

An example using Row Level Security in Power BI with TMVGate

Technical Note: TA2019008

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1.0 Overview

Row Level Security (RLS) in Power BI allows the dataset owner to manage user access. This document illustrates an example of implementing RLS using TMVGate.

In this example, we use the TM1 default sample, 'SalesCube' with a view that returns all the country data in the N level, within the Region dimension. RLS will mainly use Region (Country level data) to perform the mapping to the Power BI users for the access.

A sample of the dataset in Power BI is shown below:

region	model	actvsbud	account1	month	Value
Argentina	L Series 1.8 L Convertible	Budget	Units	Jan	10
Argentina	L Series 1.8 L Convertible	Budget	Units	Feb	10
Argentina	L Series 1.8 L Convertible	Budget	Units	Mar	10
Argentina	L Series 1.8 L Convertible	Budget	Units	Sep	10
Argentina	L Series 1.8 L Convertible	Budget	Units	Oct	10
Argentina	L Series 1.8 L Convertible	Budget	Units	Nov	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Jan	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Feb	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Mar	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Apr	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Sep	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Oct	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Nov	10
Belgium	L Series 2.0 L Convertible	Budget	Units	Dec	10
Belgium	L Series 2.0 L Wagon	Budget	Units	Feb	10
Belgium	L Series 2.0 L Wagon	Budget	Units	Oct	10
Belgium	L Series 2.0 L Wagon 4WD	Budget	Units	Sep	10
Belgium	L Series 2.0 L Wagon 4WD	Budget	Units	Oct	10
Belgium	L Series 2.5 L Convertible	Budget	Units	Jan	10
Belgium	L Series 2.5 L Convertible	Budget	Units	Feb	10
Belgium	L Series 2.5 L Convertible	Budget	Units	Mar	10
Belgium	L Series 2.5 L Convertible	Budget	Units	Apr	10



2.0 Creating the Mapping Cube between Region and Power BI Users

From a database perspective, there is a need to create a mapping cube as the relationship between Region and Power BI users is a many-to-many relationship. We are assuming that the mapping will not be using the current TM1 user/group information, although technically speaking, this can be done.

A new mapping cube has been defined to handle the mapping of Region to Power BI users. The following shows the cube structure of the Region to PowerBIUser mapping cube.



Dimension Name Description	
Region	All countries (existing dimension)
Power BIUser	Power BI username as elements
Power BI_Measures	A string element to indicate the access

An example of the cube view is shown below. Note that the Access set to "Y" indicates that the specific Power BI User has access to the specific country. Suppress Zero is used when creating the view to be used by TMVGate extraction. This will effectively construct the mapping table in Power BI model.



		PowerBI_M	easures
region	PowerBlUser	Access	
Denmark		Y	
Norway	he ank.com	Y	
Sweden	kita mita ang	Y	
Palatan		Y	
Belgium	k	Y	
	Alternation to the second seco	Y	
Luxemburg	1 1 1	Y	
No. I and a star	Him	Y	
Netherlands		Y	
Great Britain	hand a finite second	Y	
Ireland	iung minimus	Y	
France	lji::@iiii	Y	
Germany	i	Y	
Portugal	k	Y	
Spain	k_ jing inin T	Y	
Greece	ka guugaankuuna.	Y	
Italy		Y	

3.0 Establishing the tables in Power BI

Now with the mapping cube "Region_PowerBIUser", we are now ready to define the structures in Power BI to set up the RLS.

We are assuming that you have already defined the SalesCube date by country as shown in Overview section in Power BI.

Now, generate the TMVGate URL for the "Region_PowerBIUser" cube with a cube view. The data shown in Power BI should be similar to what is shown below. Note that we have deleted the Value column which contains the string "Y". This is not required for the mapping but rather it's used together with Suppress Zero to return the access matrix between Region and the Power BI User.



region	PowerBIUser
Denmark	i endis
Norway	}
Sweden	E J
Belgium	12 Pak com cr
Belgium	ka g
Luxemburg	k
Luxemburg	k
Netherlands	
Netherlands	k i Tirsk .
Great Britain	to and the second second
Ireland	1
France	ki '~@itlie!- J
Germany	kernelis (har an
Portugal	k !
Spain	ertinna g
Greece	7
Italy	

We will need to pull in two more dimensions, namely "Region" and "PowerBIUser" into Power BI. This can be done using the hierarchy extraction. Note that, at the very least, you will need to define a simple hierarchy in "PowerBIUser" in order for the hierarchy extraction to work.



At the end of all TMVGate extractions, you should now have 4 tables in Power BI as shown below:



4.0 Linking the tables in Power BI

We will now need to link up the tables. Power BI will auto-detect the relationship for the tables, but we will need to make some adjustment to the relationships.

