Calendar-based time intelligence in DAX and Power BI

- Marco Russo

Sponsor & Org

MINDMASH
KEEP THINKING

digitale

DATA SKILLS
UNDERSTANDING THE WORLD

M D
massive
dynamic *holding*
H

engage
LABS

daniela malvisi
COMMUNICATION

Lucient
ITALIA

Bi Factory
DATA KNOWLEDGE ADVISOR

Agenda

- Why calendar-based time intelligence exists
- How does it work?
- How to create a calendar
- Examples
- Choosing calendar-based vs classic time intelligence
- Q & A

Classic time intelligence

- The “classic” time intelligence “ignores” the Date table:
  - It uses only the Date column
  - It assumes a Gregorian calendar exists
  - Only knows year/quarter/month aggregations
  - It ignores week/day of week and other custom aggregations
- Many companies have special needs:
  - Week comparison; 4-4-5 calendars
  - Month calendars with 13 months in a year
  - …

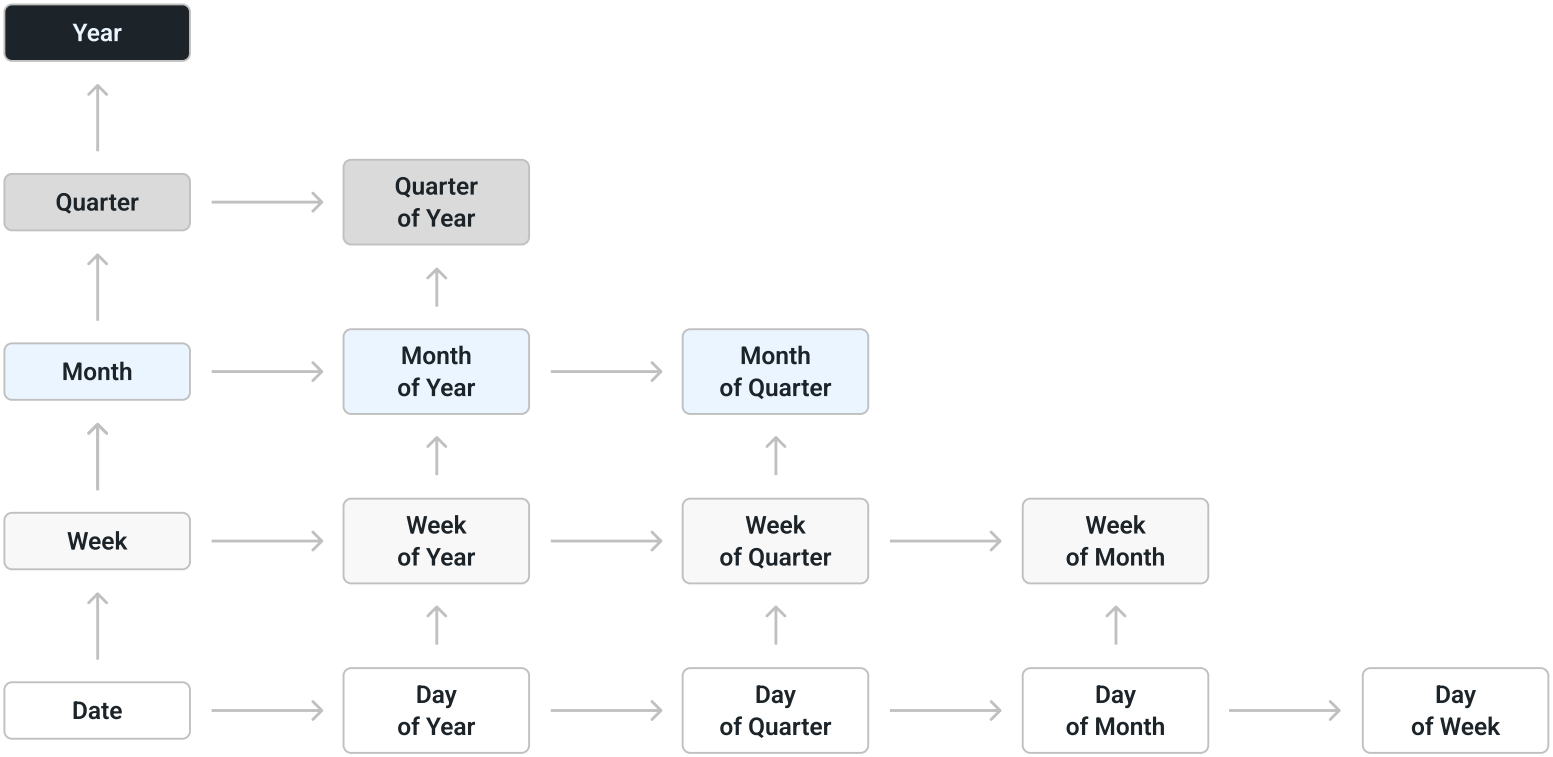
Why calendar-based time intelligence

- The calendar-based time intelligence makes no assumptions:
  - The calendar is defined by tables of the Date table
  - Time intelligence functions manage filters on columns that belong to calendars in the Date table
  - The model developer must define the Calendar
- It virtually manages all the scenarios
- It requires more work to prepare the Date table

