

Financial dimension design principles

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Agenda

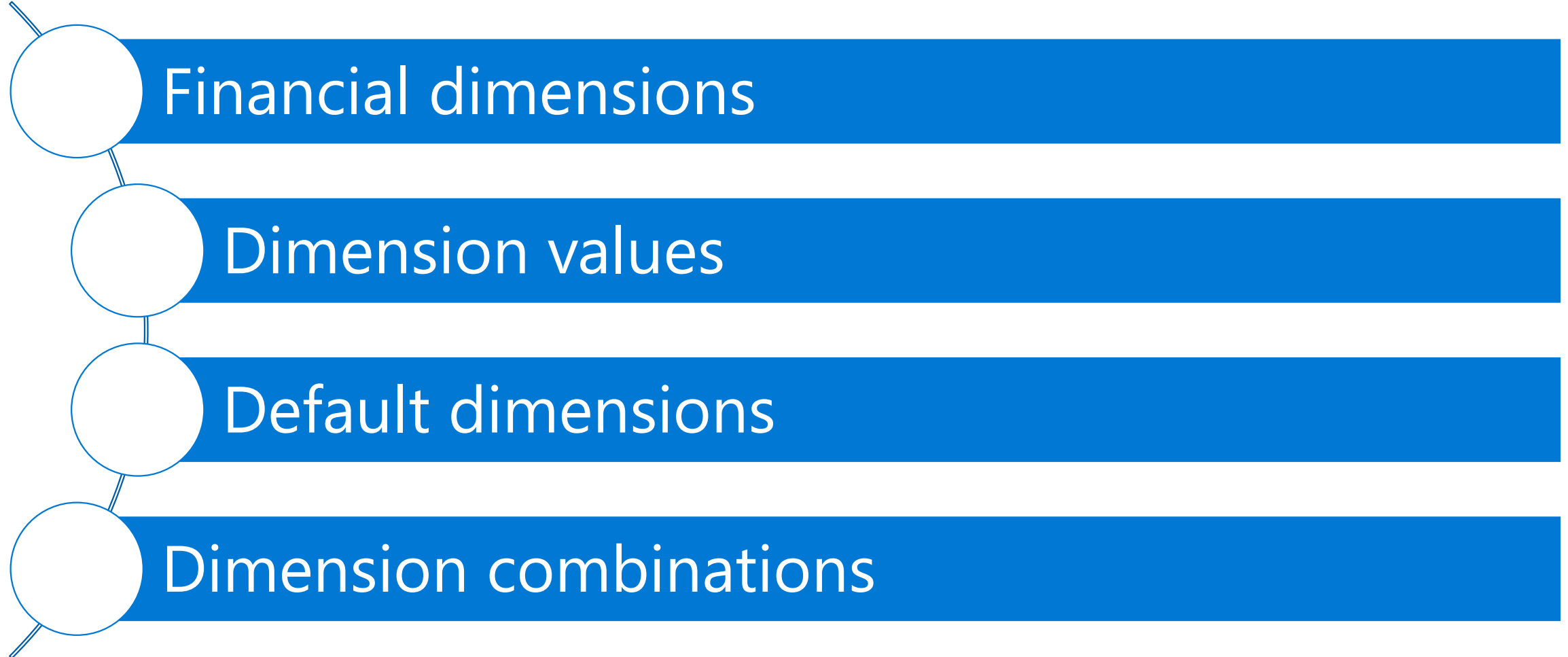
- Background
- Dimension details
- Design principles
- Q & A

