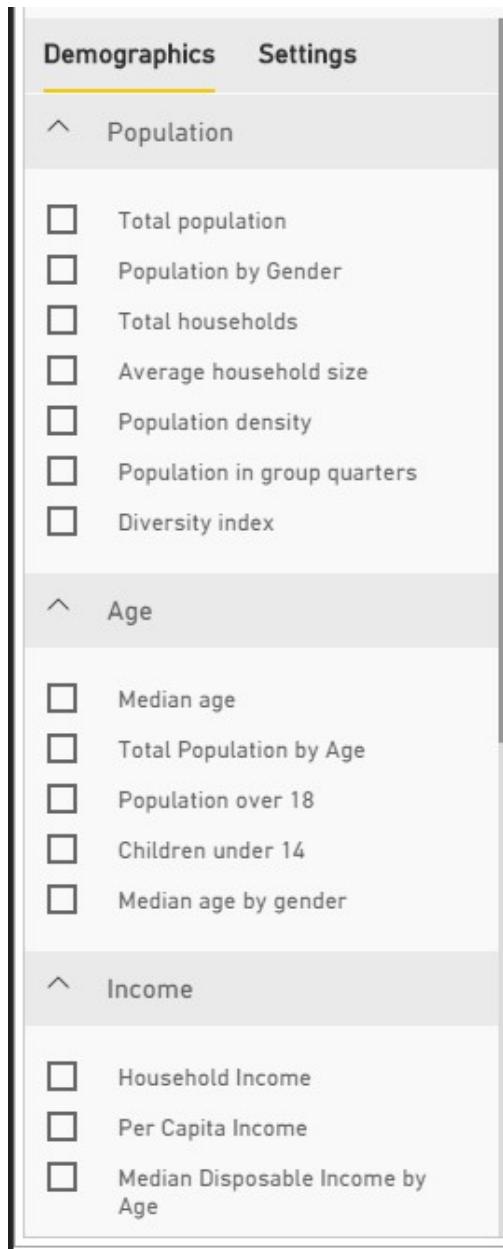
If you write some words and click the lens, you'll get the layers that match your search as output. Type for example, river, train, volcanoes.

For this demo, we want to compare the amount the population along with airports passengers, so search for the following layer: *Demography\_of\_Europe\_1*

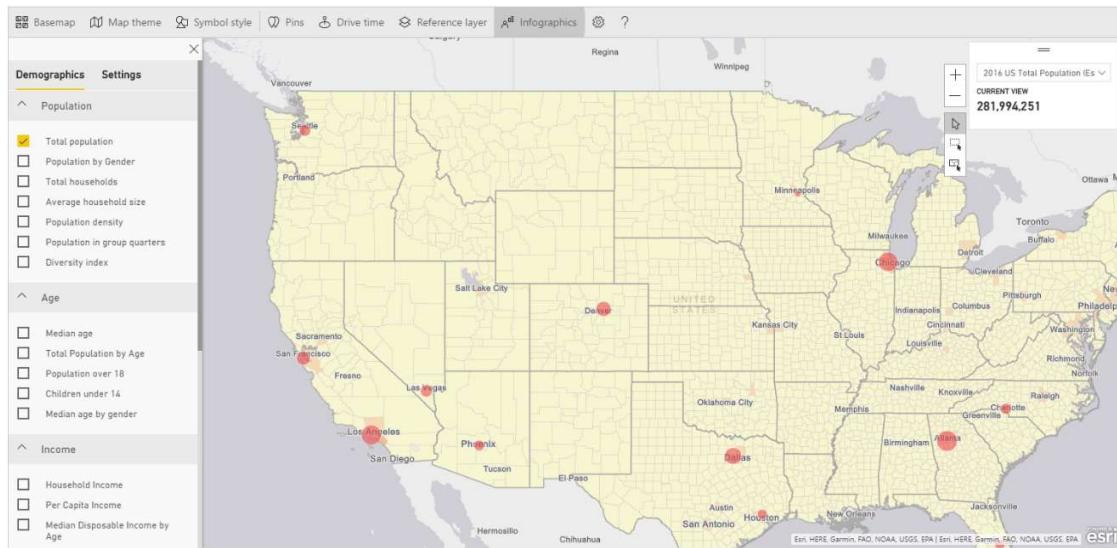


Add the layer to the map; as in the previous example you can get demographics info by clicking on each country. Even in this case we can found out a direct correlation between population and passengers.

The last item in the menu bar for ArcGIS visual is *Infographics*. Basically, it consists of "cards" placed on a map to display some kind of info. If you click on the voice, you can see all the available data.



To test the operation of *Infographic*, filter again USA as country in the report. Then try to add an infographic "Total population" for instance. White windows shows up in the upper right corner with the Total population number.



Note that infographics is responsive and interacts with the map itself. The number displayed in the card changes according to your selection. Try to zoom in or out into the maps and see how the *Total population* varies to display only data for the highlighted area.

You can even add more infographics to you map by simply selecting and deselecting each one.

Unfortunately, this feature is available only with data for USA. If you change the map's focus to another area, you won't be able to see any data.

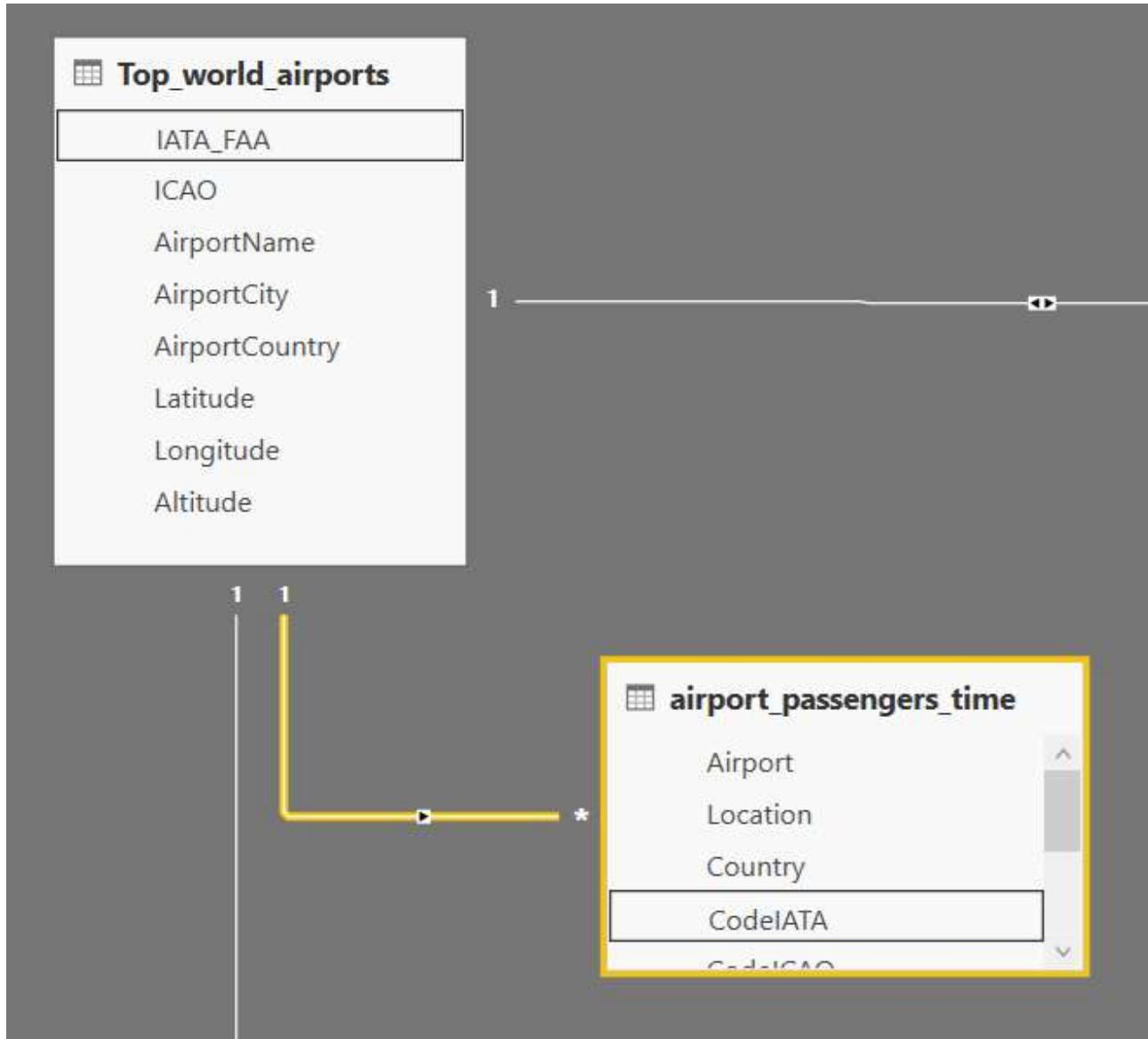
The last feature, *Time*, performs a time analysis of the map, showing the evolution of a certain measure over the time. For this demo, download and import the dataset *airport\_passengers\_time.csv*: *Get Data > TXT/CSV > Load*.

The dataset contains the number of passengers for the world's busiest airports ranging from 2000 to 2016. The source is as usual Wikipedia. I've added a *Date* set by default to the end of every year (31/12/2000, 31/12/2001, ...) as ArcGIS requires a date/time format field for time analysis.

Join the airports' code to the dataset *Top\_world\_airports* in order of getting coordinates for every airport.

Go to *Relationships* and set the following relationship:

*Top\_world\_airports/IATA\_FAA* -> *airport\_passengers\_time/CodeIATA*



Create a new report, click on ArcGIS visual and add the following fields:

Dataset *Top\_world\_airports*:

*Latitude* > *Latitude*

*Longitude* > *Longitude*

Dataset *airport\_passengers\_time*

*Total passengers* > *Size*

*Date* > *Time*

ArcGIS adds a timeline at the bottom of your map, with interval dates at every end.

You can either move the yellow slider over the control, or click play for continuous animation. The map rolls by the years showing a clear shift of traffic volumes from Western countries (USS, Europe) to Asia.

By default, ArcGIS divides the time frame into 10 intervals. Drag the handles at the end of the slider if you want to change the visible intervals.

TotalPassengers by Date



# Laboratorio 0 PQ e M (In autonomia la classe)

In questo esercizio il tuo obiettivo è utilizzare Power Query per importare più file di testo e combinarli (aggiungerli) in un singolo set di dati nel modello di dati Power Pivot.

1. Nella cartella **mesi** trovi i file così come nella cartella **dati**
2. Guarda i file per vedere che tipo di dati sono (nessuna sorpresa: sono solo alcune tabelle di vendita).
3. Utilizzando Power Query importare più file di testo e combinarli (aggiungerli) in un singolo set di dati che chiameremo **SalesDaFolder**
4. Caricare i file (**sales.xlsx** e **product.txt**) che si trovano nella cartella **dati** e utilizzate la funzionalità Merge di Power Query tra tabella **sales** e tabella **product** per aggiungere una colonna di categoria (**productcategory**) alla tabella delle vendite, e quindi carica la tabella nel modello dati. La tabella finale dovrebbe apparire così:

	Date	Product	Units	1.2 Rev	1.2 COGS	ProductCategory
1	12/16/2017	Fun Fly	36	161.05	114.66	Beginner
2	10/7/2018	Fun Fly	2	13.98	6.7	Beginner
3	7/28/2018	Fun Fly	5	34.6	15.76	Beginner
4	1/8/2018	Fun Fly	1	6.99	3.54	Beginner
5	6/21/2016	Fun Fly	1	6.99	3.54	Beginner
6	12/15/2016	Fun Fly	2	13.98	5.66	Beginner
7	2/23/2016	Fun Fly	4	27.96	11.44	Beginner
8	8/12/2017	Eagle	1	23.95	9.15	Intermediate
9	11/17/2017	Aspen	2	47.9	20.67	Beginner
10	12/28/2018	Carlota	3	65.85	26.97	Beginner
11	9/21/2017	Carlota	2	43.9	14.59	Beginner

5. Caricare il file (**multisales.xlsx**) che contiene tre tabelle **SalesTable(1)**, **SalesTable(2)**, **SalesTable(3)** che dovremmo unire assieme in un'unica tabella dal nome **SalesTable**

6. Alla fine bisogna disabilitare tutte le tabelle che non serve caricare e il nome delle tabelle devono essere caricate nel modello sono quelle indicate nell'immagine sotto e la Prodcut e SalesTable(2), SalesTable(3) che sono disabilitate

The screenshot shows the 'Queries' pane in Power BI. A folder named 'SalesDaFolder' is expanded, revealing its contents. Inside, there are six entries: 'Sales', 'Product', 'SalesTable(2)', 'SalesTable(3)', and 'SalesTable'. The 'SalesTable(2)' and 'SalesTable(3)' entries are highlighted with a light gray background, which typically indicates that they are disabled or not currently selected for use.

# Demo 3: Vendite per CAP per comprendere le funzioni

In questa Demo abbiamo le vendite per comune. Si vogliono avere queste vendite per CAP, campo che nella tabella iniziale non è presente.

1. Aprire **3-VenditePerCAP.pbix**. Questa è la situazione iniziale

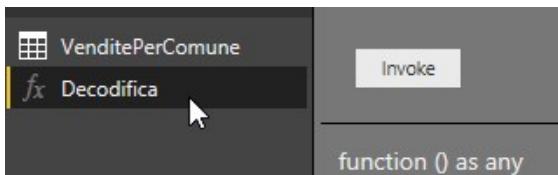
CodiceISTAT	NomeComune	Vendite
093001	Andreis	12
093005	Azzano Decimo	455
093008	Budoia	234

2. Per recuperare i CAP andare su <http://www.comuni-italiani.it/093/001/index.html> tramite get data → WEB.
3. Selezionare Table 1 e premere edit per modellare la tabella secondo le nostre esigenze.
4. Eliminare le prime 7 righe. Da Home Remove rows → remove top e scrivere 7
5. Eliminare le ultime 7 righe. Da Home Remove rows → remove bottom e scrivere 7
6. La tabella ottenuta non fa ancora al caso nostro. Utilizzare la funzione Transpose (da ribbon Transform), poi impostare la seconda riga come intestazione.
7. Rinominare la query “Decodifica” e fare chiudi e applica.
8. Creare relazione tra VenditePerComune e Decodifica per CodiceISTAT.
9. Per effetto di questa relazione ora posso trascinare il CAP sul report.

CodiceISTAT	NomeComune	Vendite	CAP
093001	Andreis	12	33080
<b>Total</b>	<b>33080</b>		

10. A questo punto questa operazione andrebbe fatta per tutte le righe della mia tabella di vendite, ma non posso fare una trasformazione per ognuna, devo creare una funzione. Si noti che nell’indirizzo su <http://www.comuni-italiani.it/093/001/index.html> 093 e 001 sono lo spit del codice ISTAT. Per trasformare in funzione la query Decodifica è sufficiente aprire la query in advance editor ed aggiungere in testa prima del comando let () => .

```
(() => let  
    Source = Web.  
    Data1 = Sourc  
    ...  
    ...
```



Con il tasto Invoke esce la tabellina calcolata prima.

11. Il passo successivo è passare alla funzione i parametri affinché funzioni per tutte le righe della tabella. Rientriamo in query editor advance e aggiungiamo tra le parentesi i due parametri di tipo testo e

modifichiamo l'indirizzo web con il passaggio dei parametri concatenandoli in questo modo (prime due righe query)

(x as text, y as text) => let

Source = Web.Page(Web.Contents("http://www.comuni-italiani.it/" & x & "/" & y & "/index.html ")),

12. Se inseriamo 093 e 001 vediamo che restituisce i valori di prima ma stavolta con la funzione.

13. Ora non resta che far in modo che i parametri vengano presi dalla tabella vendite sul campo CodiceISTAT che ha bisogno però di qualche trasformazione.

Aggiungo una colonna che a partire da codice istat estrae (add column → extract) i primi 3 caratteri e una volonna analoga con gli ultimi 3 caratteri. Rinominare le colonne in x e y.

14. Aggiungere una colonna invocando una funzione



### Invoke Custom Function

Invoke a custom function defined in this file for each row.

New column name

CAP

Function query

Decodifica

x



x



y



y



15. Dei campi importati mantenere solo CAP.

16. Eliminare le colonne x e y in quanto sono dei passi della query e non servono al set di dati finale.

## Demo 3 Script già pronti

Aprire I file **3-Script\_DateDimension.txt** e **3-Script\_DateDimensionNOFiscal.txt** poi **3-Funzioni custom** e mostrare le loro funzionalità

Demo5_Function_With_Date_Dimensi...	2/5/2019 8:45 AM	Text Document	3 KB
Demo5_Function_With_Date_Dimensi...	5/21/2019 11:49 AM	Text Document	2 KB
Demo5_MExamples.txt	5/9/2018 12:23 AM	Text Document	2 KB

## Demo 4 Gestione Errori

Aprire Il file **4-GestioneErrori.pbix** e mostrare le 4 funzionalità per la gestione dell'errore

- ErrorRowLevel-WithOut (senza gestione errore)
- ErrorRowLevel-With (con gestione dell'errore -> rowsWithErrors)
- ErrorRecordDetails (con gestione dettagliata -> ExpandRecordColumn)
- DirectHandlingErrorWith (con gestione onlytry)
- DirectHandlingOnlyTry (con gestione otherwise)

# Laboratori 2 PQ e M (assieme in classe) (2 ore)

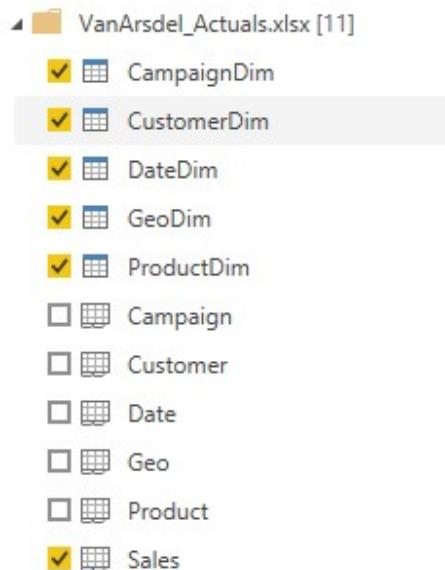
----- Prima parte in cui si spiegano le sorgenti dato!!!!-----

1. Open **VanArsdel\_Actuals.xlsx** file.

2. Talk about the data we will be working with.

We have VanArsdel sales data by **Date, Product, Customer** and **Campaign**.

We also have individual Campaign, Product and Customer information. We also have Geographic information for each Customer.



3. Open **VanArsdel\_Budget.xlsx** file. This file provides Budget and Forecast information by Product Category and Segment.

----- Inizio realizzazione progetto-----

In labs, we are going to read all this data, transform the data and create a data model.

1. Open a new Power BI Desktop file.

2. Follow steps in Module 2 lab and walk through following key

3. Objective: Import multiple worksheets from an Excel file in one step

Get Data > from Excel **VansArsdel\_Actuals.xlsx**

4. Select the following **Tables** :

- CustomerDim
- ProductDim
- Sales

In GeoDim, change the [ZIP] Data Type to Text

5. Create the **Product Category Segment Dimension** by extracting Categories and Segments from the **ProductDim**

6. Duplicate the ProductDim query

7. Highlight **[Category]** and **[Segment]**, and Remove other columns

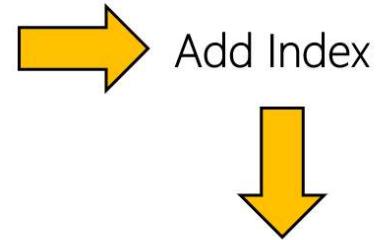
8. Highlight **[Category]** and **[Segment]**, and Remove Duplicates

9. Add Column > Add Index Column starting at 1, with column name **[CatSegID]**

10. Reorder Columns: **[CatSegID], [Category], [Segment]**

11. Rename the query "**CatSegDim**"

	ProductID	Product	Category	Segment	ManufacturerID	Manufacturer
1	392	Maximus RP-01	Rural	Productivity	7	VanArsdel
2	393	Maximus RP-02	Rural	Productivity	7	VanArsdel
3	394	Maximus RS-01	Rural	Select	7	VanArsdel
4	396	Maximus UM-01	Accessory	Accessory	7	VanArsdel
5	397	Maximus UM-02	Accessory	Accessory	7	VanArsdel



	CatSegID	Category	Segment
1	Rural	Productivity	
2	Rural	Select	
3	Accessory	Accessory	
4	Urban	Moderation	
5	Urban	Regular	
6	Urban	Extreme	
7	Mix	All Season	
8	Mix	Productivity	
9	Youth	Youth	
10	Urban	Convenience	

***CatSegDim*** is a **Degenerate Dimension**  
It is extracted from the data in the fact table.

## 12. Add Product Category Segment ID in the ProductDim

1. Select the *ProductDim* query
2. From Home Ribbon > Merge Queries > Select ProductDim
  - a) From *ProductDim*, highlight [Category] and [Segment]
  - b) From *CatSegDim*, highlight [Category] and [Segment]
  - c) Note the Join Kinds available, and leave **Left Outer**
  - d) Expand the [NewColumn] > Select [CatSegID] and deselect "Use Original column name as prefix"
3. Remove columns: [Category], [Segment], [Manufacturer ID], and [Manufacturer].
  - a) Hint: There is only one manufacturer name and one manufacturer ID, so we don't need this information!
4. Reorder columns: [ProductID], [CatSegID], [Product], [Unit Price], [Unit Cost]

## 13. Create a First, Last, and Full Name columns based on the Email Name column.

- o Use Recent Sources to get *CustomerDim*
- o Highlight the Email Name column, then Split Column > by Delimiter, select **Custom** and enter : (due punti con lo spazio)
- o Replace per rimuovere le parentesi tonde ( e )
- o Add Column per provare il comando **Text.PositionOf()** della virgola
  - Add Column > Custom Column
  - Name = "Separator"
  - Formula = **Text.PositionOf([Email Name.2],",")**

CustomerID	ZipCode	Email Name.1	Email Name.2	Separator
1	1	90250 Meghan.Alexander@xyz.com	Alexander, Meghan	,
2	2	90250 Leah.Kemp@xyz.com	Kemp, Leah	,
3	3	90250 Tamekah.Stevens@xyz.com	Stevens, Tamekah	,
4	4	90250 Dexter.Haney@xyz.com	Haney, Dexter	,
5	5	90250 Jonah.Moon@xyz.com	Moon, Jonah	,
6	6	90250 Brock.Burnett@xyz.com	Burnett, Brock	,
7	7	90250 Lamar.Daugherty@xyz.com	Daugherty, Lamar	,
8	8	90250 Dorian.Turner@xyz.com	Turner, Dorian	,
9	9	90250 Olympia.Rodriguez@xyz.com	Rodriguez, Olympia	,
10	10	90250 Colby.Snow@xyz.com	Snow, Colby	,

- o Usare la posizione della virgola trovata prima per dividere Last Name e First Name  
Add Columns per 3 volte per tre colonne **First Name**, **Last Name** and **Full Name**  
**Last Name = Text.Start([Email Name.2],[Separator])**  
**First Name = Text.Range([Email Name.2],[Separator]+2)**  
**Full Name = [First Name] & " " & [Last Name]**

ABC 123 Email Name.2	ABC 123 Separator	ABC 123 Last Name	ABC 123 First Name	ABC 123 Full Name
Alexander, Meghan		9 Alexander	Meghan	Meghan Alexander
Kemp, Leah		4 Kemp	Leah	Leah Kemp
Stevens, Tamekah		7 Stevens	Tamekah	Tamekah Stevens
Haney, Dexter		5 Haney	Dexter	Dexter Haney
Moon, Jonah		4 Moon	Jonah	Jonah Moon
Burnett, Brock		7 Burnett	Brock	Brock Burnett
Daugherty, Lamar		9 Daugherty	Lamar	Lamar Daugherty
Turner, Dorian		6 Turner	Dorian	Dorian Turner
Rodriguez, Olympia		9 Rodriguez	Olympia	Olympia Rodriguez

- 
- **Se non funziona facciamo trim prima del split by delimiter and do the ":" (colon and space) then they can >"Trim the blank space in front of the last name in the new column by right clicking on the column header Email Name.2 and select Transform>Trim"**

#### 14. Creazione della tabella di budget (Budget Fact)

- Import CSV document "VanArsdel\_Budget.csv"
- Rename query from VanArsdel\_Budget to **BudgetFact\_Data**
- Remove Rows > **Remove Top Rows**, enter 3 (to remove the first 3 rows)

#### 15. Creazione dell'header dalla combinazione delle prime tre righe

- Duplicate query BudgetFact\_Data rename to "**BudgetFact**"
- Keep Rows > **Keep Top Rows**, enter 3 (to keep the first three rows)



The image shows two tables. The top table has 12 columns and 12 rows, representing the original data. The bottom table has 8 columns and 3 rows, representing the header created by combining the first three rows of the original data.

ABC Column1	ABC Column2	ABC Column3	ABC Column4	ABC Column5	ABC Column6	ABC Column7	ABC Column8
1 Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
2 2016	2016	2016	2016	2016	2016	2016	2016
3 Category	Segment	Dec	Oct	Aug	Jul	Jun	
4 Accessory	Accessory	44190.07886	50000.01568	54780.5709	56000.01202	56700.57238	44190.07886
5 Mix	All Accessory	11442.18478	14220.76893	18120.44004	24817.26704	37450.39738	41560.35994
6 Sustainability	Sustainability	11593.55008	12335.18894	23557.234	34960.40444	17207.22662	23460.21864
7 Total	Total	311.369778	372.3400118	462.78128	514.89920	311.708773	334.67679
8 Urban	Convenience	120710.4466	129923.2914	169440.7696	219703.7363	333440.8589	345230.5632
9 Urban	Extreme	20669.84972	44971.33037	30793.02886	11587.07523	106469.924	14280.02201
10 Urban	Moderation	251115.7122	322084.2215	342385.4466	529188.1249	675144.498	44230.7190
11 Urban	Regular	699.7989225	427.4372025	299.28976	701.40442	931.3103	1381.098238
12 Youth	Youth	1931.03074	2891.005425	5387.746985	6437.887575	10355.73442	11738.08424

ABC Column1	ABC Column2	ABC Column3	ABC Column4	ABC Column5	ABC Column6	ABC Column7	ABC Column8
1 Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
2 2016	2016	2016	2016	2016	2016	2016	2016
3 Category	Segment	Dec	Nov	Oct	Sep	Aug	Jul

#### 16. To Create a Header which combines the first three rows

- Transform > Transpose (tabella "BudgetFact")
- Add Column to combine month and year into a date
  - Add Column > Custom Column
  - Name = "Budget Month"
  - Formula = *try Date.From ([Column3] & [Column2]) otherwise null*
  - Add Column to combine Month and Scenario
- Add Column > Custom Column
  - Name = "FullyCombinedHeader"
  - Formula = *if Text.Length([Column3]) > 3 then [Column3] else [Column1] & "~" & Date.ToString([Budget Month], "M/D/YYYY")*
  - Hint: Day did not come through correctly, as it is case sensitive. Update to "MM/dd/yy"
- Remove all columns except for [FullyCombinedHeader]
- Transform > Transpose to transpose back to wide

The diagram illustrates the transformation of a wide data table into a long data table. It consists of three tables connected by arrows:

- Top Table:** A wide data table with columns: Column1, Column2, Column3, Column4, Column5, Column6, Column7, Column8. Rows 1-3 are header rows, and rows 4-16 contain data.
- Middle Table:** A long data table with a single header row labeled "FullyCombinedHeader". The data rows (rows 1-16) now have a single column labeled "Category" and a single column labeled "Segment".
- Bottom Table:** A long data table with a single header row: "Category", "Segment", "Forecast-12/01/2016", "Forecast-11/01/2016", "Forecast-10/01/2016", "Forecast-09/01/2016", "Forecast-08/01/2016". The data rows (rows 1-16) now have multiple columns corresponding to the forecast dates.

## 17. To Append the new header row to the data to create the new wide data table with a single header row

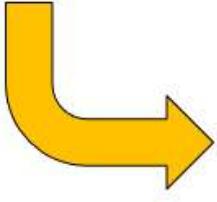
- Append alla query **BudgetFact** la query **BudgetFact\_Data**
- Use **First Row as Header** to promote the newly fixed header row
- Remove Rows > (to remove the first 3 rows – the old header rows)

The screenshot shows the Power BI interface with three tables:

- Top Table:** A wide data table with columns: Column1, Column2, Column3, Column4, Column5, Column6, Column7. Rows 1-3 are header rows, and rows 4-16 contain data.
- Middle Table:** A long data table with a single header row labeled "Category" and "Segment". The data rows (rows 1-16) now have multiple columns corresponding to the forecast dates.
- Bottom Table:** A wide data table with a single header row: "Category", "Segment", "Forecast-12/01/2016", "Forecast-11/01/2016", "Forecast-10/01/2016", "Forecast-09/01/2016", "Forecast-08/01/2016". The data rows (rows 1-16) now have multiple columns corresponding to the forecast dates.

## 18. Create the Budget Fact

- Highlight [Category] and [Segment] and Transform > Unpivot Other Columns
- Highlight [Attribute] and navigate to Home > Split Column > By Delimiter > "~~"
- Rename: [Attribute.1] = "Scenario", [Attribute.2] = "Date", [Value] = "Budget Amount"
- Change the Data Types: [Budget Amount] = Fixed Decimal, [Date] = Date



	Category	ABC Segment	ABC Forecast"12/01/2016"	ABC Forecast"11/01/2016"	ABC Forecast"10/01/2016"	ABC Forecast"09/01/2016"	ABC Forecast"08/01/2016"
1	Accessory	Accessory	44190.57088	50598.81566	54740.5709	64442.9079	99285.91338
2	All	All Season	11442.54474	14120.78693	18109.64804	26737.36704	37439.83736
3	Mix	Productivity	18538.89812	17597.55924	22839.18396	25557.336	34963.40484
4	Burat	Select	311.708775	172.2601125	662.79129	314.98992	311.708775
5	Urban	Convenience	120710.4406	129923.2814	169468.7696	214703.7363	333480.8569

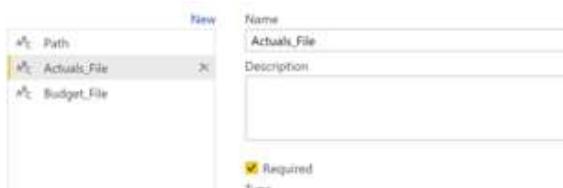
	Category	ABC Segment	ABC Scenario	Date	\$ Value
1	Accessory	Accessory	Forecast	12/1/2016	44190.57088
2	Accessory	Accessory	Forecast	11/1/2016	50598.81566
3	Accessory	Accessory	Forecast	10/1/2016	54740.5709
4	Accessory	Accessory	Forecast	9/1/2016	64442.9079
5	Accessory	Accessory	Forecast	8/1/2016	99285.91338
6	Accessory	Accessory	Forecast	7/1/2016	61545.4106
7	Accessory	Accessory	Forecast	6/1/2016	91299.654
8	Accessory	Accessory	Forecast	5/1/2016	120579.7261
9	Accessory	Accessory	Forecast	4/1/2016	103436.9095

#### 19. Merge the queries together to create the final Budget Fact table

- Home > **Merge Queries** > Select **CatSegDim**
- From the CatSegDim **highlight** both **[Category]** and **[Segment]**
- From BudgetFact, **highlight** both **[Category]** and **[Segment]**
- Show the Join Kinds available, and leave “Left Outer”
- **Expand** [NewColumn] > **Select** “CatSegID” and **deselect** “Use Original column name as prefix”
- **Remove**: [Category], [Segment]
- **Reorder**: [CatSegID], [Scenario], [Date], [Budget Amount]
- **Disable** the load of BudgetFact\_Data

#### 20. Update file paths to use dynamic variables

- From the Home Ribbon > Manage Parameters
- **Create** a new Parameter
  - Parameter Name: **Path**
  - Type: Text
  - Current Value = C:\Power BI\_Adv\_M\
  - **Important that this matches the file name that the student has on their C Drive. If they don't have the underline but they have spaces in the folder name then this needs to match their folder**
- **Create** a new Parameter
  - Parameter Name: **Actuals\_File**
  - Type: Text
  - Current Value = VanArsdel\_Actuals.xlsx
- **Create** a new Parameter
  - Parameter Name: **Budget\_File**
  - Type: Text
  - Current Value = VanArsdel\_Budget.csv
- **Update** the text files to ensure the parameter names are consistent



#### 21. Create a query to validate if source is Web or Local and resolve path

- **Create** a new blank query
  - Query Name: **“Actuals\_Path”**
  - Open Advanced Editor and copy the text from the **Actuals\_Path.txt** (preso dalla cartella dell'esercizio!!!!)
  - If you need to troubleshoot:Text as shown in slide (white box) with the correction above

- **Update** Source Applied Step to use Resolved Path = “Actuals\_Path” to all of the following queries:
  - CampaignDim
  - CustomerDim
  - ProductDim
  - CatSegDim
  - DateDim
  - GeoDim
  - SalesFact

22. **Objective:** Update CSV file paths to use dynamic variables

- **Create a new blank query**
  - Query Name: “**Budget\_Path**”
  - **In Advanced Editor**
  - Copy in text from **Budget\_Path.txt**(preso dalla cartella dell'esercizio!!!!)
- Update Source Applied Step to **use ResolvedBudgetPath** = “**Budget\_Path**” for the following Queries:
  - a) BudgetFact
  - b) BudgetFact\_Data

The screenshot shows the 'Advanced Editor' window with the title 'Budget\_Path'. The code area contains the following M language script:

```

let
    FilePath = Path, /*External reference to text query = FilePath
    Budgetfilename= Budget_File, /* Wrapping comment line */

    PathSlash = if Text.StartsWith(FilePath,"http") then "/" else "\",
   FullPath = FilePath & (if Text.EndsWith(FilePath, PathSlash) then "" else PathSlash) & Budgetfilename,

    Source = if Text.StartsWith(FilePath,"http")
        then Csv.Document(Web.ContentsFullPath ),[Delimiter=",", Encoding=1252, QuoteStyle=QuoteStyle.None]
        else Csv.Document(File.ContentsFullPath ),[Delimiter=",", Encoding=1252, QuoteStyle=QuoteStyle.None]]
in
    Source
  
```

Below the code, a green checkmark icon indicates "No syntax errors have been detected." At the bottom right are 'Done' and 'Cancel' buttons.

23. **Create a custom function**

1. **Create** a new blank query
  - a) Query Name: “**fn\_DaySinceYearStart**”
  - b) In Advanced Editor
    - Copy in text from **Number\_Days.txt** (preso dalla cartella dell'esercizio!!!!)
2. **Create** a new Parameter
  - a) Parameter Name: **TransactionDate**
  - b) Type: Date
  - c) Current Value = **1/1/2011**
3. **Update** Sales query. Add Column -> **Invoke Custom Function** dalla tabella delle sales
  - a) New Column Name: **DaysFromYearStart**
  - b) Function query: **fn\_DaySinceYearStart**
  - c) Transaction Date = **Date**

# fn\_DaySinceYearStart

Display Options ▾

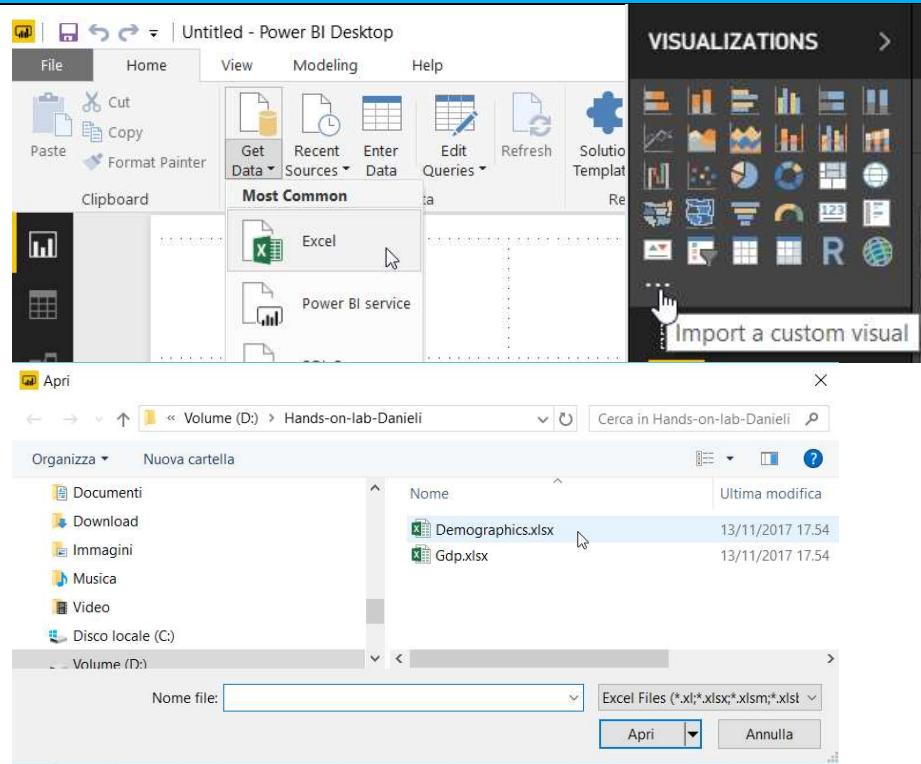
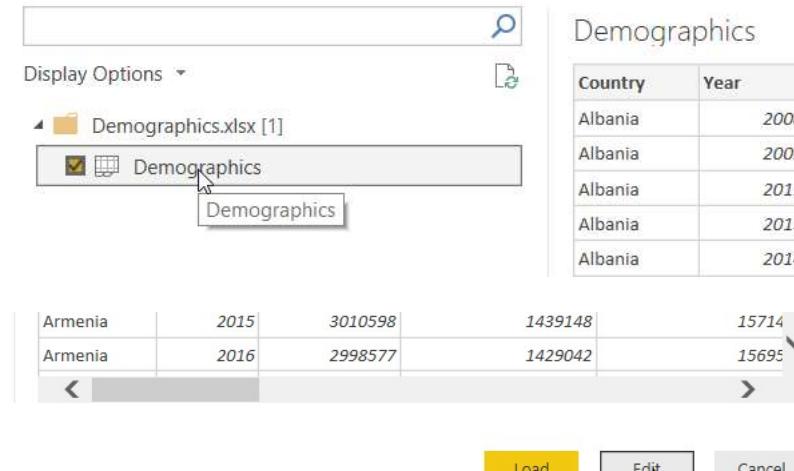


```
let
    Source = (TransactionDate as date) => let
        YearStart = #date(Date.Year(TransactionDate),1,1),
        #"DateDiff" = Duration.From(TransactionDate-YearStart),
        #"NumberDays" = Duration.Days(#"DateDiff") + 1
    in
        #"NumberDays"
in
    Source
```

✓ No syntax errors have been detected.

