

Financial dimension design

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Agenda

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

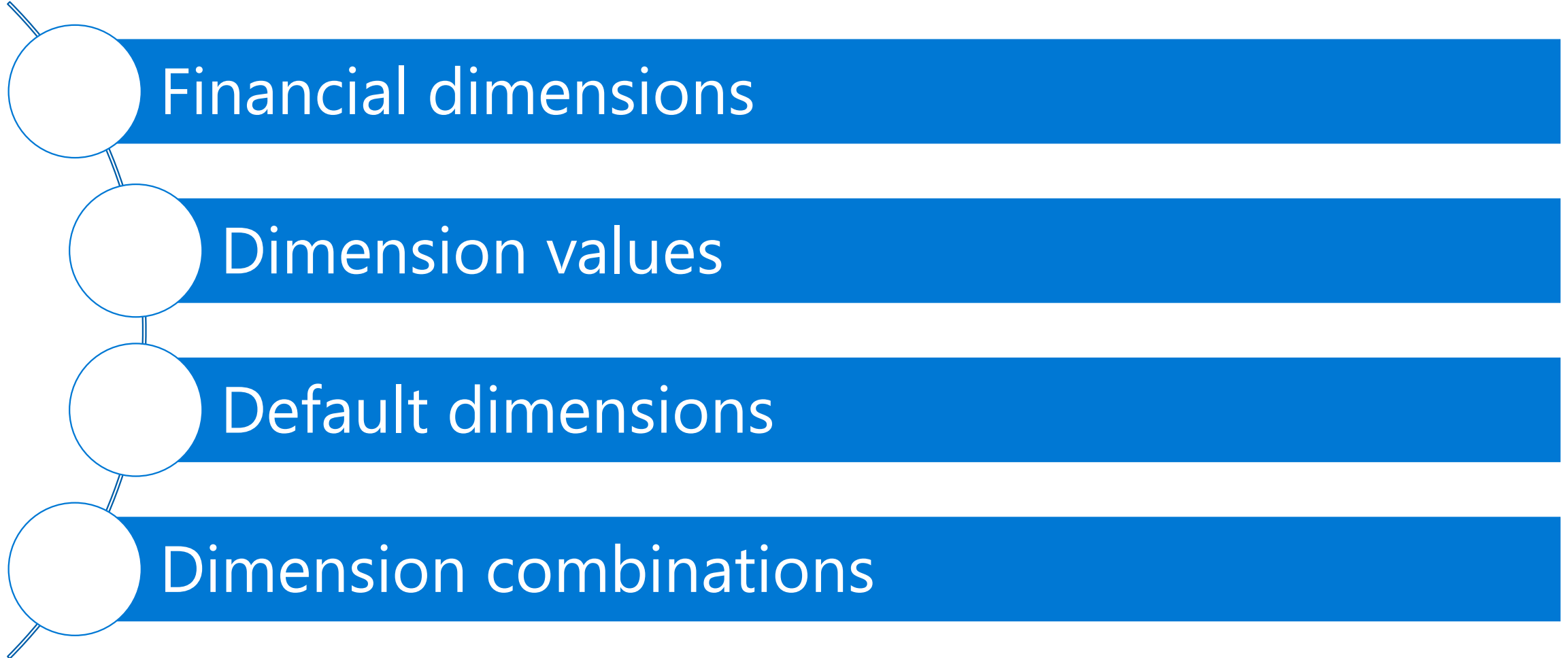
Formerly: degenerate dimensions

- 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

- A category that is used for an account segment

- **Examples**

- Department
- Cost center
- Item group

The screenshot displays the 'Financial dimensions' configuration page in Microsoft Dynamics 365. The left-hand navigation pane lists several dimensions: BusinessUnit (selected and highlighted in blue), BusinessUnit_FR, Campaign, Cargo, Cashflow_CN, Center, Condition, Contract, and CostCenter. Each dimension entry includes an 'Active' status indicator. The main content area is titled 'Financial dimensions' and shows the configuration for the selected 'BusinessUnit' dimension. It includes a table with columns for 'Use values from', 'Dimension name', 'Report column name', and 'Status'. Below this, the 'Administration' section contains settings for 'ADMINISTRATION', including a 'Copy values to this dimension on ea...' toggle (set to 'No') and a 'Require the dimension to be balanced' toggle (set to 'No').