Highly variable financial dimension

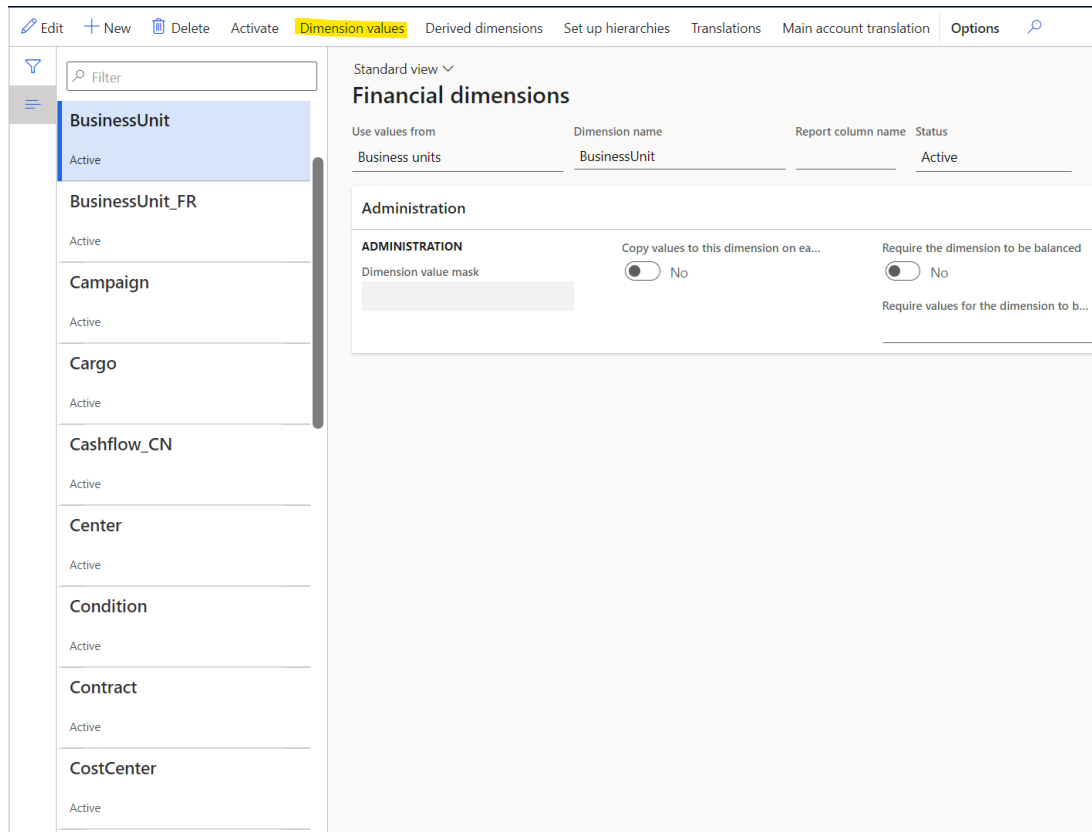
- A “highly variable” financial dimension is one that has lots of new values and new dimension combinations (and is to be avoided)
- We previously used the term “degenerate dimension” to refer to a financial dimension with lots of new values
- Degenerate dimension is a specific term with a different meaning so we are no longer using it
- “Low reuse” is another way to say “highly variable”

Financial dimension background

Background



Financial dimensions



- A category that is used for an account segment

- **Examples**

- Department
- Cost center
- Item group

Dimension values

BusinessUnit | Standard view

Financial dimension values

Dimension value: 001 | Description: Home

General

Σ Totals

Active from: _____

Suspended: No

Calculate total from multiple dimen...: No

Owner: _____

Active to: _____

Group dimension: _____

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				

- 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

<input type="radio"/>	<input type="radio"/>	Date	Voucher	Company	Account type	Account
<input checked="" type="radio"/>		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 dimension use



The data model for dimension values is highly normalized

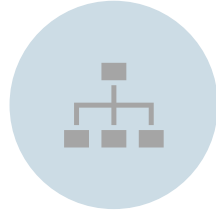
This is the data specific to each segment



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 patterns



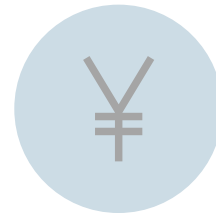
A new dimension combination will be created for a new combination of existing dimension values



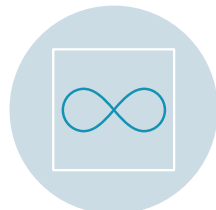
A new dimension value implicitly requires multiple new combinations as it is combined with other dimension values



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

Dimension combination performance

Reusing an existing dimension combination is very cheap

Creating a new dimension combination is relatively expensive

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

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

Number theory – dimension combinations (10 values)