# Laboratorio 3 PQ e M (In autonomia in classe)

## Data manipulation

Azione	Screenshot												
Aggiungere i due file excel. Possiamo caricare solo un file alla volta. Quindi incominciamo con scegliere il file Demographic.xlsx													
Selezionare il tab "demographics" del file e premere il tasto "edit" per applicare le modifiche al file prima di caricarlo nel modello.	<p>Navigator</p>  <table border="1"><thead><tr><th>Country</th><th>Year</th></tr></thead><tbody><tr><td>Albania</td><td>2008</td></tr><tr><td>Albania</td><td>2009</td></tr><tr><td>Albania</td><td>2011</td></tr><tr><td>Albania</td><td>2013</td></tr><tr><td>Albania</td><td>2014</td></tr></tbody></table> <p>Armenia 2015 3010598 1439148 15714 Armenia 2016 2998577 1429042 15695</p> <p>Load Edit Cancel</p>	Country	Year	Albania	2008	Albania	2009	Albania	2011	Albania	2013	Albania	2014
Country	Year												
Albania	2008												
Albania	2009												
Albania	2011												
Albania	2013												
Albania	2014												

Selezionare l'Icona  
"Choose Columns"  
e Deselezionare le  
due colonne  
Population of  
Man/Woman

The screenshot shows the Power Query Editor interface. At the top, the ribbon has tabs for File, Home, Transform, Add Column, View, and Help. The Home tab is selected. In the ribbon, the 'New Source' icon is highlighted. Below the ribbon, there's a toolbar with icons for Close & Apply, New Source, Recent Sources, Enter Data, Data source settings, Manage Parameters, Refresh Preview, Properties, Advanced Editor, and Manage. A dropdown menu labeled 'Choose Columns' is open. The main area shows a 'Queries [1]' list with 'Demographics' selected. Underneath, a preview pane shows a table with columns: Country, Year, Population. The first row of the preview shows 'Albania', '2008', and '3170050'. A 'Choose Columns' dialog box is overlaid on the editor. It contains a title 'Choose Columns' and a sub-instruction 'Choose the columns to keep'. A search bar 'Search Columns' is at the top of the list. The list itself includes: '(Select All Columns)', 'Country' (checked), 'Year' (checked), 'Population' (checked), 'Population of Man' (unchecked), 'Population of Woman' (unchecked), 'N° of Divorces' (checked), 'Marriage' (checked), 'Age Man First Marriage' (checked), 'Age First Marriage Woman' (checked), 'Life Expectancy' (checked), 'Life Expectancy Male' (checked), 'Life Expectancy Female' (checked), 'Net Income' (checked), 'Education Level 0-2 %' (checked), and 'Education Level 3-8 %' (checked).

Ora ci si trova nell'ambiente di Power Query e senza uscire cliccare sull'Icona "New Source" e aggiungere il file excel rimanente. Quindi carichiamo il file Gdp.xlsx

The screenshot shows a Windows file dialog box titled 'Apri' (Open). The path 'Volume (D:) > Hands-on-lab-Danieli' is shown in the address bar. The file list shows two Excel files: 'Demographics.xlsx' and 'Gdp.xlsx'. Both files were modified on 13/11/2017 at 17:54. The 'Gdp.xlsx' file is currently selected. At the bottom of the dialog, there are buttons for 'Nome file:' (set to 'Gdp.xlsx'), 'Excel Files (\*.xl\*;\*.xlsx;\*.xlsm;\*.xlst') in a dropdown, and 'Apri' (Open) and 'Annulla' (Cancel) buttons.

Selezionare il tab “Gdp” del file e premere il tasto “Ok” per applicare le modifiche al file prima di caricarlo nel modello.

### Navigator

The screenshot shows the 'Navigator' dialog box. On the left, there's a tree view with 'Gdp.xlsx [1]' expanded, showing 'Gdp' selected. To the right is a table titled 'Gdp' with the following data:

Country	Year
Belgium	2005
Belgium	2006
Belgium	2007
Belgium	2008
Belgium	2009
Bulgaria	2007
Bulgaria	2008
Bulgaria	2009
Bulgaria	2010
Bulgaria	2011
Bulgaria	2012
Bulgaria	2013
Bulgaria	2014
Bulgaria	2015
Bulgaria	2016

At the bottom right are 'OK' and 'Cancel' buttons, with 'OK' being highlighted.

Creare una relazione tra le due sorgenti dati caricate. Selezionare la query Demographics e cliccare sull’opzione “Merge query” in alto a destra

The screenshot shows the 'Untitled - Query Editor' window. The ribbon tabs are 'File', 'Home', 'Transform', and 'Add Column'. The 'Home' tab is selected. In the center, there's a 'Queries [2]' pane showing 'Demographics' and 'Gdp' selected. To the right, there's a preview pane showing a table with two rows labeled '1' and '2', both containing 'Albania' under the 'Country' column. At the bottom, the 'Transform' ribbon tab is active, showing various tools like 'Split Column', 'Group By', and 'Replace Values'. A dropdown menu under 'Merge Queries' is open, with 'Merge Queries' highlighted.

Selezionare “Year” e “Country” da entrambi i data source. Attraverso il tasto CTRL premuto e l’utilizzo del mouse si selezionano i campi da entrambe le tabelle in modo tale che l’ordine dei campi sia lo stesso. Infine scegliere il tipo di associazione che deve essere “Full Outer”.

## Merge

Select a table and matching columns to create a merged table.

### Demographics

Country	Year	Population	N° of Divorces	Marriage	Age Man First Marriage	Age First Marriage Woman
Albania	2008	3170050	3610	21290	null	null
Albania	2009	3184701	null	null	null	null
Albania	2011	2831741	4807	25303	null	null
Albania	2013	2898782	null	23820	null	null
Albania	2014	2895947	4240	23769	null	null

### Gdp

Country	Year	Export of Goods % GDP	GDP (euro Mil)
Belgium	2005	73,5	null
Belgium	2006	75,7	null
Belgium	2007	77,5	344712,5
Belgium	2008	79,7	354065,9
Belgium	2009	69,3	348781,1

### Join Kind

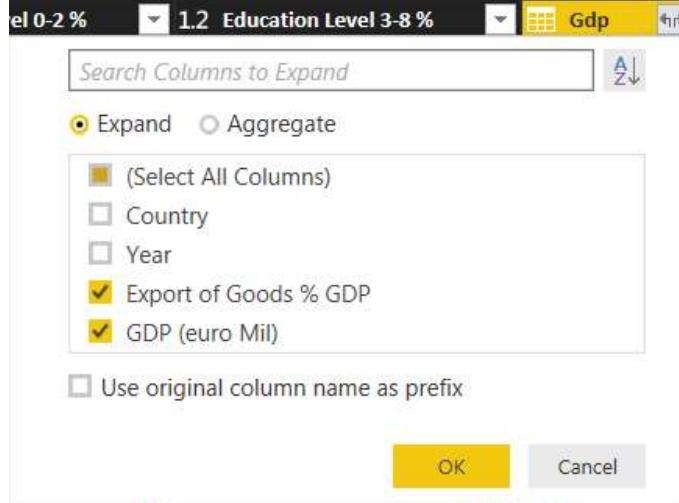
Full Outer (all rows from both)

i The selection has matched 318 out of the first 458 rows.

OK

Cancel

Nella tabella “demographics” compare una colonna Gdp con due frecce di espansione . Scegliere tutti i campi tranne “Country” e “Year”. Deselezionare la spunta “use originale column name as prefix”



Cliccare con il tasto destro sulla testata della colonna “Country” e scegliere la voce “Replace Values”

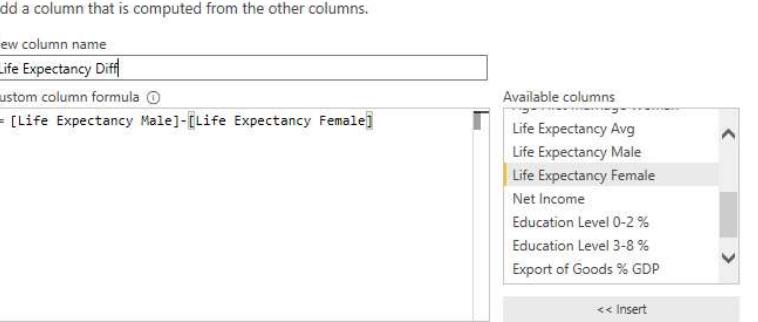
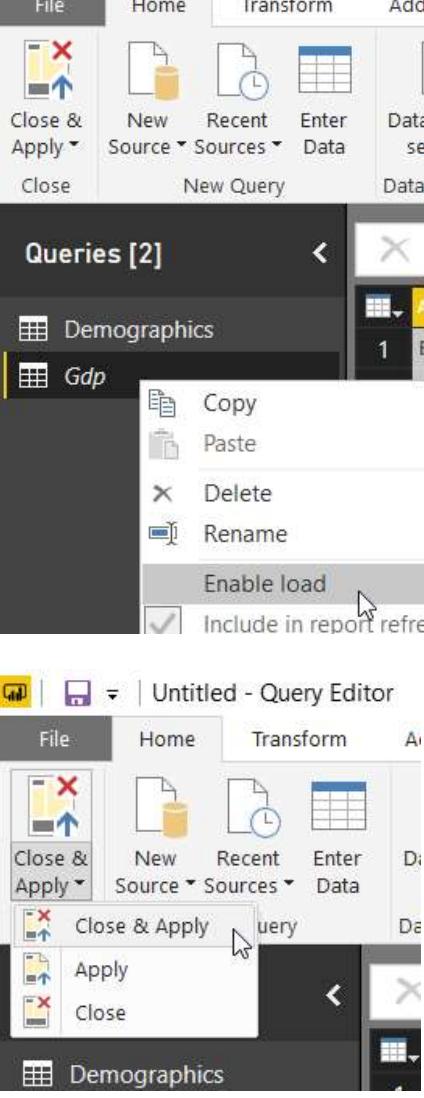
Rimpiazzare il valore di “Kosovo (under United Nations Security Council Resolution 1244/99)” con “Kosovo”

The screenshot shows a Power BI data grid with columns labeled 'Country', 'Year', and 'Population'. A context menu is open over the 'Country' column header, showing options like Copy, Remove, Remove Other Columns, Duplicate Column, Add Column From Examples..., Remove Duplicates, Remove Errors, Change Type, Transform, Replace Values..., and Replace Errors... The 'Replace Values...' option is highlighted with a yellow arrow. Below the menu, a 'Replace Values' dialog box is displayed, containing fields for 'Value To Find' (set to 'Kosovo (under United Nations Security Co') and 'Replace With' (set to 'Kosovo'). Buttons for 'OK' and 'Cancel' are at the bottom right.

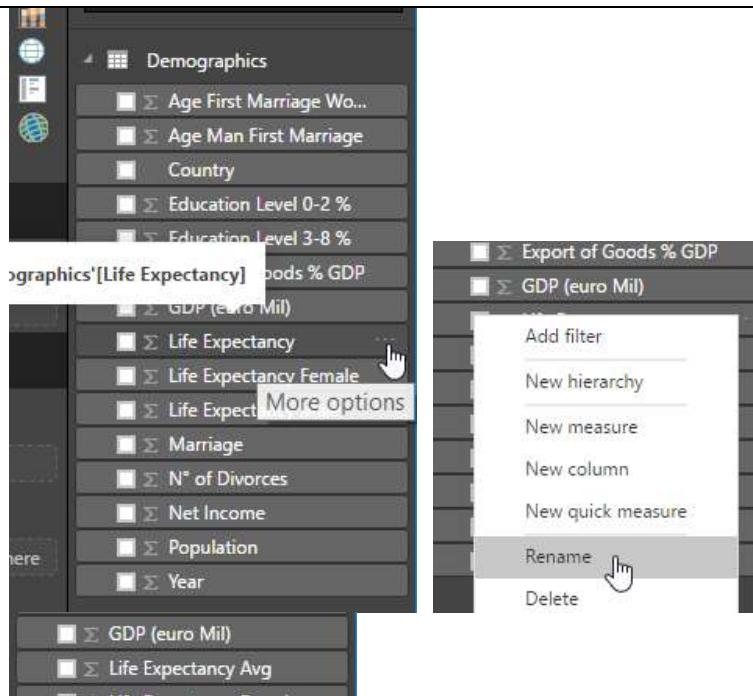
Cliccare con il tasto destro sulla testata della colonna “Country” e scegliere la voce “Replace Values”

Rimpiazzare il valore di “Former Yugoslav Republic of Macedonia, the” con “Republic of Macedonia”

The screenshot shows a Power BI data grid with columns labeled 'Country', 'Year', and 'Population'. A context menu is open over the 'Country' column header, showing options like Copy, Remove, Remove Other Columns, Duplicate Column, Add Column From Examples..., Remove Duplicates, Remove Errors, Change Type, Transform, Replace Values..., and Replace Errors... The 'Replace Values...' option is highlighted with a yellow arrow. Below the menu, a 'Replace Values' dialog box is displayed, containing fields for 'Value To Find' (set to 'Former Yugoslav Republic of Macedonia, t') and 'Replace With' (set to 'Republic of Macedonia'). Buttons for 'OK' and 'Cancel' are at the bottom right.

<p>Creare una colonna custom per la Life Expectancy Diff che è la differenza tra Life Expectancy Male e Life Expectancy Female</p>	
<p>Cliccare sulla query della “Gdp” e selezionare “Enabled load” per non caricare le query nel modello.</p> <p>Selezionare l’icona “Close &amp; Apply” che permette di applicare le trasformazioni impostate e caricare i dati nel modello. In automatico ci troveremo nella schermata iniziale di Power BI Desktop da dove procederemo ad inserire le misure.</p>	

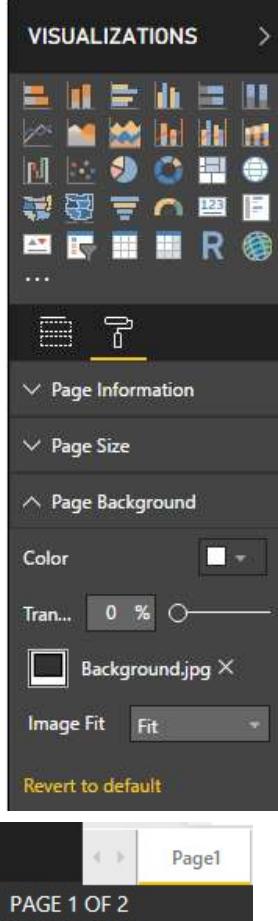
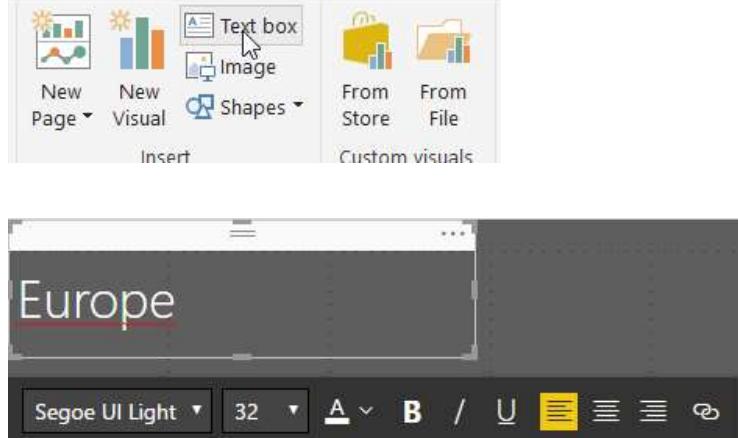
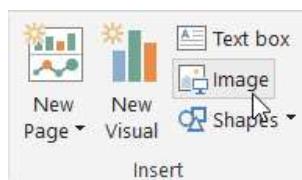
Rinominare il campo “Life Expectancy” in “Life Expectancy Avg” cliccando sui tre punti accanto al nome originale e sezionando “Rename” e scrivendo il nuovo nome del campo.

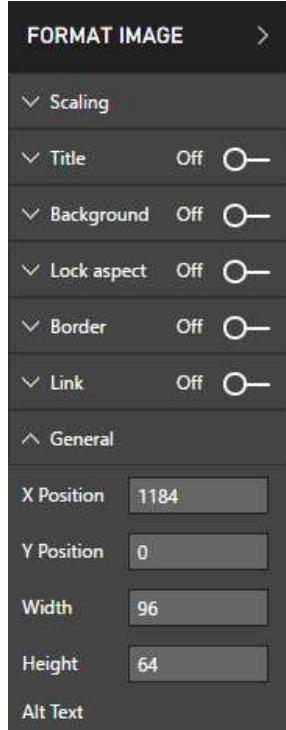
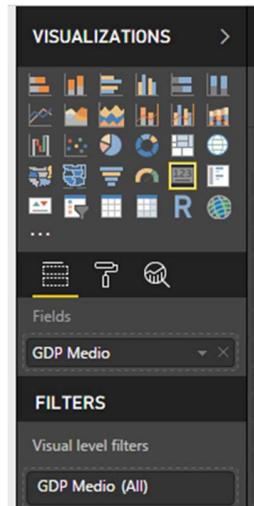


Cambiare la funzione di aggregazione mettendo invece che la “sum” la “average” per le seguenti misure:  
**-Population**  
**-Life Expectancy Avg**  
**-Life Expectancy Female**  
**-Life Expectancy Male**  
**-Net Income**  
**-Life Expectancy Diff**

A screenshot of the Power BI Fields view and Modeling ribbon. The Fields view shows the same list of columns as the Data View. In the bottom right corner of the Fields view, there's a dropdown menu for the 'Population' column, which is currently set to 'Sum'. The dropdown menu also includes 'Average' and other options. The Modeling ribbon at the top has tabs for View, Modeling, Help, and buttons for New Column, New Table, New Parameter, What If, Sort, and Formatting. It also shows settings for Data type: Whole Number, Format: Whole number, and Default Summarization: Sum.

## Data visualization : Europe

Azione	Screenshot
<p>Caricare un'immagine di sfondo per caricare la barra del titolo Background.jpg e impostare a Fit la proprietà "image Fit"</p> <p>Sotto rinominare la tab "Page1" con "Europe"</p>	
<p>Inserire una TextBox in cui scriviamo "Europe" con carattere 32 di colore bianco.</p> <p>Nelle impostazioni generali inserire 184 come "width" e "height" 56 e come "Xposition" 0 e "Yposition" 0</p>	
<p>Inserire un'immagine. Es. europe-flag.png</p>	

	
<p>Nelle impostazioni generali inserire 96 come "width" e "height" 64 e come "Xposition" 1184 e "Yposition" 0</p>	
<p>Inserire un chart di tipo "Card" e selezionare il campo GDP (euro Mil) e cambiare in media la funzione di aggregazione. Rinominare la colonna con Gdp Medio che finirà sul Fields.</p>	

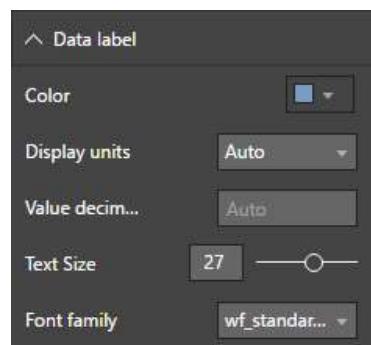
Nella parte del colore del “border” inserire il seguente colore 799EC2 su “Custom color”



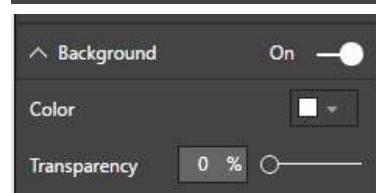
nella parte del colore del “category label” inserire il seguente colore 799EC2



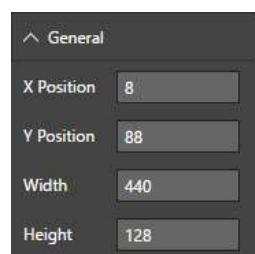
Nella parte del colore del “data label” inserire il seguente colore 799EC2



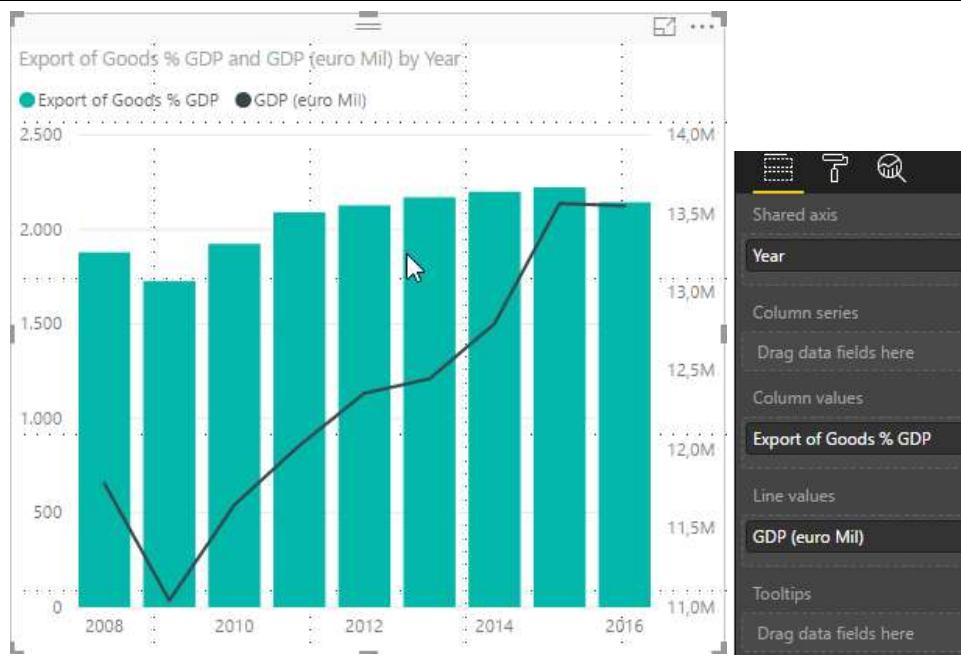
E selezionare come background il bianco con livello di trasparenza 0%



Seguire queste impostazioni per il posizionamento del riquadro

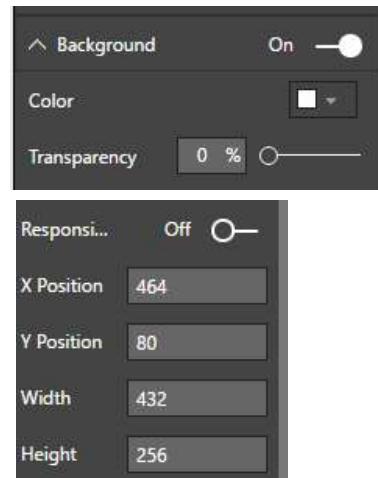


<p>Ripetere la stessa operazione per Life Expectancy Avg e Net Income e disporli nel seguente modo</p> <p>Posizione Life expectancy</p> <p>Posizione Net Income</p>	<p>347.25K GDP Medio</p> <p>78.41 Life Expectancy Avg</p> <p>14.64K Net Income</p> <p><b>General</b></p> <table border="1"> <tr><td>X Position</td><td>8</td></tr> <tr><td>Y Position</td><td>224</td></tr> <tr><td>Width</td><td>232</td></tr> <tr><td>Height</td><td>112</td></tr> </table> <p><b>General</b></p> <table border="1"> <tr><td>X Position</td><td>248</td></tr> <tr><td>Y Position</td><td>224</td></tr> <tr><td>Width</td><td>200</td></tr> <tr><td>Height</td><td>112</td></tr> </table>	X Position	8	Y Position	224	Width	232	Height	112	X Position	248	Y Position	224	Width	200	Height	112
X Position	8																
Y Position	224																
Width	232																
Height	112																
X Position	248																
Y Position	224																
Width	200																
Height	112																
<p>Inserire un grafico combinato con Year, GDP (euro Mil) e Export of Goods %.</p>	<p>VISUALIZATIONS &gt; Fi</p> <p>Line and stacked column chart</p>																



Nella parte di formatting selezionare come background il bianco con livello di trasparenza 0%

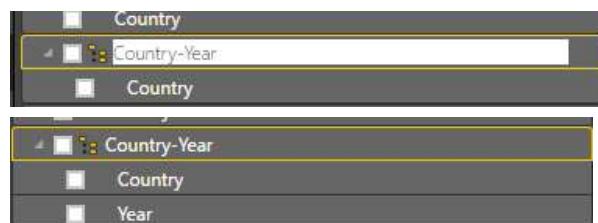
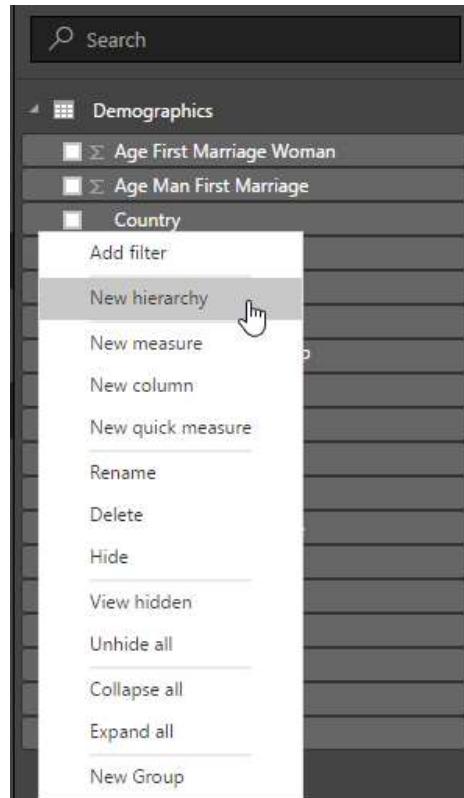
Seguire queste impostazioni per il posizionamento del riquadro



Creare una dimensione di drill.

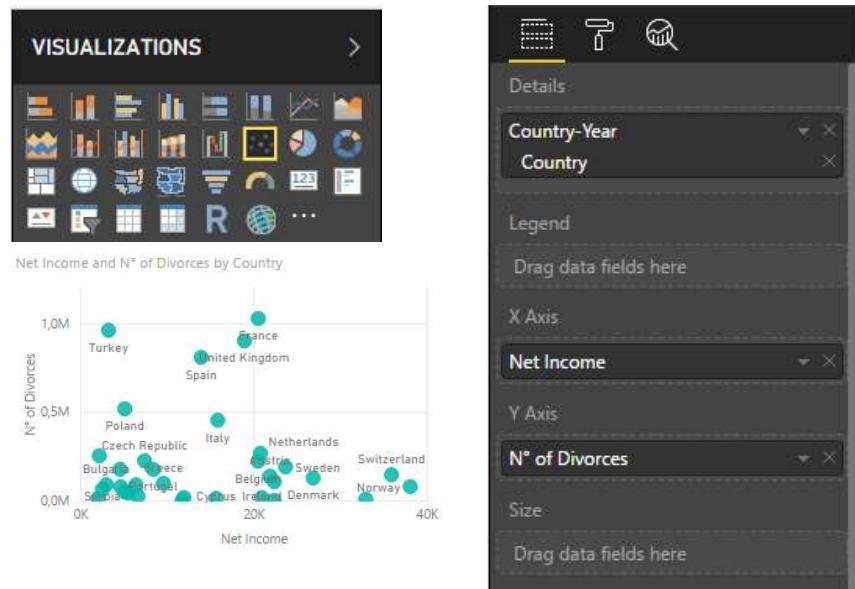
Country-Year  
Per fare questo cliccare con il tasto destro sul campo "Country" e scegliere New Hierarchy

Rinominiamo facendo doppio click sul nome della gerarchia in "Country-Year"  
Trascinare il campo "year" sopra la gerarchia appena creata

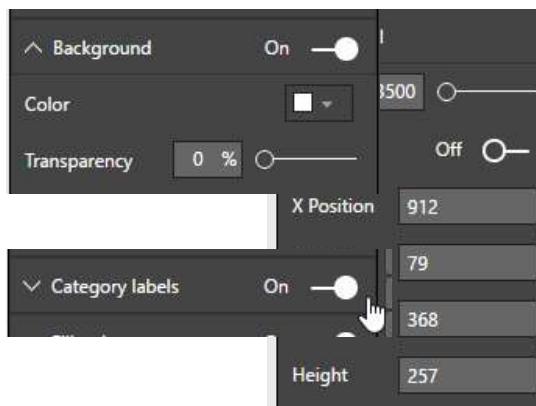


Inserire un grafico a dispersione con la dimensione di drill appena creata, l'avg del "N° of Divorce" e il net income

Nella parte di formatting selezionare come



background il bianco con livello di trasparenza 0% E abilitiamo il “category label”



Inserire una tabella con la dimensione country, life expectancy Female, life expectancy Male e la Life expectancy Diff appena creata.



Country

	Life Expectancy Avg	Life Expectancy Female	Life Expectancy Male	Life Expectancy Diff
Albania	156,10	159,90	152,50	3,70
Andorra	182,80	186,50	180,20	3,15
Armenia	222,40	231,60	212,40	6,40
Austria	648,20	668,90	626,30	5,33
Azerbaijan	519,90	537,30	502,50	4,97
Belarus	363,00	390,30	335,00	11,06
Belgium	644,70	665,30	623,20	5,26
Bulgaria	593,50	622,30	565,50	7,10
Croatia	616,70	642,80	589,80	6,63
Cyprus	652,50	670,20	635,00	4,40
Czech Republic	624,40	649,10	599,50	6,20
Denmark	639,10	655,40	622,30	4,14
Estonia	611,90	649,20	571,00	9,77
Finland	645,50	670,40	620,10	6,29
Former Yugoslav Republic of Macedonia, the	600,30	616,90	584,10	4,10
France	656,80	683,30	629,10	6,78
Total	25.013,30	25.974,60	24.026,60	6,11

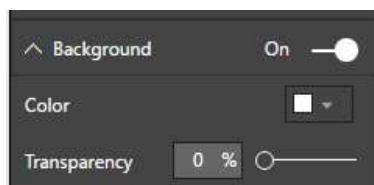
Rows: Country

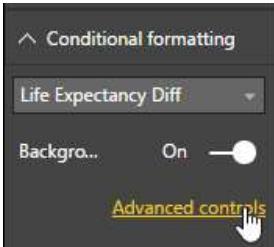
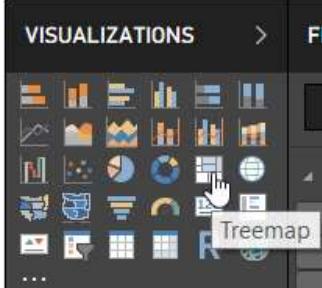
Columns: Drag data fields here

Values: Life Expectancy Avg, Life Expectancy Female, Life Expectancy Male, Life Expectancy Diff

FILTERS

Nella parte di formatting selezionare come background il bianco con livello di trasparenza 0%



	<p>Entrare nelle proprietà della Life Expectancy Diff e modificare l'espressione del colore di sfondo.</p>  <p>Colore di sfondo - Minimo di Life Expectancy Diff</p> <p>Formatta per: Regole</p> <p>Aplica a: Valori e totali</p> <p>In base al campo: Media di Life Expectancy Diff</p> <p>Esecuzione del riepilogo: Media</p> <p>Regole: Se il valore è maggiore o uguale a 5 e è minore di 100 allora allora</p> <table border="1"> <thead> <tr> <th>Country</th><th>Media di Life Expectancy Avg</th><th>Media di Life Expectancy Female</th><th>Media di Life Expectancy Male</th><th>Media di Life Expectancy Diff</th></tr> </thead> <tbody> <tr><td>Albania</td><td>78.05</td><td>79.95</td><td>76.25</td><td>3.70</td></tr> <tr><td>Andorra</td><td>91.40</td><td>93.25</td><td>90.10</td><td>3.15</td></tr> <tr><td>Armenia</td><td>74.13</td><td>77.20</td><td>70.80</td><td>6.40</td></tr> <tr><td>Austria</td><td>81.03</td><td>83.61</td><td>78.29</td><td>5.33</td></tr> <tr><td>Azerbaijan</td><td>74.27</td><td>76.76</td><td>71.79</td><td>4.97</td></tr> <tr><td>Belarus</td><td>72.60</td><td>78.06</td><td>67.00</td><td>11.06</td></tr> <tr><td>Belgium</td><td>80.59</td><td>83.16</td><td>77.90</td><td>5.26</td></tr> <tr><td>Bulgaria</td><td>74.19</td><td>77.79</td><td>70.69</td><td>7.10</td></tr> <tr><td>Croatia</td><td>77.09</td><td>80.35</td><td>73.73</td><td>6.63</td></tr> <tr><td>Cyprus</td><td>81.56</td><td>83.78</td><td>79.38</td><td>4.40</td></tr> <tr><td>Czech Republic</td><td>78.05</td><td>81.14</td><td>74.94</td><td>6.20</td></tr> <tr><td>Denmark</td><td>79.89</td><td>81.93</td><td>77.79</td><td>4.14</td></tr> <tr><td>Estonia</td><td>76.49</td><td>81.15</td><td>71.38</td><td>9.77</td></tr> <tr><td>Finland</td><td>80.69</td><td>83.80</td><td>77.51</td><td>6.29</td></tr> <tr><td>France</td><td>82.10</td><td>85.41</td><td>78.64</td><td>6.78</td></tr> <tr><td>Georgia</td><td>73.90</td><td>78.22</td><td>69.43</td><td>8.78</td></tr> <tr><td>Greece</td><td>80.84</td><td>83.55</td><td>78.13</td><td>5.43</td></tr> <tr><td>Hungary</td><td>75.15</td><td>78.78</td><td>71.33</td><td>7.45</td></tr> <tr><td>Totale</td><td>78.41</td><td>81.43</td><td>75.32</td><td>6.11</td></tr> </tbody> </table> <p>Inserire una "Tree Map" con la dimensione "Country-Year" e "Average of education Level3-8%"</p> 	Country	Media di Life Expectancy Avg	Media di Life Expectancy Female	Media di Life Expectancy Male	Media di Life Expectancy Diff	Albania	78.05	79.95	76.25	3.70	Andorra	91.40	93.25	90.10	3.15	Armenia	74.13	77.20	70.80	6.40	Austria	81.03	83.61	78.29	5.33	Azerbaijan	74.27	76.76	71.79	4.97	Belarus	72.60	78.06	67.00	11.06	Belgium	80.59	83.16	77.90	5.26	Bulgaria	74.19	77.79	70.69	7.10	Croatia	77.09	80.35	73.73	6.63	Cyprus	81.56	83.78	79.38	4.40	Czech Republic	78.05	81.14	74.94	6.20	Denmark	79.89	81.93	77.79	4.14	Estonia	76.49	81.15	71.38	9.77	Finland	80.69	83.80	77.51	6.29	France	82.10	85.41	78.64	6.78	Georgia	73.90	78.22	69.43	8.78	Greece	80.84	83.55	78.13	5.43	Hungary	75.15	78.78	71.33	7.45	Totale	78.41	81.43	75.32	6.11
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Nella parte di  
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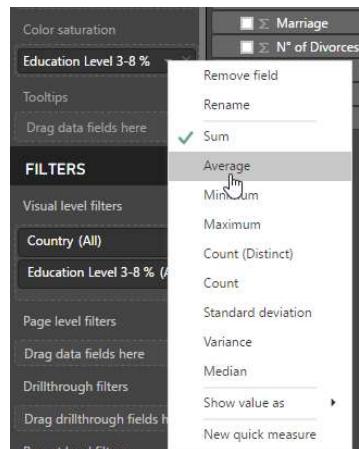
Net Income and Average of Education Level 3-8 % by Country



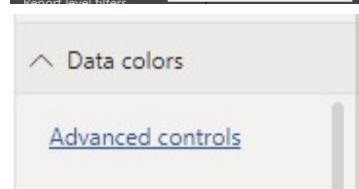
The screenshot shows the Power BI Fields pane. In the "Group" section, "Country-Year" is selected, with "Country" and "Year" as its children. In the "Values" section, "Net Income" is selected. Below the Fields pane is a small preview window showing a single row of data.

The screenshot shows the "Background" settings dialog. It has three main sections: "Background" (which is turned "On"), "Color" (set to white), and "Transparency" (set to 0%).

