

# **Bl4Dynamics –** Setting up Roles & Permissions in Tabular Database

Last update: March 2023 Version: 1.5

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# **1 INTRODUCTION**

Implementation services cover standard software installation with configuration and reports connection.

### 1.1 About Security

Security is a feature of all Microsoft's developed and maintained programs:

- BI4Dynamics provides content
- Microsoft provides security

All of the services have identical content, but different security management.

### **1.2 Tabular Database Implementation Options**

BI4Dynamics publishes data from data warehouse to tabular model that can be hosted:

- Locally (On-Premises) or in Azure VM as part of SQL Server
- By Microsoft in Azure as Azure Analysis Services
- By Microsoft in Power BI Premium Service as XMLA capacity



Tabular database can be access by **SSMS** (SQL Server Management Studio):

Minnerft SOL Carrier Management Studio							
EX Microsoft SQL Server Management Studio							
File Edit View Tools Window Help							
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🖪 🔳 Management							
🛛 📄 📉 asazure://westeurope.asazure.windows.net/aasbi4dynamics (Microsoft Analysis Server 16.0.34.19 - mg@bi4dynamics.com)							
📹 Databases							
🗄 💼 Management							
🖃 📐 powerbi://api.powerbi.com/v1.0/myorg/BI4Dynamics%20PPU%20Production (Microsoft Analysis Server 16.0.32.19 - powerbi@bi4dynamics.com)							
🖪 💼 Databases							

### 1.3 Microsoft documentation

URL
<u>Tabular modeling – Roles</u>
Create and manage roles with SSMS

# **2 SETTING UP ROLES AND PERMISSIONS**

This chapter **shows how to**: connect tabular database, create roles, add membership, obtain the correct name of a column, add DAX expressions into DAX Filter and check the syntax of it.

### 2.1 Connect to Tabular database with SSMS

Connecting to any type of Tabular database with SSMS is the same.

- Select Server / Workspace
- Select Tabular Database



### 2.2 Create roles

Admin user can create a new Role. Go to Roles and click "New Role"

Screate Role			-		$\times$			
Select a page	🖵 Script 🔻 🕜 Help							
<ul> <li>Membership</li> <li>Row Filters</li> </ul>	The database role defines a category of users and groups that have the same permissions on the database.							
	Role name:	Sales team			0			
	Role description:							
	Set the database permissi	ions for this role:						
	Full control ( Admin	istrator )						
	Process database							
	Read							

### 2.3 Add Membership (users or user groups)

		-
ect a page	🖵 Script 🔻 😮 Help	
Membership Row Filters	The users and groups member of this role will have privileges in all the Analysis Services objects associated with this role. Specify the users and groups for this role: It @bi4dynamics.com Itc@bi4dynamics.com	
Select a User or Grou	Jp X	
	Power Bl powerbi@bi4dvnamics.com	
nned Search	N/d	
erver: Search Results		
ornec <b>Vančo Koki</b> ik@bi4dynar ik@bi4dynar	tovski nics.com	
10 10 <sup>10</sup>	Add <u>R</u> emove	
	OK Cancel	
Manual Entry		

Local service requires Windows login from local domain, Azure and Power BI get users from AAD (Azure Active Directory). It is recommended to save the role and reopen it.

### 2.4 Add DAX expression into DAX Filter

#### Select the desired filtering table and add DAX expression into DAX Filter column.

DAX Filter examples:

Table in Tabular	Table	DAX Filter expression	Comment
Database	Туре		
GL Transaction	Transaction	=FALSE()	Access to transactional table is
			denied
Pay to Vendor	Dimension	=FALSE()	Access to dimensional and all
			related transactional tables is denied
			(Purchase and Payables)
Sell To Customer	Dimension	= [Customer Posting	Allowed only filtered rows and all
		Group] IN	related transactions
		{"EU","DOMESTIC"}	
Company	Dimension	= [Company Code] IN	Allowed only filtered rows and all
		{"E001","E004","E005"}	related transactions
ltem	Dimension	=[Sales Category 2	Allowed only filtered rows and all
		Name]="Lenovo"	related transactions

Check the **Row Filters** by clicking **top corner of DAX Filter** to **sort rows** by DAX text:

📽 Role Properties - Sales team - 🗆 🗙								
Select a page	🖵 Script 🔻 😮 Help							
General     Membership     Row Filters	DAX expressions that return users in this role. Calculation	Boolean values. Only rows that match the spec groups are currently not supported.	ified filters are	e visible to	)			
	Table							
	GL Cash Flow Transactions	=FALSE()						
	Pay To Vendor	=FALSE()						
	Buy From Vendor							
	GL Transactions	=FALSE()						
	GL Budget Transactions							
	Sell To Customer =[Customer Posting Group] in {"EU","DOMESTIC"}							
	Company							
	FA Maintenance Entry							
	FA Maintenance							
Connection	Depreciation Book							
Server:	FA Class							
powerbi://api.powerbi.com/v1.0/n	Reason Code				~			
powerbi@bi4dynamics.com	DAX Filter â€" Common Meas	sures						
↓ View connection properties								
Progress								
Ready								
			ОК	Cano	el			

#### 2.5 Obtain the correct name of the desired filtering column

When **filtering the rows** by **column in a table**, the exact column name should be used as in tabular database. This **may not be** the **column name** in front-end tool (Excel or Power BI) as this may be a **caption** (label) or **translation**.

Column names from SQL will not work, as names in data warehouse do not have spaces.

select * from dim.Company									
	CompanyID	CompanyName	CompanyShortName						
1	1	CRONUS International Ltd_	UK 2018						
2	2	UK 2009	UK 2009						

#### Columns can be explored by Tabular Editor:

	😥 BI4D	ynam	ics PPU I	Produc	tion.	BI4Dynami	cs Prod	dution CORP	- <mark>Tabular Editor</mark> 2.15.3
	File	Edit	View	Mo	del	Column	Tool	s	
Ľ	<b>4</b>	9	Perspe	ctive:	(All c	bjects)	-	Translation:	(No translation)
1	Σ目		2	Z	Ш Ş	t D			
	>	III S	crap		<u> </u>				
	~	III S	ell To Cu	stomer					
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			Blocked						
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			Code						
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		昌	Contact	lype					
		별	Country						
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		丨	Custome	a nice	Group	Description			
		Ħ	Custom	erDim	PKID	)			
		<u> </u>	Custon	IGI DIIII	TAIL	,			