Number of
dimensions

10 values each

Simple
multiplication

Number of
potential
combinations

2
dimensions

10^2

$10 * 10$

100 combinations

4
dimensions

10^4

$10 * 10 * 10 * 10$

10,000
combinations

8
dimensions

10^8

$10 * 10 * 10 * 10 * 10 * 10 * 10 * 10$

100,000,000
combinations

Number theory – dimension combinations (100 values)

Number of
dimensions

100 values for each

Simple multiplication

Number of potential
combinations

2
dimensions

100^2

$100 * 100$

10,000 combinations

4
dimensions

100^4

$100 * 100 * 100 * 100$

100,000,000
combinations

8
dimensions

100^8

$100 * 100 * 100 * 100 * 100 * 100 * 100 * 100$

10,000,000,000,000,000
combinations

Number theory – example

Number of
dimensions

2000 values

Simple
multiplication

Number of
potential
combinations

One

2000^1

2000

2,000

Two

1000^2

$1000 * 1000$

1,000,000

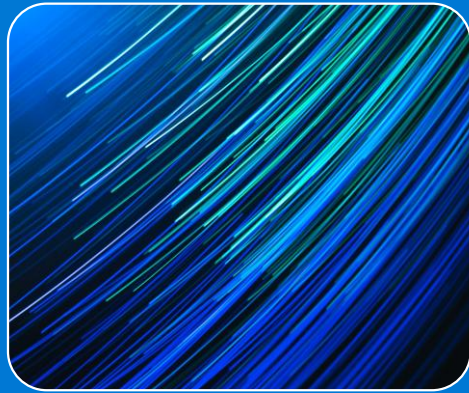
Four

500^4

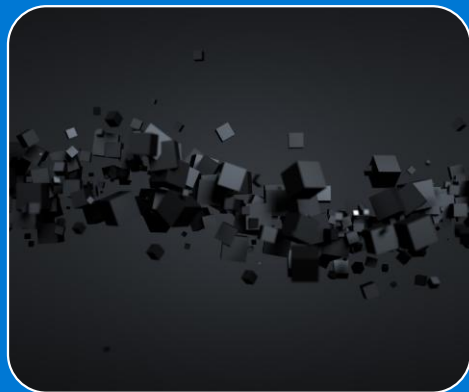
$500 * 500 * 500 * 500$

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 that is highly variable

Data examples

Moderate scenario (okay)

- 35M rows in the general ledger for a fiscal year
 - $35\text{M} / 365 = 95\text{K}$ general ledger rows/day
- 1M unique dimension combinations
 - $1\text{M} / 365 = 2.7\text{K}$ dimension combinations/day
 - $1\text{M} / 12 = 83\text{K}$ dimension combinations/month

Extreme scenario (bad)

- 71M rows in the general ledger for a fiscal year
 - $71\text{M} / 365 = 194\text{K}$ general ledger rows/day
- 7M unique dimension combinations
 - $7\text{M} / 365 = 19\text{K}$ dimension combinations/day
 - $7\text{M} / 12 = 583\text{K}$ dimension combinations/month

Trial balance – Main account

Finance and Operations

General ledger > Inquiries and reports > Trial balance

USMF

Balances as of 2 minute(s) ago

Accounting source explorer All transactions Fiscal year transactions By currency Period Cash flow forecasts

Trial balance

Standard view

Parameters

Filter

Ledger account	Name	Opening balance	Debit	Cred
110110	Bank Account - USD	199.0000	670.9883	41.0988
110130	Bank Account - EUR	110.0000	0.0000	0.0000
110160	Bank Account - Payroll	-256,149.2523	3,847.9531	89,435.0619
130100	Accounts Receivable - Domestic	-309.0000	683.3071	683.3071
140200	Finished Goods Inventory	-12.0000	0.0000	0.0000
202180	Georgia State Tax Payable	0.0000	0.0000	10.0000
401100	Product Sales foo	241,675.5723	89,435.0619	8,190.0571
401102	Sales alternate	0.0000	0.0000	250.0000
401103	Sales alternate2	0.0000	0.0000	420.8071
401200	Service Revenues	14,473.6800	4,342.1040	0.0000
403300	Customer Cash Discounts Taken	0.0000	12.3188	2.5000
500150	Deferred COGS	12.0000	0.0000	0.0000
600155	Deferred Expense	0.0000	41.0988	0.0000
Total				