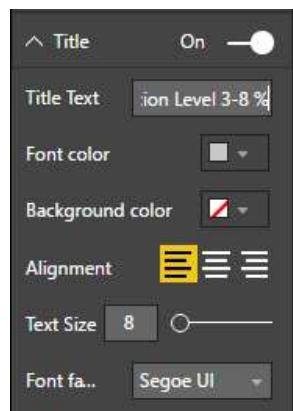
Nelle proprietà del chart andare su “Data colors” e modificare la misura con cui viene colorata la mappa in  $\text{Avg}([\text{Education Level 3-8 \%}])$



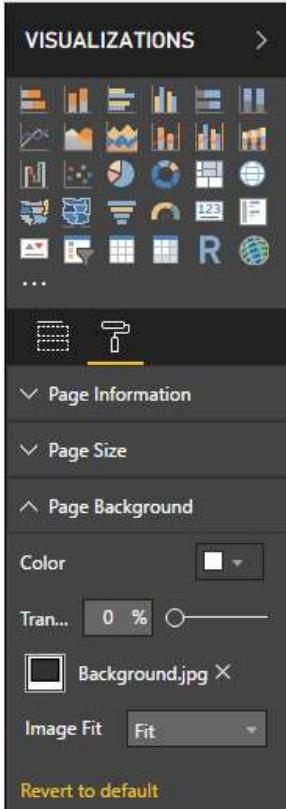
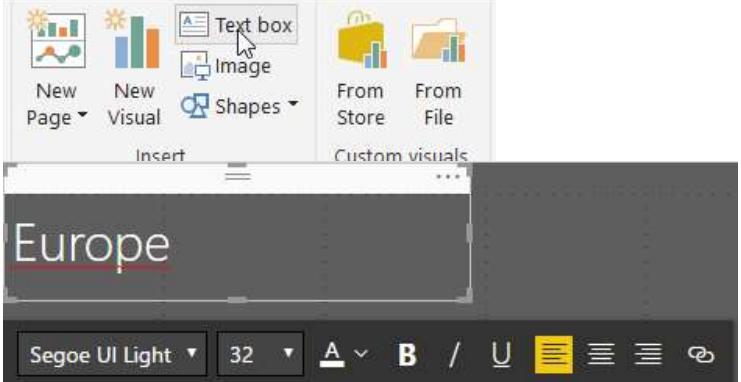
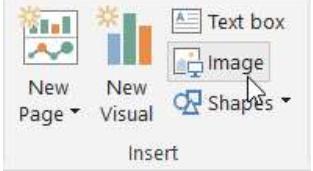
Inoltre nella parte data colors impostare come colore minimio il seguente valore e come valore massimo # FAE99F il seguente valore #FF1D00

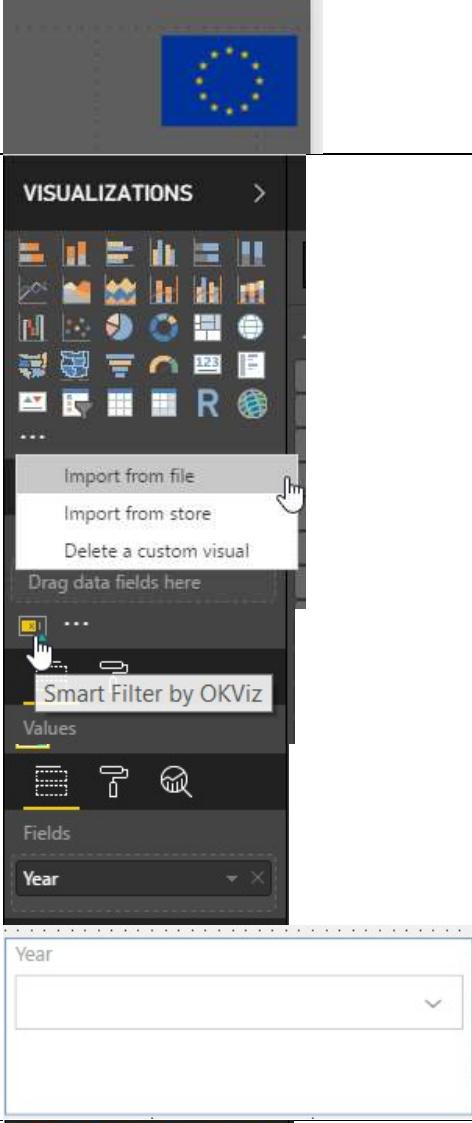
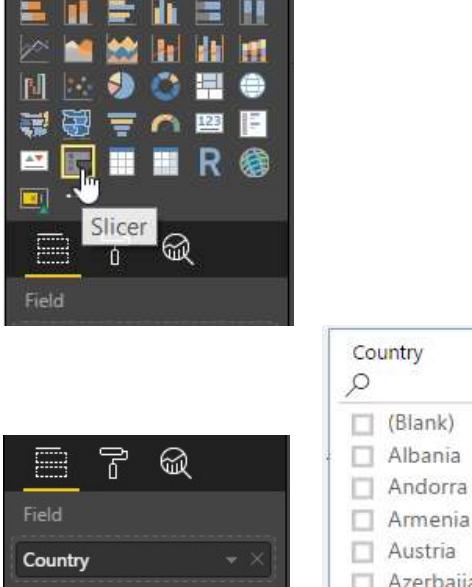


Nella parte di formatting selezionare come titolo “Life Expectancy by Education Level 3-8 %”

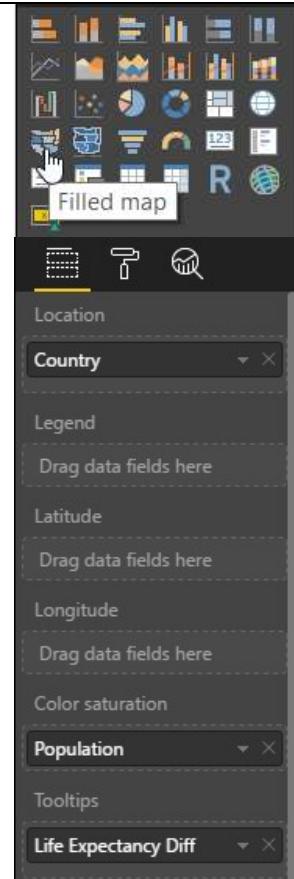


## Data visualization : Europe Geo

Azione	Screenshot
Creare un nuovo foglio cliccando sul + e rinominandolo in “Europe Geo”	
Caricare un immagine di sfondo per caricare la barra del titolo Background.jpg e impostare a Fit la proprietà “image Fit”	
Inserire una TextBox in cui scriviamo “Europe” con carattere 32 di colore bianco. Nelle impostazioni generali inserire 184 come “width” e “height” 56 e come “Xposition” 0 e “Yposition” 0	
Inserire un’immagine. Es. europe-flag.png  Nelle impostazioni generali inserire 96 come “width” e “height” 64 e come	

<p>“Xposition” 1184 e “Yposition” 0</p>								
<p>Selezionare i puntini nella parte dei visual per caricare un filtro custom per l’anno.</p> <p>Scegliere importa da file e selezionare dalla cartella locale il file “smartFilter.pbviz”</p> <p>Usare il nuovo oggetto visual per inserirlo nella pagina che stiamo costruendo</p> <p>Come campo per filtrare selezionare “Year”</p>								
<p>Inserire uno slicer e selezionare il campo “Country”</p>	 <table border="1" data-bbox="874 1657 1356 1918"> <thead> <tr> <th>Country</th> </tr> </thead> <tbody> <tr> <td>(Blank)</td> </tr> <tr> <td>Albania</td> </tr> <tr> <td>Andorra</td> </tr> <tr> <td>Armenia</td> </tr> <tr> <td>Austria</td> </tr> <tr> <td>Azerbaijan</td> </tr> </tbody> </table>	Country	(Blank)	Albania	Andorra	Armenia	Austria	Azerbaijan
Country								
(Blank)								
Albania								
Andorra								
Armenia								
Austria								
Azerbaijan								

Inserire una "Filled Map" dagli oggetti visual  
Inserire la "country" nella location e la "Population" nella color saturation e infine la "Life Expectancy Diff" nella sezione Tooltips



## Advanced

In questa sezione vengono descritte alcune delle funzionalità avanzate proprie della piattaforma di Power BI.

### Analytics pane

Quasi tutti gli elementi visuali presenti in Power BI Desktop hanno un pane con delle funzionalità di analytics già preconfezionate. A breve saranno disponibili su tutti gli elementi visuali.

Esempio. Creazione di linee di trend in automatico senza dover creare misure specifiche nel modello.

Azione	Screenshot
Se ci posizioniamo sopra al grafico a dispersione possiamo notare che c'è un icona con una lente che consente di accedere ad un menu di analytics già pronti.	
Espandere la prima voce "Trend Line" e cliccare su "Add" per aggiungere una linea di trend	
Lasciamo invariato il titolo	

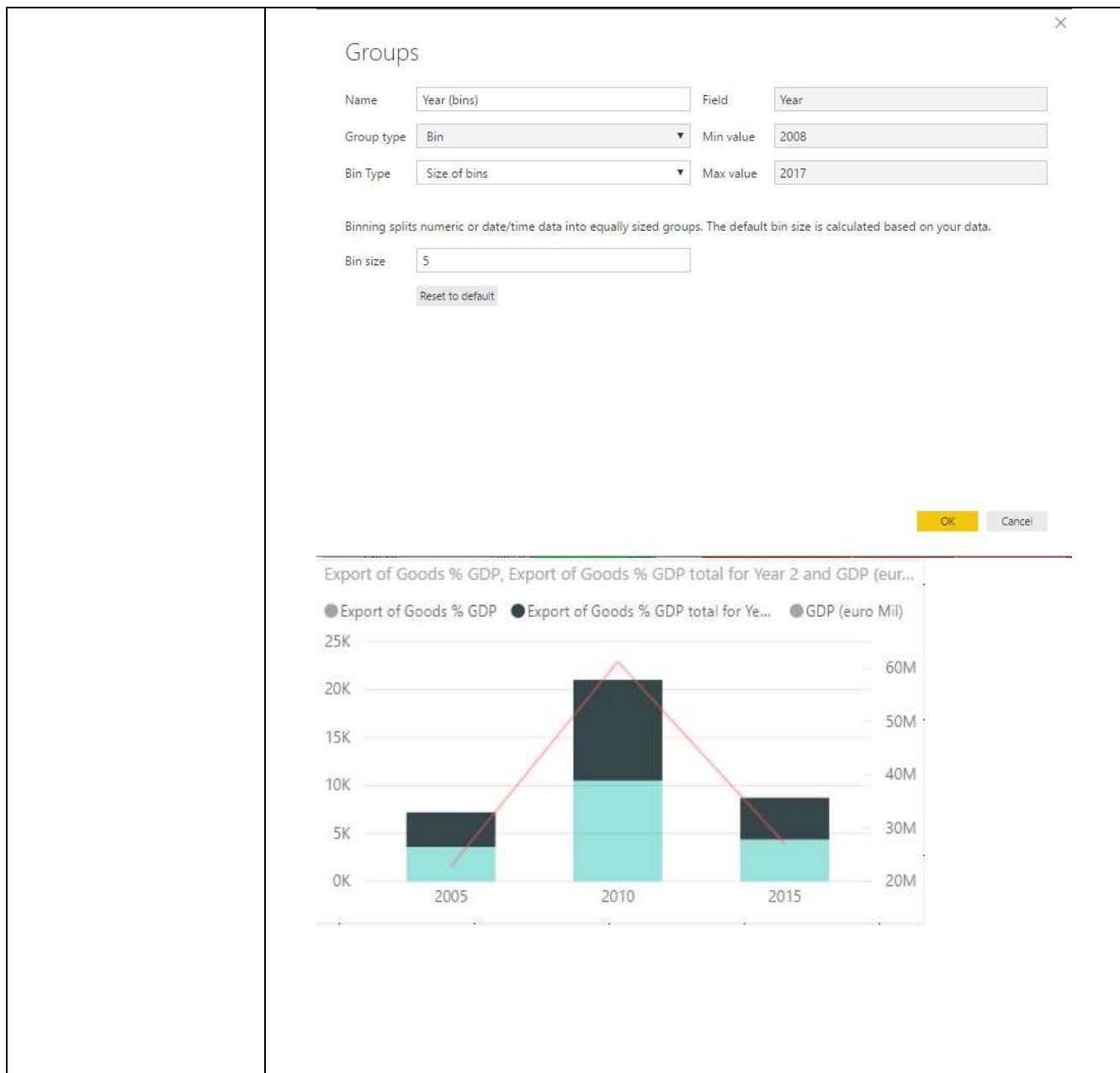


## Grouping o Binning

Quando Power BI Desktop crea i visual, aggrega i dati in blocchi (o gruppi) in base ai valori trovati nei dati sottostanti. Spesso va bene, ma potrebbero esserci delle volte in cui si desidera perfezionare il modo in cui vengono presentati questi blocchi. Ad esempio, potresti voler posizionare tre categorie di prodotti in una categoria più grande (un gruppo).

In Power BI Desktop, è possibile raggruppare i dati per consentire una visione più chiara e per analizzare ed esplorare dati e tendenze nei visual. Puoi anche definire la dimensione del bin, spesso chiamata binning, per mettere i valori in gruppi di dimensioni uguali che ti consentono di visualizzare i dati in modo significativo.

Azione	Screenshot																																																
<p>Ci posizioniamo sopra al grafico a barre e linee appena modificato</p> <p>Nella parte della configurazione in cui si impostano i valori se clicchiamo con il tasto destro sopra la voce “Shared axis” compare un menù a scelta rapida.</p> <p>Dal menù scegliamo la voce “New Group” e dalla schermata che esce fuori scegliamo di raggruppare gli anni per “bin” che hanno una dimensione di 5 item (anni).</p>	<p>The chart displays two data series: 'Export of Goods % GDP' (teal bars at the bottom) and 'GDP (euro Mil)' (black bars stacked on top). The Y-axis ranges from 0K to 30K. The X-axis shows years from 2008 to 2018. A red line series is also present. Below the chart, the 'Shared axis' settings are shown, and a context menu is open, highlighting the 'New Group' option under the 'Year' section.</p> <table border="1"><caption>Data extracted from the chart</caption><thead><tr><th>Year</th><th>Export of Goods % GDP (K)</th><th>GDP (euro Mil) (K)</th><th>Total (K)</th></tr></thead><tbody><tr><td>2008</td><td>~2K</td><td>~28K</td><td>~30K</td></tr><tr><td>2009</td><td>~1K</td><td>~29K</td><td>~30K</td></tr><tr><td>2010</td><td>~2K</td><td>~28K</td><td>~30K</td></tr><tr><td>2011</td><td>~1K</td><td>~28K</td><td>~30K</td></tr><tr><td>2012</td><td>~2K</td><td>~28K</td><td>~30K</td></tr><tr><td>2013</td><td>~1K</td><td>~28K</td><td>~30K</td></tr><tr><td>2014</td><td>~2K</td><td>~28K</td><td>~30K</td></tr><tr><td>2015</td><td>~3K</td><td>~27K</td><td>~30K</td></tr><tr><td>2016</td><td>~2K</td><td>~28K</td><td>~30K</td></tr><tr><td>2017</td><td>~1K</td><td>~27K</td><td>~28K</td></tr><tr><td>2018</td><td>~2K</td><td>~26K</td><td>~28K</td></tr></tbody></table>	Year	Export of Goods % GDP (K)	GDP (euro Mil) (K)	Total (K)	2008	~2K	~28K	~30K	2009	~1K	~29K	~30K	2010	~2K	~28K	~30K	2011	~1K	~28K	~30K	2012	~2K	~28K	~30K	2013	~1K	~28K	~30K	2014	~2K	~28K	~30K	2015	~3K	~27K	~30K	2016	~2K	~28K	~30K	2017	~1K	~27K	~28K	2018	~2K	~26K	~28K
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### Aggiungere parametri e trasformare il foglio in un template

In questa parte dovremmo creare dei parametri per parametrizzare il caricamento dei file e successivamente salveremo il foglio come un template per renderlo distribuibile senza inviare ai colleghi anche i dati all'interno ma lasciando la libertà ad ognuno di caricarsi i propri file.

Azione	Screenshot
Entriamo in power query sfruttando il tasto di “transform data”	<p>External tools</p> <p>The screenshot shows the Power BI ribbon with the 'Transform data' icon highlighted in blue. Other icons include 'New visual', 'Text box', and 'Inse'.</p>

Una volta entrati in power query si seleziona dalla voce “**Gestisci Parametri**”

l’opzione di creare un nuovo parametro come si vede a lato. Gli si da il nome di **Path** e lo definiamo tipo testo impostando come default il percorso in cui si trovano i file che avete usato per costruire questa demo

Una volta aggiunto il parametro dobbiamo inserirlo nel codice M quindi andiamo nell’editor avanzato per la query **Demographics** e sostituiamolo la prima parte della query con la variabile **Path**

Facciamo la stessa cosa per la query **Gdp** e sostituiamolo la prima parte della query con la variabile **Path**

Esportiamo il file come un template.

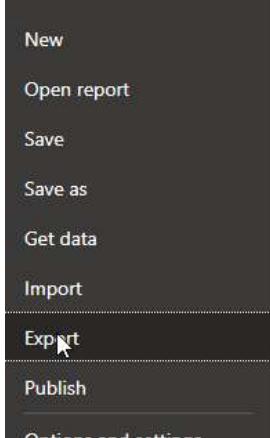
## Demographics

```
1 let
2 ... Source = Excel.Workbook(File.Contents(Path &"\Demographics.xlsx"), null, true),
3 ... Demographics_Sheet = Source{[Item="Demographics", Kind="Sheet"]}[Data],
4 ... in Demographics_Sheet
```

## Gdp

```
1 let
2 ... Source = Excel.Workbook(File.Contents(Path &"\Gdp.xlsx"), null, true),
3 ... Gdp_Sheet = Source{[Item="Gdp", Kind="Sheet"]}[Data],
```

Proviamo il nuovo template cliccando sul file appena esportato e verifichiamo che inserendo il percorso dei file questo effettivamente carichi tutti i dati e gli elementi visivi.



The screenshot shows the Power BI desktop application. On the left, a dark sidebar menu is open with the following options: New, Open report, Save, Save as, Get data, Import, Export (which is highlighted with a cursor), Publish, and Options and settings. To the right of the menu, the main workspace displays a data grid with several columns labeled 'Data', 'Query', 'Wanted', 'Cancel', and 'Condiz'. A small modal dialog box is overlaid on the grid, titled '3-PQ e M (Finale)'. It contains a single input field labeled 'Path' with the value 'C:\Users\...'. Below the input field are two buttons: 'Cerca' (Search) and 'Annulla' (Cancel). To the right of the search bar, there is a large 'X' button to close the dialog. On the far right of the workspace, there is a vertical sidebar with filter settings, including sections for 'Filtri in questa pag' (Filters in this page) and 'Filtri in tutte le pag' (Filters in all pages), each with 'Cerca' and 'Aggiungere qs' (Add query string) buttons.

# Demo 0- Modellazione

**Mostrare limiti per granularità che aumenta:** Si parte dal file excel (**0 - Single table in Excel.xlsx**) e si genera una tabella pivot dalla tabella excelsi mostra che per interrogare la tabella singola si usa in excel la tabella pivot.

- Si aggrega per brand e sAles amount (sum di tutte le transazioni raggruppate per brand)

Row Labels	Sum of SalesAmount	Sum of TotalCost
A. Datum	179,451,946.31	75,231,658.82
Adventure Works	364,980,354.95	178,905,144.45
Adventure Works	5,311,502.59	2,645,179.87
Contoso	507,742,659.30	239,715,609.47
Contoso	114,687,636.93	54,873,950.83
Fabrikam	267,614,714.84	126,609,686.76
Fabrikam	181,011,339.85	80,570,194.62
Litware	245,428,449.09	119,093,456.75
Litware	51,949,740.38	26,245,598.66
Northwind Traders	108,163,138.94	52,248,581.46
Prosware	223,288,734.22	103,791,556.33
Southridge Video	131,026,015.56	120,515,842.72
Tailspin Toys	30,588,870.06	15,780,150.92
The Phone Company	124,810,502.38	60,337,578.95
Wide World Importers	182,147,024.42	87,690,717.11
<b>Grand Total</b>	<b>2,718,202,629.81</b>	<b>1,344,254,907.72</b>

- Si leva il brand e si porta la categoria sopra la subcategory e si interroga la tabella QUESTO E' POSSIBILE PERCHE' CATEGORY E SUBCATEGORY sono due colonne SEPARATE della tabella
- Cosa succede se voglio interrogare per color?
  - NON c'è e quindi non possiamo analizzare per colore. Il problema è che dobbiamo chiedere a chi ci fornisce il file una granularità superiore cioè aumentare la granularità -> Quale problema?

1. Mostrare che non tutti : Si passa a mostrare il file power bi che contiene un'unica tabella di 12 milioni di righe (**0 - Introducing the data model.pbix**)

- Trasciniamo sulle righe l'education poi trasciniamo la **sales amount**. Tutto sembra bene MA ci sono delle colonne nella tabella che non sono aggregabili con la sum. Vediamo se trasciniamo la **averageyearlyincome**

ProductName	ColorName	Education	Sum of SalesAmount
TV and Video	Black		8,410,177.49
Music, Movies and Audio Books	Black	Bachelors	277,505.46
Home Appliances	Black	Graduate Degree	192,227.27
Games and Toys	Black	High School	150,521.56
Computers	Black	Partial College	256,989.12
Cell phones	Black	Partial High School	56,077.35
Cameras and camcorders	Blue		170,542.26
Audio	Gold		1,128,143.39
	Grey		1,320,188.41
	Red		499,711.38
	Red	Bachelors	19,655.06
	Red	Graduate Degree	14,622.68
	Red	High School	11,813.04
	Red	Partial College	21,925.93
	Red	Partial High School	5,624.73
	<b>Total</b>		<b>30,345,766.30</b>

- Trascino anche la media annua(**averageyearlyIncome**) per esempio la averageyearlyincome ad esempio va bene per customer ma cosa succede se raggruppo per brand? questo crea un valore

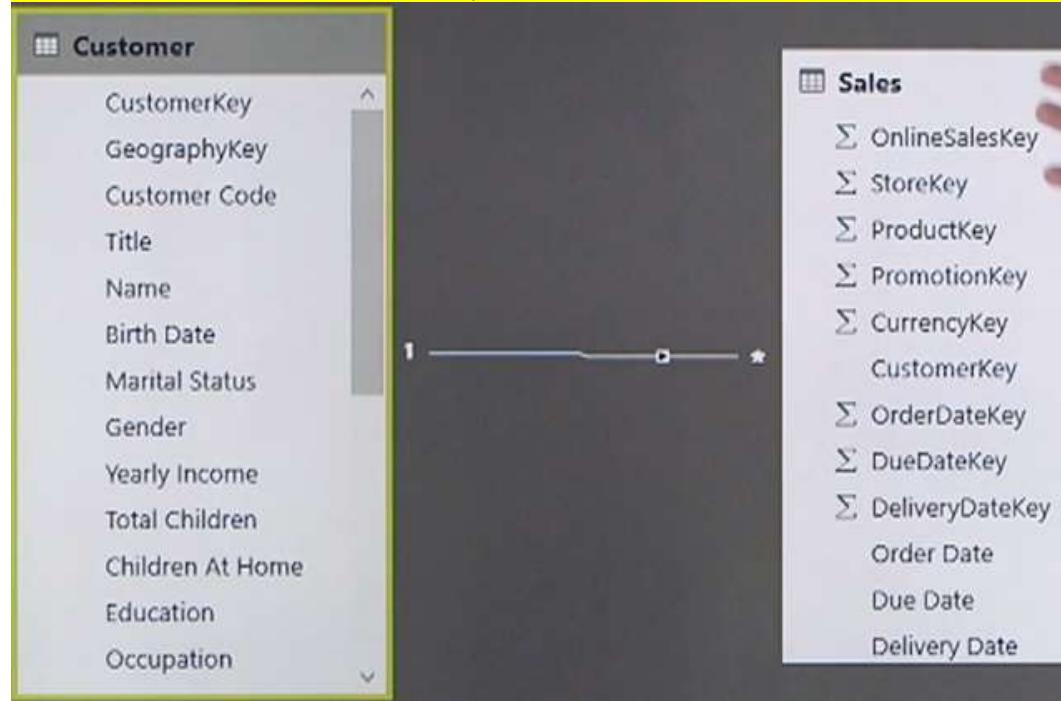
completamente sbilanciato il GRAND TOTAL è strano che la media sia 7769508.95 non ci sono customer così ricchi e **allora cosa E' Successo?** Andiamo a vedere il data model **Quale è il significato dell'attributo YearlyIncome per questa tabella dove ci sono le transazioni?** Se noi prendiamo un sigolo customer vediamo che si ripete più volte per ogni transazione. Quindi la media avviene sul numero di righe che sarebbero le transazioni quindi sono le trasnazioni che fanno pesare la media in modo diverso che E' sbagliato.... UN CUSTOMER E' un CUSTOMER NON DOBBIAMO FARLO PESARE IN BASE ALLE SUE TRANSAZIONI.

**Come si risolve questo problema?-→ bisogna costruire una complessa funzione dax**

```
Correct Average =
```

```
AVERAGEX (
    SUMMARIZE (
        Sales,
        Sales[CustomerKey],
        Sales[YearlyIncome]
    ),
    Sales[YearlyIncome]
)
```

**Non è una soluzione facile e quindi?** Bisogna lavorare sul data model creando più tabelle per descrivere le varie entità da analizzare quindi tabella dei customer e tabella delle trasnazioni.

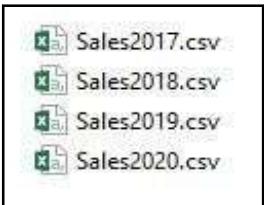


Andiamo a vedere come avremmo fatto (**0-Leveraging the data model.pbix**) spiegare che ci sono diversi modi per creare questi modello. **MOSTRARE CHE ORA SE LA MISURA LA FACCIAMO SUL CUSTOMER E NON SULLE TRANSAZIONI ALLORA ABBIAMO VINTO**

```
AverageYearlyIncome = AVERAGE ( Customer[Yearly Income] )
```

## Laboratorio 0–Data Model (assieme in classe)

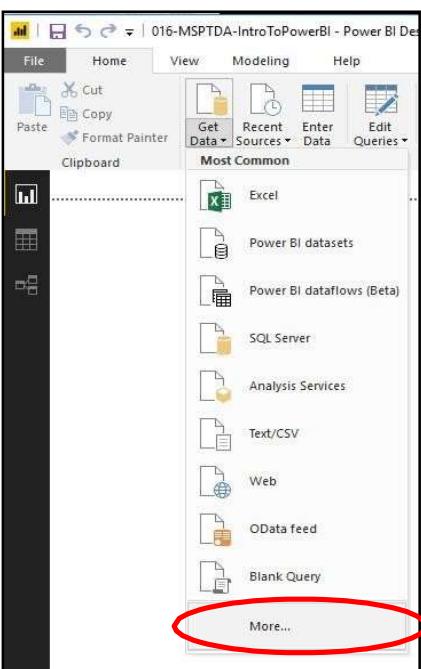
- 1) In questo Laboratorio incominceremo portando i dati all'interno di power query per trasformarli poi e vedremo come arrivare alla costruzione di un data model efficiente
  - 2) Apri il file vuoto di Power BI Desktop
- IMPORTAZIONE DEI FATTI-----**
- 3) I dati della tabella dei **fatti** che dobbiamo importare provengono da più CSV (Valori separate da virgola) che si trovano nella directory **dati nella cartella 0-DATA MODEL**. Dobbiamo importare queste tabelle e aggiungerle in un'unica tabella dei fatti. I file che dobbiamo importare e aggiungere hanno questo aspetto



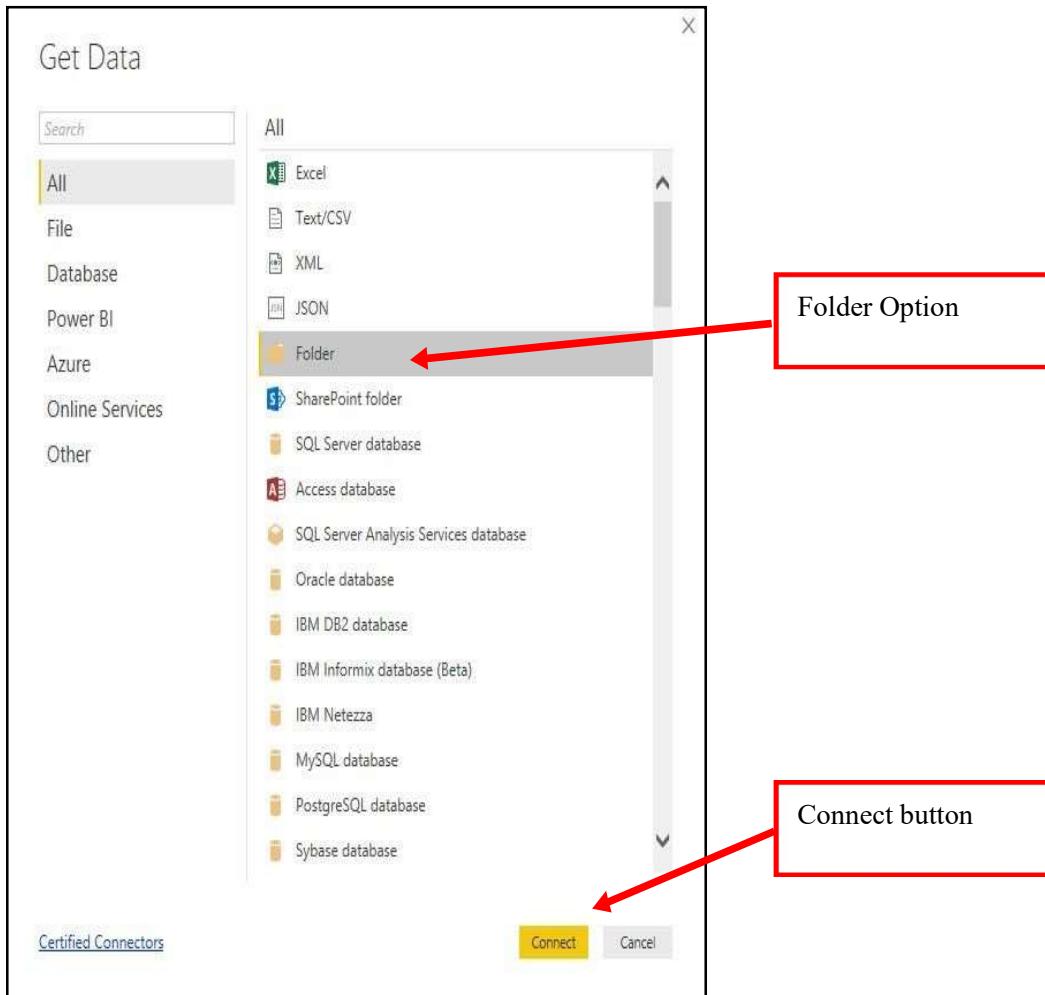
- 4) I singoli file CSV si presentano così:

A	B	C	D	E	F	G
1	ISO Date	ProductID	SalesRep	UnitsSold	Discount	COGSTotal
2	20171228	1	2	7	0.055	131.0582355
3	20170118	7	4	95	0.4375	675.4277925
4	20171012	12	2	72	0.4375	708.2377406
5	20171212	1	1	4	0	74.89042027
6	20171109	6	15	6	0.055	60.91124705
7	20170124	7	1	72	0.4375	511.9031691
8	20171119	10	6	8	0.055	76.829026
257498	20170419	1	2	72	0.4375	1348.027565
257499	20170428	2	22	96	0.4375	953.3091909
257500						

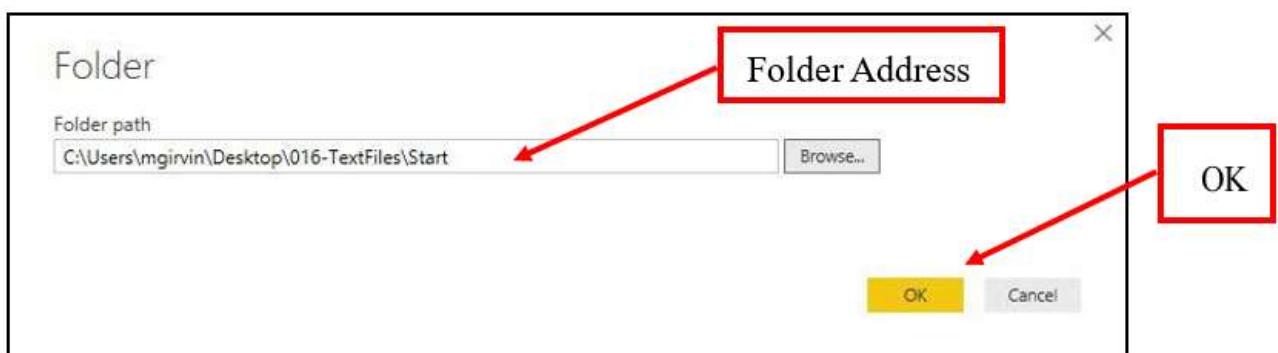
- 5) Per iniziare la nostra importazione e trasformazione dei file CSV in un singolo set di dati corretti andiamo sulla ribbon Home, quindi nel gruppo "External data", facciamo clic sulla freccia a discesa "Get data", quindi facciamo clic su "More...."



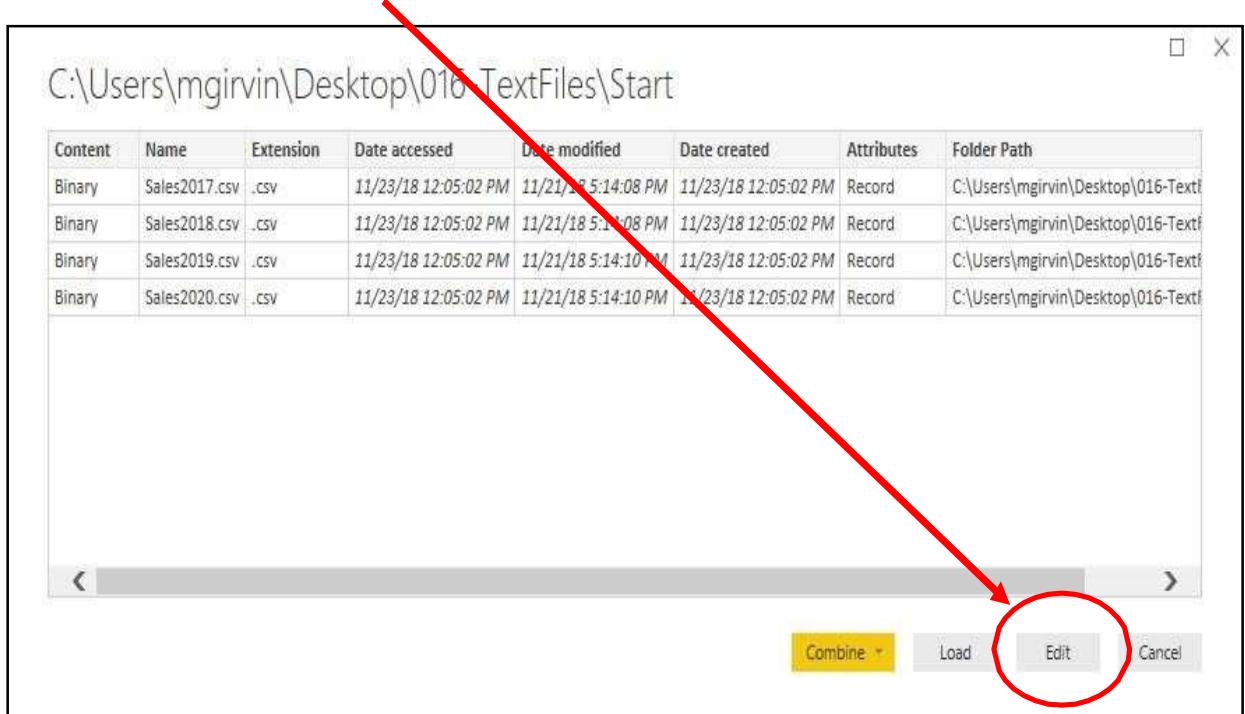
- 6) Nella finestra di dialogo “**Get Data**” seleziona l’opzione “**Folder**”, quindi fai clic sul pulsante “**Connect**”..



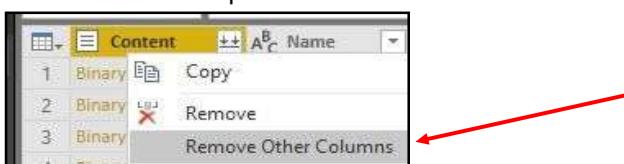
- 7) Nella finestra di dialogo Cartella, vai alla cartella "Start" corretta che contiene i quattro file CSV iniziali, quindi fai clic su OK



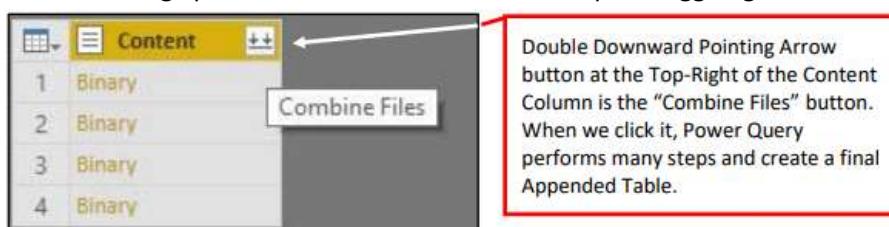
- 8) Nella finestra di dialogo successiva, fai clic su "Edit" o "Transform data"



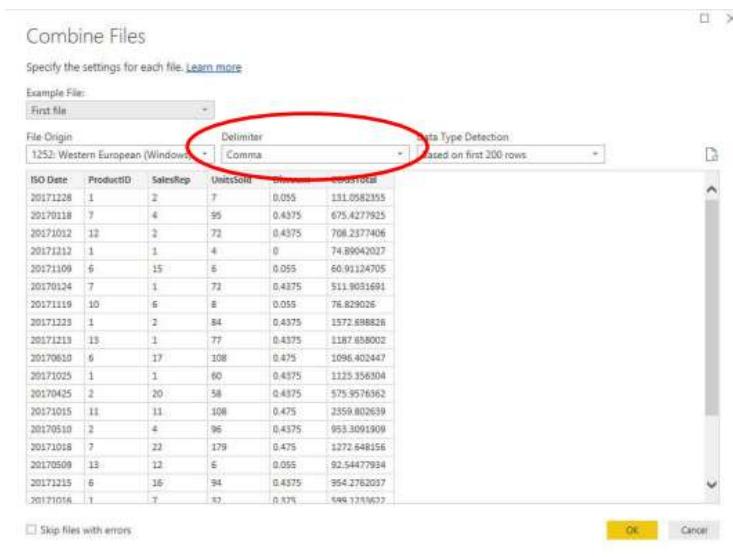
- 9) Mostrare quello che ha fatto l'operazione di combine
- 10) Se osserviamo la colonna delle estensioni nella figura precedente vediamo che **la cartella che contiene questi file ha solo file ".csv"** quindi non serve filtrare la tipologia di file.
- 11) La colonna **Content** è la colonna che contiene i file ".csv" per ogni riga. Non abbiamo bisogno di nessuna delle altre colonne rimanenti con attributi di file e quindi per rimuovere tutte le colonne ad eccezione di Colonna del contenuto, facciamo clic con il pulsante destro del mouse sulla colonna "**Remove other Columns**"



- 12) Il pulsante con la doppia freccia rivolta verso il basso in alto a destra nella colonna del contenuto è il "**Combina file**". Quando si fa clic su questo pulsante, Power Query ci chiederà quale è il delimitatore, quindi, dopo averlo indicato, creerà una funzione **Power Query personalizzata che verrà utilizzata per ogni riga del contenuto colonna per estrarre il file di testo e convertirlo in un set di dati corretto**. Power Query utilizzerà quindi la Funzione personalizza su ciascuna riga per creare un set di dati corretto, quindi aggiungerà tutte le tabelle in una singola tabella.



