Exercise 5.1: DAX Time Intelligence

⊞ In Report view:

1. Add a new page to the report and name it "Exercise 5"
2. On 'Fact' table, add a measure "Last_month_actual", which calculates actual expenditures from last month (value as calculated in 'Fact'[Actual], but from previous month)

Hint

DAX-syntax is: CALCULATE(***measure name***, DATEADD(***Date column***, ***number of intervals***, ***interval length***)

3. Add a table with values "Date", "Actual" and "last_month_actual" to check, whether last_month_actual behaves as expected.
4. Add a KPI visual with "Actual" as Indicator, "FactDate" as Trend axis and "last_month_actual" as Target goals
5. In formatting tab of KPI visual, change color coding to "low is good", remove the title and change the label of the goal to "Last month":
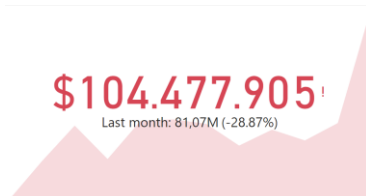
6. If your model does not feature a 'Date' table, import it now from "Exercise 3.xlsx".
7. In 'Fact' table, add a measure that sums up all total expenditures 'Fact'[total_expenditure] from the start of the year to current date (YTD) and name it "YTD_total_expenditure".

Hint

DAX Syntax is: YTD_total_expenditure = TOTALYTD(***aggregation function***([***column name***]), 'Fact'[Date])
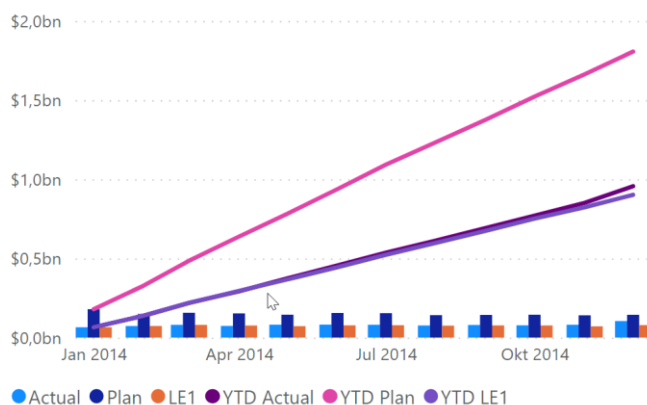
8. Add following measures:
    a. YTD_Actual_total_expenditure: filter YTD_total_expenditure on ScenarioDescription = "Actual"
    b. YTD_Plan_total_expenditure: filter YTD_total_expenditure on ScenarioDescription = "Plan"
    c. YTD_LE1_total_expenditure: filter YTD_total_expenditure on ScenarioDescription = "Latest Estimate 1"
    d. LE1: analogous to Fact[Actual], but with filter on ScenarioDescription = "Latest Estimate 1"

Hint

To evaluate an expression in a filter context, you can use the CALCULATE-function: CALCULATE(<expression>, <filter context>)

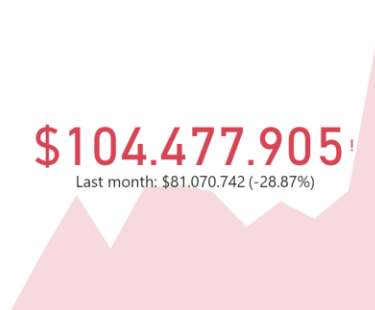9. In a line and clustered column chart: visualize actual, plan and LE1 values per month and YTD:

Actual, Plan and Lates Estimate – per month & YTD

● Actual ● Plan ● LE1 ● YTD Actual ● YTD Plan ● YTD LE1
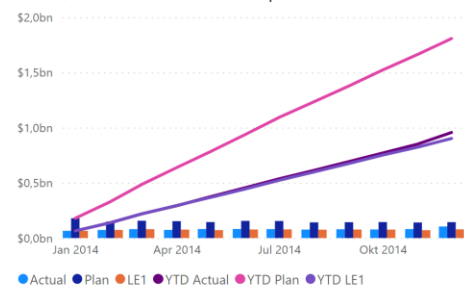
Bonus 5.1:

10. In 'Fact' table, add following measures:
    a. Diff_YTD_actual_plan: measure YTD_Actual_total_expenditure minus YTD_Plan_total_expenditure
    b. Diff_YTD_atual_le1: analogous to Diff_YTD_actual_plan
    c. % Diff_YTD_actual_plan: DIVIDE([Diff_YTD_actual_plan], [YTD_Plan_total_expenditure], BLANK())
    d. % Diff_YTD_actual_le1: analogous to % Diff_YTD_actual_plan
11. Add a line chart, plotting % Diff_YTD_actual_plan against time
12. Add a bubble chart with Business Are as Details, "Diff_YTD_actual_plan" as X Axis, "% Diff_YTD_actual_plan" as Y-axis, "Ytd_Axtual_total_expenditure" as Size and "Date" as Play Axis.
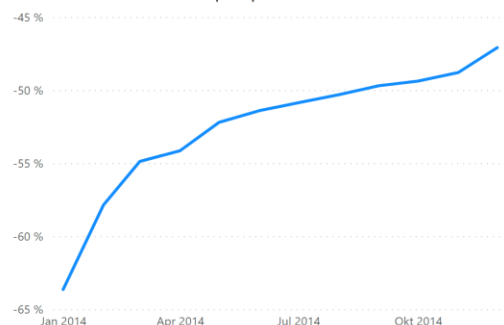

Exercise 5.2: DAX Iterator Functions

In Report view:

13. On 'Fact' table: Create a measure "efficient_total expenditures", which yields the same output as "total expenditures", without the need of any additional calculated columns. For this, apply the iterator function SUMX().