15 rows

Trial balance – Business unit

Finance and Operations

General ledger > Inquiries and reports > Trial balance

USMF

Balances as of 2 minute(s) ago

Accounting source explorer All transactions Fiscal year transactions By currency Period Cash flow forecasts

Trial balance

Standard view

Parameters

Filter

Ledger account	Name	Opening balance	Debit	Cred
		-309.0000	93,906.1286	94,276.0181
001	Home	100.0000	1,760.3301	1,390.4406
002	Auto	209.0000	794.7366	794.7366
003	Management Consulting Practice	0.0000	832.8945	832.8945
004	IT Consulting Practice	0.0000	1,085.5260	1,085.5260
005	Electronics	0.0000	542.1051	542.1051
006	Sporting	0.0000	0.0000	0.0000
302	BU302	0.0000	111.1111	111.1111

Total
8 rows

Trial balance – Main account + Business unit

Finance and Operations

General ledger > Inquiries and reports > Trial balance

USMF

Balances as of 4 minute(s) ago

Accounting source explorer All transactions Fiscal year transactions By currency Period Cash flow forecasts

Trial balance

Standard view

Parameters

Filter

Ledger account	Name	Opening balance	Debit	Cred
110110-001	Bank Account - USD-Home	100.0000	670.9883	41.0988
110110-002	Bank Account - USD-Auto	99.0000	0.0000	0.0000
110130-002	Bank Account - EUR-Auto	110.0000	0.0000	0.0000
110160-	Bank Account - Payroll-	-256,149.2523	3,736.8420	89,435.0619
110160-302	Bank Account - Payroll-BU302	0.0000	111.1111	0.0000
130100-	Accounts Receivable - Domestic-	-309.0000	683.3071	683.3071
140200-001	Finished Goods Inventory-Home	-12.0000	0.0000	0.0000
202180-001	Georgia State Tax Payable-Home	0.0000	0.0000	10.0000
401100-	Product Sales foo-	256,149.2523	89,435.0619	3,736.8420
401100-001	Product Sales foo-Home	-3,255.2622	0.0000	1,086.8419
401100-002	Product Sales foo-Auto	-3,257.8938	0.0000	794.7369
401100-003	Product Sales foo-Management...	-1,627.6311	0.0000	832.8949
401100-004	Product Sales foo-IT Consulting	-3,256.5789	0.0000	1,085.5369
Total				

30 rows

Trial balance – Main account + 3 dimensions

Finance and Operations

General ledger > Inquiries and reports > Trial balance

USMF

Balances as of 0 minute(s) ago

Accounting source explorer All transactions Fiscal year transactions By currency Period Cash flow forecasts

Trial balance

Standard view

Parameters

Filter

Ledger account	Name	Opening balance	Debit	Cred
<input checked="" type="radio"/> 110110-001--073	Bank Account - USD-Home--BR ...	100.0000	670.9883	41.0988
<input type="radio"/> 110110-002--073	Bank Account - USD-Auto--BR F...	99.0000	0.0000	0.0000
<input type="radio"/> 110130-002--	Bank Account - EUR-Auto--	110.0000	0.0000	0.0000
<input type="radio"/> 110160---	Bank Account - Payroll---	-256,149.2523	3,736.8420	89,435.0615
<input type="radio"/> 110160-302--	Bank Account - Payroll-BU302--	0.0000	111.1111	0.0000
<input type="radio"/> 130100---	Accounts Receivable - Domestic...	-309.0000	683.3071	683.3071
<input type="radio"/> 140200-001-023-	Finished Goods Inventory-Hom...	-12.0000	0.0000	0.0000
<input type="radio"/> 202180-001--	Georgia State Tax Payable-Hom...	0.0000	0.0000	10.0000
<input type="radio"/> 401100---	Product Sales foo---	256,149.2523	89,435.0619	3,736.8420
<input type="radio"/> 401100-001-022-008	Product Sales foo-Home-Sales ...	-35.5263	0.0000	0.0000
<input type="radio"/> 401100-001-022-009	Product Sales foo-Home-Sales ...	-36.8421	0.0000	0.0000
<input type="radio"/> 401100-001-022-010	Product Sales foo-Home-Sales ...	-35.5263	0.0000	0.0000
<input type="radio"/> 401100-001-022-011	Product Sales foo-Home-Sales ...	0.0000	0.0000	36.8421
Total				