#### Or with **DAX Studio**:

Ø	<u>// 📄</u>										DaxStudio - 2.16.2					
	File	Home	Advanc	ed Help												
	Run	Cancel	Clear Cache eny	Output	Query Builder View	t 🖍 Undo py 🍳 Redo tte Edit	Format Query •	A To Upper "I Comme a To Lower "I Uncom ,; Swap Delimiters D. Merge Format	ent P Find ment E Replace KML Find	Load Perf Data C Power Bl	All Query Server veries Plan Timings Traces	nnect Refresh Metadata				
ŀ	Query1.c	lax* ×														
H 6	/etadata			- q	1 // Generat	ed DAX Que	ry									
III		wnamics P	Prodution	·	2 EVALUATE	1c-11 T-	current .	<b>`</b>								
di k	a Mar	4-1			4	Sell to	Customer	)								
11		Jei		-												
	۹				100 %											
Hſ					100 % • 1											
	P	Sales BUDG	get deut Tree		Results											
	р III -	Foales Duc FSales Del	livery - Re	eturn	CustomerDimPK	ID CompanyID	DataSourceID	Customer Name	Search Name		Address	City	Territory Code	Customer Posting Group	Currency Code	Customer
		Sales Del	livery Trar	nsact		1 1		1 Spotsmeyer's Furnishings	SPOTSMEYER'S FURNISH	HINGS	612 South Sunset Drive	Miami	FOREIGN	FOREIGN	USD	N/A
	D	Sales Doci	ument An	chive		2		1 Progressive Home Furnishings	PROGRESSIVE HOME FU	IRNISHINGS	3000 Roosevelt Blvd.	Chicago	FOREIGN	FOREIGN	USD	N/A
		ales Doci	ument An	chive		3	1	1 New Concepts Furniture	NEW CONCEPTS FURNIT	TURE	705 West Peachtree Street	Atlanta	FOREIGN	FOREIGN	USD	N/A
		ales Dec	umont An	ehin.		4		1 Candoxy Canada Inc.	CANDOXY CANADA INC		18 Cumberland Street	Thunder Bay	FOREIGN	FOREIGN	CAD	N/A
			ument An	criive		5		1 Elkhorn Airport	ELKHORN AIRPORT		105 Buffalo Dr.	Elkhorn	FOREIGN	FOREIGN	CAD	N/A
	P	ales Docu	ument An	cnive		6		1 London Candoxy Storage Campu	s LONDON CANDOXY STO	DRAGE CAMPUS	120 Wellington Rd.	London	FOREIGN	FOREIGN	CAD	N/A
	Þ 🐻	ales Docu	ument Da	ate		9		1 Metatorad Malaysia Sdn Bhd	METATORAD MALAYSIA	SDN BHD	No 16M Jalan SS22	PETALING JAYA, Selango	FOREIGN	FOREIGN	MYR	N/A
	Þ 🛄 S	ales Docu	ument Ext	tema		10		1 Highlights Electronics Sdn Bhd	HIGHLIGHTS ELECTRON	ICS SDN BHD	28 Ground Floor, 1 Jalan 3/2	5 KUALA LUMPUR	FOREIGN	FOREIGN	MYR	N/A
	Þ 🛄 S	Sales Docu	ument Ty	pe		11 1	1	1 TraxTonic Sdn Bhd	TRAXTONIC SDN BHD		Sama Jaya Free Industrial Zo	ne KUCHING, Sarawak	FOREIGN	FOREIGN	MYR	N/A
	Þ 🔳 S	ales Line	Type and	l No		12		1 Somadis	SOMADIS		37, Rue El Wahda	AGDAL-RABAT	FOREIGN	FOREIGN	MAD	N/A
	Þ 🛄 #	Sales Orc	ders			13		1 Maronegoce	MARONEGOCE		21, Boulevard de la Nation	CASABLANCA	FOREIGN	FOREIGN	MAD	N/A
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		Salec Shi	inned Tra	ncaci		15		1 Zanlan Corp.	ZANLAN CORP.		2 Beta Street	Carletonville	FOREIGN	FOREIGN	ZAR	N/A
		Cales Val	lues	induc		16		1 Karoo Supermarkets	KAROO SUPERMARKETS		38 Voortrekker Street	Bloemfontein	FOREIGN	FOREIGN	ZAR	N/A
		Fodies Vall	iues			17		1 Durbandit Fruit Exporters	DURBANDIT FRUIT EXPO	ORTERS	100 St. George's Mall	Durban	FOREIGN	FOREIGN	ZAR	N/A
	Þ 🛄 🕯	FSales Vali	iues - Sale	es Cr		25		1 Francematic	FRANCEMATIC		19 Boulevard Commanderie	PLAISIR	FOREIGN	EU	EUR	N/A
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	Þ 🛄 🕯	≠Sales Valı	lues - Sen	vice		27		1 Livre Importants	LIVRE IMPORTANTS		46 Rue Orteaux	ESBLY	FOREIGN	EU	EUR	N/A

### 2.6 Check the syntax of DAX Filters

#### Use **Tabular editor** to check the accuracy of the **DAX syntax**.

BI4Dynamics PP11 Production BI4Dynamics Production CORP - Tabular	Editor 2 15 3
File Edit View Model Tools	
	slation) - Filter
	Expression Editor Advanced Scripting
<ul> <li>Model</li> <li>Data Sources</li> <li>Perspectives</li> <li>Relationships</li> <li>Roles</li> <li>Shared Expressions</li> <li>Tables</li> <li>Translations</li> </ul>	
Connected succesfully.	
Objects with errors (1)	
Name Type	
Purchase team 'Company' RLS: Column 'Company Name' cannot be	found or may not be used in this expression.

# **3 SETTING UP DYNAMIC ROLES**

#### 3.1 Identifying connected user

Dynamics roles are most often based on user login and most used identifiers are:

- A. On-premises Analysis Services will use Windows login, DAX function to identify user is USERNAME()
- **B.** Azure Analysis Services and Power BI Service is using **Azure AD** login, DAX function to identify user is **USEPRINCIPALNAME()**

### 3.2 Bridge table

Tabular database must have a table which makes the bridge between User and related permission. Example of a table **Salesperson** where columns contain both (Windows and AAD) user mappings.

