

# Financial dimension design principles

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# Agenda

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- Dimension background
  - Dimensions with high cardinality
  - Design principles

Dimension  
background

The background is a dark navy blue. In the upper right, there is a large, semi-circular shape with a gradient from light beige to orange. Below this, on the right side, is a solid light blue semi-circle. In the top right corner, there is a white rectangular area with a dark blue curved shape overlapping its corner.

# Financial dimension

- A category used for similar values
- **Examples**
  - Department
  - Cost center
  - Item group

The screenshot displays the 'Financial dimensions' configuration window. The top navigation bar includes options like 'Edit', 'New', 'Delete', 'Activate', 'Dimension values' (highlighted), 'Derived dimensions', 'Set up hierarchies', 'Translations', 'Main account translation', and 'Options'. On the left, a list of dimensions is shown, including 'BusinessUnit' (Active), 'BusinessUnit\_FR', 'Campaign', 'Cargo', 'Cashflow\_CN', 'Center', 'Condition', 'Contract', and 'CostCenter'. The main panel shows the configuration for the selected dimension, 'BusinessUnit'. It includes a table with columns 'Use values from', 'Dimension name', 'Report column name', and 'Status'. Below this, the 'Administration' section contains settings for 'ADMINISTRATION', including 'Dimension value mask', 'Copy values to this dimension on ea...' (set to 'No'), 'Require the dimension to be balanced' (set to 'No'), and 'Require values for the dimension to b...'. The interface is clean and modern, with a light blue and white color scheme.

# Dimension values

- The values for a specific financial dimension
- **Examples**
  - Business unit 001
  - Cost center 007
  - Department 022

The screenshot shows the 'Financial dimension values' configuration page in Microsoft Dynamics 365. The left sidebar contains a list of dimension values, with '001 Home' selected. The main area displays the configuration for dimension value '001' with description 'Home'.

**General**

Dimension value: 001, Description: Home

**General**

Σ Totals

Active from: [text field], Suspended: ☒ No, Calculate total from multiple dimen...: ☒ No, Owner: [text field]

Active to: [text field], Group dimension: [text field], Do not allow manual entry: ☒ No, Require the dimension value to be b...: ☒ No

**Legal entity overrides**

+ Add, Remove

Legal entity	Name	Suspended	Active from	Active to	Owner
<input checked="" type="radio"/> GLMF	Contoso Entertainment System				

# Default dimensions

A set of dimension values that flow from the subledger to the General ledger

Entered on master records, subledger transactions, and general journal transactions (non-ledger account type)

Combined with a main account to create a dimension combination during subledger and journal posting to the General ledger

# Default dimensions – example

**Financial dimensions** ^

**DEFAULT FINANCIAL DIMENSIONS**

Business Unit

002

Auto

CostCenter

007

Trade Shows

Department

027

Legal

ItemGroup

Audio

Audio Products

Project

No default

# Dimension combinations

A main account and set of dimension values that is also referred to as a "ledger dimension"

Entered directly into the segmented entry control for general journal lines (ledger account type)

Generated by subledger posting to the general ledger and various general ledger processes

Dimension combinations have no notion of being posted or unposted



# Dimension combinations – example

Journal number	Voucher	Date	Ledger account	Account name	Currency	Amount CAD	Amount USD
021913	USMF-000000077	02/07/2022	401100-001---	Product Sales	CAD	-11.00	-10.76
021913	USMF-000000077	02/07/2022	401100-002---	Product Sales	CAD	-12.00	-11.74
021913	USMF-000000077	02/07/2022	401100-003---	Product Sales	CAD	-13.00	-12.72
021913	USMF-000000077	02/07/2022	401100-004---	Product Sales	CAD	-14.00	-13.70
021913	USMF-000000077	02/07/2022	110160---0001	Bank Account - Payroll	CAD	50.00	48.92



Dimensions with  
high cardinality

# High cardinality dimensions

- In the past, we've referred to dimensions with values that were only used for a few transactions as "degenerate dimensions"
- "Degenerate dimension" is actually a specific term with a different meaning, so we are going to stop using it
- Instead, a "high cardinality dimension" is one that has lots of new dimension combinations, typically due to lots of new dimension values
- The rest of this content explains why high cardinality dimensions should not be selected as dimensions in the first place