- 13) Dopo aver fatto clic sul pulsante "Combina file", la finestra di dialogo successiva chiede quale Delimitatore utilizzare che per noi sarà la virgola. Dopo aver selezionato il delimitatore, fare clic sul pulsante OK.



- 14) Dopo aver selezionato il delimitatore e fare clic sul pulsante OK:
- Power Query creerà una funzione Power Query personalizzata che può essere utilizzata per ogni riga nella colonna Contenuto per estrarre il file di testo come Set di dati
  - Power Query utilizzerà la funzione personalizzata per ogni riga

- Power Query aggiungerà tutte le tabelle in un singolo set di dati corretto (tabella)
- Power Query eseguirà una serie di passaggi per aggiungere le tabelle, incluso l'ultimo passaggio per aggiungere il tipo di dati corretto a ciascuna colonna.

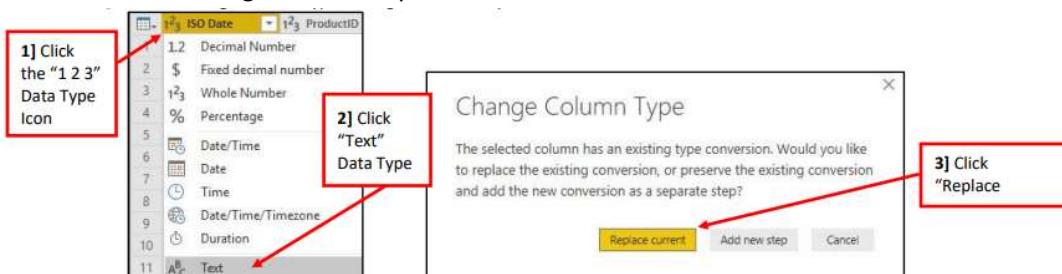
15) Le prime tre righe della tabella finale di **fTransactions** sono illustrate di seguito. Ma dobbiamo eseguire due attività di pulizia dei dati rimanenti per questa tabella:

- dobbiamo 1) **convertire la data ISO in una data corretta** e 2) **quindi arrotondare i numeri COGS (cost of goods sold)**

	ISO Date	ProductID	SalesRep	UnitsSold	Discount	COGSTotal
1	20171228	1	2	7	0.055	131.0582
2	20170118	7	4	95	0.4375	675.42775
3	20170112	12	2	72	0.4375	708.23774

16) Converti la **ISO Date** in data corretta:

- Fare clic sull'icona del tipo di dati "1 2 3" nell'intestazione della colonna della data ISO in alto a sinistra
- Dal menu a discesa, fai clic sul tipo di dati "Testo"
- Nella finestra di dialogo "Cambia tipo di colonna", fai clic su "Sostituisci corrente"



- Fare clic sull'icona del tipo di dati "A B C" nell'intestazione della colonna della data ISO in alto a sinistra
- Dal menu a discesa, fai clic sul tipo di dati "Data"
- Nella finestra di dialogo "Cambia tipo di colonna", fai clic su "Aggiungi nuovo passaggio"

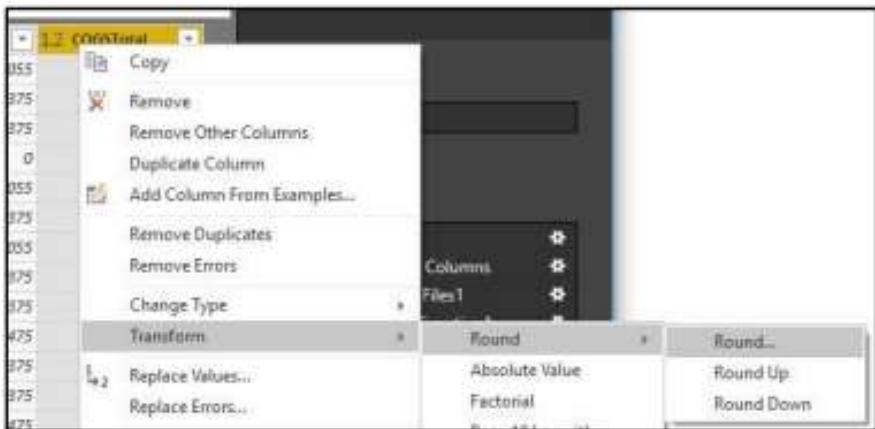


17) Fare doppio clic sul nome del campo "**ISO Date**", digitare il nuovo nome del campo "**Date**", quindi premere Invio.

1	12/28/17
2	1/18/17
3	10/12/17

The result should look like this

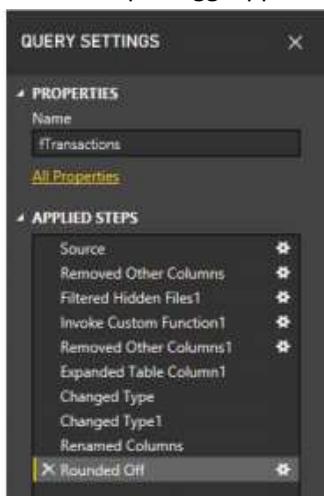
18) Campo COGS arrotondato: fare clic con il pulsante destro del mouse su Nome campo **COGSTotal**, selezionare "**Transform**", quindi fare clic su "**Round**".



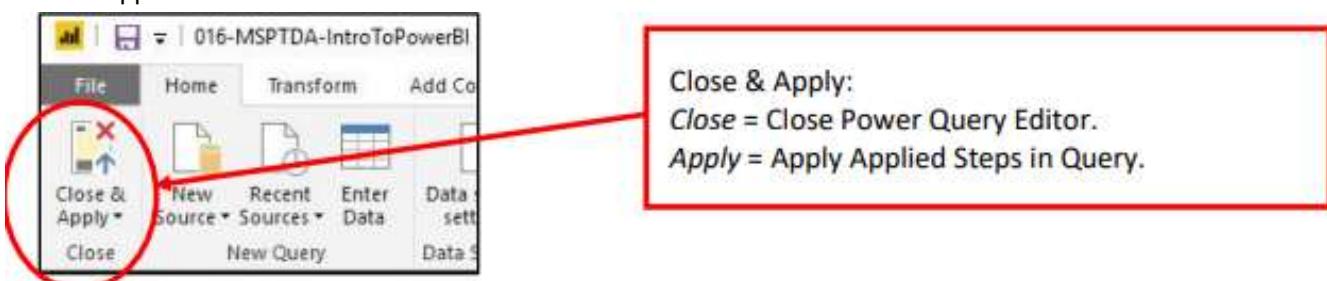
19) Nella finestra di dialogo Round, **digitare 2**, quindi fare clic su OK



20) Nell'Elenco dei passaggi applicati di Power Query, ecco i passaggi finali per la nostra importazione e trasformazione:



21) Chiudi e applica. Per caricare la tabella nel modello dati nella Ribbon Home.



22) **Data Icon**. Nella finestra dell'Editor di Power Query, sull'estrema sinistra, fa clic sul pulsante icona "Data" (in realtà

questa icona dovrebbe essere chiamata "Table icon").



23) Ecco come appare la tabella **fTransactions** caricata

With "Data" Icon selected, we can preview tables in Data Model.

Table Name with Field Names listed below.

24) Facciamo alcune considerazioni importanti sui campi Date e Numero nella tabella Power BI

a. Di seguito è riportata un'immagine dei nomi delle tabelle e dei campi **fTransactions**:

1] The Sigma Icon (SUM Icon) is mis-leading because it looks similar to the Icon for a Measure in Power Pivot.  
2] In Power BI Desktop, this Sigma Icon means that there are numbers in these fields.  
3] These Number Fields should NOT be dragged to Reports for summary calculations because it will create Implicit Measures.

b. Dando un'occhiata ravvicinata al nome della tabella e ai nomi dei campi, notiamo:

- i. Un'icona della tabella appare a sinistra del nome della tabella.
- ii. Il campo della data non mostra un'icona a sinistra del nome del campo.

- I campi data dalle tabelle dei fatti non devono essere trascinati in tabelle e oggetti visivi perché ogni volta che si esegue questa operazione, Power BI Desktop crea una tabella di data nascosta (opzione da disabilitare da power bi desktop)
- Come vedremo è molto più efficiente creare una nostra tabella delle date specifica con la nostra logica; e, soprattutto, creando una singola tabella Date e contrassegnandola come una

tabella Date, evitiamo l'accumulo di più tabelle di date non necessarie.

- In seguito dovremo nascondere tutti i campi data nella tabella dei fatti dalla vista nel report.
- **Regola per i campi data dalle tabelle dei fatti: non vogliamo trascinare i campi data dalle tabelle dei fatti nelle tabelle o visualizzazioni**

iii. I campi che contengono numeri hanno un'icona **Sigma** (icona SUM) fuorviante a sinistra di Nome campo  
In Power BI Desktop questa icona indica che ci sono numeri nella colonna. Questo **icona è fuorviante** per due motivi:

- Il primo motivo per cui l'icona Sigma è fuorviante è che è simile all'icona utilizzata in Excel Power Pivot per misure. Ciò significa che l'icona Sigma in Excel Power Pivot indica una "misura", ma in Power BI Desktop indica che il campo contiene numeri.
- La seconda ragione per cui è fuorviante è che suggerisce indirettamente che è un campo da trascinare nel report per le visualizzazioni ma non va bene perché dietro le quinte power bi crea una misura implicita che non vediamo quindi tanto meglio creare noi una misura che specifica come trattare il campo **inoltre le Misure implicite lo sono inefficienti**.
- In seguito dovremo nascondere i campi del numero della tabella dei fatti dalla vista report
- **Regola per i campi numerici con icone Sigma: non vogliamo trascinare e rilasciare il campo con il numero dalle tabelle dei fatti in tabelle o visualizzazioni**

---

#### -----IMPORTAZIONE DELLE DIMENSIONI-----

25) Importa le tabelle delle dimensioni da un singolo file Excel. Nel file Excel con il nome "**0-Data Model.xlsx**", abbiamo queste tabelle delle dimensioni:

- a. **dSalesRep tabella Excel.**
  - i. Collegheremo questa tabella dimensionale con la tabella dei fatti in una relazione uno-a-molti in modo da poter utilizzare i campi SalesRep e Region come condizioni / criteri / filtri per i nostri report.
- b. **dProduct tabella Excel.**
  - i. La tabella dProduct contiene due chiavi esterne (**CategoryID** e **SupplierID**) che si collegano in una relazione uno-a-molti con il Tabelle **dCategory** e **dSupplier**. Dopo aver importato tutte e tre le tabelle, utilizzeremo Power Query per estrarre il campo Categoria dalla **dCategory** e campo del fornitore dalla tabella **dSupplier** alla tabella dProduct in modo da poter disporre di un **modello di dati adeguato allo schema a stella**.
  - ii. Collegheremo la tabella dimensionale **dProduct** con la tabella dei fatti in una relazione uno-a-molti in modo da poter usare vari campi come Condizioni / criteri / filtri per i nostri report, e quindi possiamo utilizzare le formule DAX dei prezzi al dettaglio per calcolare le entrate.
- c. **dCategory tabella Excel.**
  - i. Utilizzando Power Query, uniremo questa tabella nella tabella **dProduct**.
- d. **dSupplier tabella Excel.**
  - i. Utilizzando Power Query, uniremo questa tabella nella tabella **dProduct**.

016-MSPTDA-Excel.xlsx - Saved

File Home Insert Page Layout Formulas Data Review View Developer Add-ins Help Power Pivot Tell me what you want to do Share Comments

S39

**dSalesRep**

SalesRepID	SalesRep	Region
1	Sioux Redcoordinator	NW
2	Tyrone Smithie	NE
3	Chantel Zoya	SW
4	Chin Pham	SE
5	Diego Vasque	MW
6	Vannessa Deloach	W
7	Shan Stein	NW
8	Tom Benton	NE
9	Ghislaine Stidham	SW
10	Yoshiko Murillo	SE
11	Hoyt Potts	MW
12	Alysha Dewitt	W
13	Claudine Dupuis	NW
14	Shanta Spring	NE
15	Ramonita Babcock	SW
16	Jaynece Betancourt	SE
17	Rhianon Cathey	MW
18	Dominica Ordonez	W
19	Rana Burchfield	NW
20	Neida Ashe	NE
21	Maryeuse Halverson	MW
22	Naome Bloom	NW
23	Jojo Jones	W
24	Dean Washington	W
25	Kiki Lim	W

**dProduct**

ProductID	Products	RetailPrice	CategoryID	SupplierID
1	Quad	49.95	3 GB	
2	Yankee	27.95	1 CO	
3	Eagle	19.95	2 CC	
4	Bellie	26.95	1 GB	
5	Aspen	24.95	1 CO	
6	Carlota	23.95	3 GB	
7	Sunshine	19.95	4 GB	
8	Sunset	22.95	4 GB	
9	Beaut	35.95	5 CO	
10	Kangaroo	25	2 CC	
11	Elevate	48.95	5 GB	
12	Fiatop	25.95	2 CO	
13	Vriang	32.95	4 DB	
14	Trifly	21.95	3 DB	
15	NaturalEibow	35	4 DB	
16	LongRang	41	5 CC	

**dCategory**

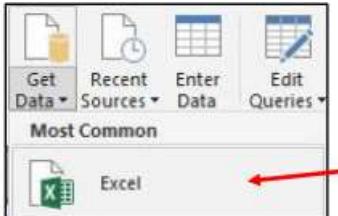
CategoryID	Category
1	Beginner
2	Advanced
3	Freestyle
4	Competition
5	Long Distance

**dSupplier**

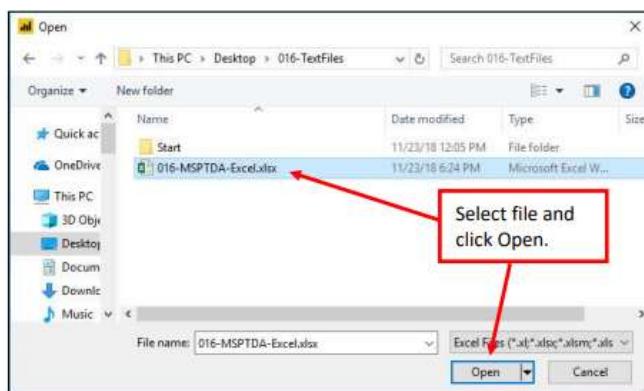
SupplierID	Supplier	City	State	E-mail
GB	Gei Boomerangs	Oakland	CA	gei@gei-boomerang.com
CD	Colorado Boomerangs	Gunnison	CO	Pollock@coloradoboomerang.com
CC	Channel Craft	Richland	WA	Dino@CC.com
DB	Darnell Booms	Burlington	VT	Darnell@Darnell.com

After we Import all four tables, We will use Power Query to Merge the two Snow Flake Dimension Tables into the dProducts Table.

- 26) Per importare le tabelle delle dimensioni dalla cartella di lavoro di Excel, andiamo alla scheda Ribbon Home di Power BI Desktop, quindi nel gruppo "External Data", facciamo clic sulla freccia a discesa Ottieni dati, quindi facciamo clic sull'opzione Excel (prima voce nell'elenco).

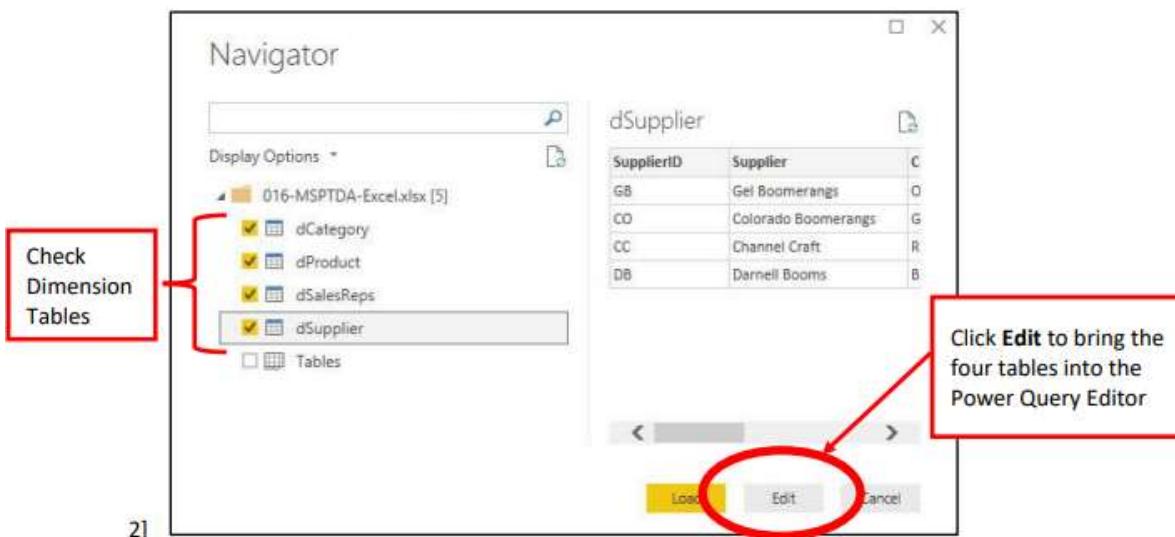


- 27) Nella finestra di dialogo Apri, selezionare il file della cartella di lavoro di Excel denominato "0-Data Model.xlsx". Fai clic su Apri



- 28) Nella finestra di dialogo Navigator, selezionare gli oggetti Excel desiderati. Per questo progetto scegli le quattro tabelle delle dimensioni. Quindi fare clic su Modifica per portare le quattro tabelle in Power Query Editor.
- Nota: ci sono più potenziali oggetti Excel che possono apparire in questa finestra di dialogo Navigator, tra cui Oggetti tabella Excel e oggetti foglio. Dovrai essere consapevole di quali oggetti sono presenti nell' Excel e

selezionare gli oggetti che si desidera importare.



29) **Verificare** che le tabelle delle dimensioni siano state importate correttamente e verificare il tipo di dati corretto per ciascun campo. Nell'editor di Power Query, possiamo vedere che ci sono quattro nuove query elencate nel riquadro delle query a sinistra: dCategory, dProduct (quello selezionato nell'immagine), dSalesRep e dSupplier. A destra in Riquadro impostazioni query, possiamo vedere il nome della query e dei passaggi applicati per la query dProduct. Uno per uno, **DEVI controllare ciascuna query per verificare che il nome della query sia adeguato e che i passaggi applicati abbiano aggiunto il tipo di dati corretto per ciascuna colonna di ciascuna tabella**. Per ogni nome di query, il nome tabella Excel ereditato è sufficiente. Ad esempio, "dProduct" è il nome della tabella Excel ereditato e questo è un buon nome per la query e per tabella risultante che verrà importata nel modello dati.

The screenshot shows the Power Query Editor window with the title '016-MSPTDA-IntroToPowerBI - Power Query Editor'. The ribbon tabs include File, Home, Transform, Add Column, View, and Help. The Home tab is selected. The toolbar includes Close & Apply, New Source, Recent Sources, Enter Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Split Column, Group By, Sort, Data Type (set to Whole Number), Use First Row as Headers, and Transform. The 'Queries [9]' pane on the left lists several queries, including 'Transform File from fTransactions [3]', 'Sample Query [2]', 'Other Queries [5]', and four specific queries: 'dCategory', 'dProduct', 'dSalesReps', and 'dSupplier'. A red bracket groups 'dCategory', 'dProduct', 'dSalesReps', and 'dSupplier' with the text 'Four Individual Queries, one for each Excel Table, have been created'. In the center, a preview grid shows data for the 'dProduct' query, with columns ProductID, Products, RetailPrice, CategoryID, and SupplierID. The data consists of 16 rows of product information. To the right, the 'QUERY SETTINGS' pane shows 'dProduct' selected in the 'Properties' section. The 'Applied Steps' section shows a step named 'Changed Type' with a red box around it. A red box with the text 'For each Table, Verify that Query Name and Applied Steps are correct.' is located at the bottom right of the pane. The status bar at the bottom indicates '5 COLUMNS, 16 ROWS' and 'PREVIEW DOWNLOADED AT 12:42 PM'.

## -----UNIRE LE SNOW FLAKE DIMENSION DENTRO LA DPRODUCT-----

- 30) Unisci le tabelle delle dimensioni dei fiocchi di neve nella tabella dProduct. Attenersi alla seguente procedura per unire **dCategory** e la tabella del fornitore nella tabella del **dproduct**:

- Selezionare la tabella **dProduct** nel riquadro delle query
- Nel gruppo Combina, nella Ribbon Home, fare clic sul menu a discesa **Merge query**, quindi da menu a discesa fai clic su **Merge query**.

**1] Select the dProduct table.**

**2] Click Merge Queries**

- Nella finestra di dialogo di **Merge** fare clic sulla colonna **CategoryID** nella tabella superiore
- Per la tabella inferiore selezionare **dCategory** dalla freccia a discesa.
- Fare clic sulla colonna **CategoryID** nella tabella inferiore.
- Fare clic su **OK**.

**3] Click the CategoryID column in the Top Table**

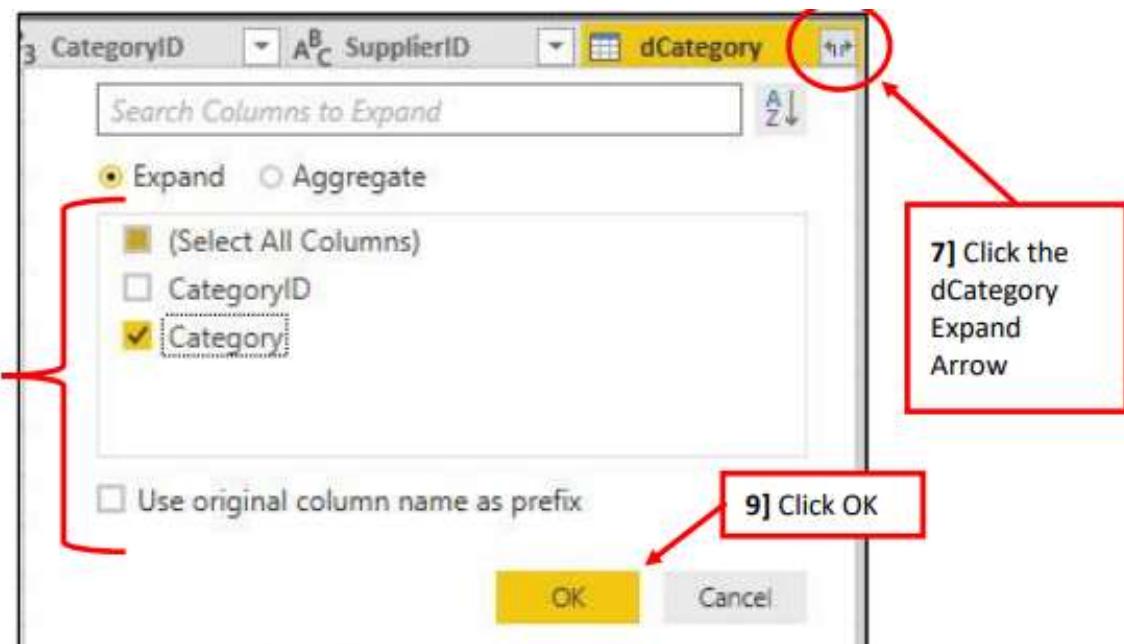
**4] Select dCategory from the dropdown arrow**

**5] Click the CategoryID column in the Bottom Table**

**6] Click OK**

- Il processo di **Merge** ha aggiunto una nuova colonna denominata **dCategory**. Fare clic sulla freccia Espandi **dCategory**.

- Deseleziona tutto tranne la colonna **dCategory**.
- Fare clic su OK.



- Ripetiamo la stessa operazione con la tabella **dSupplier** sul campo **SupplierID** e recuperiamo solo la descrizione **Supplier**

## Merge

Select a table and matching columns to create a merged table.

dProduct

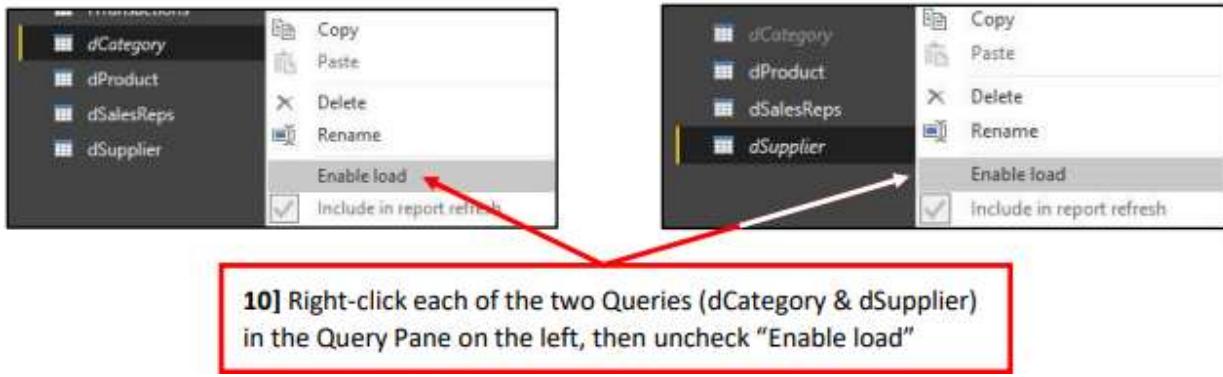
ProductID	Products	RetailPrice	CategoryID	SupplierID
1	Quad	43.95	3	GB
2	Yanaki	27.95	1	CO
3	Eagle	19.95	2	CC
4	Bellen	26.95	1	GB
5	Aspen	24.95	1	CO



dSupplier

SupplierID	Supplier	City	State	E-mail
GB	Gel Boomerangs	Oakland	CA	gel@gel-boomerang.com
CO	Colorado Boomerangs	Gunnison	CO	Pollock@coloradoboomerang.com
CC	Channel Craft	Richland	WA	Dino@CC.com
DB	Darnell Booms	Burlington	VT	Darnell@Darnell.com

- Eliminiamo le chiavi usate per recuperare le informazioni quindi **CategoryID** e **SupplierID**. Poiché abbiamo solo bisogno delle tabelle **dCategory** e **dSupplier** per parte della nostra trasformazione Power Query, e poiché NON vogliamo caricare le due tabelle nel modello di dati, dobbiamo fare clic con il pulsante destro del mouse su ciascuna delle opzioni delle due query (**dCategory & dSupplier**) quindi deselezionare "Enabled Load".



- 31) Di seguito è riportata un'immagine della tabella Transformed dProduct. A sinistra nel riquadro delle query, possiamo vedere che esiste una tabella **dei fatti (fTransactions)**, due **Tabelle dimensioni (dProduct & dSalesRep)** e **dCategory & dSupplier**, che sono in corsivo e NON verranno caricati nel modello dati. Sulla destra puoi vedere i passi applicati completati per la tabella dProduct.

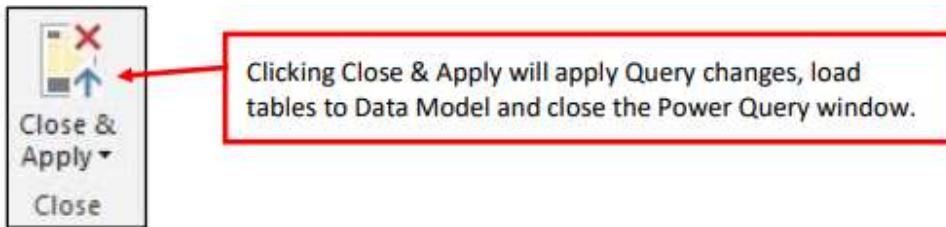
**dCategory & dSupplier are italicized and will NOT be loaded to the Data Model**

**Finished Steps for dProduct**

**Properties**  
Name: dProduct  
All Properties

**Applied Steps**  
Source, Navigation, Changed Type, Merged Queries, Expanded dCategory, Merged Queries1, Expanded dSupplier

- 32) Per chiudere e caricare le tabelle delle dimensioni nel database colonna nel modello dati, fare clic sul pulsante Chiudi e applica nel gruppo Close della ribbon Home



### 33) Visualizza tabelle nella finestra di Power BI Desktop:

- Per visualizzare le tre tabelle caricate nel Modello dati, fare clic sull'Icona Dati nell'estrema sinistra nella finestra di Power BI Desktop.

Nel riquadro Campi a destra, è possibile selezionare le tabelle da visualizzare.

Clicking Data Icon (really should be names Tables Icon) allows you to see tables that have been loaded to the Data Model.

Click on Table Name to view table.

Click Expand triangle to reveal Fields below tables.

ProductID	Products	RetailPrice	CategoryID	SupplierID	Category	Suppliers
1	Quad	43.95	3	GB	Freestyle	Gel Boomerangs
6	Carlots	23.95	3	GB	Freestyle	Gel Boomerangs
4	Bellini	26.95	1	GB	Beginner	Gel Boomerangs
2	Yanaki	27.95	1	CO	Beginner	Colorado Boomerangs
5	Aspen	24.95	1	CO	Beginner	Colorado Boomerangs
3	Eagle	19.95	2	CC	Advanced	Channel Craft
7	Sunshine	19.95	4	GB	Competition	Gel Boomerangs
8	Sunset	22.95	4	GB	Competition	Gel Boomerangs
9	Beaut	35.95	5	CO	Long Distance	Colorado Boomerangs
10	Kangaroo	25	2	CC	Advanced	Channel Craft
11	Elevate	48.95	5	GB	Long Distance	Gel Boomerangs
12	Flattop	25.95	2	CO	Advanced	Colorado Boomerangs
13	Vrsng	12.95	4	DB	Competition	Darnell Booms
14	Trifly	21.95	3	DB	Freestyle	Darnell Booms
15	NaturalEbow	35	4	DB	Competition	Darnell Booms
16	LongRang	41	5	CC	Long Distance	Channel Craft

TABLE dProduct (16 rows)

FIELDS

- dProduct
  - Category
  - CategoryID
  - ProductID
  - Products
  - RetailPrice
  - Supplier
  - SupplierID
- dSalesReps
  - Region
  - SalesRep
  - SalesRepID
- fTransactions
  - COGSTotal
  - Date
  - Discount
  - ProductID
  - SalesRep
  - UnitsSold

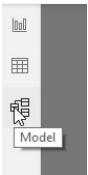
### 34) Ci manca la dimensione del tempo per poter fare le analisi.

- Quindi entriamo in Power Query e apriamo una query vuota. Poi copiamo all'interno del designer il codice m che si trova nella cartella del Laboratorio **dCalendar.m** che contiene una funzione che genera il calendario.
- Eseguiamo la funzione e creiamo il calendario.
- Poi facciamo chiudi e applica per collegare il calendario creato con le altre tabelle del modello dati.

# Demo 6: Relazioni

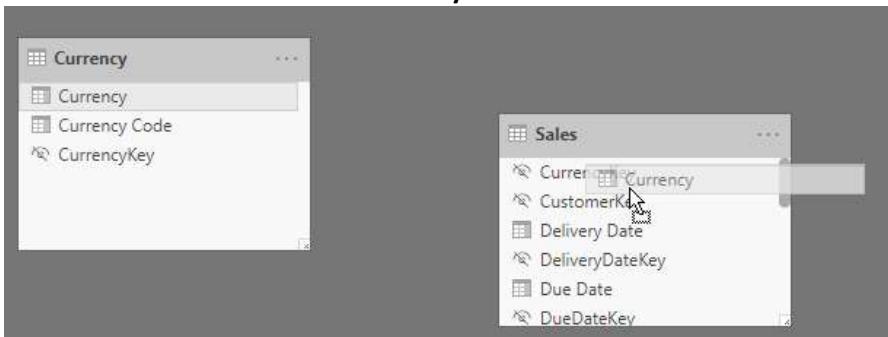
Step dimostrativi

1. Apriamo il file della dimostrazione 6-Relazioni.pbix,
2. Andiamo nel pannello delle relazioni per creare le relazioni

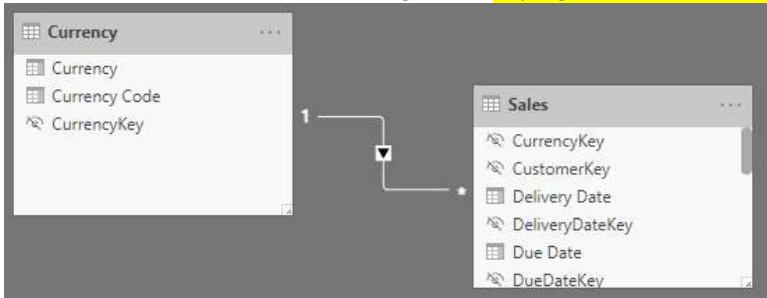


3. Andiamo nel pannello delle relazioni per creare le relazioni.

- Mostriamo che Possiamo creare una relazioni semplicemente trascinando un campo sopra un'altro e lo mostriamo con la tabella della **currency**



- Il risultato finale dovrà essere il seguente ( spiegare cardinalità e verso direzione)



- Oppure Possiamo creare una relazioni utilizzando il “Manage Relationship”



- Cliccando sul tasto “new”



- Poi selezioniamo le due tabelle che si devono mettere in relazioni e i campi. Facciamo un esempio con la tabella **store** e **sales**

## Create relationship

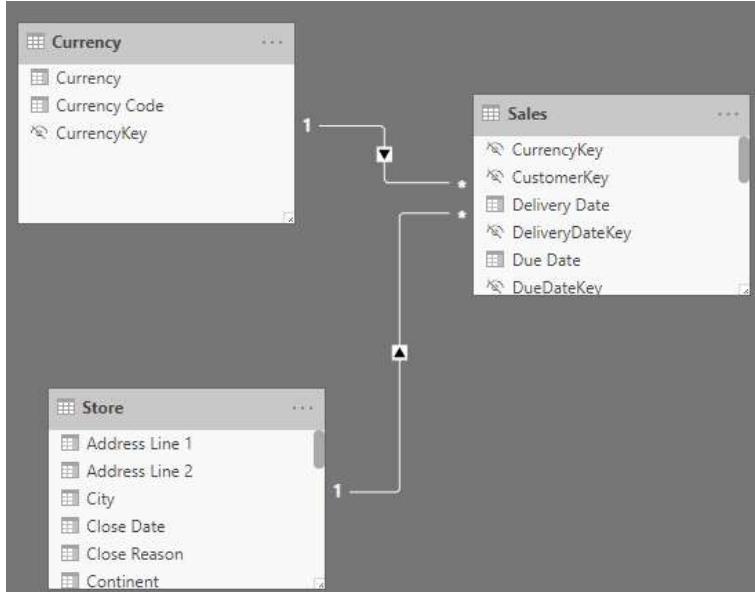
Select tables and columns that are related.