Calculate

Trial balance – Main account + 3 dimensions (rows)

Finance and Operations

General ledger > Inquiries and reports > Trial balance

USMF

Balances as of 0 minute(s) ago

Accounting source explorer All transactions Fiscal year transactions By currency Period Cash flow forecasts

Trial balance

Standard view

Parameters

Filter

Ledger account	Name	Opening balance	Debit	Cred
110110-001--073	Bank Account - USD-Home--BR ...	100.0000	670.9883	41.0988
110110-002--073	Bank Account - USD-Auto--BR F...	99.0000	0.0000	0.0000
110130-002--	Bank Account - EUR-Auto--	110.0000	0.0000	0.0000
110160---	Bank Account - Payroll---	-256,149.2523	3,736.8420	89,435.0619
110160-302--	Bank Account - Payroll-BU302--	0.0000	111.1111	0.0000
130100---	Accounts Receivable - Domestic...	-309.0000	683.3071	683.3071
140200-001-023-	Finished Goods Inventory-Hom...	-12.0000	0.0000	0.0000
202180-001--	Georgia State Tax Payable-Hom...	0.0000	0.0000	10.0000
401100---	Product Sales foo---	256,149.2523	89,435.0619	3,736.8420
401100-001-022-008	Product Sales foo-Home-Sales ...	-35.5263	0.0000	0.0000
401100-001-022-009	Product Sales foo-Home-Sales ...	-36.8421	0.0000	0.0000
401100-001-022-010	Product Sales foo-Home-Sales ...	-35.5263	0.0000	0.0000
401100-001-022-011	Product Sales foo-Home-Sales ...	0.0000	0.0000	36.8421
Total				

1058 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



Dimension references

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

[Highly variable dimensions - Finance | Dynamics 365 | Microsoft Learn](#)

[Check for highly variable dimensions - Finance | Dynamics 365 | Microsoft Learn](#)

[Year-end close validation - Finance | Dynamics 365 | Microsoft Learn](#)
(deep link to Highly variable dimensions)