# Dimension combinations – high cardinality

A new dimension combination has to be created the first time a new combination of dimension values is used

Using a new dimension value implicitly requires creating a new dimension combination

A dimension with high cardinality results in a constant stream of new dimension combinations as the new dimension values are created

Dimensions with high cardinality: sales order numbers, purchase order numbers, serial numbers, and so on

## Dimension combinations – reuse

Reusing an existing dimension combination is cheap in terms of using system resources

We only have to look up the correct reference (no records are created)

Dimensions with low cardinality (high reuse): business units, departments, cost centers, and so on

# Dimension combinations – create

Creating a dimension combination or default dimension is relatively expensive in terms of using system resources

Creating a dimension combination requires creating at least two records

Creating a dimension combination with a new dimension value requires creating two records for the new dimension value

## Dimension combinations – limits

A high cardinality dimension results in the total number of dimension combinations building up in the General ledger during the fiscal year

The limits are quite high, and performance typically becomes a problem only when the dimension design has a serious flaw

# Dimension combinations – impact

The number of dimension combinations in the General ledger may only become a problem during the year-end close or consolidation because they process a large amount of General ledger data at one time

The dimension set balances also have logic to process each dimension combination and can be affected by the number of dimension combinations in the General ledger



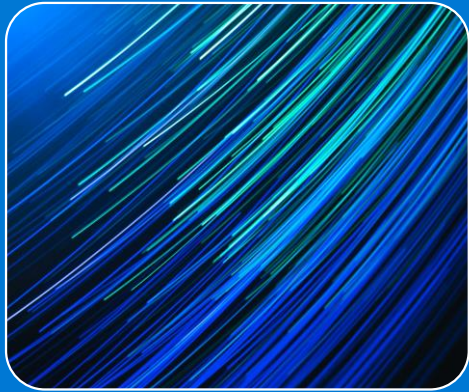
# Number theory – dimension combinations

Number of dimension values	2 dimensions	4 dimensions	8 dimensions
10 values each	$10^2$	$10^4$	$10^8$
Simple multiplication	$10 * 10$	$10 * 10 * 10 * 10$	$10 * 10 * 10 * 10 * 10 * 10 * 10 * 10$
Number of potential combinations	100 combinations	10,000 combinations	100,000,000 combinations

# Number theory – example

Number of dimension values	1 dimension	2 dimensions	4 dimensions
2000 total values	$2000^1$	$1000^2$	$500^4$
Simple multiplication	2000	$1000 * 1000$	$500 * 500 * 500 * 500$
Number of potential combinations	2,000	1,000,000	62,500,000,000

# Number reality – dimension combinations



The number of potential combinations is not usually a problem because a small number of the dimension values typically have a lot of reuse



The most common source of problems is a dimension that has new values created very often – a dimension with high cardinality

# Data examples

## Moderate scenario (okay)

- 35M rows in the general ledger for a fiscal year
  - $35\text{M} / 365 = 95,980$  general ledger rows/day
- 1M unique dimension combinations
  - $1\text{M} / (2 * 365) = 1,369$  source dimension combinations/day
  - $1\text{M} / (2 * 12) = 41\text{K}$  source dimension combinations/month

## Extreme scenario (bad)

- 71M rows in the general ledger for a fiscal year
  - $71\text{M} / 365 = 194,520$  general ledger rows/day
- 7M unique dimension combinations
  - $7\text{M} / (2 * 365) = 9,589$  source dimension combinations/day
  - $7\text{M} / (2 * 12) = 291\text{K}$  source dimension combinations/month



# Financial dimension design principles

# Dimension design pattern #1



Choose dimensions  
with infrequent new  
values (high reuse)