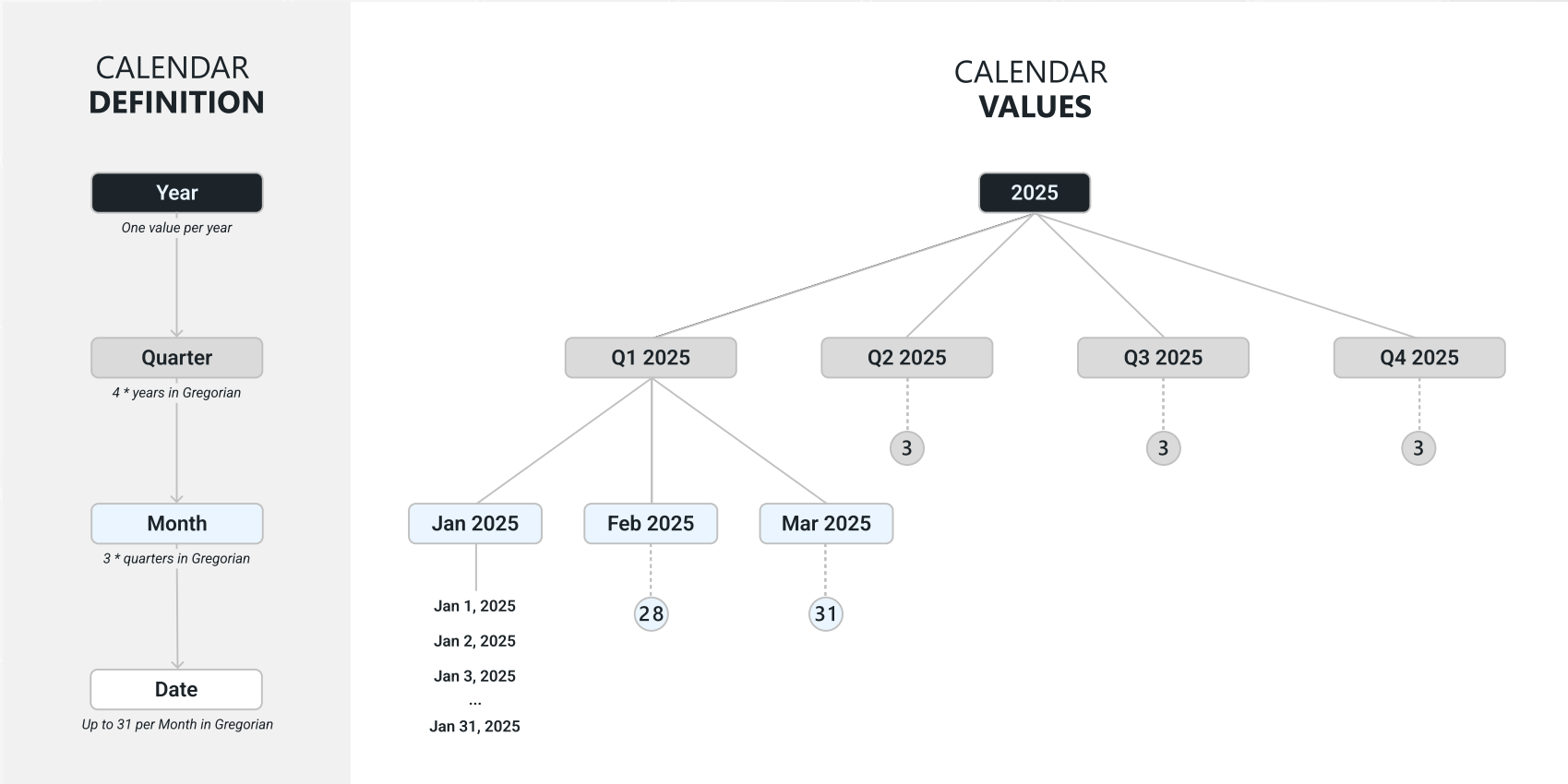
How does it work

- Assign a category to Date columns that belong to a calendar
- Time intelligence functions operate this way:
  - Detect the lowest filter applied (year, or quarter, or month, …)
  - Remove the filters from calendar columns
  - Compute the period requested by the function (YTD, YOY, …)
  - Apply a new filter to calendar columns according to the request

Categories available in a calendar



Examples of calendar values



Description of categories

Category	Example	Description	Type	Example of cardinality
Year	2025	The year	Complete	1 per year
Quarter	Q1 2025	The quarter, including the year	Complete	4 per year
Month	January 2025	The month, including the year	Complete	12 per year
Week	2025 Week 20	The week, including the year	Complete	52/3 per year
Date	01/05/2025	The individual date	Complete	365/6 per year
Quarter of Year	Q1	The quarter, without the year	Partial	4
Month of Year	January	The month, without the year	Partial	12
Month of Quarter	Q1 M1	The month, including the quarter	Partial	3
Week of Year	Week 2	The week, without the year	Partial	53
Week of Quarter	Q1 Week 2	The week, including the quarter	Partial	13
Week of Month	January Week 3	The week, including the month	Partial	5
Day of Year	Day 39	The day, without the year	Partial	366
Day of Quarter	Q1 Day 12	The day, including the quarter	Partial	92
Day of Month	January Day 12	The day, including the month	Partial	31
Day of Week	Week 3 Day 4	The day, including the week	Partial	7

How to create a Calendar

- Power BI user interface
- TMDL view
- External tools

Demo

How to create a Calendar

How to use a Calendar