Salesperson name	E-mail	Windows login
John Brown	jb@contoso.com	CONTOSO\JOHNBROWN
Mary Winter	mw@contoso.com	CONTOSO\MARYWINTER

#### 3.3 DAX expression for Dynamic security

DAX Filter examples for Dynamics security (2 options):

Table	DAX Filter expression	Login	Tabular database
		type	installation option
Salesperson	=[Windows login] = USERNAME()	Windows	On-premises
Salesperson	=[E-mail] = USERPRINCIPALNAME()	AAD	Azure or Power Bl
			Service

Example of Dynamics security settings with Windows login option:

요음 Role Properties - Sales team - Dynamic						
Select a page	. Script ▼ 2 Help					
General	• .					
<ul> <li>Row Filters</li> </ul>	DAX expressions that return Boolean values. Only rows that match the specified filt role. Calculation groups are currently not supported.					
	Table	DAX Filter				
	Salesperson	=[Windows Login] = USERNAME()				
	Company					
	FA Maintenance Registration					
	Date					
	Vendor					
	Fixed Asset					
	FA Maintenance Entry					
	FA Maintenance					
	Depreciation Book					
Connection	FA Class					
Server:	Reason Code					
MLADENNUC\BC	Source Code					
Connection: NPS-GROUP\mgvozden	DAX Filter â€″ Salesperson					
₩ View connection properties	=[Windows Login] = USERNAME()					

# 4 OPTION B: SETTING IN AZURE PORTAL WHEN USING AZURE ANALYSIS SERVICES

When using **Azure Analysis services** users **must be added** to Azure Analysis Services in **Azure Portal**, setting **user type = Reader**.



#### And select the members:

😑 🛛 Microsoft Azur	${\cal P}$ Search resources, services, and docs (G+/)	D 4 0 0 0 R
Home > aasbi4dynami Add role assig	s> gnment …	Select members
🖗 Got feedback?		Select ① Tarek A
Role Members	Review + assign	No users, groups, or service princip
Selected role	Reader	
Assign access to	User, group, or service principal     Managed identity	
Members	+ Select members	Selected members:
	Name Object ID Type	Tarek Al Chawa tc@bi4dynamics.com
	No members selected	
Description	Optional	
Review + assign	Previous Next	Select Close

# 5 OPTION C: SETTING IN POWER BI SERVICE WHEN USING POWER BI PREMIUM

Go to workspace, select the DataSource and go to Manage Permissions:

	Power BI BI4Dynamics PPU Production								
=	808 Bl4Dynamics PPU Production 🕾								
ŵ	Home	×							
+	Create	+ New	$+$ New $\sim$ $$ $$ $$ Create a pipeline						
Ð	Browse	All	All Content Datasets + dataflows Datamarts (Preview)						
٥	Data hub								
₽	Metrics		Name		Туре	Owner	Refreshed		
₽	Apps	Ð	BI4Dynamics AX (SSAS DWA) - Retail - v3.4		Dataset	BI4Dynamics PPU Pro	6/10/22, 1:44:25 PM		
\$	Deployment pipelines	Ð	BI4Dynamics L - Manufacturing - v2.1		Dataset	BI4Dynamics PPU Pro	5/31/22, 3:11:28 PM		
	Learn	0	BI4Dynamics Prodution CORP 🖒 🎵	:	Dataset	BI4Dynamics PPU Pro	6/20/22, 3:50:05 PM		
	Workspaces >	0	Sales and Budgets (sales department)	Analy	ze in Excel	14Dynamics PPU Pro	12/30/21, 4:28:51 PM		
8	BI4Dynamics PP 🎨 🗸	PP ♥ ✓ Cre Sales Model 3 for Store managers #2 Cre		Create report Create paginated report	I4Dynamics PPU Pro	2/8/22, 8:09:14 PM			
		Ð	Untitled 2022-05-29T09:01:04.460Z	Creat	te formatted table	I4Dynamics PPU Pro	5/29/22, 11:07:28 AM		
				Delet	te				
				Get c	quick insights				
				Secu	rity				
				Rena	me				
				Settir	ngs				
				Dow	nload this file				
				Mana	age permissions				
				View	lineage				

Add user with required permission settings.

BI4Dynamics I				
=	BI4Dynamics Prodution CORP			
යි Home	Related content	+ Add user		
+ Create	Ø Dashboards			
D Browse	🛦 Reports 🗸	Links Direct access		
🖯 Data hub	Workbooks	People and groups with access	Email Address	Permissions
Metrics		R Power RI	nowerbi@bi4dvnamics.com	Admin (Owner)
₽ Apps				
Deployment pipelines		PowerBI Demo	Grant people access X	Read, Build
🛄 Learn		Mladen Gvozdenovic	✓ Enter a name or email address	Viewer
❑ Workspaces >			Allow recipients to share this dataset	
🔞 BI4Dynamics PP 🎕 🗸			Allow recipients to build content with the	
			data associated with this dataset	
			Send an email notification	
			Add a message (optional)	
			Grant access Cancel	

Please note that user with **Read** permission must have **Build** option selected as well.