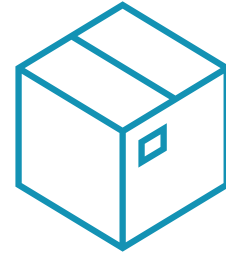
High reuse dimension examples



Business unit

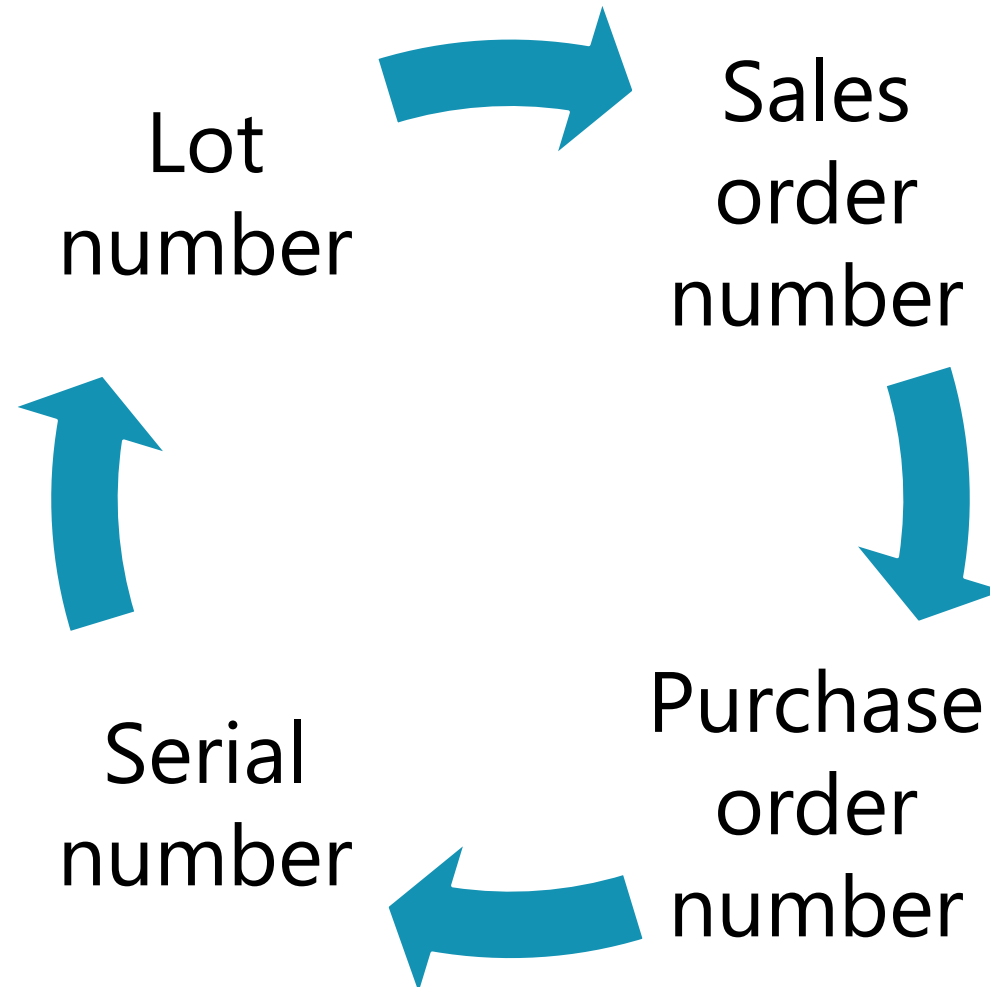


Sales region



Item group

Low reuse dimension examples



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

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

Financial tag references

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

[Differences between financial tags and financial dimensions - Finance | Dynamics 365 | Microsoft Learn](#)

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

[Financial tags development guidelines and FAQ - Finance | Dynamics 365 | Microsoft Learn](#)

Dimension set design

Each dimension set defines its own structure



The general ledger data is summarized into dimension set balances



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

New financial dimension sets



Feature: Performance enhancement for general ledger dimension set balance calculation

New financial dimension sets – pros



SIMPLE AND EFFICIENT DATA MODEL



BETTER PERFORMANCE AND USES
LESS STORAGE

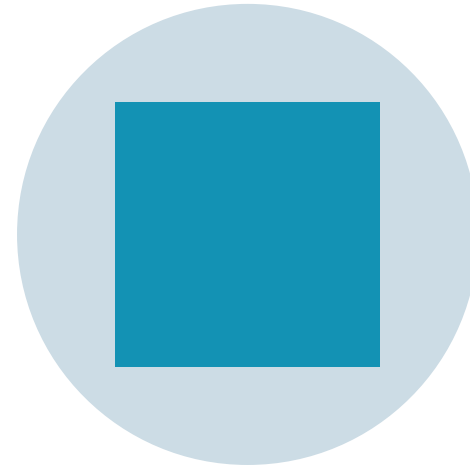


AUTOMATIC UPDATES FOR ALL LEGAL
ENTITIES FROM **ONE** BATCH JOB

New financial dimension sets – cons



PREVIOUS CUSTOMIZATIONS
HAVE TO BE REIMPLEMENTED



BATCH JOB RECURRENCE IS
LIMITED TO 5 MINUTES

Trial balance > Update balances

Finance and Operations General ledger > Inquiries and reports > Trial balance

Balances as of 6 minute(s) ago

Accounting source explorer All transactions Fiscal year transactions By currency

Trial balance

Standard view ▾

Parameters

Filter

Ledger account	Name
110110	Bank Account - USD
110130	Bank Account - EUR
110160	Bank Account - Pavroll

Previously, you could have to wait 5 minutes

Update balances ▾ Options 🔍

Update balances

Balances as of 0 minute(s) ago

Update

In 10.0.46, you can update the balances manually**

Dimension set references

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

[New financial dimension sets - Finance | Dynamics 365 | Microsoft Learn](#)

Q & A

References

- [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