Use values from	Dimension name	Report column name	Status
Business units	BusinessUnit		Active

Administration

ADMINISTRATION

Copy values to this dimension on ea... ☐ No

Require the dimension to be balanced ☐ No

Require values for the dimension to b...

Dimension values

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

EditNewDeleteTranslationsExternal codesOptions

Filter

001Home

002Auto

003Management Consulting Practice

004IT Consulting Practice

005Electronics

006Sporting

069Chemical

078Fashion

081Tokyo

082Osaka

203Business unit 203

204Business unit 204

205Business unit 205

BUSINESSUNIT | Standard view

Financial dimension values

Dimension value001

DescriptionHome

General

Σ Totals

Active from

Active to

Suspended

No

Group dimension

Calculate total from multiple dimen...

No

Do not allow manual entry

No

Owner

Require the dimension value to be b...

No

Legal entity overrides

+ Add

Remove

Legal entity	Name	Suspended	Active from	Active to	Owner
GLMF	Contoso Entertainment System				

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"/>		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 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

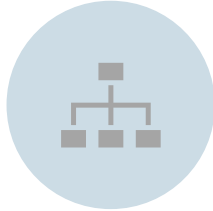
Creating a new dimension combination is relatively expensive

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

Dimension combination patterns



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



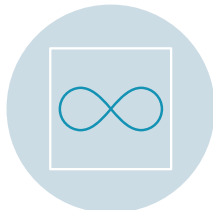
A new dimension value implicitly requires multiple new combinations as it is combined with other dimension values



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

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	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
 - $35\text{M} / 365 = 95,980$ general ledger rows/day
- 1M unique dimension combinations
 - $1\text{M} / 365 = 2,739$ 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
 - $71\text{M} / 365 = 194,520$ general ledger rows/day
- 7M unique dimension combinations
 - $7\text{M} / 365 = 19,178$ 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				
110110					Bank Account - USD					199.0000					670.9883				
110130					Bank Account - EUR					110.0000					0.0000				
110160					Bank Account - Payroll					-256,149.2523					3,847.9531				
130100					Accounts Receivable - Domestic					-309.0000					683.3071				
140200					Finished Goods Inventory					-12.0000					0.0000				
202180					Georgia State Tax Payable					0.0000					0.0000				
401100					Product Sales foo					241,675.5723					89,435.0619				
401102					Sales alternate					0.0000					0.0000				
401103					Sales alternate2					0.0000					0.0000				
401200					Service Revenues					14,473.6800					4,342.1040				
403300					Customer Cash Discounts Taken					0.0000					12.3188				
500150					Deferred COGS					12.0000					0.0000				
600155					Deferred Expense					0.0000					41.0988				
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

3

Accounting source explorer

All transactions

Fiscal year transactions

By currency

Period

Cash flow forecasts

0

0

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

2

Balances as of 4 minute(s) ago

5

<

Accounting source explorer

All transactions

Fiscal year transactions

By currency

Period

Cash flow forecasts

0

Trial balance

Standard view

Parameters

Filter

<input type="radio"/> Ledger account	Name	Opening balance	Debit	Cred
<input type="radio"/> 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
<input type="radio"/> 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	1,086.8418
401100-002	Product Sales foo-Auto	-3,257.8938	0.0000	794.7366
401100-003	Product Sales foo-Management...	-1,627.6311	0.0000	832.8945
401100-004	Product Sales foo-IT Consulting	-3,256.5780	0.0000	1,085.5366
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
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	89,435.0615
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				
Calculate				

Trial balance – Main account + 3 dimensions (rows)