Sales							
StoreKey	GeographyKey	Store Manager	Store Type	Store Name	Status	Open Date	Deliv
17	551	135	Store	Contoso Spokane Store	On	3/26/2004 12:00:00 A	
5	677	38	Store	Contoso Redmond Store	On	4/2/2004 12:00:00 A	
15	678	48	Store	Contoso Renton Store	On	2/24/2004 12:00:00 A	

Cardinality		Cross filter direction
One to many (1:*)	Single	
<input checked="" type="checkbox"/> Make this relationship active	<input type="checkbox"/> Apply security filter in both directions	
<input type="checkbox"/> Assume referential integrity		

- Il risultato finale dovrà essere il seguente



- Ora mostriamo come funziona la funzionalità di **autodetect**

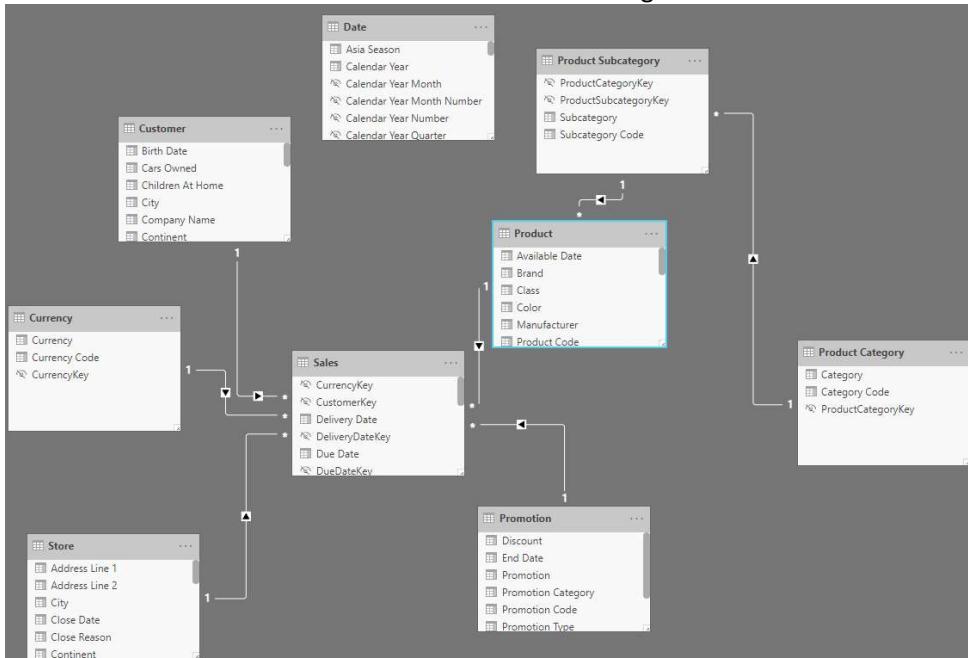
- Entriamo nel “**Manage Relationship**” e premiamo il tasto “autodetect” come si vede nell’immagine sotto



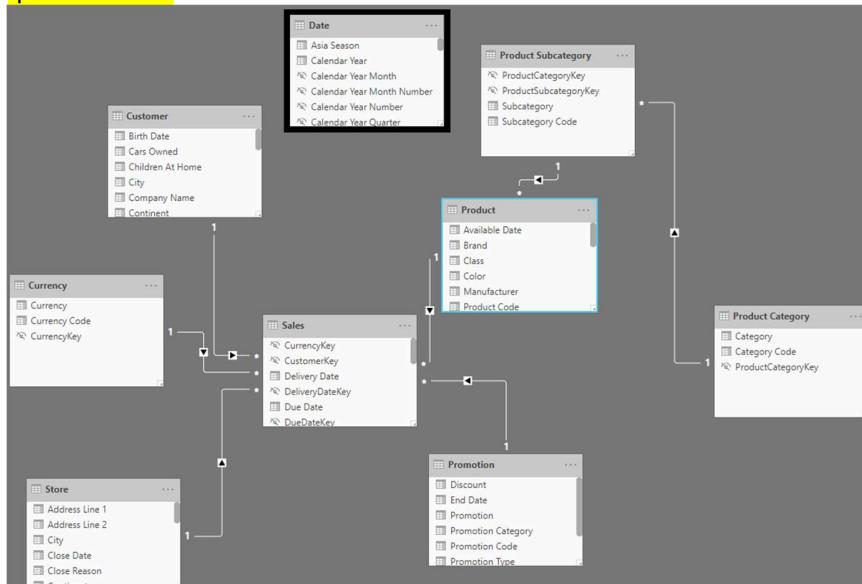
- Il risultato sarà che power bi trova 5 relazioni nuove

<input checked="" type="checkbox"/>	Sales (CurrencyKey)	Currency (Currency)
<input checked="" type="checkbox"/>	Sales (CustomerKey)	Customer (CustomerKey)
<input checked="" type="checkbox"/>	Sales (ProductKey)	Product (ProductKey)
<input checked="" type="checkbox"/>	Sales (PromotionKey)	Promotion (PromotionKey)
<input checked="" type="checkbox"/>	Sales (StoreKey)	Store (StoreKey)

- Successivamente facciamo chiudi e il risultato sarà il seguente



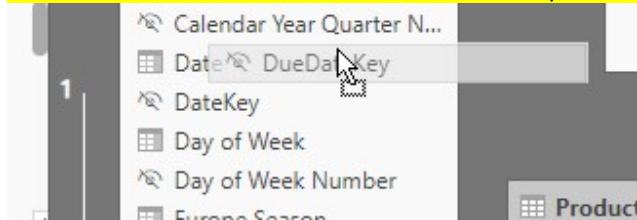
- Ci accorgiamo che per una tabella non è riuscito ad ottene la relazioni che è la tabella DimDate per quale motivo?



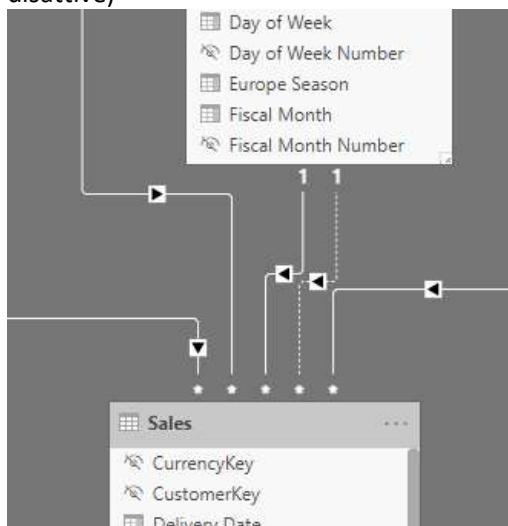
- Il motivo è che non ci possono essere più di una relazione tra due tavole in questo caso la dimensione DimDate ha tre campi date che potrebbero andare su Sales e quindi non sa come comportarsi. Quindi bisogna manualmente inserire la relazioni tra I campi che ci interessano e quindi trasciniamo il campo OrderDatekey sul campo DateKey della tabella DimDate come si vede nell'immagine



- Ma cosa succede se Trasciniamo anche il campo DueDatekey sopra il campo DateKey di DimDate?



- Si viene a creare una relazione trateggiata (Spiegare il perchè ci sono e che si chiamano relazioni disattive)



## Demo 9: Misure e Colonne Calcolate

Aprire il file con I dati già pronto che si chiama **9-Misure e Colonne Calcolate.pbix**

- Creare una Colonna calcolata totale delle vendite
  - **SalesAmount** = Sales[OrderQuantity] \* Sales[Unit Price]
- Creare una colonna calcolata per il totale dei costi
  - TotalCost = Sales[Unit Cost] \* Sales[Quantity]
- Creare una Colonna calcolata per il margine
  - **GrossMargin** = Sales[SalesAmount]-Sales[TotalCost]
- Creare un visual tabella con Color, SalesAmount, TotalCost e GrossMargin
- Creare una colonna calcolata per il margine in %
  - **GrossMargin%** = DIVIDE(Sales[GrossMargin];Sales[SalesAmount])
  - Questa colonna calcolata a livello di riga funziona, ma se la utilizziamo con aggregazione nel report notiamo che i valori non sono corretti. Questo perché quando si fanno aggregazioni di percentuale non si possono usare colonne calcolate. E' necessario creare valori aggregati per numeratore e denominatore divisi. In altre parole dobbiamo fare il rapporto delle somme non la somma del rapporto.

$$\sum \frac{\text{Margin}}{\text{SalesAmount}} \neq \frac{\sum \text{Margin}}{\sum \text{SalesAmount}}$$

- Creiamo la misura come segue
  - **Gross Margin % := DIVIDE ( SUM ( Sales[GrossMargin] ); SUM (Sales[SalesAmount] ) )**
  - Questa misura se la portiamo nel report funziona correttamente. Questo perché la misura a differenza della colonna calcolata lavora sul contesto del report nel momento in cui deve essere

valutata. Una colonna calcolata invece viene valutata a livello di riga all'interno della tabella alla quale appartiene in modo statitico al caricamento dei dati o al successivo aggiornamento.

## Demo 10: Related e Relatedtable

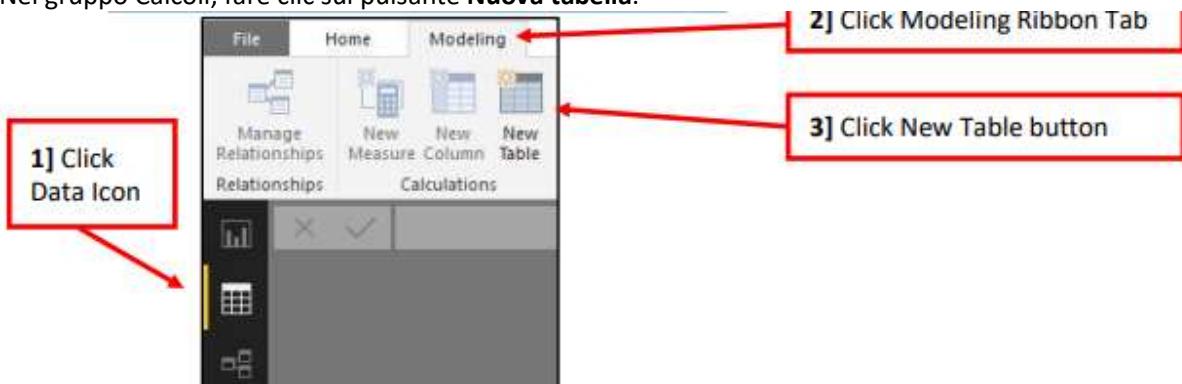
1. Aprire il file **10-Related e Relatedtable.pbix**
2. Per effetto della relazione tra Product e Sales possiamo creare una colonna calcolata sulla tabella Product  
**NumeroVendite = COUNTROWS(RELATEDTABLE(Sales))**
3. Sempre per effetto della relazione possiamo creare una colonna calcolata sulla tabella Sales che per ogni riga ci dia il colore del prodotto venduto.  
**SalesColor = RELATED('Product'[Color])**

# Laboratorio 1-Primi Passi con DAX (assieme in classe)

1. Aprire il file 0-Data Model(Finale).pbix che si trova all'interno della cartella Laboratori\PP\1—PRIMI PASSI CON DAX. Questo file è il risultato della modellazione fatta in precedenza dove abbiamo ricreato un modello a star schema.
2. **Rimuoviamo il calendario caricato con uno script M** perchè lo creeremo in DAX per vedere due modi diversi di creare un calendario se non ne abbiamo uno nelle sorgenti dato.

## -----CREAZIONE DELLA TABELLA TEMPORALE DEL CALENDARIO-----

3. Nel modello ci manca una tabella delle date che possiamo creare utilizzando DAX
  - La tabella delle date fornisce gli attributi della data che possiamo usare come filtri per i nostri report. Vogliamo che le formule DAX lavorino su (importantissimo!!!) un elenco univoco nella prima colonna di una tabella delle dimensioni, anziché una colonna intera in una tabella dei fatti.
  - Abbiamo bisogno di avere una tabella delle dimensioni in grado di filtrare la tabella dei fatti (così le formule possono lavorare su un set di numeri più piccolo).
  - Le funzioni di Time Intelligence (come TOTALYTD, SAMEPERIODLASTYEAR e DATEADD) che vedremo successivamente per funzionare hanno bisogno di una tabella del tempo
3. La tabella dimensionale **della data deve avere queste caratteristiche:**
  - Elenco univoco di valori nella prima colonna per ogni possibile giorno per ogni anno della data in modo che le funzioni di Time Intelligence funzionino correttamente, come per Funzione DATEADD).
  - **Devi contrassegnare come tabella delle date altrimenti le funzioni di time intelligence non funzioneranno!!!**
4. Passaggi per creare la tabella delle date utilizzando **la funzione tabella DAX CALENDAR** e le colonne calcolate:
  3. Sul lato sinistro della finestra di Power BI Desktop, fare clic sull'icona Dati.
  4. Fare clic sulla ribbon **modelling**.
  5. Nel gruppo Calcoli, fare clic sul pulsante **Nuova tabella**.



6. Si apre la formula bar in cui è possibile inserire il codice DAX per creare la tabella calendario
7. Nel secondo argomento della funzione **CALENDAR** abbiamo bisogno dell'ultimo giorno dell'anno per la data più recente nella colonna Data fTransactions. Per raggiungere questo obiettivo, nel secondo argomento di **CALENDAR** usiamo l'elemento formula: **DATE(YEAR(MAX(fTransactions[Date])),12,31)**
  - a. La funzione MAX seleziona la data più recente nella colonna Data di fTransactions.
  - b. La funzione YEAR estrae l'anno della data più grande e lo inserisce nel primo argomento della funzione DATE.

8. La funzione DATE utilizza l'anno della funzione YEAR e quindi con Month = 12 e Day = 31, Fornisce la data di fine corretta per la funzione CALENDAR

The screenshot shows the Power BI Model view. In the top ribbon, the 'Modeling' tab is selected. On the far right, there are buttons for 'Data type', 'Format', and 'Formatting'. A red arrow points from the text '4] DAX Table Formula to deliver first column of Date Table' to the 'Data type' button.

```

1 dDate =
2 CALENDAR (
3     DATE ( YEAR ( MIN ( fTransactions[Date] ) ), 1, 1 ),
4     DATE ( YEAR ( MAX ( fTransactions[Date] ) ), 12, 31 )
5 )

```

9. Per aggiungere una colonna calcolata con attributi di data alla nostra tabella delle date, fai clic sul pulsante Nuova colonna calcolata nel Gruppo di calcoli nella scheda modellazione.

The screenshot shows the Power BI Model view. In the top ribbon, the 'Modeling' tab is selected. On the far left, there is a vertical toolbar with icons for 'Manage Relationships', 'New Measure', 'New Column', and 'New Table'. A red arrow points from the text '5] New DAX Calculated Column' to the 'New Column' icon.

10. Nella barra della formula digitare la formula per il numero del mese, come mostrato di seguito. Questa colonna è necessaria perché poi la possiamo usare come colonna di ordinamento per la colonna del nome del mese e perché farà parte del calcolo per i Quarti di anno. In seguito nasconderemo questa colonna in modo che non compaia nei report

The screenshot shows the Power BI Model view. In the top ribbon, the 'Modeling' tab is selected. A red arrow points from the text '6] Calculated Column for Month Number' to the formula bar. The formula is '1 MonthNumber = MONTH(dDate[Date])'. Below the formula bar is a table with three rows. The first row has 'Date' as '1/1/17 12:00:00 AM' and 'MonthNumber' as '1'. The second row has 'Date' as '1/2/17 12:00:00 AM' and 'MonthNumber' as '1'. The third row has 'Date' as '1/3/17 12:00:00 AM' and 'MonthNumber' as '1'.

11. Nella barra della formula digitare la formula per Month, come mostrato di seguito. Questa colonna utilizza la funzione **FORMAT DAX**. È simile alla funzione di Excel. Il primo argomento contiene la colonna della data e il secondo argomento contiene il formato numerico personalizzato per il nome del mese. Abbiamo usato "mmm" per mostrare l'abbreviazione di tre lettere per mese.

The screenshot shows the Power BI Model view. In the top ribbon, the 'Modeling' tab is selected. A red arrow points from the text '7] Calculated Column for Month Name' to the formula bar. The formula is '1 Month = FORMAT(dDate[Date], "mmm")'. Below the formula bar is a table with three rows. The first row has 'Date' as '1/1/17 12:00:00 AM', 'MonthNumber' as '1', and 'Month' as 'Jan'. The second row has 'Date' as '1/2/17 12:00:00 AM', 'MonthNumber' as '1', and 'Month' as 'Jan'. The third row has 'Date' as '1/3/17 12:00:00 AM', 'MonthNumber' as '1', and 'Month' as 'Jan'.

12. Le abbreviazioni di tre lettere del mese NON sarebbero ordinate in base ai mesi effettivi in un anno (Jan, Feb, Mar ...), ma invece di ordinare la colonna in ordine alfabetico dobbiamo ordinare la colonna del mese in base alla colonna del numero del mese. Per fare ciò, seleziona la colonna del mese, quindi nella ribbon "Modellazione" nel gruppo Ordina, fai clic sulla freccia a discesa "Sort by column", quindi seleziona la colonna MonthNumber

**8] We MUST Sort Month Column by MonthNumber Column**

13. Nella barra della formula digitare la formula per Anno, come mostrato di seguito.

**9] Create Column for Year using formula**

14. La società per la quale stiamo modellando ha un anno fiscale a partire dall'1 aprile. Tuttavia, prima di calcolare il

Trimestre e anno fiscale, dobbiamo calcolare il trimestre standard per un anno solare. Nella formula Bar digitare la formula per Quarter, come mostrato di seguito. Questa formula prende il numero del mese e si divide per 3. Quando arrotondiamo, questo produce il numero di trimestre corretto per ogni riga nella tabella delle date

**10] Create Column for Standard Quarter using formula**

15. Poiché il nostro anno fiscale inizia il 1 ° aprile, dobbiamo convertire il trimestre standard in un trimestre fiscale. Nel

la barra della formula digita la formula per il trimestre fiscale, come mostrato di seguito. Questa formula converte il quarto 1 nel quarto 4 e i restanti quarti a uno in meno rispetto al quarto standard.

Date	MonthNumber	Month	Year	Quarter	Fiscal Quarter
1/1/17 12:00:00 AM	1	Jan	2017	1	4
1/2/17 12:00:00 AM	1	Jan	2017	1	4
1/3/17 12:00:00 AM	1	Jan	2017	1	4

16. Poiché il nostro anno fiscale inizia il 1 ° aprile, dobbiamo convertire l'anno standard in un anno fiscale. Nella barra della formula digita la formula per il trimestre fiscale, come mostrato di seguito. Questa formula converte l'anno civile per i primi tre mesi (un trimestre standard) fino all'anno fiscale corretto (ultimo anno)

e lascia i restanti 9 mesi (ultimi tre trimestri) come anno solare.

	MonthNumber	Month	Year	Quarter	Fiscal Quarter	Fiscal Year
00 AM	1	Jan	2017	1	4	2016
00 AM	1	Jan	2017	1	4	2016
00 AM	1	Jan	2017	1	4	2016
00 AM	1	Jan	2017	1	4	2016

12] Create Column for Fiscal Year

17. Vorremo una breve etichetta per i nostri report. A tale scopo, creiamo una formula di testo per il periodo fiscale. Nella barra della formula digitare la formula per il periodo fiscale, come mostrato di seguito.

	MonthNumber	Month	Year	Quarter	Fiscal Quarter	Fiscal Year	Fiscal Period
00 AM	1	Jan	2017	1	4	2016	Q4-16
00 AM	1	Jan	2017	1	4	2016	Q4-16
00 AM	1	Jan	2017	1	4	2016	Q4-16

13] Create Column for Fiscal Period

18. Per fare in modo che il nostro campo Periodo fiscale sia ordinato correttamente nei nostri report, dobbiamo creare una colonna di supporto che possiamo utilizzare per ordinare il campo Periodo fiscale. Per realizzare questo, creiamo una formula di aiuto. Nella barra della formula digitare la formula per "SortFiscalPeriod", come mostrato di seguito. Dopo aver creato questa colonna, dobbiamo tornare indietro e utilizzare la funzione "Sort by column" (come spiegato nel passaggio precedente per il campo del mese) per ordinare il periodo fiscale sul campo "SortFiscalPeriod"

	Month	Year	Quarter	Fiscal Quarter	Fiscal Year	Fiscal Period	SortFiscalPeriod
1 Jan	2017	1	4	2016	Q4-16		20164
1 Jan	2017	1	4	2016	Q4-16		20164

14] Create Column for SortFiscalPeriod

19. Contrassegnare la tabella delle date come tabella del tempo nella ribbon della modellazione, nel gruppo Calendario, fare clic sul pulsante "Mark as datatable" dsdsds

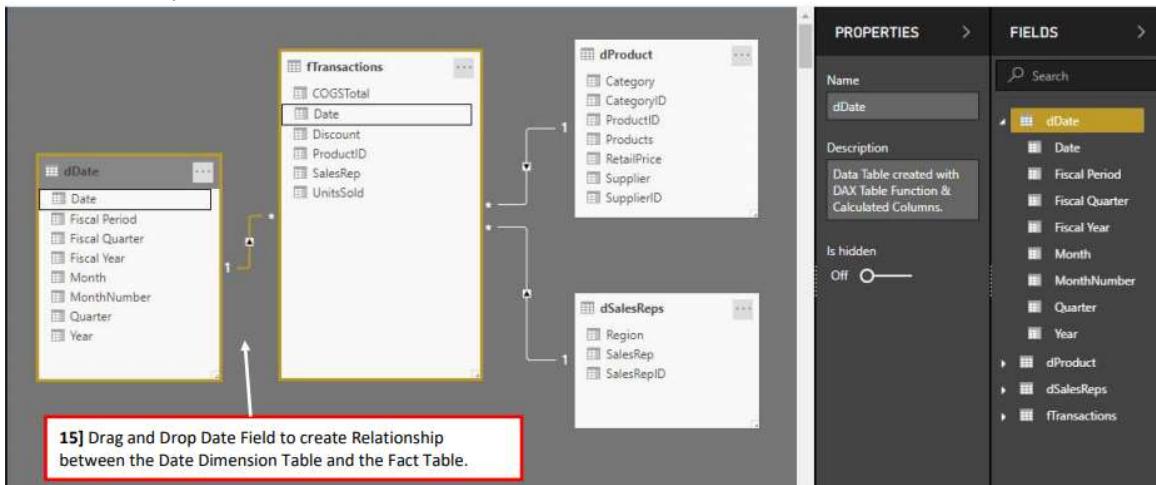
15] Mark as Date Table

20. La tabella delle date finite è simile alla seguente:

Date	MonthNumber	Month	Year	Quarter	Fiscal Month	Fiscal Year	Fiscal Period	SortFiscalPeriod
1/1/17 12:00:00 AM	1	Jan	2017	1	4	2016	Q4-16	20164
1/2/17 12:00:00 AM	1	Jan	2017	1	4	2016	Q4-16	20164
1/3/17 12:00:00 AM	1	Jan	2017	1	4	2016	Q4-16	20164
1/4/17 12:00:00 AM	1	Jan	2017	1	4	2016	Q4-16	20164
1/5/17 12:00:00 AM	1	Jan	2017	1	4	2016	Q4-16	20164

16] Finished Date Table

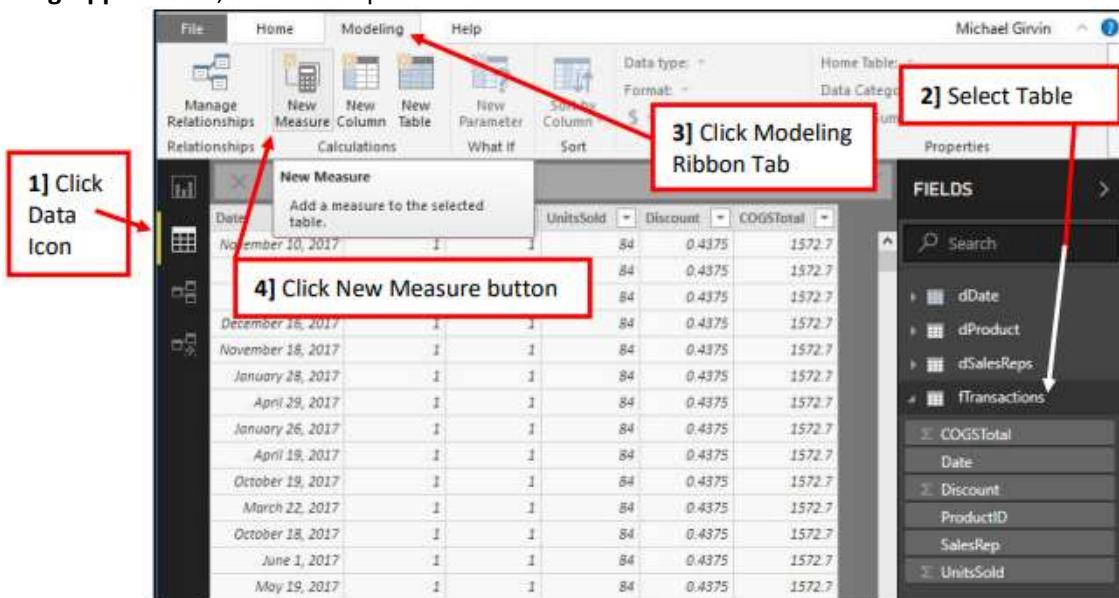
21. Nell'area Relazioni, è possibile trascinare e rilasciare il campo dati dalla tabella **dDate** alla tabella **fTransactions** per creare una relazione uno-a-molti.



#### -----CREAZIONE DELLE MISURE-----

##### 5. Creazione misure

1. Cliccare sull'icona “Data Icon”
2. Sul lato destro della finestra di Power BI Desktop, selezionare la tabella in cui si desidera visualizzare la misura
3. Fare clic sulla scheda della ribbon modellazione.
4. Nel gruppo **Calcoli**, fare clic sul pulsante **Nuova misura**



5. La nostra prima misura è per **Total Units**. Fai clic sulla barra della formula e crea la formula come mostrato di seguito, quindi premi Invio.

The screenshot shows the Power BI Model view interface. In the center, there is a table with columns: Date, ProductID, SalesRep, UnitsSold, Discount, and COGSTotal. A red box highlights the formula bar at the top, which contains the DAX formula: `1 Total Units = SUM(fTransactions[UnitsSold])`. To the right of the table, a sidebar titled "FIELDS" lists various data sources and their fields. A red box highlights the "Total Units" field under the "fTransactions" section, with a callout text: "5] When we create our DAX Measure in the Formula Bar and hit Enter, the new Measure appears in the List below the Selected Table".

6. Si noti che l'icona di una misura è una calcolatrice.



7. Dopo aver creato la misura, selezionare la misura e aggiungere la **formattazione numerica desiderata** da  
Gruppo di formattazione nella ribbon modellazione.  
8. Dal formato: freccia a discesa, selezionare Formattazione numerica "**Whole Number**"

This screenshot shows the ribbon with the "Modeling" tab selected. A red box highlights the "Formatting" group in the ribbon. Another red box highlights the "Format" dropdown menu. A callout text "7] Number Formatting in the Formatting group in the Modeling Ribbon Tab" points to the "Formatting" group. A callout text "8] From the Format: dropdown, select 'Whole Number'" points to the "Format" dropdown menu, which is open and shows options: General, Currency, Date Time, Decimal number, Whole number (which is highlighted), and Percentage.

9. La misura successiva è per **Total Revenue**. Fai clic sulla barra della formula e crea la formula come mostrato all'inizio della pagina successiva.

The screenshot shows the Power BI formula editor with the following code:

```

1 Total Revenue =
2     SUMX(fTransactions,
3         ROUND(fTransactions[UnitsSold]*
4             (1-fTransactions[Discount])*_
5                 RELATED(dProduct[RetailPrice])),2)
6

```

A red box highlights the formula bar with the instruction: **9] Measure for Total Revenue using SUMX Iterator function**.

To the right is a table preview showing sales data with columns: Date, ProductID, SalesRep, COGSTotal. The COGSTotal column contains values like 1572.7 and 0.4375. A red box highlights the COGSTotal column header.

On the far right is a Fields pane with a list of fields: dDate, dProduct, dSalesReps, fTransactions, COGSTotal, Date, Discount, ProductID, SalesRep, **Total Revenue**, Total Units, and UnitsSold. The **Total Revenue** field is highlighted with a yellow box.

10. Dopo aver creato Misura per **Total Revenue**, fare clic sul menu a discesa nel gruppo Formattazione  
11. Selezionare “\$ English (United States)”

The screenshot shows the Power BI formula bar with the following code:

```

1 Total COGS = SUM(fTransactions[COGSTotal])

```

A red box highlights the formula bar with the instruction: **10] Click Dollar Sign Dropdown in Formatting group**.

To the right is a numerical format dialog box with the following settings:

- Data type: Decimal Number
- Format: \$ English (United States)
- Symbol: \$
- Decimal places: 2

A red box highlights the \$ symbol with the instruction: **11] Select "\$ English (United States)"**.

12. La misura successiva è per i Total COGS. Fai clic sulla barra della formula e crea la formula come mostrato di seguito, quindi premi Invio. Aggiungi la formattazione numerica "\$ English (Stati Uniti)".

The screenshot shows the Power BI formula bar with the following code:

```

1 Total COGS = SUM(fTransactions[COGSTotal])

```

A red box highlights the formula bar with the instruction: **12] Measure for Total COGS**.

13. La misura successiva riguarda il **Total Gross Profit**. Fai clic sulla barra della formula e crea la formula come mostrato sotto, quindi premi Invio. Aggiungi la formattazione numerica "\$ English (Stati Uniti)". Questa formula utilizza due Misura che abbiamo già creato: [Total Revenue] and [Total COGS].

The screenshot shows the Power BI formula bar with the following code:

```

1 Total Gross Profit = [Total Revenue]-[Total COGS]

```

A red box highlights the formula bar with the instruction: **13] Measure for Total Gross Profit**.

14. La misura successiva è per l'utile lordo%. Fai clic sulla barra della formula e crea la formula come mostrato di seguito, quindi premi Invio. Aggiungi la formattazione del numero percentuale. Questa formula confronta il **Total Gross Profit** e **Total Revenue** usando la funzione DIVIDE di DAX. Il vantaggio di usare la funzione DIVIDE piuttosto che la divisione diretta è che se la divisione genera un errore Divide-By-Zero, la funzione DIVIDE visualizzerà uno spazio vuoto.

**14] Measure for % Gross Profit**

```
1 % Gross Profit = DIVIDE([Total Gross Profit],[Total Revenue])
```

15. La misura successiva è per l'**Average Daily Gross Profit**. Fare clic nella barra della formula e creare la formula come visto sotto, quindi premi Invio. Aggiungi la formattazione numerica "\$ English (Stati Uniti)".

- AVERAGEX è una funzione Iteratore che ci permetterà di calcolare una serie di prodotti lordi giornalieri e quindi utilizzare la matrice di valori per calcolare la media, ottenendo una media degli importi degli utili lordi giornalieri.
- La chiave di questa formula è che mettiamo la tabella dimensionale della data con il livello del giorno corretto granularità nel primo argomento di AVERAGEX. Ciò consente calcoli a livello di giorno per il **Total Revenue** PRIMA di calcolare la media dei valori risultanti

```
1 Ave Daily Gross Profit = AVERAGEX(dDate,[Total Gross Profit])
```

16. La misura successiva è per **Average Daily Revenue**. Fai clic sulla barra della formula e crea la formula come mostrato sotto, quindi premi Invio. Aggiungi la formattazione numerica "\$ English (Stati Uniti)". Questa formula calcola analogamente alla formula precedente, tranne per il fatto che calcola gli importi della media del **Total Revenue** giornaliero.

**16] Measure for Average Daily Revenue**

```
1 Ave Daily Revenue = AVERAGEX(dDate,[Total Revenue])
```

17. La misura successiva è per **Average Transactional Revenue**. Fare clic nella barra della formula e creare la formula come mostrato di seguito, quindi premi Invio. Aggiungi la formattazione numerica "\$ English (Stati Uniti)"

**17] Measure for Total Gross Profit**

```
1 Ave Transaction Revenue =
AVERAGEX(fTransactions,
ROUND(fTransactions[UnitsSold]*
RELATED(dProduct[RetailPrice])*(
1-fTransactions[Discount]),2)
```

18. L'elenco finale di colonne e misure sotto la tabella fTransactions è simile al seguente:

fTransactions
% Gross Profit
Ave Daily Gross Profit
Ave Transaction Revenue
Σ COGSTotal
Date
Discount
ProductID
SalesRep
Total COGS
Total Gross Profit
Total Revenue
Total Units
Σ UnitsSold

19. Per rendere l'ambiente di reporting facile da usare, dobbiamo nascondere qualsiasi colonna, tabella o misura di cui avremo bisogno come parte dei passaggi di modellazione dei dati, ma non necessari nella vista dei report.

- i. Nell'area Relazione è possibile selezionare più colonne come mostrato qui:

fTransactions
COGSTotal
Date
Discount
ProductID
SalesRep
UnitsSold
% Gross Profit
Ave Daily Gross Profit

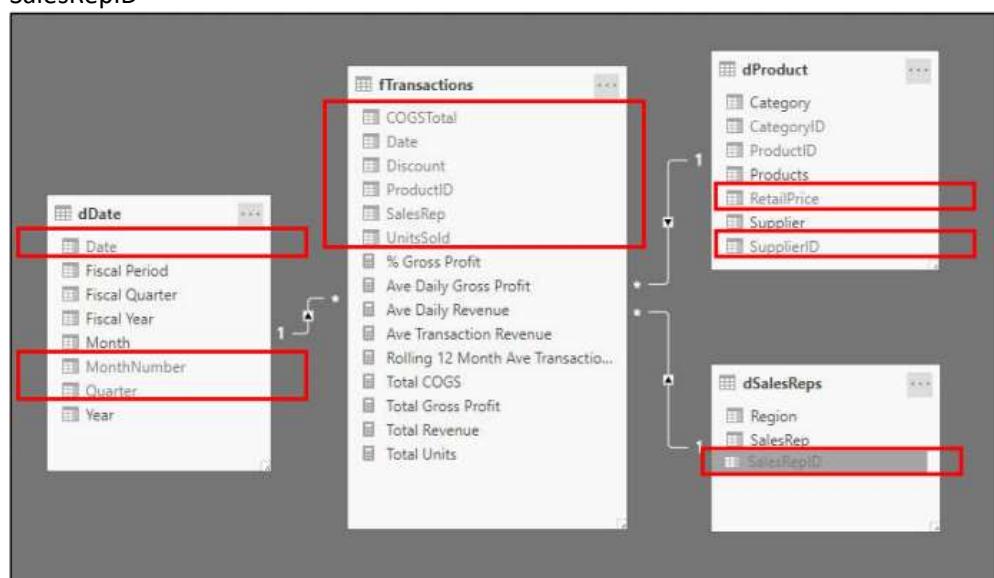
- ii. Fare clic con il tasto destro e fare clic su "Hide in report view"

fTransactions	
COGSTotal	
Date	
Discount	
ProductID	
SalesRep	
Delete from model	
Hide in report view	
Ave Daily Revenue	
Ave Transaction Revenue	

- iii. Nel nostro modello di dati vogliamo nascondere questi campi:

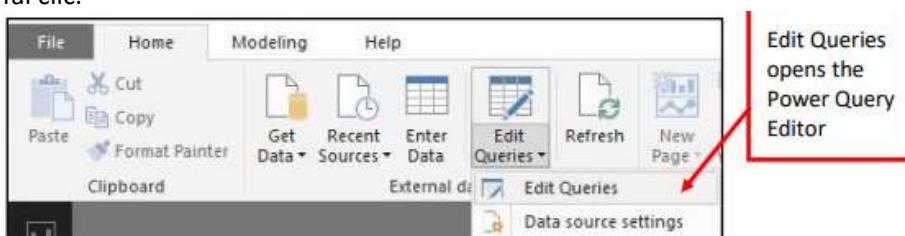
1. Tabella delle dDate
  - a. i. Data
  - b. ii. MonthNumber
  - c. iii. Quarter
2. Tabella delle fTransactions:
  - a. COGSTotal

- b. Date
  - c. Discount
  - d. ProductID
  - e. SalesRep
  - f. UnitSold
3. Tabella dei dProduct:
- a. RetailPrice
  - b. SupplierID
4. dSalesRep:
- a. SalesRepID

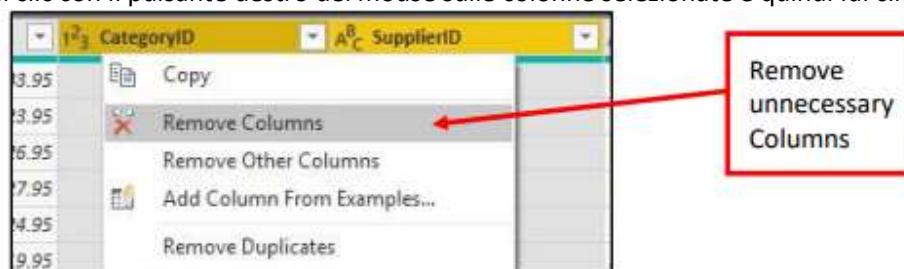


#### 6. Perfeziona il modello di dati in Power Query rimuovendo le colonne nella tabella dProduct:

- Siamo autorizzati a tornare indietro e modificare le nostre query Power Query in qualsiasi momento se dobbiamo perfezionare i dati del Modello.
- Nella Home Ribbon Tab, nel gruppo "External Data", fare clic sulla freccia a discesa "Edit Query" e quindi fai clic.



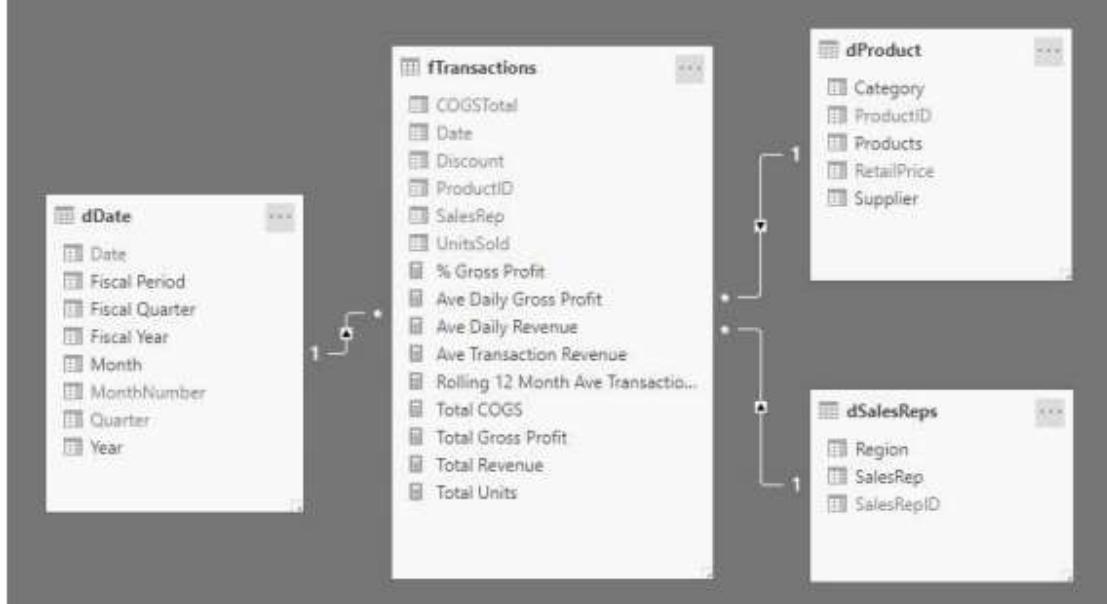
- Nell'editor di Power Query, selezionare la query dProduct, quindi selezionare CategoryID e SupplierID , fai clic con il pulsante destro del mouse sulle colonne selezionate e quindi fai clic su Rimuovi colonne.



