Financial dimension design

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Agenda

- Background
- Dimension details
- Design principles
- Q & A

Formerly: degenerate dimensions

- We use the term "degenerate dimension" to refer to a financial dimension with high cardinality

- "Degenerate dimension" is a specific term with a different meaning so we are trying to get away from using it

- A "high cardinality financial dimension" is one that has lots of new values and new dimension combinations (and is to be avoided)

- "Low reuse" is easier to understand than "high cardinality" so this presentation uses it

Financial dimension background

Background

- Financial dimensions
- Dimension values
- Default dimensions
- Dimension combinations
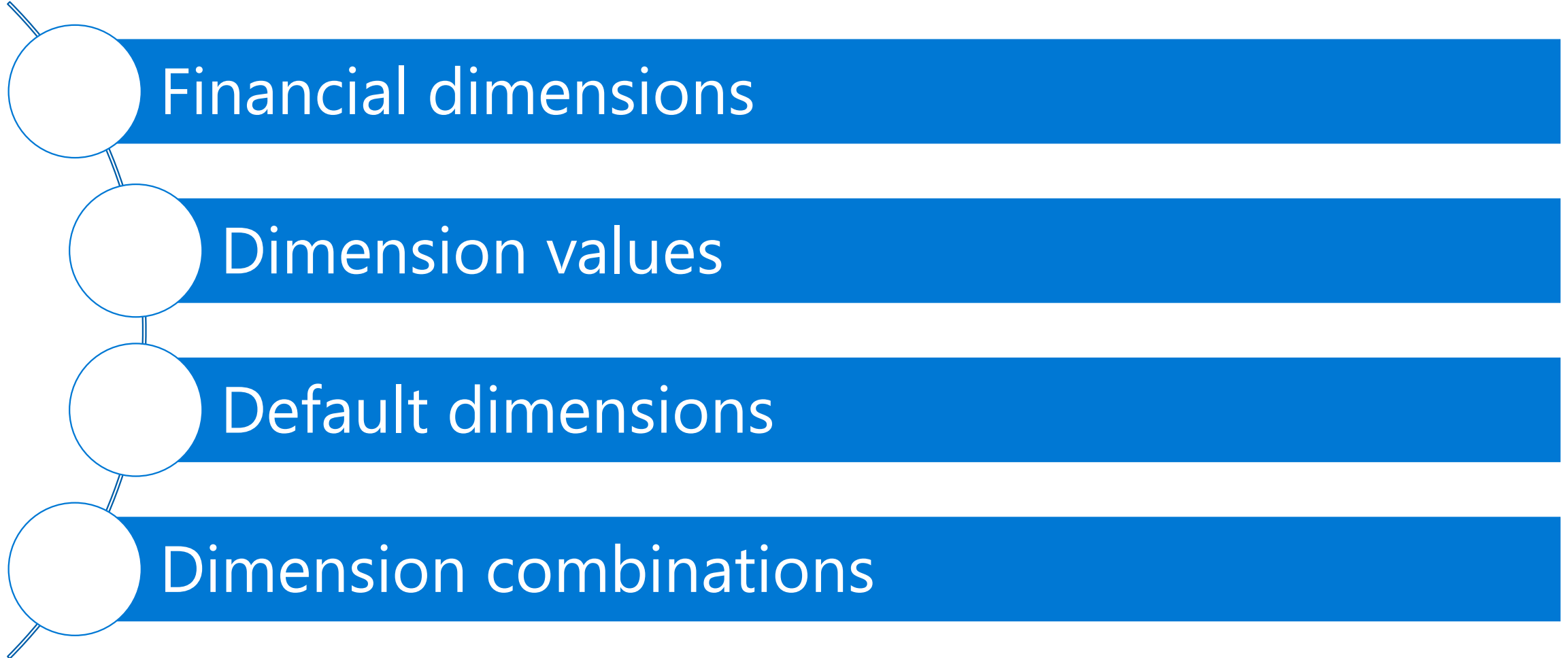
Financial dimensions

- A category that is used for an account segment

- **Examples**
  - Department
  - Cost center
  - Item group

Dimension values

- The individual values for a specific financial dimension

- **Examples**
  - Business unit 001
  - Cost center 007
  - Department 022

Default dimension example

Standard view ⌄

Enter account financial dimensions

Options ⌄

SELECT ACCOUNT DIMENSION VALUES FOR USMF

BusinessUnit

| 001 ⌄ | Home |

CostCenter

| 007 ⌄ | Trade Shows |

Department

| 022 ⌄ | Sales & Marketing |

ItemGroup

| ⌄ | |

Project

| ⌄ | |

Default dimensions

A set of dimension values that is used to connect the subledger and general ledger

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

Combined with a main account to create a dimension combination for posting to the general ledger

Dimension combination examples

		Date	Voucher	Company	Account type	Account
⚪	↻					
✓		4/24/2025 📅	GNJL275179	usmf ⌄	Ledger ⌄	401100-001-022-- ⌄