Finance and Operations

General ledger > Inquiries and reports > Trial balance

USMF

2

Balances as of 0 minute(s) ago

7

<

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



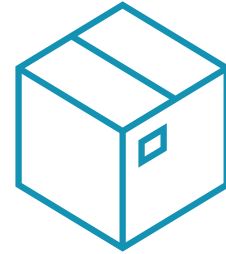
High reuse dimension examples



Business unit

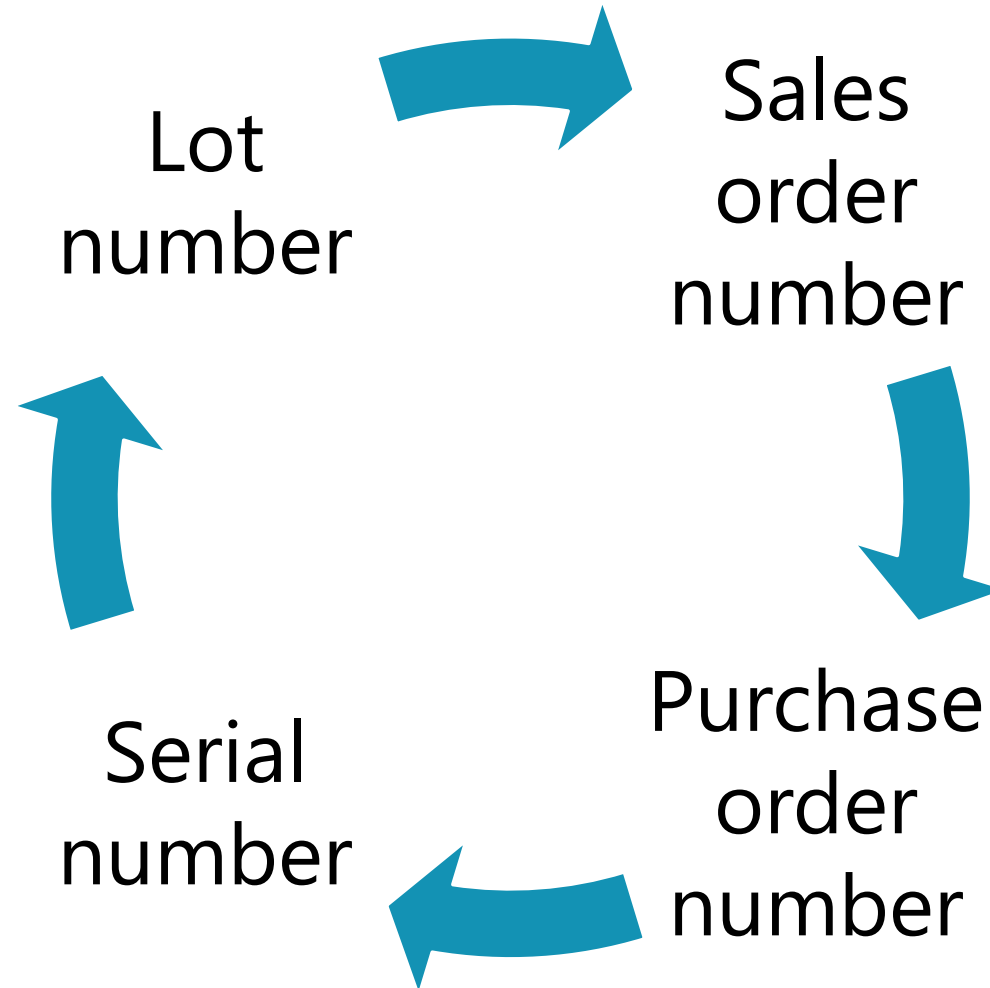


Sales region



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



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

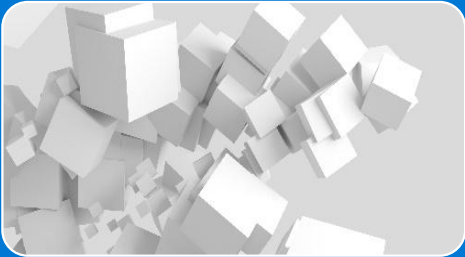
A financial dimension that is not used for a trial balance should not be a financial dimension

Low reuse tends to repeat and multiply



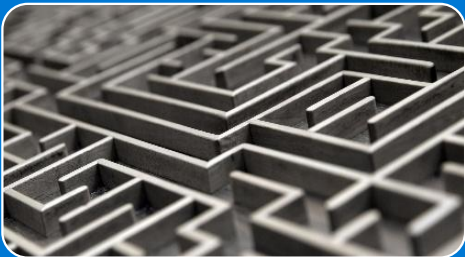
General ledger data is the source for downstream processes

- 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