# 6 SETTING UP ROLES WITH OBJECT-LEVEL SECURITY USING TABULAR EDITOR

Object-level security (OLS) allows us to restrict access to specific tables and columns. Once OLS is implemented, the chosen table is secured so the existence of that object is completely hidden from the user. The users will not be to access the table through any reporting tool.

**Tabular editor** can be used to implement OLS.

#### Open Tabular editor and go to File > Open > From DB

🔞 Ta	abular Editor 2.16.1		
File	Edit View Model	Tools	
9	New model Ctrl+N	1	- Translation:
	Open 🕨	2	From File Ctrl+O
E E	Save .bim file Ctrl+S	٢	From DB Ctrl+Shift+O
	Save As		From Folder

Specify the Server and Instance you want to connect to.

Connect to Tabul	ar Server	
Server:		~
Local instance:		~
Authentication:	<ul> <li>Windows Integrated or Azure AD login</li> </ul>	
	O Usemame and Password	

#### Select *Model* and add a *New Role*.

File Edit View	Mo	del Tools	
놀 🥸   🕋   Perspec	*	Deploy	F6
∑       ∃       ▲       ↓       ↓         ✓       Model       >       □       Data Sources         ✓       Perspectives       >       □       Relationships		Import Tables Refresh Table Metadata New Table New Calculated Table	Alt+5 Alt+6
<ul> <li>☐ Roles</li> <li>☐ Shared Expres</li> <li>&gt; ☐ Tables</li> <li>&gt; ☐ Translations</li> </ul>		New Calculation Group New Data Source (Legacy) New Data Source (Power Q New Perspective New Shared Expression New Relationship New Role	Alt+7 (uery)
	_	New Translation	

#### Click on a New Model Role.



The properties of the new role will appear on the bottom left part of the application.

Under the property *Security* there will be an option *Table Permissions* available. This option should be chosen to protect objects by hiding and restricting them from users.

•		
~	Basic	
	Description	
	Name	New Model Role
$\sim$	Metadata	
>	Annotations	0 annotations
	ErrorMessage	
>	Extended Properties	0 extended properties
	Object Type	Role
$\sim$	Security	
>	Row Level Security	RLS enabled on 0 out of 251 tables
>	Table Permissions	OLS enabled on 0 out of 251 tables

To enable object-level security, extend Table Permissions. The list of all tables in the model will appear.

The access	to the tables	can be	restricted k	ov choosing	option None	2.
				,		•••

~	Security	
>	Row Level Security	RLS enabled on 0 out of 251 tables
~	Table Permissions	OLS enabled on 1 out of 251 tables
	Account Schedule	None 🗸
	Area	Default
	Basket Value	None
	Bill To Customer	Read
	* *	Security     Row Level Security     Table Permissions     Account Schedule     Area     Basket Value     Bill To Customer

The restricted table will appear under the role.



#### Right click the new role, select *Script > Create or Replace > To Clipboard*.

It will generate the script that creates a new role with the specified restrictions in a model.



Open Microsoft SQL Server Management Studio and connect to the Server and Analysis Database you want to create a new role with Object Level Security in.



Paste the copied script and run it.

MDXQuery1.mdxNPS-GROUP\andrii)* 😐 🗙		
Cube:		{
Model	$\sim$	"createOrReplace": {
Metadata 🔗 Functions		"database": "BI4Dynamics BC",
Search Model		"role": "New Model Role"
Measure Group:		}, "role": {
<ali></ali>	$\sim$	"name": "New Model Role",
🛇 Model	^	"tablePermissions": [
🗄 📶 Measures		{
H KPIs		"name": "Account Schedule",
⊞ [@ Account Schedule		metadataPermission : none
🗄 🙋 AccSch_ANALYSIS		3
🗄 🙋 AccSch_BS		
🗄 🙋 AccSch_CAMPAIGN		}
		}
🗄 🙋 AccSch_CA-STAFF		}

Once the execution is complete, the new role will be added to the model.



In *Role Properties* set up the access as **Read** and add members as was explained previously.

₽ Role Properties - New Model Role			—		×
Select a page	🖵 Script 🔻 😯 Help				
<ul> <li>Membership</li> <li>Row Filters</li> </ul>	The database role defines a category of users and groups that have the same permissions on the database.				
	Role name:	New Model Role			0
	Role description:				
	Set the database permissions for this role:				
	Full control ( Administrator )				
	Process database				
	🗹 Read				