- Quando si fa clic sul pulsante Chiudi e applica.



- I modello di dati raffinati si presenta così (**tranne per la Rolling 12 Month Ave Transaction**) per creare questa misura ci servono nozioni di CALCULATE che ancora non abbiamo fatto.



# Demo 11: ALL\_VALUES

1. Aprire il file **11-ALL\_VALUES\_Congeggi.pbix**
2. Devo creare le misure ALL e VALUES
  - **ALL = COUNTROWS(ALL('Sales'[ProductId]))**
  - **VALUES = COUNTROWS(VALUES(Sales[ProductId]))**
3. Mostrare che con ALL torniamo tutti i risultati mentre con VALUES no

ProductId	ALL	VALUES
1	5	1
2	5	1
3	5	1
4	5	1
5	5	1
<b>Total</b>	<b>5</b>	<b>5</b>

4. Inoltre mostrare che con DISTINCT, VALUES, ALL, ALLNOBLANKROW ci sono valori dei conteggi diversi
5. Creiamo le misure ALL\_C, DISTINCT\_C, ALLNOBLANKROW\_C
  - **DISTINCT\_C = DISTINCT('Product')**
  - **ALL\_C = ALL('Product')**
  - **VALUES\_C = VALUES ('Product')**
  - **ALLNOBLANKROW\_C = ALLNOBLANKROW('Product')**

Row Labels	CountRowsDistinct	CountRowsValues	CountRowsAll	CountRowsAllNoBlankRow
Coffee	1	1	4	3
Pasta	1	1	4	3
Tomato	1	1	4	3
(blank)		1	4	3
<b>Grand Total</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>3</b>



Soffermarsi ad analizzare la seguente formula e mostrare l'interazione tra le tabelle e le relazioni.

**Importante!!! Il risultato di una table function non è una tabella solamente ma una tabella che eredita tutte le relazioni esistenti nella tabella base**

```
=  
SUMX (  
    FILTER ( ProductCategory, COUNTROWS ( RELATEDTABLE ( Product ) ) > 10 ),  
    SUMX ( RELATEDTABLE ( Sales ), Sales[SalesAmount] )  
)
```

**La FILTER ritorna le categorie(tabella) in cui ci sono più di 10 prodotti**

**La domanda è quali sono le vendite della SUMX interna? Sono le vendite per ogni categoria in quanto siamo sul row context del FILTER**

# Laboratorio 1A-Ginnastica con DAX (in autonomia la classe)

## Reporting delle vendite

1	Sales[SalesAmount] = Sales[Quantity] * Sales[Unit Price]
2	TotalSales := SUM ( Sales[SalesAmount] )
3	TotalSales := SUMX ( Sales, Sales[Quantity] * Sales[Unit Price] )

## Analizzare le vendite nella stessa città

4	Sales[SaleType] = IF ( RELATED ( Customer[City] ) = RELATED ( Store[City] ), "SAME CITY", "DIFFERENT CITY" )
5	Sales[SaleTypeSort] = IF ( RELATED ( Customer[City] ) = RELATED ( Store[City] ), 1, 2 ) <i>Then, use "Sort By Column" to sort SaleType by SaleTypeSort.</i>

## Analizzare gli sconti

6	Sales[DiscountPct] = DIVIDE ( Sales[Unit Discount], Sales[Unit Price] )
7	Sales[DiscountCategory] = IF ( Sales[DiscountPct] = 0, "FULL PRICE", IF ( Sales[DiscountPct] <= 0.05, "LOW", IF ( Sales[DiscountPct] <= 0.1, "MEDIUM", "HIGH" ) ) )
8	TotalDiscount := SUMX ( Sales, Sales[Unit Discount] * Sales[Quantity] ) [Total Discount %] := DIVIDE ( [TotalDiscount], [TotalSales] )

## Analizzare le vendite scontate

	1      NumOfDiscountedSales := COUNTRROWS ( FILTER ( Sales, Sales[Unit Discount] > 0 ) )
2	ValueOfDiscountedSales := SUMX ( FILTER ( Sales, Sales[Unit Discount] > 0 ), Sales[Quantity] * Sales[Net Price] )
3	PercDiscountedSales := DIVIDE ( [NumOfDiscountedSales], [NumOfSales] )
4	NumOfDiscountedProducts := COUNTRROWS ( FILTER ( Product, COUNTRROWS ( FILTER ( RELATEDTABLE ( Sales ), Sales[Unit Discount] = 0 ) ) ) COUNTRROWS ( FILTER ( RELATEDTABLE ( Sales ), Sales[Unit Discount] > 0 ) ) )
5	NumOfProductsWithNoSales := COUNTRROWS ( FILTER ( Product, COUNTRROWS ( RELATEDTABLE ( Sales ) ) = 0 ) )  <i>This technique of checking that a table is empty is very common, but also expensive. In Power BI and Excel 2016, you can also write it in this more efficient way:</i>  NumOfProductsWithNoSales := COUNTRROWS ( FILTER ( Product, ISEMPTY ( RELATEDTABLE ( Sales ) ) ) )

## Trovare i migliori clienti

1	AvgCustomerSale := AVERAGEX ( Customer, SUMX ( RELATEDTABLE ( Sales ), [ Sales[Quantity] * Sales[Net Price] ) )  <i>Or, in a much more elegant way:</i>  AvgCustomerSale := AVERAGEX ( Customer, [TotalSales] )
2	NumOfCustomers := COUNTROWS ( FILTER ( Customer, [TotalSales] > 0 ) )
3	GoodCustomers := VAR AvgAllSelected = CALCULATE ( [AvgCustomerSale], ALLSELECTED () ) RETURN COUNTROWS ( FILTER ( Customer, [AvgCustomerSale] >= AvgAllSelected ) )

## Lavorare con i contesti di valutazione e Iteratori

5	SalesInWorkingDays := SUMX ( Sales, IF ( RELATED ( 'Date'[Working Day] ) = "WorkDay", Sales[Quantity] * Sales[Net Price], 0 )  SalesInNonWorkingDays := SUMX ( Sales, IF ( NOT ( RELATED ( 'Date'[Working Day] ) = "WorkDay" ), Sales[Quantity] * Sales[Net Price], 0 )
---	---

## Creazione di una tabella di parametri

```

4   Sales :=  

    IF (  

        HASONEVALUE ( ShowValueAs[ShowValueAs] ),  

        [TotalSales] / VALUES ( ShowValueAs[DivideBy] ),  

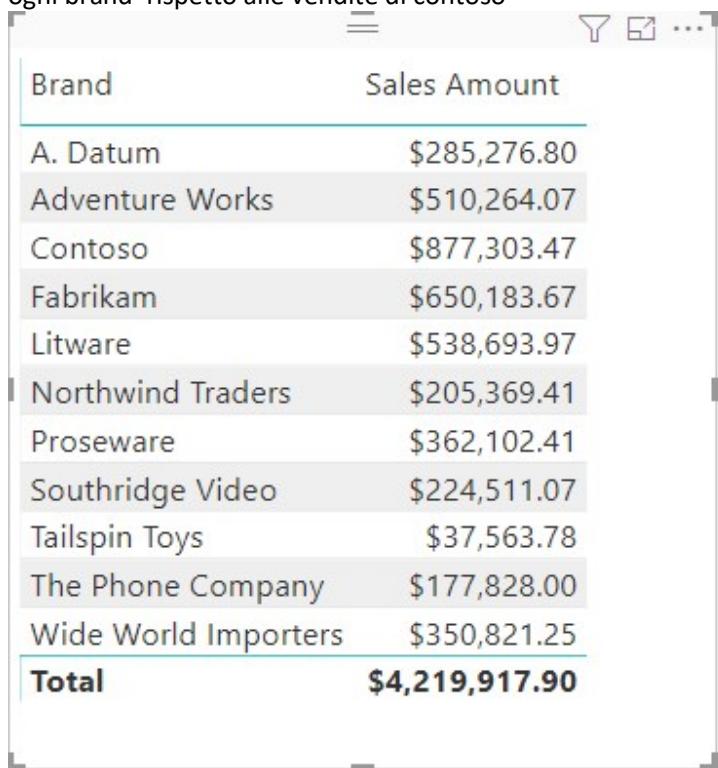
        [TotalSales]  

    )

```

## Demo 12: CALCULATE

1. Aprire il file **12-CALCULATE.pbix**
2. Immaginiamo di aprire il foglio e vedere la seguente tabella e di voler calcolare la percentuale delle vendite di ogni brand rispetto alle vendite di contoso



The screenshot shows a Power BI report interface with a table titled 'Brand' and 'Sales Amount'. The table lists various brands and their total sales amount. The last row shows a total for all brands.

Brand	Sales Amount
A. Datum	\$285,276.80
Adventure Works	\$510,264.07
Contoso	\$877,303.47
Fabrikam	\$650,183.67
Litware	\$538,693.97
Northwind Traders	\$205,369.41
Proseware	\$362,102.41
Southridge Video	\$224,511.07
Tailspin Toys	\$37,563.78
The Phone Company	\$177,828.00
Wide World Importers	\$350,821.25
<b>Total</b>	<b>\$4,219,917.90</b>

3. **Contoso Sales = CALCULATE(Sales[Sales Amount],'Product'[Brand]="Contoso")**
4. Vediamo il risultato nella tabella sotto:

Brand	Sales Amount	Contoso Sales
A. Datum	\$285,276.80	\$877,303.47
Adventure Works	\$510,264.07	\$877,303.47
Contoso	\$877,303.47	\$877,303.47
Fabrikam	\$650,183.67	\$877,303.47
Litware	\$538,693.97	\$877,303.47
Northwind Traders	\$205,369.41	\$877,303.47
Proseware	\$362,102.41	\$877,303.47
Southridge Video	\$224,511.07	\$877,303.47
Tailspin Toys	\$37,563.78	\$877,303.47
The Phone Company	\$177,828.00	\$877,303.47
Wide World Importers	\$350,821.25	\$877,303.47
<b>Total</b>	<b>\$4,219,917.90</b>	<b>\$877,303.47</b>

5. Che cosa è successo? Spiegare cosa è successo ragionando sui filter context 😊
6. Scriviamo la misura della percentuale **pct = DIVIDE([Sales Amount],[Contoso Sales])**
7. **Ora ignoriamo il problema della percentuale sbagliata** sul totale e creiamo una nuova misura:
  - Scriviamo anche la misura della percentuale **pct over brands = DIVIDE([Sales Amount],CALCULATE([Sales Amount],ALL(Product[Brand]))**

Brand	Sales Amount	pct over brands
A. Datum	\$285,276.80	6.76%
Adventure Works	\$510,264.07	12.09%
Contoso	\$877,303.47	20.79%
Fabrikam	\$650,183.67	15.41%
Litware	\$538,693.97	12.77%
Northwind Traders	\$205,369.41	4.87%
Proseware	\$362,102.41	8.58%
Southridge Video	\$224,511.07	5.32%
Tailspin Toys	\$37,563.78	0.89%
The Phone Company	\$177,828.00	4.21%
Wide World Importers	\$350,821.25	8.31%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>100.00%</b>

8. Ora proviamo ad aggiungere sopra al **brand** un attributo e mettiamo il **color sopra**. Che cosa succede? Dobbiamo modificare la formula

The screenshot shows a table with three columns: Color, Sales Amount, and pct over brands. The rows list various colors with their respective sales amounts and percentage values. To the right of the table is a Power BI slicer interface. The 'Rows' section contains 'Color' and 'Brand'. The 'Values' section contains 'Sales Amount' and 'pct over brands'.

Color	Sales Amount	pct over brands
Azure	\$12,071.90	100.00%
Black	\$791,735.81	100.00%
Blue	\$294,838.55	100.00%
Brown	\$225,705.83	100.00%
Gold	\$43,292.49	100.00%
Green	\$202,219.08	100.00%
Grey	\$509,990.58	100.00%
Orange	\$55,324.68	100.00%
Pink	\$130,243.02	100.00%
Purple	\$286.00	100.00%
Red	\$126,762.21	100.00%
Silver	\$918,587.35	100.00%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>100.00%</b>

9. Dobbiamo modificare la formula **pct over brands = DIVIDE([Sales Amount],CALCULATE([Sales Amount],ALL(Product[Brand],'Product'[Color])))**

The screenshot shows a table with four columns: Brand, Sales Amount, and pct over brands. The rows list various brands with their total sales amounts and percentages. Below each brand, there is a list of colors with their individual sales amounts and percentages. The last row shows the total sales amount and percentage for all brands combined.

Brand	Sales Amount	pct over brands
+ A. Datum	\$285,276.80	6.76%
+ Adventure Works	\$510,264.07	12.09%
+ Contoso	\$877,303.47	20.79%
+ Fabrikam	\$650,183.67	15.41%
- Litware	\$538,693.97	12.77%
Black	\$47,908.72	1.14%
Blue	\$27,241.35	0.65%
Brown	\$141,101.00	3.34%
Green	\$30,359.87	0.72%
Grey	\$64,635.63	1.53%
Orange	\$9,363.79	0.22%
Pink	\$141.82	0.00%
Red	\$19,450.95	0.46%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>100.00%</b>

10. Ora usiamo uno slicer su category e vediamo cosa accade se clicco sulla categoria “Computers”. Nulla tutto funziona bene.

Brand	Sales Amount	pct over brands
Adventure Works	\$210,016.15	23.24%
Contoso	\$101,237.57	11.20%
Fabrikam	\$44,067.75	4.88%
Proseware	\$242,516.00	26.83%
Southridge Video	\$27,401.64	3.03%
Wide World Importers	\$278,617.00	30.83%
Total	\$903,856.11	100.00%

-PORTIAMO LA CATEGORIA SULL LIVELLO PIU' ALTO-

11. Ma se ora proviamo a mettere la categoria come primo elemento nelle righe sopra il brand e levo il valore dello slicer?

Category	Sales Amount	pct over brands
Audio	\$47,116.66	100.00%
Cameras and camcorders	\$861,595.54	100.00%
Cell phones	\$240,738.09	100.00%
Computers	\$903,856.11	100.00%
Games and Toys	\$42,832.57	100.00%
Home Appliances	\$1,426,288.26	100.00%
Music, Movies and Audio Books	\$47,088.48	100.00%
TV and Video	\$650,402.19	100.00%
Total	\$4,219,917.90	100.00%

12. Cosa è successo? Il valore è sempre 100% come primo livello questo perché nella categoria “Computers” ad esempio non viene rimosso dal filter context e quindi divide per se stesso.

-VOGLIAMO AVERE LE PERCENTUALI SU TUTTI I PRODOTTI-

13. Ora proviamo a fare drill-down sulla categoria “Computer” e vedremo le percentuali che sono riferite ai totali sui computer

Computers	\$903,856.11	100.00%
Adventure Works	\$210,016.15	23.24%
Contoso	\$101,237.57	11.20%
Fabrikam	\$44,067.75	4.88%
Proseware	\$242,516.00	26.83%
Southridge Video	\$27,401.64	3.03%
Wide World Importers	\$278,617.00	30.83%

14. Se io volessi le percentuali rispetto a tutti i prodotti? Devo modificare la formula DAX

- pct over brands = DIVIDE([Sales Amount],CALCULATE([Sales Amount],ALL(Product[Brand],'Product'[Color])))

<input type="checkbox"/> Computers	\$903,856.11	21.42%
<input type="checkbox"/> Adventure Works	\$210,016.15	4.98%
<input type="checkbox"/> Contoso	\$101,237.57	2.40%
<input type="checkbox"/> Fabrikam	\$44,067.75	1.04%
<input type="checkbox"/> Proseware	\$242,516.00	5.75%
<input type="checkbox"/> Southridge Video	\$27,401.64	0.65%
<input type="checkbox"/> Wide World Importers	\$278,617.00	6.60%

15. **TEST** per verificare che la formula DAX funzioni bene leviamo dalle righe la gerarchia **Category,Brand,Color** e mettiamo solo **manufacturer**

Manufacturer	Sales Amount	pct over product
A. Datum Corporation	\$285,276.80	6.76%
Adventure Works	\$510,264.07	12.09%
Contoso, Ltd	\$877,303.47	20.79%
Fabrikam, Inc.	\$650,183.67	15.41%
Litware, Inc.	\$538,693.97	12.77%
Northwind Traders	\$205,369.41	4.87%
Proseware, Inc.	\$362,102.41	8.58%
Southridge Video	\$224,511.07	5.32%
Tailspin Toys	\$37,563.78	0.89%
The Phone Company	\$177,828.00	4.21%
Wide World Importers	\$350,821.25	8.31%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>100.00%</b>

Rows  
Manufacturer ▾ ×

-----AGGIUNGIAMO UN CAMPO DI UNA DIMENSIONE DIVERSA DA PRODOTTI -----

16. **TEST** tutto quello che abbiamo testato fino ad ora era relativo ad attributi presi sempre dalla tabella prodotti. Ma se ora prendiamo attributi da un'altra dimensione tipo **Country Region** di **Store**?

CountryRegion	Sales Amount	pct over product
China	\$1,523,075.01	100.00%
Germany	\$1,142,465.09	100.00%
United States	\$1,554,377.80	100.00%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>100.00%</b>

17. Il filter context del denominatore del divide è lo stesso del numeratore. Quindi bisogna eliminare il filtro anche per gli store quindi dobbiamo modificare la calculate:

1. pct over product and store = DIVIDE([Sales Amount],CALCULATE([Sales Amount],ALL('Product'),ALL(Store)))  
 pct over product and store =  
 DIVIDE (  
 [Sales Amount],  
 CALCULATE ( [Sales Amount], ALL ( 'Product' ), ALL ( Store ) )  
 )

18. TEST tutto quello che abbiamo testato fino ad ora era relativo ad attributi presi sempre dalla tabella prodotti.  
 Ma se ora prendiamo attributi da un'altra dimensione tipo Month di Date?

Month	Sales Amount	pct over product and store
January	\$275,793.52	100.00%
February	\$257,770.07	100.00%
March	\$284,332.86	100.00%
April	\$374,055.05	100.00%
May	\$422,962.94	100.00%
June	\$320,328.12	100.00%
July	\$388,710.17	100.00%
August	\$350,355.12	100.00%
September	\$384,524.90	100.00%
October	\$265,056.10	100.00%
November	\$446,705.67	100.00%
December	\$449,323.38	100.00%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>100.00%</b>

19. Stessa cosa di prima nel punto 17 quindi dovremmo aggiungere anche la tabella DATE... ma questo sistema non è molto efficiente in quanto se per caso aggiungo una tabella al mio modello dovrei modificare tutte le formule con il calculate e non va bene allora cosa possiamo fare?

20. APETTATE UN SECONDO!!! 😊 ma se io filtro date questo filtra sales se io filtro product questo filtra sales quindi invece di rimuovere il filtro da tutte le altre tabelle basta che rimuovo il filtro da SALES !!!! (Geniale)

- pct over all = DIVIDE([Sales Amount],CALCULATE([Sales Amount],ALL(Sales)))  
 pct over ALL =  
 DIVIDE (  
 [Sales Amount],  
 CALCULATE (  
 [Sales Amount],  
 ALL ( Sales )  
 )  
 )

21. **TEST** Proviamo a levare il month e mettere il color nelle righe e tutto funziona bene.

Color	Sales Amount	pct over ALL
Azure	\$12,071.90	0.29%
Black	\$791,735.81	18.76%
Blue	\$294,838.55	6.99%
Brown	\$225,705.83	5.35%
Gold	\$43,292.49	1.03%
Green	\$202,219.08	4.79%
Grey	\$509,990.58	12.09%
Orange	\$55,324.68	1.31%
Pink	\$130,243.02	3.09%
Purple	\$286.00	0.01%
Red	\$126,762.21	3.00%
Silver	\$918,587.35	21.77%
Silver Grev	\$60,366.60	1.43%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>100.00%</b>

-----CLICCHIAMO SU UN ELEMENTO DELLO SLICER E VEDIAMO LA NECESSITA DI ALLSELECTED -----

22. Ora proviamo a cliccare su Audio nello slicer che cosa succede vediamo? (Guardate il totale in %)

Color	Sales Amount	pct over ALL
Black	\$7,549.99	0.18%
Blue	\$6,542.80	0.16%
Green	\$4,255.25	0.10%
Orange	\$779.87	0.02%
Red	\$7,003.13	0.17%
Silver	\$15,558.40	0.37%
White	\$5,427.22	0.13%
<b>Total</b>	<b>\$47,116.66</b>	<b>1.12%</b>

23. Cosa possiamo fare? Dobbiamo cambiare ALL con ALLSELECTED

- pct over ALL = DIVIDE([Sales Amount],CALCULATE([Sales Amount],ALLSELECTED(Sales)))

```

pct over ALL =
DIVIDE (
    [Sales Amount],
    CALCULATE (
        [Sales Amount],
        ALLSELECTED ( Sales )
    )
)

```

Color	Sales Amount	pct over ALL
Black	\$7,549.99	16.02%
Blue	\$6,542.80	13.89%
Green	\$4,255.25	9.03%
Orange	\$779.87	1.66%
Red	\$7,003.13	14.86%
Silver	\$15,558.40	33.02%
White	\$5,427.22	11.52%
<b>Total</b>	<b>\$47,116.66</b>	<b>100.00%</b>

Category  
 Audio  
 Cameras and camcorders  
 Cell phones  
 Computers  
 Games and Toys  
 Home Appliances  
 Music, Movies and Audio Books  
 TV and Video

24. Ora proviamo a scrivere un'altra misura che calcoli il **SalesAmount** di una serie di colori di prodotti perché per noi sono importanti quindi:

- Trendy = **CALCULATE([Sales Amount],'Product'[Color] IN {"Red","White","Blue"})**

```
Trendy Sales =
CALCULATE (
    [Sales Amount],
    'Product'[Color]
    IN {
        "Red",
        "White",
        "Blue"
    }
)
```

- Leviamo lo slicer su audio!!!!

Brand	Sales Amount	Trendy Sales
A. Datum	\$285,276.80	\$2,102
Adventure Works	\$510,264.07	\$112,312.11
Contoso	\$877,303.47	\$256,243.72
Fabrikam	\$650,183.67	\$267,695.6
Litware	\$538,693.97	\$180,904.21
Northwind Traders	\$205,369.41	\$91,358.87
Proseware	\$362,102.41	\$132,111.08
Southridge Video	\$224,511.07	\$22,555.28
Tailspin Toys	\$37,563.78	\$16,271.34
The Phone Company	\$177,828.00	\$19,870
Wide World Importers	\$350,821.25	\$161,439.03
<b>Total</b>	<b>\$4,219,917.90</b>	<b>\$1,262,863.24</b>

Category  
 Audio  
 Cameras and camcorders  
 Cell phones  
 Computers  
 Games and Toys  
 Home Appliances  
 Music, Movies and Audio Books  
 TV and Video

25. Ora proviamo a calcolare il percentuale tra [Trendy Sales] e [Sales Amount]

- % Trendy Sales = **DIVIDE([Trendy Sales],[Sales Amount])**

```
% Trendy Sales =
DIVIDE (
    [Trendy Sales],
    [Sales Amount]
)
```

Brand	Sales Amount	Trendy Sales	% Trendy Sales
A. Datum	\$285,276.80	\$2,102	0.74%
Adventure Works	\$510,264.07	\$112,312.11	22.01%
Contoso	\$877,303.47	\$256,243.72	29.21%
Fabrikam	\$650,183.67	\$267,695.6	41.17%
Litware	\$538,693.97	\$180,904.21	33.58%
Northwind Traders	\$205,369.41	\$91,358.87	44.49%
Proseware	\$362,102.41	\$132,111.08	36.48%
Southridge Video	\$224,511.07	\$22,555.28	10.05%
Tailspin Toys	\$37,563.78	\$16,271.34	43.32%
The Phone Company	\$177,828.00	\$19,870	11.17%
Wide World Importers	\$350,821.25	\$161,439.03	46.02%
<b>Total</b>	<b>\$4,219,917.90</b>	<b>\$1,262,863.24</b>	<b>29.93%</b>

----CLICCHIAMO SU UN ELEMENTO DELLO SLICER E VEDIAMO LA NECESSITA DI KEEPFILTER -

--  
26. Ora proviamo ad aggiungere uno slicer con il colore e selezioniamo **Azure,black,Blue,Brown,Gold** che cosa succede?

Brand	Sales Amount	Trendy Sales	% Trendy Sales	Color
A. Datum	\$40,015.80	\$2,102	5.25%	Azure
Adventure Works	\$144,546.58	\$112,312.11	77.70%	Black
Contoso	\$163,647.51	\$256,243.72	156.58%	Blue
Fabrikam	\$221,409.19	\$267,695.6	120.91%	Brown
Litware	\$216,251.07	\$180,904.21	83.65%	Gold
Northwind Traders	\$78,240.56	\$91,358.87	116.77%	Green
Proseware	\$92,264.81	\$132,111.08	143.19%	Grey
Southridge Video	\$134,677.23	\$22,555.28	16.75%	Orange
Tailspin Toys	\$17,652.88	\$16,271.34	92.17%	Pink
The Phone Company	\$82,434.00	\$19,870	24.10%	Purple
Wide World Importers	\$176,504.95	\$161,439.03	91.46%	Red
<b>Total</b>	<b>\$1,367,644.58</b>	<b>\$1,262,863.24</b>	<b>92.34%</b>	Silver

27. Ci accorgiamo che le percentuali sono sbagliate!!!! Che cosa succede?

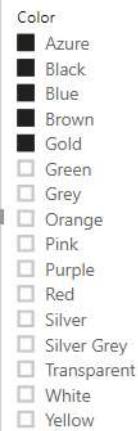
- Abbiamo selezionato dei colori ma questi colori sono rimpiazzati da altri colori cioè **red,blue e white**. Se vogliamo bloccare il problema dobbiamo digli di non rimuovere i filtri correnti sul product color ma

quindi di fare una INTERSEZIONE tra i colori del filter context corrente e quelli del filtro del calculate 😊 usando il comando KEEPFILTERS quindi NEL NOSTRO CASO IL FILTRO SARA' FORMATO DAI SOLI BLUE!!!

1. Trendy Sales = CALCULATE([Sales Amount],KEEPFILTERS('Product'[Color] IN {"Red","White","Blue"}))

```
Trendy Sales =
CALCULATE (
    [Sales Amount],
    KEEPFILTERS ('Product'[Color]
        IN {
            "Red",
            "White",
            "Blue"
        }
    )
)
```

Brand	Sales Amount	Trendy Sales	% Trendy Sales
A. Datum	\$40,015.80	\$2,102	5.25%
Adventure Works	\$144,546.58	\$16,016.13	11.08%
Contoso	\$163,647.51	\$21,616.2	13.21%
Fabrikam	\$221,409.19	\$86,663.6	39.14%
Litware	\$216,251.07	\$27,241.35	12.60%
Northwind Traders	\$78,240.56	\$78,140.57	99.87%
Proseware	\$92,264.81	\$9,337.06	10.12%
Southridge Video	\$134,677.23	\$1,481	1.10%
Tailspin Toys	\$17,652.88	\$10,900.44	61.75%
The Phone Company	\$82,434.00		
Wide World Importers	\$176,504.95	\$41,340.2	23.42%
<b>Total</b>	<b>\$1,367,644.58</b>	<b>\$294,838.55</b>	<b>21.56%</b>



# Demo 12-a: Comprensione della CALCULATE

## 1. CALCOLO BASE

Lo scenario più comune in cui CALCULATE è utile è quando è necessario calcolare rapporti e percentuali. Prima di imparare argomenti più avanzati, è importante trascorrere qualche minuto a vedere con gli occhi che cosa succede con il CALCOLO di base. Per scopi educativi, in questo modello abbiamo denormalizzato la categoria e la sottocategoria del prodotto, utilizzando due colonne calcolate.

## 2. Si inizia con un semplice modello che contiene categorie, sottocategorie e vendite totali:

Row Labels	TotalSales
Audio	\$384,518.16
Bluetooth Headphones	\$124,450.79
MP4&MP3	\$170,194.00
Recording Pen	\$89,873.37
Cameras and camcorders	\$7,192,581.95
Camcorders	\$3,157,075.19
Cameras & Camcorders Accessories	\$800,534.42
Digital Cameras	\$784,935.68
Digital SLR Cameras	\$2,450,036.66
Cell phones	\$1,604,610.26
Computers	\$6,741,548.73
Games and Toys	\$360,652.81
Home Appliances	\$9,600,457.04
Music, Movies and Audio Books	\$314,206.74
TV and Video	\$4,392,768.29
<b>Grand Total</b>	<b>\$30,591,343.98</b>

## 3. Creare una nuova misura con questa formula:

```
SalesOfAudio :=  
CALCULATE (  
    [TotalSales],  
    Product[Product Category] = "Audio"  
)
```

Product Category	Product Subcategory	TotalSales	SalesOfAudio
Audio	Bluetooth Headphones	\$124,450,79	\$124,450,79
	MP4&MP3	\$170,194,00	\$170,194,00
	Recording Pen	\$89,873,37	\$89,873,37
	<b>Total</b>	<b>\$384,518,16</b>	<b>\$384,518,16</b>
Cameras and camcorders	Camcorders	\$3,157,075,19	
	Cameras & Camcorders Accessories	\$800,534,42	
	Digital Cameras	\$784,935,68	
	Digital SLR Cameras	\$2,450,036,66	
	<b>Total</b>	<b>\$7,192,581,95</b>	<b>\$384,518,16</b>
Cell phones	Cell phones Accessories	\$274,049,03	
	Home & Office Phones	\$92,927,08	
	Smart phones & PDAs	\$708,949,30	
	Touch Screen Phones	\$528,684,85	
	<b>Total</b>	<b>\$1,604,610,26</b>	<b>\$384,518,16</b>

Mettere la misura nella pivot table e guardare il risultato e Rispondi a queste semplici domande:  
• Perché il punto (3) mostra il totale di Audio, se Computer si trova nelle righe? (**soluzione 1**)

- È perché il filter contest è creato dalle righe viene sovrascritto dal nuovo contesto del filtro generato da CALCULATE
- Perché il punto (2) non mostra nulla? Come è possibile che il totale degli spazi in questione si traduca in somma di audio? Suggerimento: scrivere su un pezzo di carta il contesto di filtro delle celle, e simulare l'operazione CALCULATE (**soluzione 2**)
  - Perché c'è un filtro nella sottocategoria del prodotto. Noi sostituiamo il filtro per categoria, ma il filtro in sottocategoria è ancora lì e non c'è nessun prodotto che è una fotocamera e, allo stesso tempo, un audio.
- Perché, se al livello di sottocategoria del punto (2) sono presenti spazi vuoti, nella somma a livello di sottocategoria punto (1) ci sono valori, e sono identici alla quantità di vendita delle sottocategorie? (**soluzione 3**)
  - Poiché il filtro di categoria introdotto da CALCULATE, inserisci e con l'esistente filtrare in sottocategoria, genera e svuota un set (2) e un set con alcuni elementi in (1).

4. Creare una nuova formula:

```
SalesOfValuesAudio:=  
CALCULATE (  
    [TotalSales],  
    Product[Product Category] = "Audio",  
    VALUES ( Product[Product Category] )  
)
```

Date un'occhiata al risultato.

Product Category	Product Subcategory	TotalSales	SalesOfAudio	SalesOfValuesAudio
Audio	Bluetooth Headphones	\$124.450,79	\$124.450,79	\$124.450,79
	MP4&MP3	\$170.194,00	\$170.194,00	\$170.194,00
	Recording Pen	\$89.873,37	\$89.873,37	\$89.873,37
	<b>Total</b>	<b>\$384.518,16</b>	<b>\$384.518,16</b>	<b>\$384.518,16</b>
Cameras and camcorders	Camcorders	\$3.157.075,19		
	Cameras & Camcorders Accessories	\$800.534,42		
	Digital Cameras	\$784.935,68		
	Digital SLR Cameras	\$2.450.036,66		
Cell phones	<b>Total</b>	<b>\$7.192.581,95</b>	<b>\$384.518,16</b>	
	Cell phones Accessories	\$274.049,03		
	Home & Office Phones	\$92.927,08		
	Smart phones & PDAs	\$708.949,30		
	Touch Screen Phones	\$528.684,85		
	<b>Total</b>	<b>\$1.604.610,26</b>	<b>\$384.518,16</b>	

Perché il numero è diverso, adesso? Puoi spiegare cosa è successo alla fila Computer, che conteneva un valore e ora è vuoto? Suggerimento: le condizioni in CALCULATE vengono messe in AND assieme ... considerate gli effetti combinati di tutti gli argomenti dei filtri passati al CALCULATE

3. È giunto il momento di utilizzare CALCULATE per qualcosa di più utile. Vuoi mostrare il valore delle vendite come percentuale del totale invece di un valore. Crea una misura di SalesPct che ritorna un simile calcolo. (**soluzione 4**)

```

SalesPct :=  

DIVIDE ( [TotalSales],  

CALCULATE ( [TotalSales],  

ALL ( Product )  

)
)

```

Ora metti il campo in un report e aggiungi un slicer su Color. Sembra bene.

Product Category	Product Subcategory	TotalSales	SalesPct
Color	Audio	\$124.450,79	0,41%
	Bluetooth Headphones	\$170.194,00	0,56%
	MP4&MP3	\$89.873,37	0,29%
	Recording Pen		
	<b>Total</b>	<b>\$384.518,16</b>	<b>1,26%</b>
	Cameras and camcorders	Camcorders	\$3.157.075,19
		Cameras & Camcorders Accessories	\$800.534,42
		Digital Cameras	\$784.935,68
		Digital SLR Cameras	\$2.450.036,66
	<b>Total</b>	<b>\$7.192.581,95</b>	<b>23,51%</b>
Cell phones	Cell phones Accessories	\$274.049,03	0,90%
	Home & Office Phones	\$92.927,08	0,30%
	Smart phones & PDAs	\$708.949,30	2,32%
	Touch Screen Phones	\$528.684,85	1,73%
	<b>Total</b>	<b>\$1.604.610,26</b>	<b>5,25%</b>
Computers	Computers Accessories	\$341.362,15	1,12%
	Desktops	\$1.017.127,27	3,32%
	Laptops	\$1.925.105,28	6,29%
	Monitors	\$604.386,23	1,98%

Adesso, seleziona alcuni colori dall'apposito slicer e guarda il risultato

Product Category	Product Subcategory	TotalSales	SalesPct
Color	Digital SLR Cameras	\$168.949,21	0,55%
	<b>Total</b>	<b>\$168.949,21</b>	<b>0,55%</b>
	Cell phones	Smart phones & PDAs	\$38.552,90
		Touch Screen Phones	\$143.053,74
		<b>Total</b>	<b>\$181.606,64</b>
	Computers	Computers Accessories	\$5.866,16
		Desktops	\$142.714,45
		<b>Total</b>	<b>\$148.580,61</b>
	Games and Toys	Download Games	\$192,00
		<b>Total</b>	<b>\$192,00</b>
Color	Home Appliances	Coffee Machines	\$445,00
		Fans	\$863,71
		Refrigerators	\$229.630,08
		<b>Total</b>	<b>\$230.938,79</b>
	Music, Movies and Audio Books	Movie DVD	\$8.145,92
		<b>Total</b>	<b>\$8.145,92</b>
		Car Video	\$149.892,28
	TV and Video	Home Theater System	\$385.637,23
		Televisions	\$117.062,27
		<b>Total</b>	<b>\$652.591,79</b>
	<b>Total</b>	<b>\$1.391.004,96</b>	<b>4,55%</b>

Cosa significa 4,55% come totale della percentuale? Puoi spiegare cosa è successo?