    Hint

    Use following DAX syntax: SUMX(***table name***, ***expenditures/cost column name*** times (1+RELATED(***VAT table***[***VAT column name***]))

14. Add a table with "efficient_total_expenditures" and "total_expenditures". Do the values match? What is the difference between "efficient_total_expenditures" and "total_expenditures"?

15. In 'Fact' table, create following measure:
    a. Average_expenditure: contains the average of Fact[Value] and filtered for scenario[ScenarioDescription] = "Actual" for each date. We can use this to find the average actual monthly expenditure. Since we only have one datapoint per month, the calculated value will be the average monthly expenditure.
       Solution

       average_expenditure_per_month = AVERAGEX(values('Fact'[Date]), [Actual])

16. Add a table, containing Average_expenditure, Business Area and Actual as Values to test the measure we created.

average_expenditure_per_month	Actual	Business Area
23.864.384,66	$286.372.616	Infrastructure
14.383.766,06	$172.605.193	Office & Administrative
12.029.359,61	$144.352.315	Manufacturing
11.666.613,88	$139.999.367	BU
9.849.769,86	$118.197.238	R&D
4.473.702,24	$53.684.427	Distribution
3.389.244,03	$40.670.928	Services
79.656.840,34	**$955.882.084**	

Bonus 5.2:

1. Add a new page in the report view and name it "Exercise 5 Bonus"
2. In 'Fact' table, add a measure "rank_percentage_deviation_country". That measure should rank all countries based on their percentage deviation between planned and actual expenditures in ascending order. To do so, use the RANKX() function. The Microsoft documentation for RANKX() states following syntax (https://docs.microsoft.com/de-de/dax/rankx-function-dax):

   RANKX(<table>, <expression>[, <value>[, <order>[, <ties>]]])

   HINT 1: Values in square brackets are optional and can be skipped whenever not required. Order = 1 will yield ascending order.
   HINT 2: Use 'Exercise 2 regions_countries'[Country/Region] as <table>
   HINT 3: Use 'Fact'[perc_deviation_plan_actual] as <expression>
3. Add a table displaying Country/Region, perc_deciation_plan_actual and rank_precentage_deviation_country and order it by descending rank. The table should look like below screenshot:

Country/Region	perc_deviation_plan_actual	rank_percentage_deviation_country ▼
Netherlands	1,59	52
Brazil	1,56	51
Italy	1,54	50
Ireland	1,42	49
Canada	1,30	48
France	1,16	47
New Zeland	1,15	46
Mexico	1,03	45
Puerto Rico	1,02	44
USA	0,88	43
United Kingdom	0,87	42
~~Belgium~~	~~0,77~~	~~41~~
Total	**0,89**	**44**

4. Delete rank column from the table and add the rank column as filter so that the table displays the top ten countries with lowest percentage deviation.
5. Add another measure calculating the ascending rank of perc_deciation_plan_actual: ascending_rank_percentage_deviation_country
6. Add a table displaying top ten countries with highest plan to actual cost ratio:

Top ten countries with best plan vs. actual expenditure ratio

Country/Region	% dev plan vs. actual ▼
Netherlands	1,59
Brazil	1,56
Italy	1,54
Ireland	1,42
Canada	1,30
France	1,16
New Zeland	1,15
Mexico	1,03
Puerto Rico	1,02
USA	0,88
Total	**0,91**

7. In 'Fact' table, add another measure "US_expenditures". This measure should filter actual expenditures for Country/region = "USA".
   HINT: use CALCULATE(***aggregration***, filter(***table name***, ***filter condition))
8. Add a table with Business Area, Country/Region and US_expenditures
9. In the same table, add [Actual] and observe, how displayed data changes.

Business Area	Country/Region	US_expenditures	Actual
Manufacturing	United Kingdom		$660.566
Office & Administrative	United Kingdom		$7.485.730
R&D	United Kingdom		$6.197.407
Services	United Kingdom		$463.252
BU	USA	115.418.156,48	$115.418.156
Distribution	USA	44.634.522,45	$44.634.522
Infrastructure	USA	207.889.356,88	$207.889.357
Manufacturing	USA	108.151.984,01	$108.151.984
Office & Administrative	USA	160.977.089,35	$160.977.089
R&D	USA	110.071.740,68	$110.071.741
Services	USA	38.728.445,43	$38.728.445
BU	Venezuela		$0
Distribution	Venezuela		$0
Infrastructure	Venezuela		$0
Manufacturing	Venezuela		$0
Office & Administrative	Venezuela		$0
R&D	Venezuela		$0
Total		**785.871.295,27**	**$955.882.084**