Journal number	Voucher	Date	Ledger account	Currency	Transaction amount	Accounting amount	Posting type
288038	FTV-30030079	04/06/2025	130100---	USD	260.00	260.00	Customer balance
288038	FTV-30030079	04/06/2025	202180-001--	USD	-10.00	-10.00	Sales Tax
288038	FTV-30030079	04/06/2025	401102-001---	USD	-250.00	-250.00	Customer revenue

Dimension combinations

A main account and a set of dimension values and may also be referred to as a "ledger dimension"

Valid combinations are defined by the account structure

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

Once a dimension combination is created for a main account, the main account can't be deleted (like, ever)

Dimension details

Dimension design

The dimension data model is designed to support specific features and patterns

Financial reports and the trial balance are the poster children for dimensions

The data model for dimension values is highly normalized

This is the data specific to each segment

The data model for combinations is denormalized for improved performance

This is the data specific to the combination and includes the combination as a simple string

Dimension combination performance

Reusing an existing dimension combination is very cheap

It is a group of dimension values that have been used before

Creating a new dimension combination is relatively expensive

It could be a group of existing values that have not been used together before (short term problem)

Over time, the need to create new combinations is driven by new dimension values

Dimension combination patterns
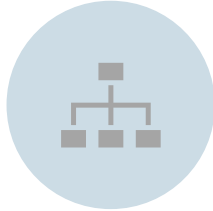
A new dimension combination will be created for a new combination of existing dimension values

A new dimension value implicitly requires multiple new combinations as it is combined with other dimension values

The number of unique dimension combinations builds up the general ledger during the fiscal year

The limits are quite high, and performance typically becomes a problem only when the financial dimension design has serious or multiple issues
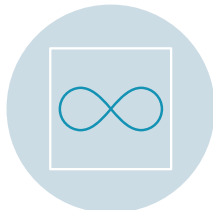
A high number of dimension combinations also reduces the ability to summarize the data in the GL which results in more rows in the GL

Number theory – dimension combinations (10 values)

Number of dimensions	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 – dimension combinations (100 values)

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

Number theory – example

Number of dimensions	One	Two	Four
2000 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 theoretical combinations may not actually be a problem because a small number of the dimension values typically have a lot of reuse

The most common source of problems is a financial dimension that has new values created very often – a dimension with low reuse

Data examples

Moderate scenario (okay)

- 35M rows in the general ledger for a fiscal year
  - 35M / 365 = 95,980 general ledger rows/day
- 1M unique dimension combinations
  - 1M / 365 = 2,739 dimension combinations/day
  - 1M / 12 = 83K dimension combinations/month

Extreme scenario (bad)

- 71M rows in the general ledger for a fiscal year
  - 71M / 365 = 194,520 general ledger rows/day
- 7M unique dimension combinations
  - 7M / 365 = 19,178 dimension combinations/day
  - 7M / 12 = 583K dimension combinations/month

Trial balance – Main account

Trial balance – Business unit

Trial balance – Main account + Business unit

Trial balance – Main account + 3 dimensions

Trial balance – Main account + 3 dimensions (rows)

Financial dimension design principles

Dimension design principles

Choose financial dimensions where summarization is common and desirable

Summarization is directly related to frequent reuse of dimension values and dimension combinations

Avoid choosing any other financial dimensions, especially ones with low reuse

Dimension design rule #1

- Choose dimensions with values that will have high reuse and, by definition, infrequent new values