E, una volta ottenuta la spiegazione, puoi risolverla, per mostrare il 100% nel totale? (**soluzione 5**)

```

SalesPct :=  

DIVIDE (
    [TotalSales],
    CALCULATE (
        [TotalSales],
        ALLSELECTED ()
    )
)

```

Category	CY 2007	CY 2008	CY 2009	<b>Total</b>
[+ Audio	2.35%	3.02%	<b>5.37%</b>	
[+ Cameras and camcorders		0.29%	<b>0.29%</b>	
[+ Cell phones	0.59%	1.39%	1.36%	<b>3.34%</b>
[+ Computers	17.25%	6.60%	5.55%	<b>29.40%</b>
[+ Games and Toys	0.42%	0.36%	0.62%	<b>1.40%</b>
[+ Home Appliances	26.30%	9.96%	23.17%	<b>59.44%</b>
[+ Music, Movies and Audio Books	0.21%	0.32%	0.24%	<b>0.77%</b>
<b>Total</b>	<b>44.78%</b>	<b>20.98%</b>	<b>34.24%</b>	<b>100.00%</b>

Le percentuali sono sopra l'intero periodo. Cosa succede se si desidera loro di anno in anno, in modo che il totale totale di ogni colonna mostra il 100%? Hai qui un paio di opzioni: ([soluzione 6](#))

```

SalesPct :=  

DIVIDE (
    [TotalSales],
    CALCULATE (
        [TotalSales],
        ALLSELECTED (),
        VALUES ( 'Date'[Calendar Year] )
    )
)

```

Oppure

```

SalesPct :=  

DIVIDE (
    [TotalSales],
    CALCULATE (
        [TotalSales],
        ALLSELECTED ( Product )
    )
)

```

Product Category	Product Subcategory	CY 2007	CY 2008	CY 2009	Total
Cameras and camcorders	Digital SLR Cameras	44,98%	59,37%	34,15%	<b>46,74%</b>
	<b>Total</b>	<b>44,98%</b>	<b>59,37%</b>	<b>34,15%</b>	<b>46,74%</b>
Cell phones	Smart phones & PDAs	13,11%	5,28%	13,87%	<b>10,66%</b>
	Touch Screen Phones	41,51%	32,44%	45,47%	<b>39,57%</b>
	<b>Total</b>	<b>54,62%</b>	<b>37,73%</b>	<b>59,33%</b>	<b>50,24%</b>
Computers	Computers Accessories		0,41%	1,58%	<b>0,60%</b>
	<b>Total</b>		<b>0,41%</b>	<b>1,58%</b>	<b>0,60%</b>
Games and Toys	Download Games	0,14%			<b>0,05%</b>
	<b>Total</b>	<b>0,14%</b>			<b>0,05%</b>
Home Appliances	Coffee Machines			0,42%	<b>0,12%</b>
	<b>Total</b>			<b>0,42%</b>	<b>0,12%</b>
Music, Movies and Audio Books	Movie DVD	0,26%	2,49%	4,51%	<b>2,25%</b>
	<b>Total</b>	<b>0,26%</b>	<b>2,49%</b>	<b>4,51%</b>	<b>2,25%</b>
	<b>Total</b>	<b>100,00%</b>	<b>100,00%</b>	<b>100,00%</b>	<b>100,00%</b>

## Test in classe di ripasso

### Calcola le vendite per giorno lavorativo

1	Il problema è che gli anni come le vendite nel 2007 si hanno solo per mesi, non per 12 mesi. Quindi, dovresti calcolare i giorni lavorativi solo per mesi dove ci sono i saldi. Altrimenti, il calcolo a livello di anno sarà sempre inferiore a previsto.
2	Il motivo è che l'espressione è calcolata a livello di anno e, le [Vendite] sono sempre maggiore di zero. Non è possibile calcolare un'espressione simile a livello aggregato, è necessario eseguire iterazioni ogni mese e ripetere l'espressione all'indirizzo mese.
3	<pre>SalesPerWorkingDay := DIVIDE ( [TotalSales], SUMX ( VALUES ( 'Date'[Month] ), IF ( [TotalSales] &gt; 0, [WorkingDays]  )  )</pre>
4	<p><b>Suggerimento:</b> pensa al contesto della riga e del filtro e prova a calcolare le espressioni da soli, scrivendo giù il contesto del filtro e il contesto della riga durante la valutazione completa dell'espressione.</p> <p>Questa formula, come noti, non funziona a causa del contesto mancante. Abbiamo deciso di mostrarlo comunque, perché è un errore molto comune dimenticando l'automatic <b>CALCULATE</b> che interviene in qualsiasi misura</p>

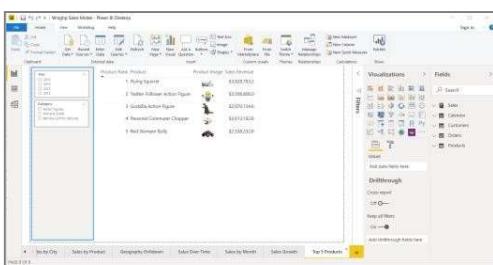
<p>5</p> <pre> SalesPerWorkingDay :=  DIVIDE (      [TotalSales],      SUMX (          VALUES ('Date'[Calendar Year]),          SUMX (              VALUES ('Date'[Month]),              IF ([TotalSales] &gt; 0, [WorkingDays])          )      )  ) </pre>	<p>Come si vede, due diverse iterazioni stanno avvenendo: una nell'anno e una sul mese. Sono entrambi necessarie per catturare il livello di mese in cui il calcolo del lavoro giornaliero dovrebbero accadere.</p>
--	---

# Pubblicazione- CorsoPowerBIModel.pbix (assieme in classe)

## Exercise 1: Publish, Promote and Certify the Model Dataset

In this exercise, you will publish and certify the dataset to make it available to other report authors.

1. Open the Power BI Desktop project named **CorsoPowerBIModel.pbix**
  - a) Launch Power BI Desktop.
  - b) Open the Power BI Desktop project named **PBI-App Workspace/CorsoPowerBI.pbix** from the previous lab located at the following path.  
**CorsoPowerBIModel.pbix**
  - c) When the project opens, click the report icon on the top of the sidebar to enter report view mode.
  - d) You should see all the report pages you created in the previous lab.



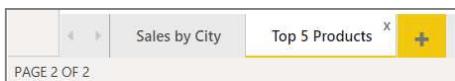
2. Remove all the report pages except for the **Sales by City** page and the **Top 5 Products** page.
  - a) Remove the Sales by State page by clicking the X in the top right corner of its page tab.



- b) When prompted with the Delete this page dialog, click the Delete button to confirm

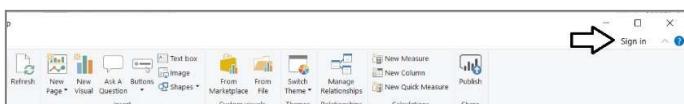


- c) Repeat the same steps to delete all pages in the report except for **Sales by City** and **Top 5 Products**.

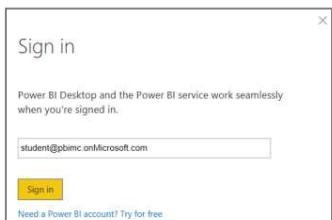


1. Publish the **Corso PowerBI Model.pbix** project to the Power BI Service.

- a) Save your changes to the **Corso PowerBI Model.pbix** project.  
b) Navigate to the **Home** tab in the ribbon and click the **Publish** button on the far right-hand side.



- c) When prompted with the **Sign in to Power BI** dialog, click the **Sign In** button



- d) When prompted for your password, sign into the Power BI service.  
e) Once you have logged in, click on the logged-in user name in the upper right corner of the main Power BI Desktop window.



- f) Verify that you are logged in using the same organizational account that you created earlier for this training course.

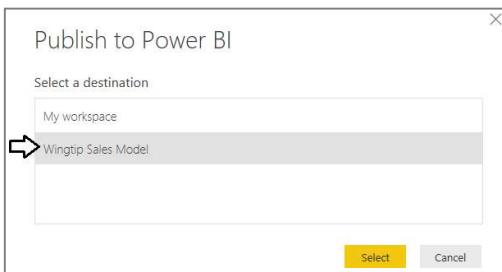


2. Publish the data model of **Corso PowerBI Model.pbx** project to the **Corso PowerBI Model** workspace.

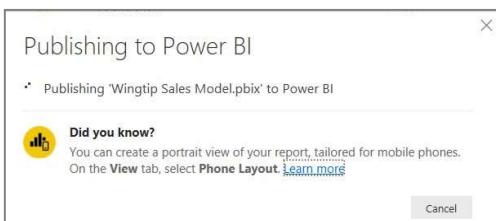
- Click the **Publish** button in the **Home** tab.



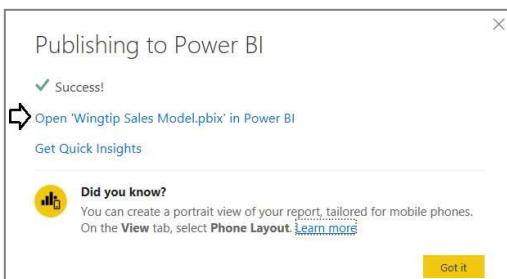
- When Power BI Desktop prompts you with the **Publish to Power BI** dialog, select **Corso PowerBI Model** then click **Select**.



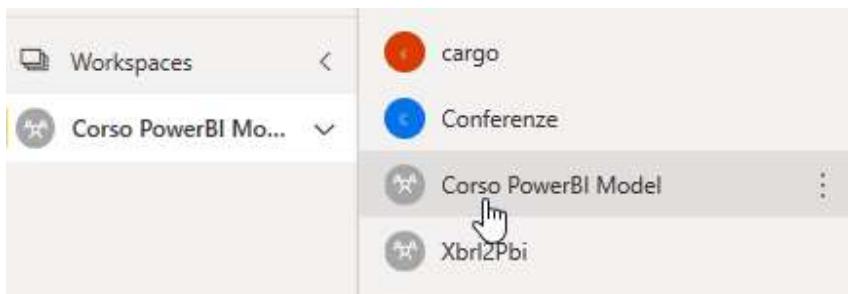
- Power BI Desktop will display the **Publishing to Power BI** dialog as the publishing process begins.



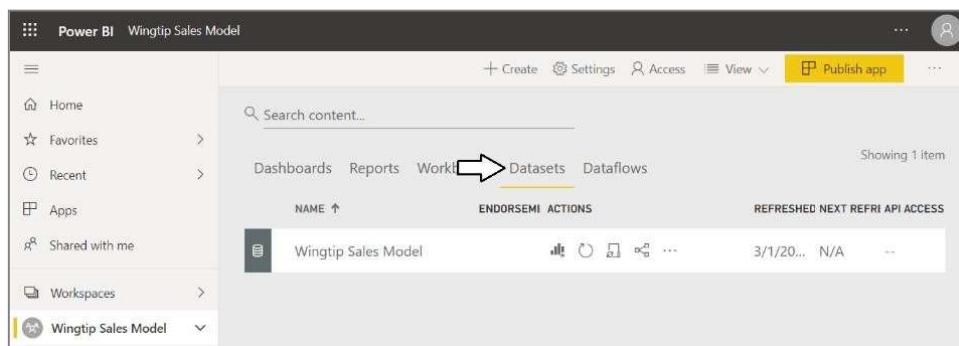
- Once the publishing process has completed, the **Publishing to Power BI** dialog will display a success message and link.
- You can click the **Open Corso PowerBI Model.pbx in Power BI** link to navigate to the Power BI service using the browser.



3. Navigate to the **Corso PowerBI Model** workspace using the browser.
- Navigate to the Power BI Service at <https://app.powerbi.com> and log in using your organizational account.
  - Navigate to the **Corso PowerBI Model** workspace.

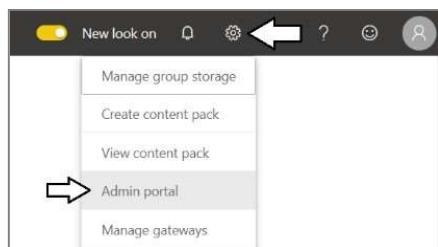


- Navigate to the **Datasets** view and verify you can see the dataset named **Corso PowerBI Model**.



Power BI does not allow an organization to certify datasets with the default settings. You must configure a tenant-level setting to allow for dataset certification. This is what you will do in the next step.

- Configure the tenant-level setting to allow for dataset certification.
- Drop down the **Settings** menu (*the menu with the gear icon*) and select the **Admin portal** command.



- On the **Portal admin** page, select **Tenant settings** in the left navigation.
- Scroll down to the **Export and sharing settings** section and expand the **Certification** section.

The screenshot shows the 'Admin portal' interface with the 'Tenant settings' section selected. Under 'Export and sharing settings', several options are listed with their status: 'Share content with external users' (Enabled for the entire organization), 'Publish to web' (Enabled for the entire organization), 'Export data' (Enabled for the entire organization), 'Export reports as PowerPoint presentations or PDF documents' (Enabled for the entire organization), 'Export reports as image files' (Disabled for the entire organization), 'Print dashboards and reports' (Enabled for the entire organization), and 'Certification' (Disabled for the entire organization).

- d) You can see that, by default, the **Certification** feature is disabled.

The screenshot shows the 'Certification' settings dialog. It displays the message 'Disabled for the entire organization' and 'Allow users in this org to certify datasets.' Below this is a toggle switch labeled 'Disabled'.

- e) Enabled the Certification feature.  
f) For the **Apply to** setting, select **The entire organization**.  
g) Click the **Apply** button to save your changes.

The screenshot shows the 'Certification' settings dialog with the status changed to 'Enabled'. It includes a field 'Specify URL for documentation page' with a placeholder 'Enter URL', and an 'Apply to:' section with the radio button selected for 'The entire organization'. At the bottom are 'Apply' and 'Cancel' buttons.

- h) You might see an **Applying changes** notification that indicates the setting might take up to 15 minutes to be applied.

The screenshot shows a notification dialog with a checkmark icon and the text 'Applying changes'. It states: 'Tenant settings changes will be applied within the next 15 minutes.'

5. Configure datasource credentials for the **CORSO PowerBI Model** dataset.

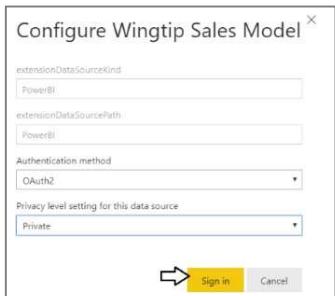
- a) Navigate to the **Datasets** tabs on the summary page for the **CORSO PowerBI Model** workspace.

- b) Click the context dropdown menu (*with the ellipse icon*) for the **CORSO PowerBI Model** dataset.

- c) Select the **Settings** command for the **CORSO PowerBI Model** dataset.

- d) On the **Settings for CORSO PowerBI Model** page, expand the **Data source credentials** section.  
e) You should see a yellow message indicating that the data source credentials have not been set.  
f) Click the **Edit credentials** link to set credentials to access the underlying dataflow.

- g) On the **Configure CORSO PowerBI Model** dialog, select **OAuth2** as the **Authentication method**.  
h) Select **Private** as the **Privacy level setting**.  
i) Click **Sign in** to set the credentials for the dataset's data source.

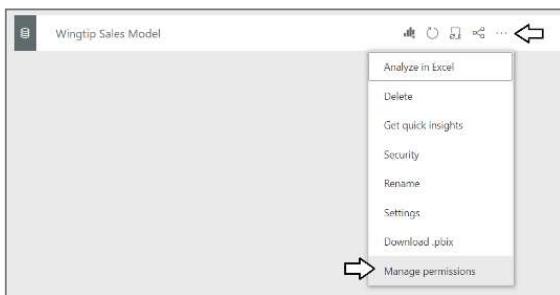


- j) Once the credentials have been set, the big yellow message should disappear.

At this point you should be able to perform a dataset refresh. You can test it if you want to ensure that this dataset can be refreshed from the data in the underlying dataflow named **Corso PowerBI Model**. Of course, the refresh will have no real effect as the data in the underlying dataflow has not changed. And even if you update the dataflow, the data in the underlying Azure SQL database is a read-only sample database that is never updated.

## 1. Manage permissions for the **Corso PowerBI Model** dataset.

- Click the context dropdown menu (*with the ellipse icon*) for the **Corso PowerBI Model** dataset.
- Select the **Manage permissions** command.



- By default, your account should be the only one that has permissions to this dataset.

- Click the **Add user** button.

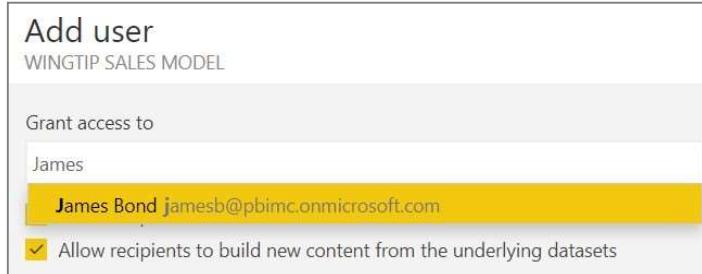
Showing 1 recipient(s)  Add user

- e) Add the user James Bond.

Add user  
WINGTIP SALES MODEL

Grant access to  
James  
**James Bond jamesb@pbimc.onmicrosoft.com**

Allow recipients to build new content from the underlying datasets

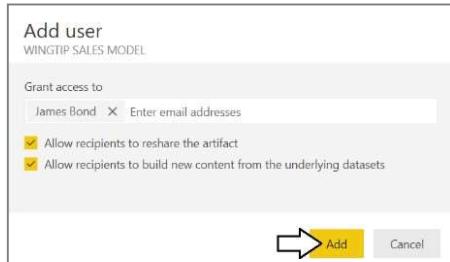


- f) Click **Add** to add the permissions for user James Bond.

Add user  
WINGTIP SALES MODEL

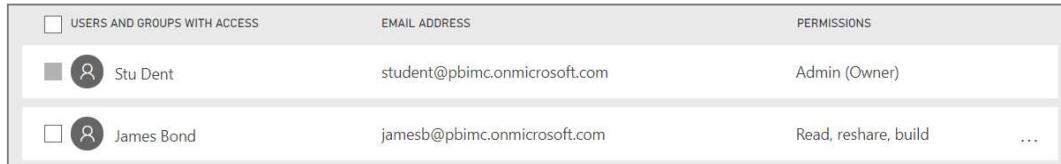
Grant access to  
James Bond  Enter email addresses  
 Allow recipients to reshare the artifact  
 Allow recipients to build new content from the underlying datasets

 Add Cancel



- g) You should be able to see that the new user has been added with three permissions which are **Read, Reshare and Build**.

USERS AND GROUPS WITH ACCESS	EMAIL ADDRESS	PERMISSIONS
 Stu Dent	student@pbimc.onmicrosoft.com	Admin (Owner)
 James Bond	jamesb@pbimc.onmicrosoft.com	Read, reshare, build



2. Configure the **Corso PowerBI Model** dataset as a promoted dataset.

- a) Click the context dropdown menu (*with the ellipse icon*) for the **Corso PowerBI Model** dataset.
- b) Select the **Settings** command for the **Corso PowerBI Model** dataset.
- c) On the **Settings for Corso PowerBI Model** page, expand the **Endorsement** section.

Wingtip Sales Model

Settings for Wingtip Sales Model

This dataset has been configured by [student@pbim.onmicrosoft.com](mailto:student@pbim.onmicrosoft.com).

[Refresh history](#)

- ▶ Gateway connection
- ▶ Data source credentials
- ▶ PowerBI [Edit credentials](#)
- ▶ Parameters
- ▶ Scheduled refresh
- ▶ Featured Q&A questions

➡ ➡ Endorsement

- d) The **Endorsement** should currently be set to **Default** which is the default setting.

▲ Endorsement

Help your colleagues find, learn about, and connect to your dataset.

Default  
This dataset can be searched for and used by others.

Promoted  
Promote this dataset with a badge to show it's ready to be used by others.

Certified  
Request certification from experts in your org to get a badge that shows it's recommended for use by others. [Learn more](#)

- e) Change the Endorsement setting from **Default** to **Promoted**.
- f) Add a description such as “This dataset contains a data model for analyzing **Corso PowerBI** sales data.”
- g) Click the **Apply** button to save your changes.

▲ Endorsement

Help your colleagues find, learn about, and connect to your dataset.

Default  
This dataset can be searched for and used by others.

➡  Promoted  
Promote this dataset with a badge to show it's ready to be used by others.

Certified  
Request certification from experts in your org to get a badge that shows it's recommended for use by others. [Learn more](#)

Description

➡ This dataset contains a data model for analyzing Wingtip sales data.

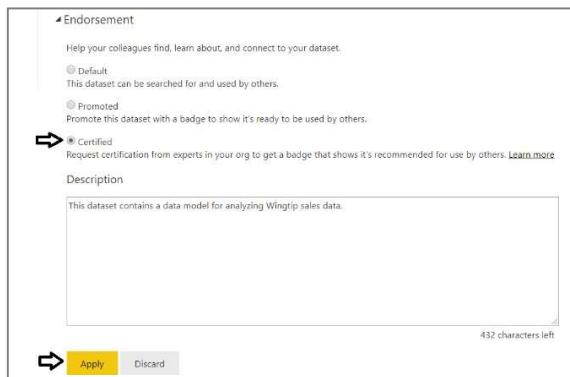
432 characters left

➡ **Apply** Discard

- h) Navigate to the **Datasets** tabs on the summary page for the **Corso PowerBI Model** workspace.
- i) You should see that the **Corso PowerBI Model** dataset now has a **Promoted** banner.

Dashboards	Reports	Workbooks	<b>Datasets</b>	Dataflows
				ACTIONS
NAME ↑		ENDORSEMENT		
	Wingtip Sales Model		Promoted	

- j) Return to the **Endorsements** section on the **Settings for Corso PowerBI Model** page.
- k) Switch the **Endorsement** setting from **Promoted** to **Certified** and then click **Apply** to save your changes.



- l) Navigate to the **Datasets** tabs on the summary page for the **Corso PowerBI Model** workspace.
- m) You should see that the **Corso PowerBI Model** dataset now has a **Certified** banner.

NAME ↑	ENDORSEMENT	ACTIONS	REFRESHED
Wingtip Sales Model			3/1/2020,

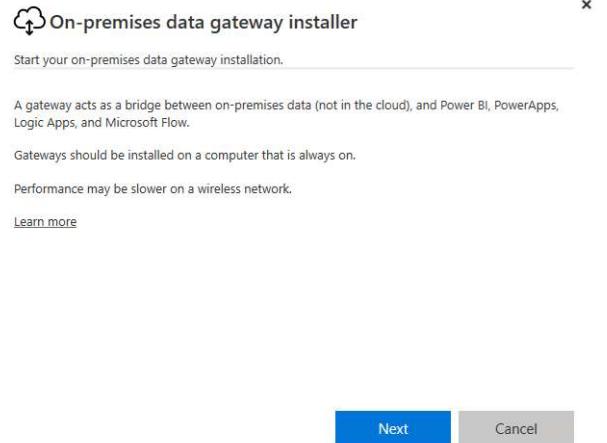
## Pubblicazione - CorsoPowerBIModel - Local.pbix (assieme in classe)

### Exercise 1: Scaricare gateway e installarlo

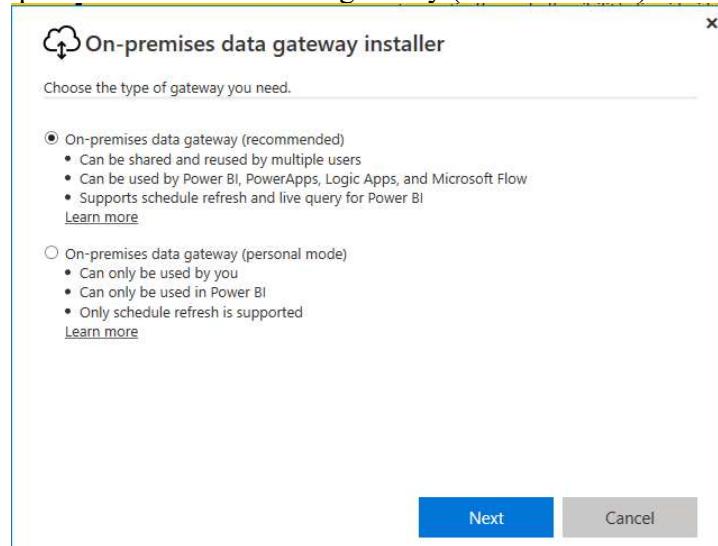
Collegarsi al sito <https://powerbi.microsoft.com/it-it/gateway/> e scaricare il gateway.

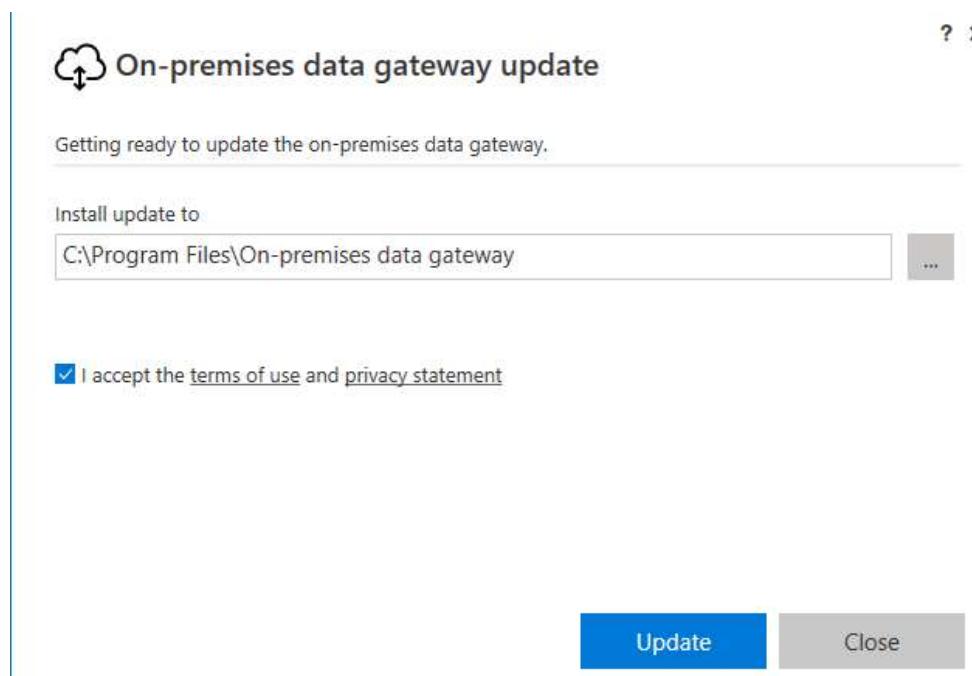


Una volta scaricato lanciare il file .exe.

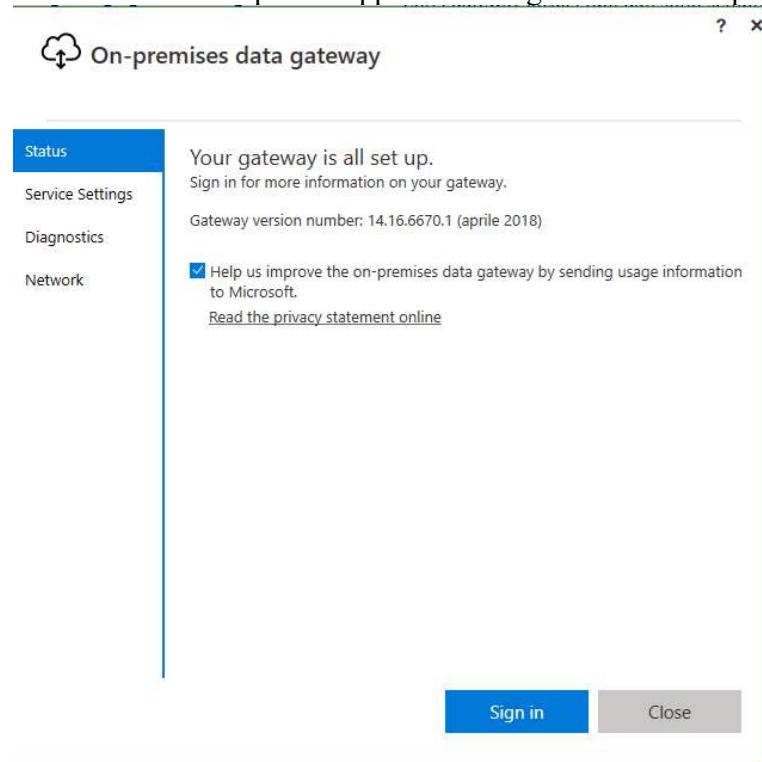


Selezionare la prima opzione “On-Premise data gateway (recommended)”



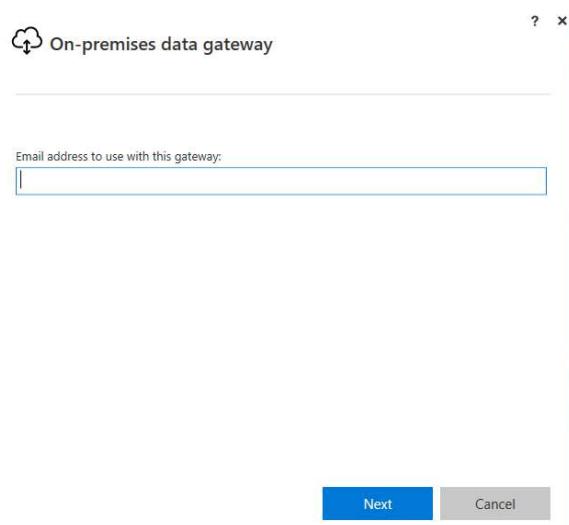


Click su update. Al termine dell'installazione quando appare l'immagine come sotto premere Sign In



Inserire account amministrativo e premere next.

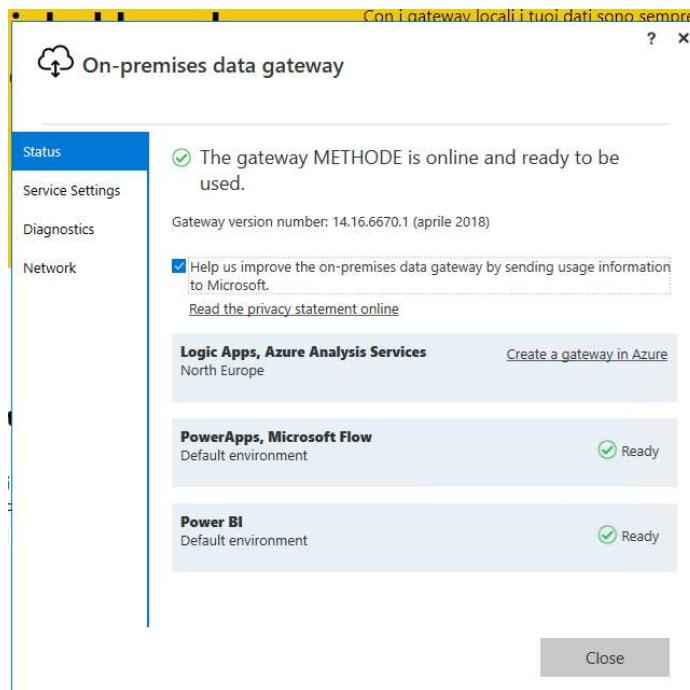
In questa fase viene specificato un utente l'utente che sarà il proprietario del gateway.



Inserire la password e cliccare “Accedi”



Una volta effettuato l’accesso comparirà la conferma di successo installazione gateway.



Al termine dell’installazione verrà creato automaticamente un PBIGwService, un account per il servizio Gateway che gira in automatico sulla macchina nella quale è installato il gateway.

Name	Description	Status	Startup Type	Log On As
On-premises data gateway service	The on-premises data gateway service	Running	Automatic	NT SERVICE\PBIGwService

Al termine dell'installazione nel servizio online di Power BI è necessario aggiungere al gateway appena creato la lista delle sorgenti dati. Per questa operazione è necessario accedere con l'utente proprietario del gateway.  
Da Manage Gateway cliccare su Add dataSource.

Specificare:

- Server
- Nome DB
- Utente:
- Spunta opzione SSO: se selezionata, quando esegue DirectQuery per risolvere la mappatura tra AD (locale) e AAD (Azure) il sistema usa il protocollo Kerberos. Qualora ci fosse sincronizzazione tra AD e AAD il sistema effettua il mapping in maniera automatica.

E' necessario nel tab User aggiungere gli utenti dell'organizzazione che devono avere i permessi di:

- Schedulare data refresh nel servizio di power BI (imported mode)
- Pubblicare un dataset che utilizza DirectQuery
- Pubblicare un dataset che utilizza Analysis Services Live Connection

NB. Gli utenti consumatori dei report non devono essere inseriti nella lista degli utenti delle sorgenti dati.

## Exercise 2: Caricare il file pbix che punta a file in locale e collegarlo al gateway

---

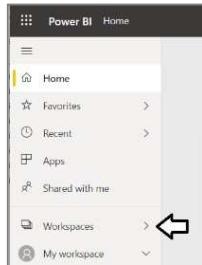
1. Selezionare il file **PBI-Gateway\CorsoPowerBIModel - Local.pbix** che punta a file in locale
2. Pubblicare il file
3. Configurare la sorgente nel gateway
4. Cofurare il mapping nel dataset

# CREAZIONE DASHBOARD E APP- App.pbix (assieme in classe)

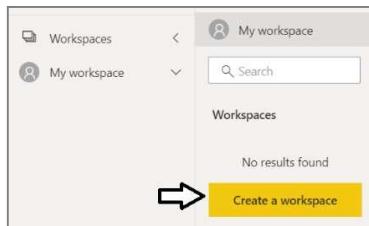
## Exercise 1: Create an App Workspaces and Add Content

In this exercise, you will create a new app workspace named **Corso Power BI Reports** and then you will publish the report from the Power BI Desktop project named **PBI-App Workspace\App.pbix**

1. Log into the Power BI Service with your Office 365 account.
  - a) Navigate the Power BI portal at <https://app.powerbi.com> and if prompted, log in using your Office 365 account.
  - b) Create a new app workspace named **Corso Power BI Reports**
  - c) Click the **Workspace** flyout menu in the left navigation.



- d) Click the **Create a workspace** button to display the **Create a workspace** dialog.

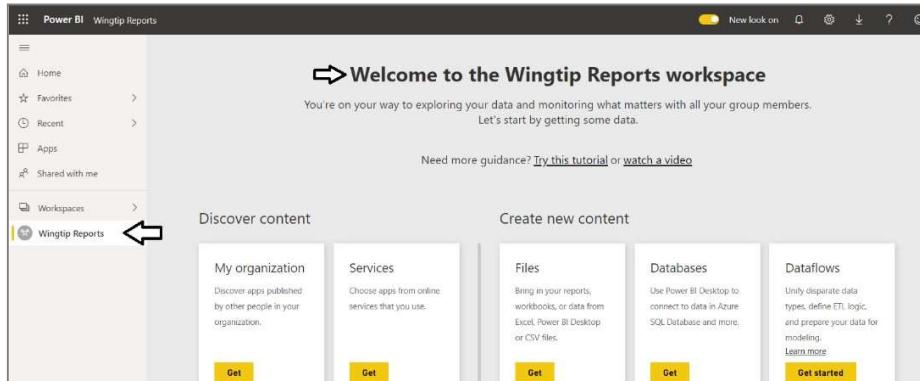


- e) In the **Create a workspace** pane, enter a workspace name of **Corso Power BI Reports**.



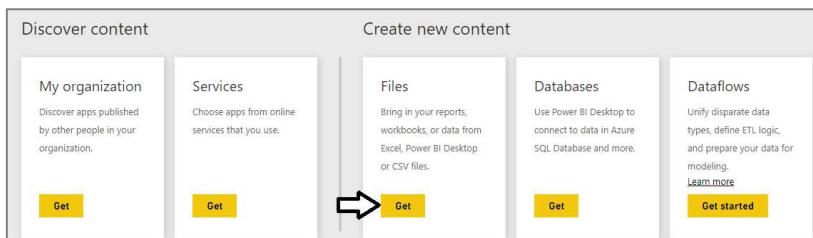
- f) Click the **Save** button to create the new app workspace named **Corso Power BI Reports**.

- g) When you click **Save**, the Power BI service should create the new app workspace and then switch your current Power BI session to be running within the context of this new **Wingtip Reports** workspace.



You have now created an app workspace which will provide the foundation for publishing and managing the Power BI reports and dashboards used by a custom solution.

2. The **Corso Power BI Reports** app workspace should currently display the standard Welcome page because it does not yet contain any datasets, reports or dashboards.

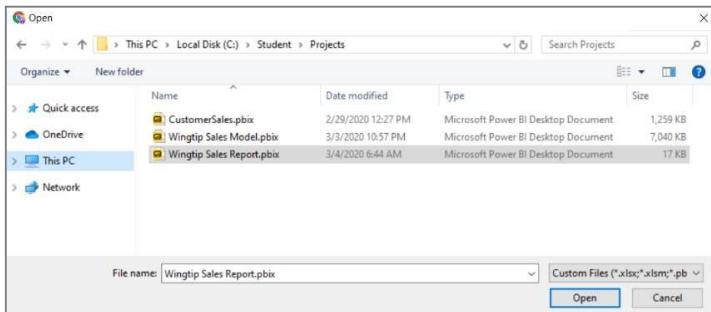


3. Import the **10-Corso Power BI Reports** project into the **Corso Power BI Reports** app workspace.

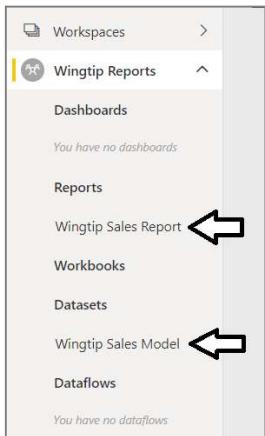
- On the Welcome page, click the **Get** button in the **Files** section.
- On the **Get Data > Files** page, click the **Local File** button to display the Windows **Open** file dialog.



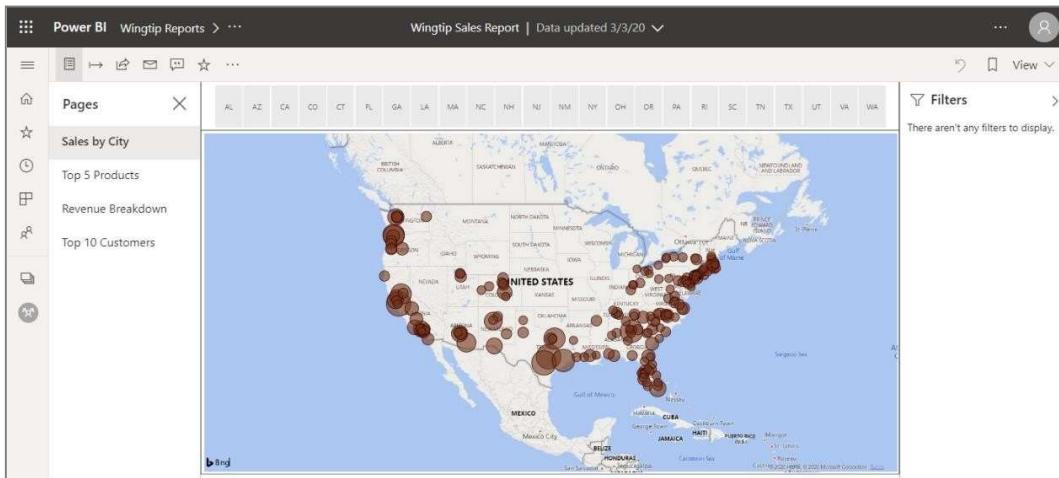
- c) In the Windows **Open** file dialog, select the project file at **5-CorsoPowerBIReport** and click **Open**.



- d) Wait while the Power BI service uploads the PBIX files and imports its assets into the **Corso Power BI Reports** app workspace  
e) Once the import operation has completed, you should only see a dataset and report in the left nav menu.