# Recommended design principles

Choose dimensions where summarization is common and desirable

Summarization is directly related to frequent reuse of dimension combinations

Avoid any other dimensions, especially ones with high cardinality

# Dimension design anti-pattern #2



Do not make subledger data a dimension

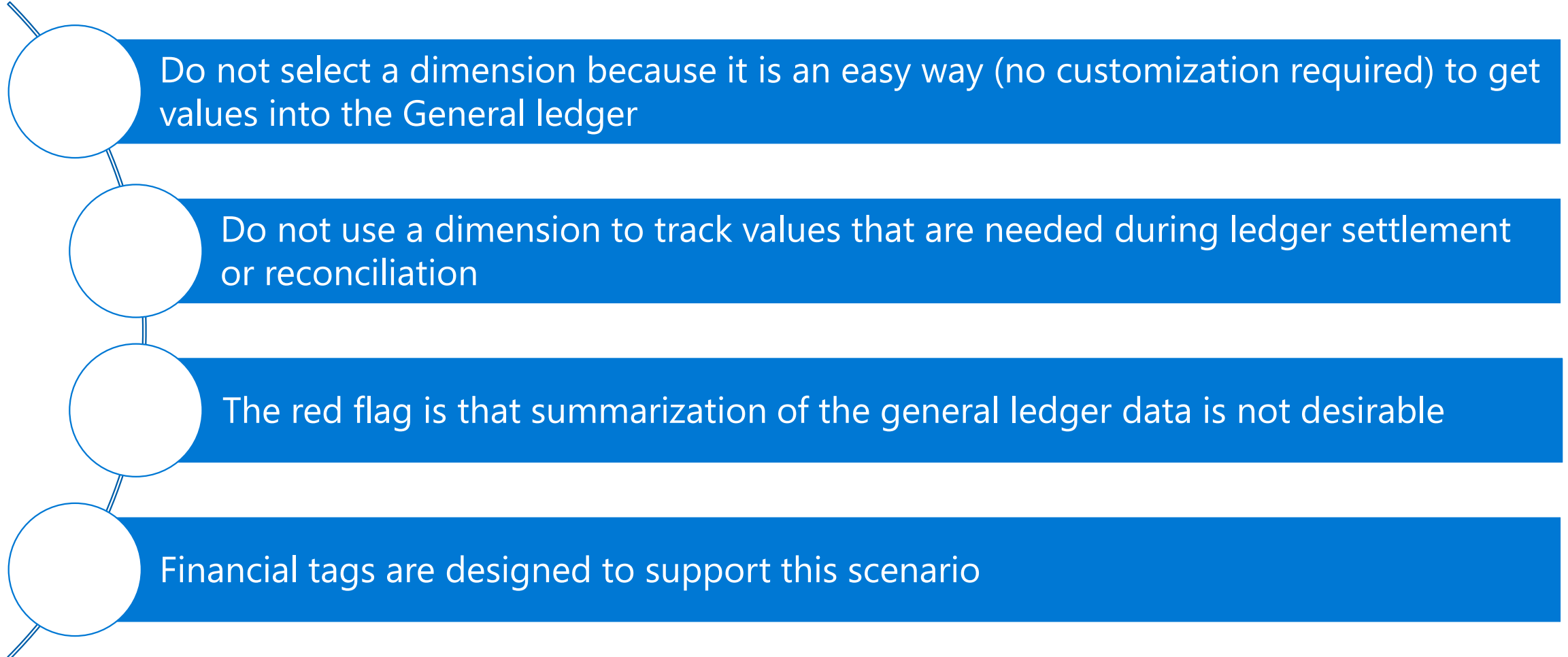
For example: customers, vendors, items, projects, fixed assets, etc.

Use the subledger for this reporting

Business Process Analytics is designed to support this scenario



# Dimension design anti-pattern #3



# High cardinality tends to multiply



General ledger data is the source for downstream processes

- Year-end close, consolidation, and foreign currency revaluation



High cardinality is repeated in downstream processes

- These processes are often where the issues come up because they process a large amount of General ledger data at once



Downstream processes never catch up

- Due to the constant stream of new dimension combinations

Q & A

# References – primary

[Financial dimensions - Finance | Dynamics 365 | Microsoft Docs](#)

[Financial dimension sets - Finance | Dynamics 365 | Microsoft Docs](#)

[Financial tags - Finance | Dynamics 365 | Microsoft Learn](#)

# References – secondary

[TechTalk Series: Planning and Configuring your Chart of Accounts - Microsoft Dynamics Blog](#) (TechTalk series)

[Financial Dimension Corruption: Understanding and Avoiding | March 2-3, 2022 - Microsoft Dynamics Blog](#) (TechTalk)

Thank you