High reuse dimension examples

Business unit

Sales region
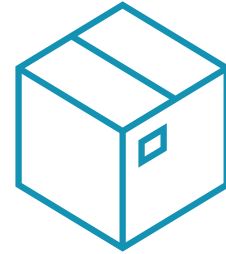
Item group

Low reuse dimension examples
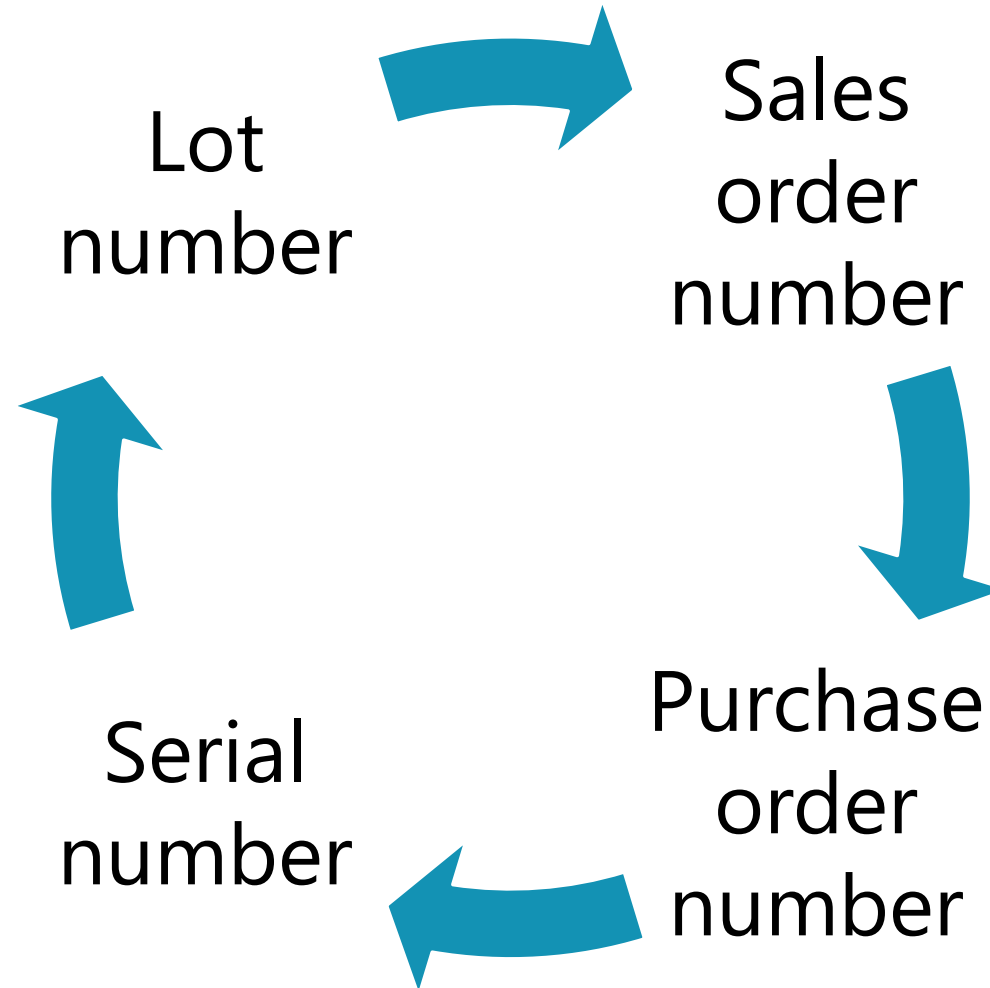
Dimension design anti-pattern #1

Avoid using subledger data as a financial dimension

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

Use the subledger for this reporting via Business Performance Analytics

Dimension design anti-pattern #2

Do not add a financial dimension because it is an easy way (no customization required) to get values into the general ledger

Do not use a financial dimension for values that are needed during ledger settlement or reconciliation

The red flag is that summarization of the general ledger data is not desirable

Dimension set design

Each dimension set defines its own account structure

↓

The general ledger data is summarized into dimension set balances

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The dimension set balances are displayed on the trial balance

↓

The trial balance contains a reasonable number of rows and performs as expected

↓

Each row in the trial balance is a unique dimension combination

Dimension set issues

Lots of new dimension combinations in the general ledger results in lots of new dimension combinations in each dimension set

Updating the dimension set balances requires creating the necessary dimension combinations
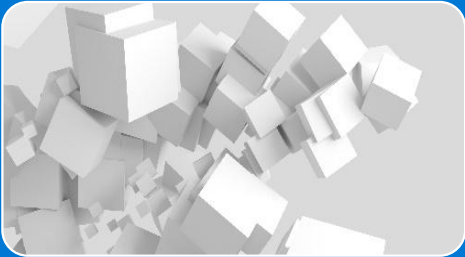
A financial dimension that is not used for a trial balance should not be a financial dimension

Low reuse tends to repeat and multiply

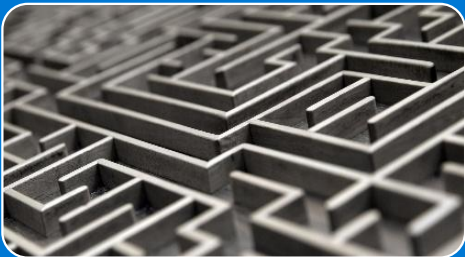## General ledger data is the source for downstream processes

- Year end close and consolidation processing

Low reuse is repeated in downstream processes

- These processes can cause the biggest issues due to the amount of general ledger data to be processed in a short time

Downstream processes never catch up

- Due to a constant stream of new dimension values and combinations

Q & A

References

- [Financial dimensions - Finance | Dynamics 365 | Microsoft Docs](#)
- [Financial dimension sets - Finance | Dynamics 365 | Microsoft Docs](#)
- [New financial dimension sets - Finance | Dynamics 365 | Microsoft Learn](#)
- [Financial tags - Finance | Dynamics 365 | Microsoft Learn](#)
- [Year-end close validation (**Degenerate dimensions**) - Finance | Dynamics 365 | Microsoft Learn](#)

- [Financial Dimension Corruption: Understanding and Avoiding | March 2-3, 2022 - Microsoft Dynamics Blog](#) (TechTalk)
- [TechTalk Series: Planning and Configuring your Chart of Accounts - Microsoft Dynamics Blog](#) (TechTalk series)

Thank you