- Time intelligence functions
  - Same functions (plus DATESWTD)
  - Use Date[Date] for classic time intelligence
  - Use calendar name for calendar-based time intelligence

```
Sales YTD Classic =
CALCULATE (
    [Sales Amount],
    DATESYTD ( 'Date'[Date] )
)
```

```
Sales YTD with Calendar =
CALCULATE (
    [Sales Amount],
    DATESYTD ( 'Gregorian' )
)
```

Demo

How to use a Calendar

One or more calendars per table?

- You can create multiple calendars in one Date table
- Just because you can, it does not mean you should
- It is not easy to detect the calendar used
  - ISFILTERED could be used if columns are exclusive to one calendar
  - However, it would be hard to maintain and long to write
  - Functions can help, but it would be safer to generate code with a script that relies on metadata to avoid errors
- Use one calendar to keep it simple

Classic or calendar-based time intelligence?

- Existing projects: no need to change
  - Unless you solve a performance issue
  - Tests needed before implementing the change
- New projects: it depends
  - Classic
    - Small proof-of-concepts
    - Very basic requirements
  - Calendar-based
    - Large enterprise projects
    - Weekly calendars, 4-4-5, monthly calendars, …

Conclusion

- Great feature, more flexibility, more work
  - Define a company Date table once
  - Share in projects (TMDL View, Bravo for Power BI)
- Learn the calendar structure
  - Design the calendar intentionally
  - You do not have to map all the columns of the Date table
- Do not use it just because it is new
  - You need a reason to spend more time

Q & A

Ask me anything:
I will try to answer!

Provide your feedback!

sqlbi