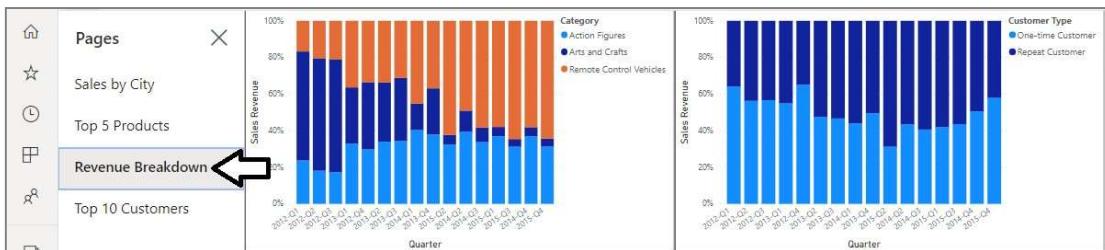
- f) Click on the report named **Corso Power BI Report** in the **Reports** section.  
4. Examine the report named **Corso Power BI Report**.  
a) Locate the page tabs in the top left corner of the report.



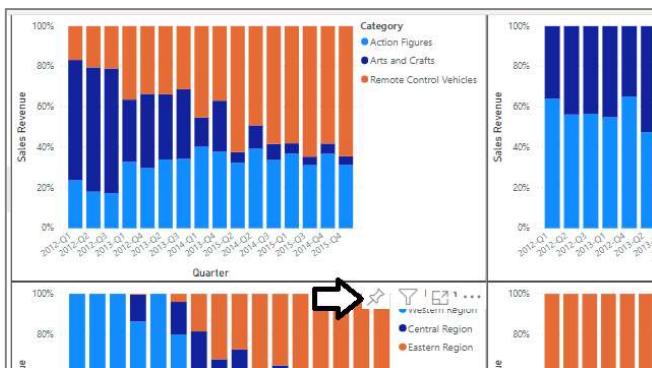
Note that you must always create dashboards using the browser. You cannot create a dashboard with Power BI Desktop.

## 5. Create a new dashboard named **Corso Power BI Dashboard**.

- Navigate to the **Reports** tab and open the report named **Corso Power BI Report**.
- Navigate to the **Revenue Breakdown** page of **Corso Power BI Report**.

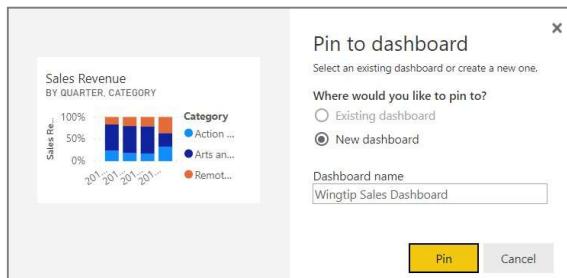


- Hover the mouse over the column chart visual which displays a sales revenue breakdown by product category.
- Locate and click the button with the thumbtack icon under the visual to pin this report visual to a new dashboard. (**Il primo chart in alto a sinistra**)



When you click the thumbtack button, you'll be prompted with the **Pin to dashboard** dialog where you must select a

- e) Select **New Dashboard**, give it a name of **Wingtip Sales Dashboard** and click the **Pin** button.



- f) Click the **Corsو PowerBI Dashboard** link in the **Dashboards** section of the left navigation to display the new dashboard.

## 6. Remove the Q&A search box from **Corsو Power BI Dashboard**

- a) You can see the dashboard is initially displayed with the **Ask a question about your data** search box.



- b) Click **Dashboards > Settings** in the left navigation to display the **Settings for Corsو Power BI Dashboard** pane.

- c) In the **Settings for Corsو Power BI Dashboard** pane, uncheck **Show the Q&A search box on this dashboard**.

General Alerts Subscriptions Dashboards Datasets Workbooks Dataflows

Wingtip Sales Dashboard

Settings for Wingtip Sales Dashboard

Q&A

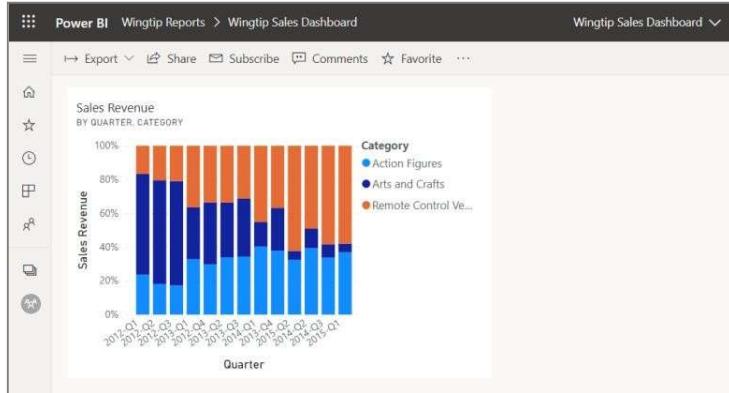
Allow people to use natural language to ask questions about their data and let them create new visuals from it.

[Learn more](#)

Show the Q&A search box on this dashboard

d) Click **Apply** below in the **Settings for Corso Power BI Dashboard** pane.

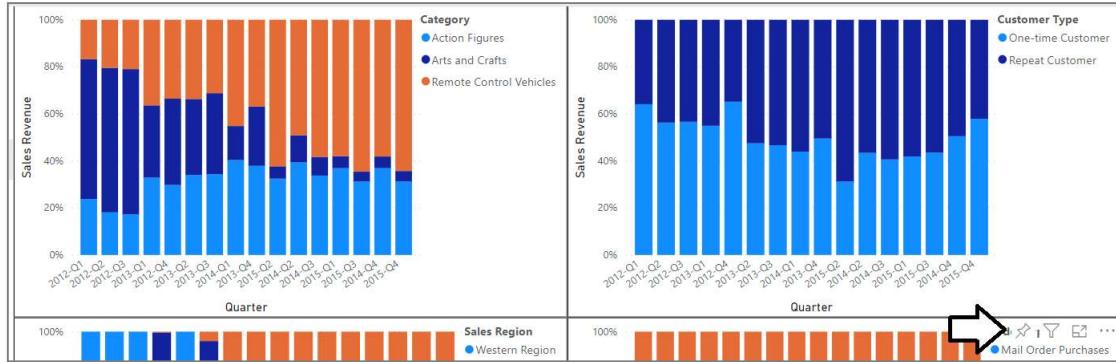
e) Confirm the Q&A search box is no longer showing.



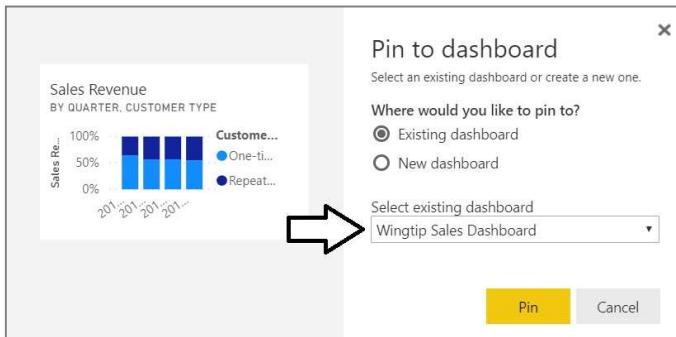
7. Add a second tile to the dashboard by pinning another visual from **Wingtip Sales Report**.

a) Navigate the **Revenue Breakdown** page of the report named **Wingtip Sales Report**.

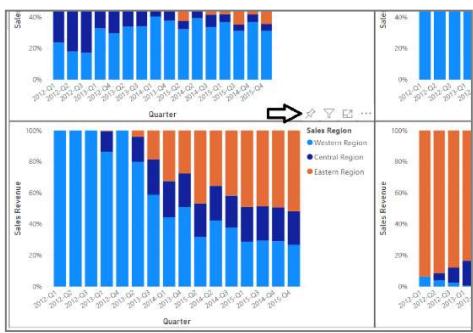
b) Click the thumbtack button of the visual underneath the visual.



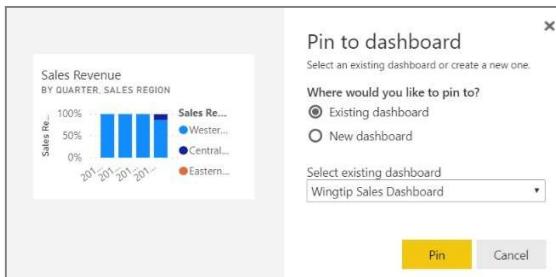
c) Pin the visual to the dashboard named **Corso PowerBI Dashboard**.



8. Add a third tile to the dashboard by pinning another visual from **Corso PowerBI Report**.
- Click the thumbtack button of the visual in the top left corner.



- Pin the visual to **Corso Power BI Dashboard**.



- Navigate to the dashboard named **Corso Power BI Dashboard**. The tile layout should match the following screenshot.

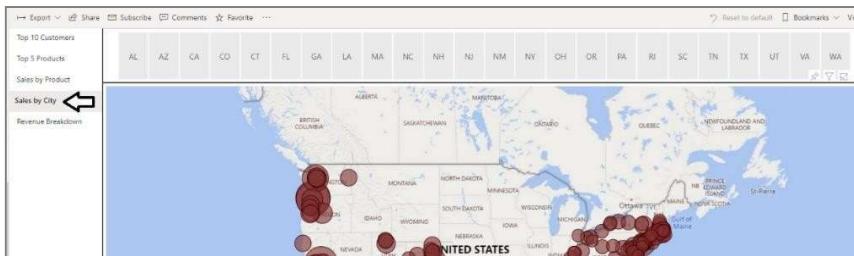


- d) Using the mouse, move the tile on the bottom row up so it's to the right of the two other tiles.

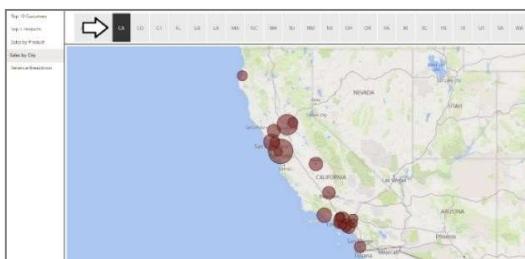


9. Add three more tiles to **Corso Power BI Dashboard** to show sales revenue by city in CA, TX and FL.

- a) Navigate to the **Sales by City** page of **Wingtip Sales Report**.



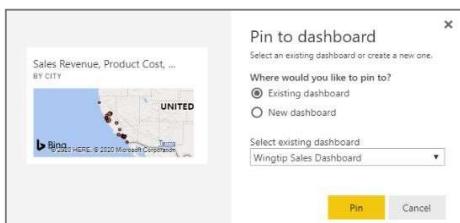
- b) Click on **CA** in the top slicer to filter cities by the state of California.



- c) Once you have applied a filter for the state of **CA**, click the thumbtack button to pin the visual as a dashboard tile.



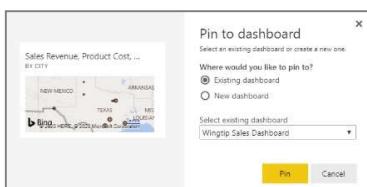
- d) Pin the filtered map visual to **Corso Power BI Dashboard**



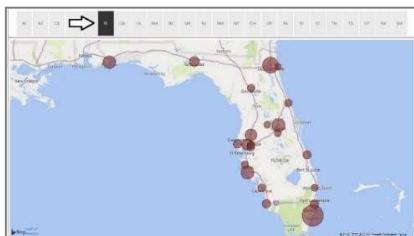
- e) Click on **TX** in the top slicer to filter cities by the state of Texas.



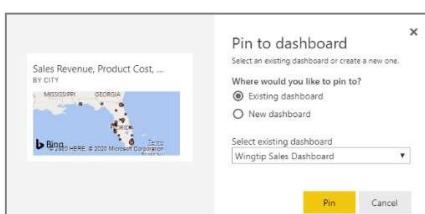
- f) Pin the filtered map visual to **Corso Power BI Dashboard**.



- g) Click on **FL** in the top slicer to filter cities by the state of Florida.

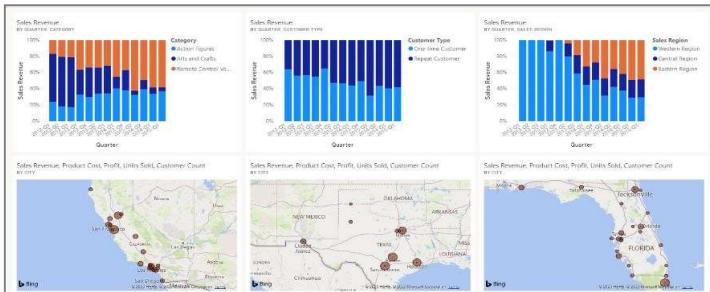


- h) Pin the filtered visual to **Corso Power BI Dashboard**



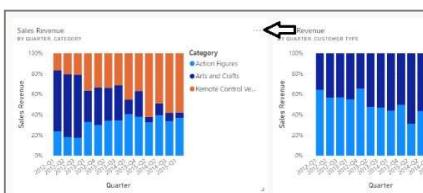
- i) Navigate back to **Corso Power BI Dashboard**

- j) Rearrange the tiles in **Corso Power BI Dashboard** to match the following screenshot.

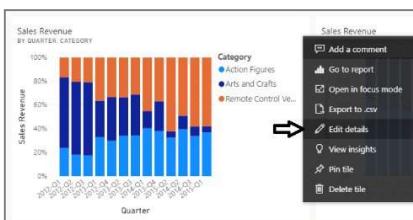


10. Remove the titles and subtitles from all six dashboard tiles

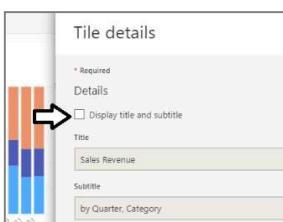
- a) Click the ellipse flyout menu for the tile at the top left of the dashboard.



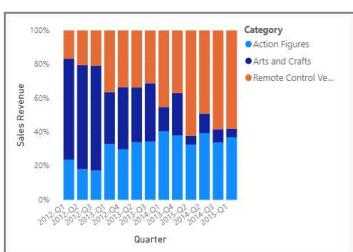
- b) Select the **Edit details** to open the **Tile details** pane for this tile.



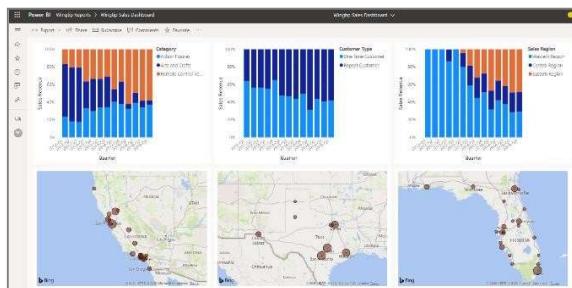
- c) On the **Tile details** pane, uncheck the **Display title and subtitle** checkbox and then click **Apply**.



- d) The top left tile should now display without a title or subtitle.



- e) Follow the same set of steps to remove the title and subtitle from the other 5 tiles.

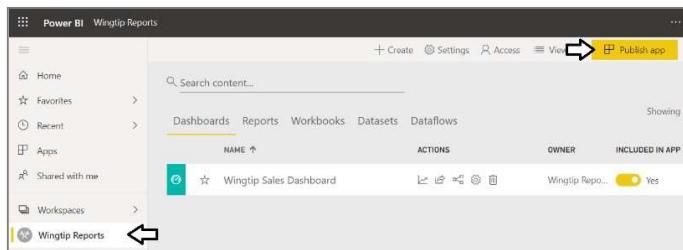


You have finished populating the **Corso Power BI Reports** workspace with content and it's time to publish this workspace.

## Exercise 2: Publish an App Workspace as a Power BI App

In this exercise you will publish the **Corso Power BI Reports** app workspace as a Power BI app.

1. Publish the **Wingtip Reports** workspace as a Power BI app.
  - a) Navigate to the **Corso Power BI Reports** workspace.
  - b) Click the **Corso Power BI Reports** link in the left navigation to show the summary page for the **Corso Power BI Reports** workspace.



- c) Click the **Publish app** button.



- d) On the **Setup** tab, enter an **App name** of **Corso Power BI Reports** and a short **Description**.

## Corso Power BI Reports

Installazione Navigazione Autorizzazioni

### Compila l'app

Nome app \*

Corso Power BI Reports

Descrizione \*

An app for analysing Corso Power BI performance.

152 caratteri rimasti

Sito del supporto

Consente di indicare il sito che gli utenti possono visitare per ottenere informazioni

Logo dell'app



Carica

Elimina

Colore tema dell'app



- e) Upload an **App logo** from **image.png**.
- f) Select an **App theme** color of black.

Logo dell'app



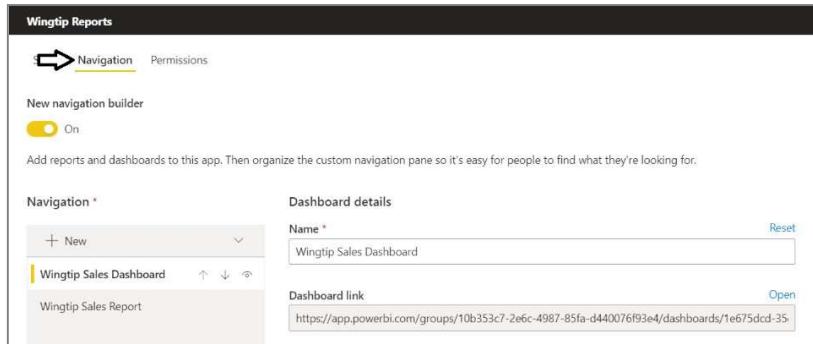
Carica

Elimina

Colore tema dell'app

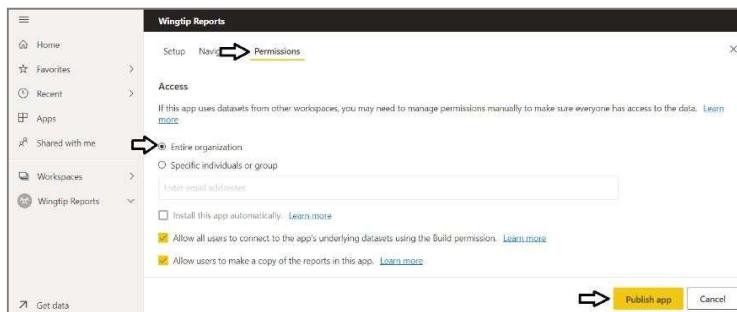


- g) Click on the **Navigation** tab and Set **New navigation builder** to **On**.



- h) On the **Permissions** tab under **Access**, select **Entire organization**

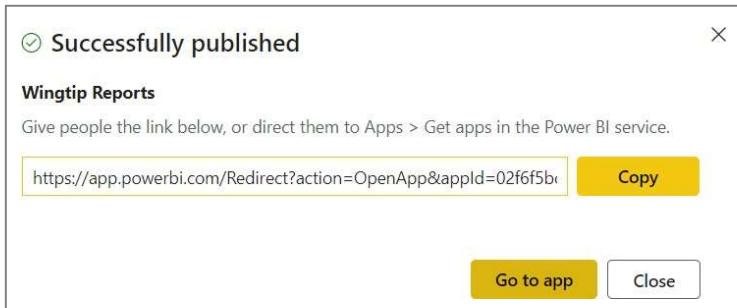
- i) Click the **Publish app** button on the right to complete the publication process.



- j) When prompted by the dialog, click **Publish**.

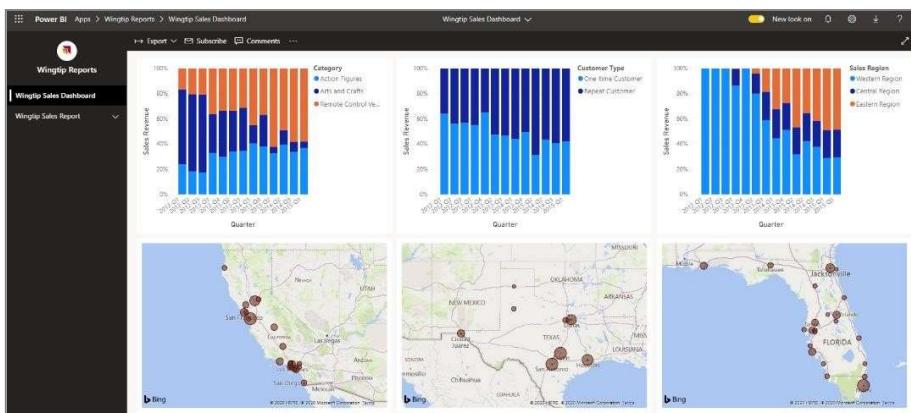


- k) When you see the **Successfully Published** dialog, click the **Go to app** button.



The **Corso Power BI Reports** app is now being installed for your organization account,

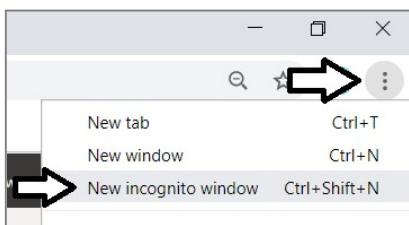
- I) You should now be redirected into the **Corso Power BI Reports** app.



In the next step, you will logon as James Bond and you will access the **Corso Power BI Reports** app as a consumer.

2. Launch a new browser session to sign into the Power BI Service as the user James Bond.

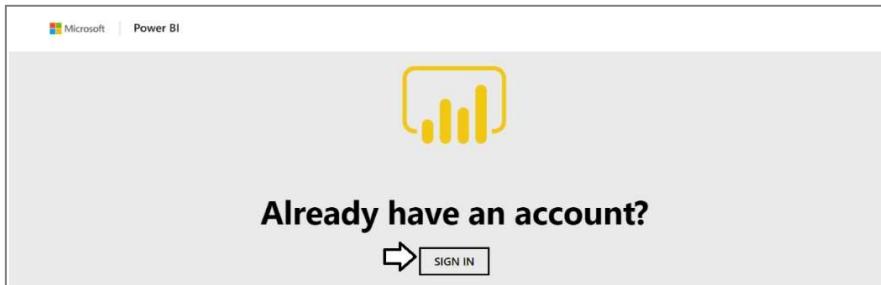
- a) Launch a new session of the Chrome browser in incognito mode. (or you can launch a different browser such as IE or Edge)



- b) In the new browser window, copy and paste the following URL into the address bar to navigate the Power BI Service.

**https://app.powerbi.com**

- c) When you navigate to the Power BI Service, you should see a page with a **Sign In** button. Click the **Sign in** button.

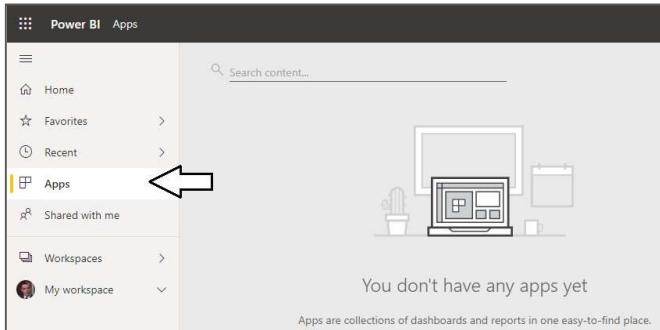


- d) Sign in using the account name and the password of the user account for James Bond.



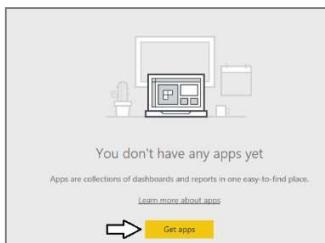
3. Install the **Corso Power BI Reports** app from the perspective of an app consumer.

- a) Click the **Apps** button in the left navigation menu.



- b) You should see there are no apps currently installed for the current user, James Bond.

- c) Click the **Get apps** button.



- d) You should see the **AppSource** dialog showing you what apps are available for installation.

- e) Inspect the apps in the **My organization** tab where you should see the new app named **Corso Power BI Reports**.

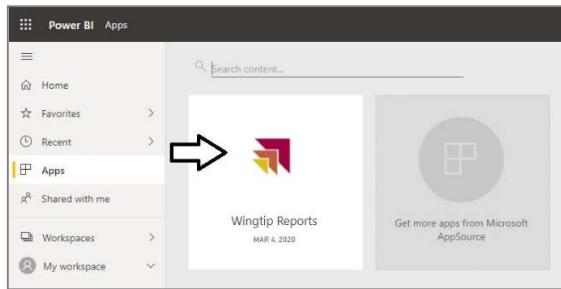


- f) Click the **Get it now** link.

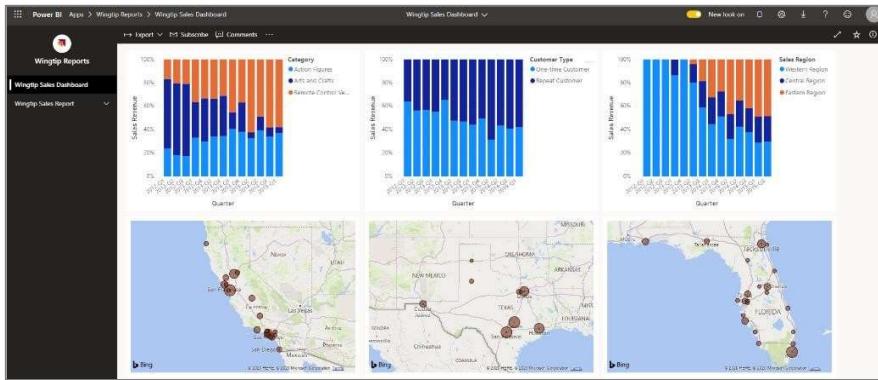


- g) The app should install and then be displayed as shown in the following screenshot.

- h) Click on the tile for the **Corso Power BI Reports** app to launch it,



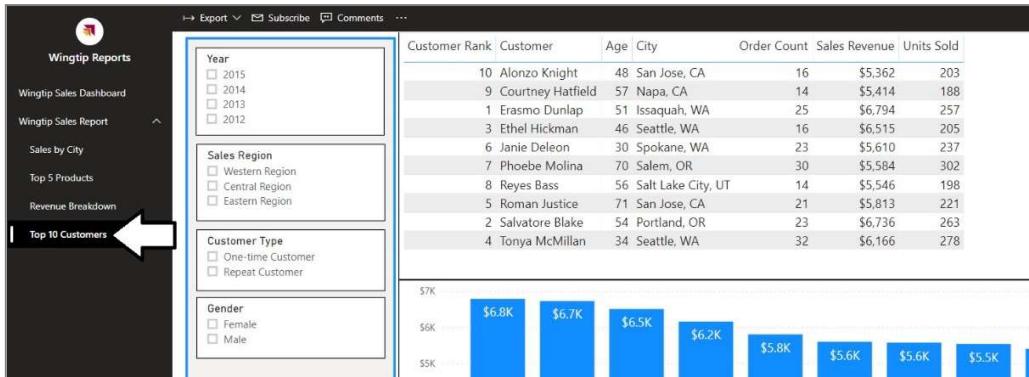
- i) When the app is launched, it displays a left navigation menu and also initially displays the **Corso Power BI Dashboard**.



- j) Note the breadcrumb at the top shows a path with the app and the dashboard inside the app.

**Power BI Apps > Wingtip Reports > Wingtip Sales Dashboard**

- k) Expand the **Corso Power BI Report** node in the left navigation so you can see all the report pages in left navigation.  
l) Experiment navigating to the report pages such as the **Top 10 Customers** page.



You have now installed and tested an app from the perspective of an ordinary user who does not an administrator.

# Demo PublishFromExcel.xlsx

## 1. Importare dati da excel su percorso locale (Import mode)

- a. Mostrare prima di iniziare come è fatto il file excel che vorremmo importare. Far notare che il foglio è previsto di:
  - i. un modello interno
  - ii. una visualizzazione
- b. Andare nel servizio di Power BI service e cliccare su “GetData” in basso a sinistra



- c. Selezionare carica dati da file

- d. Scegliere da file locale

- e. Scegliere il file “15-Dataset.xlsx”

Name	Date modified	Type	Size
15-Dataset.xlsx	5/9/2018 12:23 AM	Microsoft Excel W...	1,306 KB

f. Importantissimo in questa schermata scegliere la modalità di caricamento (Importa o carica)

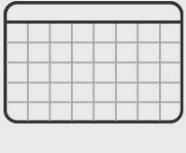
### File locale

Scegliere la modalità di connessione alla cartella di lavoro di Excel



**Importa i dati di Excel in Power BI**  
È possibile connettersi ai dati nella cartella di lavoro per creare report e dashboard di Power BI.

**Importa** 



**Caricare il file di Excel in Power BI**  
È possibile caricare i file di Excel in Power BI per visualizzarli e interagire con essi come in Excel Online e aggiungere gli intervalli ai dashboard.

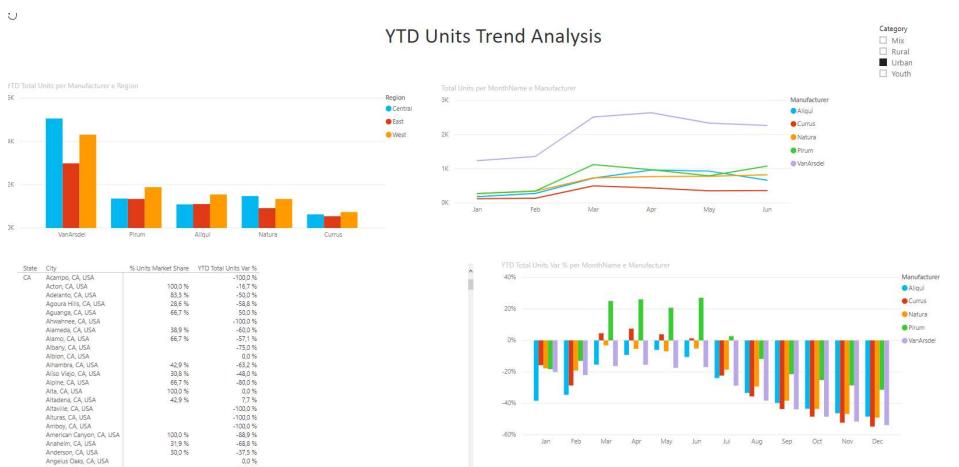
**Carica** 

g. Scegliamo “importa” e vedremo che verrà importato il modello come dataset e come report la visualizzazione che avevamo nel foglio excel

NOME ↑	APPROVAZIONE	AZIONI
15-Dataset	 	  

NOME ↑
15-Dataset



2. Ora rifacciamo il giro però scegliendo questa volta l'altra opzione. Prima però dobbiamo cancellare tutti sia il report che il set di dati.

a. Andare nel servizio di Power BI service e cliccare su "GetData" in basso a sinistra



b. Selezionare carica dati da file

### Individuare contenuto

**Organizzazione**

Consente di individuare app pubblicate da altri utenti dell'organizzazione.

**Scarica**

**Servizi**

Consente di scegliere le app dai Servizi online in uso.

**Scarica**

### Creare nuovo contenuto

**File**

Consente di importare report, cartelle di lavoro o dati da file di Excel, Power BI Desktop o CSV.

**Scarica**

**Database**

Consente di usare Power BI Desktop per connettersi ai dati nel database SQL di Azure.

**Scarica**

Altri modi per creare contenuto personalizzato

[Esempi](#)    [Pacchetti di contenuto dell'organizzazione](#)

[Showcase dei partner](#)    [Pacchetti di contenuto di servizi](#)

Compila in base a set di dati esistenti

[Set di dati pubblicati](#)

c. Scegliere da file locale



d. Scegliere il file “15-Dataset.xlsx”

	Name	Date modified	Type	Size
C	15-Dataset.xlsx	5/9/2018 12:23 AM	Microsoft Excel W...	1,306 KB

e. Importantissimo in questa schermata scegliere la modalità di caricamento (Importa o carica)

**File locale**

Scegliere la modalità di connessione alla cartella di lavoro di Excel

**Importa i dati di Excel in Power BI**

È possibile connettersi ai dati nella cartella di lavoro per creare report e dashboard di Power BI.

**Caricare il file di Excel in Power BI**

È possibile caricare i file di Excel in Power BI per visualizzarli e interagire con essi come in Excel Online e aggiungere gli intervalli ai dashboard.

**Importa ➔**

**Carica ➔**

f. Scegliamo “Carica” e vedremo che verrà importato il modello come dataset e il file excel come foglio così come è nella zona “cartella di lavoro”

The screenshot displays two instances of the Power BI service interface. Both windows have a header with 'Dashboard', 'Report', 'Cartelle di lavoro', and 'Set di dati'. The 'Set di dati' tab is selected in both. Below the header is a table with columns: 'NOME ↑', 'APPROVAZIONE', and 'AZIONI'. In the first window, there is one row with '15-Dataset' in the 'NOME' column. In the second window, there is also one row with '15-Dataset' in the 'NOME' column. The 'AZIONI' column contains icons for each dataset.

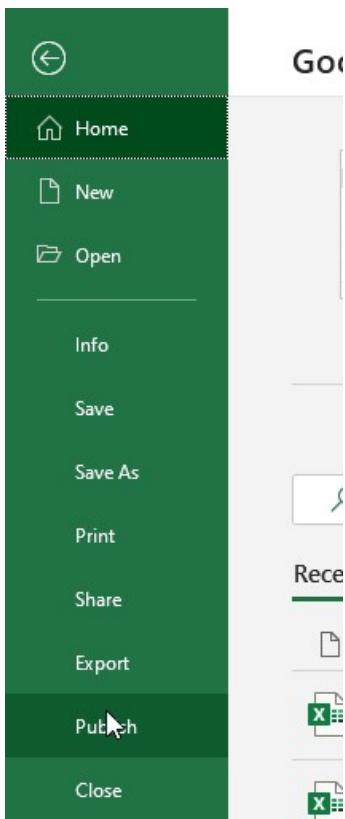
g.

3. Ora partiamo da excel e vediamo cosa è possibile da questo nuovo punto di appartenza.

- a. Apriamo il file excel "**15-Dataset.xlsx**"

	Name	Date modified	Type	Size
C	<b>15-Dataset.xlsx</b>	5/9/2018 12:23 AM	Microsoft Excel W...	1,306 KB

- b. Andiamo sul menù file e scegliamo "**Publish**"



- c. Ora compare la schermata di collegamento a Power BI. Se non siamo loggati clicchiamo sul link per loggarcici con il nostro account.

A screenshot of the 'Publish' dialog box in Power BI desktop. At the top, it says 'Publish' and has a green bar with the 'Publish to Power BI' button. Below that, it says 'Publish to Power BI' and provides instructions: 'Use Power BI to create and share rich visual reports and dashboards from your workbook.' There's a 'Learn more' link. It shows that the user is signed in as 'info@marcopozzan.it' and provides a 'Use another account' link. A dropdown menu shows 'My Workspace' and a 'Refresh' button. The dialog is divided into two main sections: 'Upload' and 'Export'. The 'Upload' section contains a description of what users can do with their workbook in Power BI, including interacting with Excel, pinning selections, and sharing. It also includes a note that the workbook was already uploaded and can be replaced. The 'Export' section contains descriptions for exporting table data and creating Power BI reports, along with a similar note about replacing datasets.

- d. Se premiamo sul tasto “upload” abbiamo lo stesso funzionamento dell’icona a destra di prima “carica”



#### Upload your workbook to Power BI

- Interact with your Excel workbook just as you would in Excel Online.
- Pin selections from your workbook to Power BI dashboards.
- Share your workbook or selected elements through Power BI.

i This workbook was already uploaded to Power BI. You can upload it again to replace the workbook in Power BI.

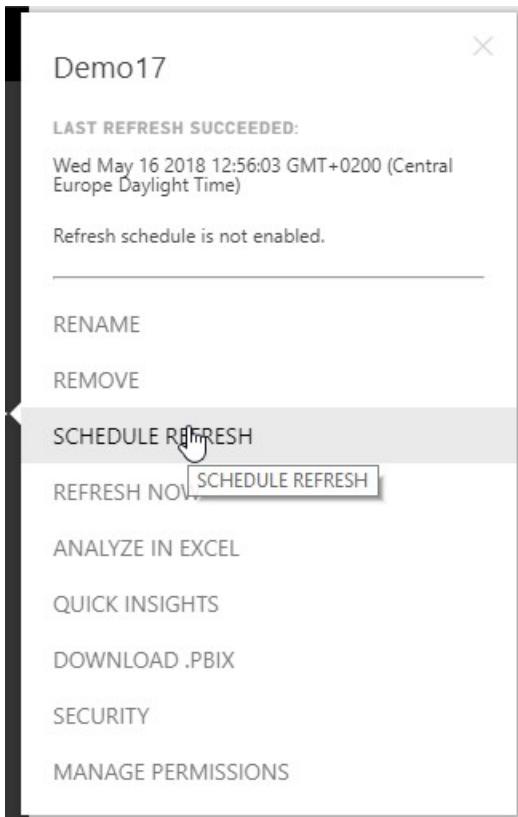
e. Se invece clicchiamo sull'icona “**Export**” carichiamo solo un dataset



#### Export workbook data to Power BI

- Export table data and data model into a Power BI dataset.
- Create Power BI reports and dashboards from your dataset.

i This workbook was already exported to Power BI. You can export it again to replace the dataset in Power BI.



- Comparirà la parte di configurazione del gateway  
Settings for Demo17

( Last refresh failed: Wed May 16 2018 15:03:53 GMT+0200 (Central Europe Daylight Time)  
Scheduled refresh has been disabled. [Show details](#)

[Refresh history](#)

**Gateway connection**  
To use a data gateway, make sure the computer is online and the data source is added in [Manage Gateways](#).  
 Use your data gateway (personal mode)  
 Use an on-prem data gateway

You have access to multiple data gateways. Choose the data gateway you'd like to use.

	Status	Department	Gateway	Contact information	Description
<input type="radio"/>	Online		METHODE	marco.pozzan@methode0...	
<input type="radio"/>	Online		ON-DATA-GAT...	marco.pozzan@methode0...	

- Successivamente bisogna impostare la schedulazione

#### ◀ Scheduled refresh

Keep your data up to date



Refresh frequency

▼

Time zone

▼

Time

▼ ▼ ▼ 

[Add another time](#)

## Demo 19

In questa dimostrazione vedremo come utilizzare un content pack esistente  
(POWER BI W2T\Demofiles\Mod02\Demo\Demo19-credenziali.txt)