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Sales <-> Region

The relationship definition is as shown below:

Edit re	elationshi	ip									
Select tab	les and column	s that ar	e rela	ted.							
Sales						*					
region	model		actvsl	bud	accour	nt1	month	Value			
Argentina	L Series 1.8 L Cor	overtible	Budge	et	Units		Jan	10			
Argentina	L Series 1.8 L Cor	overtible	Budge	et	Units		Feb	10			
Argentina	L Series 1.8 L Cor	nvertible	Budge	et	Units		Mar	10			
region_L3 World World World	region_L2 Europe Europe Europe	region_ Scandin Scandin Scandin	L1 avia avia avia	region Denm Norwa Sweda	ark ay	regio Denr Norv Swee	nark vay den				
Cardinality	,						Cross filter	direction			
Many to	one (*:1)					*	Single				+
🗸 Make t	his relationship a	active					Apply se	ecurity filte	r in both dir	rections	
Assume	e referential integ	grity									
										ОК	Cancel



Region_PowerBIUser <-> Region

The relationship definition is as shown below. Note the highlighted in red section. Make sure the security filter is applied in both directions.

Select tables and columns that are related. Region_PowerBlUser region PowerBlUser Denmark K Norway I	Edit re	elationsh	ip			
Region_PowerBlUser * region PowerBlUser Denmark K Norway I I I Sweden .	elect tabl	es and colum	ns that are rela	ated.		
region PowerBIUser Denmark K Norway I I I Sweden I	Region_Po	owerBIUser			*	
Denmark K	region	PowerBIUser				
Norway I _ I Sweden .	Denmark	k	-			
Sweden . Region -	Norway	L	1			
Region	Sweden					
region_L3 region_L2 region_L1 region_L0 region	region_L3	region_L2	region_L1	region_L0	region	
region_L3 region_L2 region_L1 region_L0 region	region_L3	region_L2	region_L1	region_L0	region	
World Europe Scandinavia Denmark Denmark	World	Europe	Scandinavia	Denmark	Denmark	
World Europe Scandinavia Norway Norway	World	Europe	Scandinavia	Norway	Norway	
World Europe Scandinavia Sweden Sweden	World	Europe	Scandinavia	Sweden	Sweden	
	dinality	,			Cross filter direction	
Cardinality Cross filter direction	Many to o	one (*:1)			Both	
Cardinality Cross filter direction Many to one (*:1) Both	✓ Make ti	his relationship	active		Apply security filter in both directions	
Cardinality Cross filter direction Many to one (*:1) Make this relationship active Apply security filter in both directions	Assume	referential inte	writy		,	
Cardinality Cross filter direction Many to one (*:1) Make this relationship active Apply security filter in both directions Accuracy referential integrity	Posuline	- referendar inte	-gridy			
Cardinality Cross filter direction Many to one (*:1) Both Make this relationship active Apply security filter in both directions Assume referential integrity Apply security filter in both directions						
Cardinality Cross filter direction Many to one (*:1) Both Make this relationship active Apply security filter in both directions Assume referential integrity Image: Cross filter direction						K Cance

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Region_PowerBIUser <-> PowerBIUser

The relationship definition is as shown below:

Edit relationship	
Select tables and columns that are related.	
Region_PowerBIUser *	
region PowerBIUser Denmark k Norway k Sweden I	
PowerBIUser	
Cardinality	Cross filter direction
Many to one (*:1)	Single *
 Make this relationship active Assume referential integrity 	Apply security filter in both directions
	OK Cancel



5.0 Define the Security Filter in Power BI

We will now need to define the filter to filter records by Power BI Usernames. Go to Manage Role in Power BI, and define the following filter. Note that we use the DAX function 'USERNAME'. This will return the Power BI login username. In the Power BI Desktop environment, Username returns the SAMAccountname, which is a logon name used to support clients and servers from previous version of Windows (eg domain\username).

This is different in Power BI cloud, where USERNAME() will return the internet-style login name (username@domain). This can be quite confusing, especially during testing.

A quick way to test out the filter is to hardcode the filter to use a specific Power BI Username defined instead of USERNAME(). Once it has been confirmed that the filter is working, you can switch it back before publishing.

Manage roles			×
Roles	Tables	Table filter DAX expression	×
ByUser	. PowerBIUser Region Region_PowerBIUser Sales	<pre> [PowerBIUser] = USERNAME()</pre>	

We can test out the filter by using View as Roles as shown below. If the filter is working, it should return only the countries that the specific Power User is defined to have access to.



_				
•	Home Table: ~ Data Category: Uncategorized ~ Default Summarization: Don't summa Properties	arize -	Manage Roles Secu	View as Roles rity
	/iew as roles □ None □ Other user ■ ByUser			
		OK	Ca	ancel

You can now publish the workbook to Power BI Service for further testing.

Under Power BI Service web interface, you will need to define the members to be included in the published workbook dataset under the role you have defined.

Row-Level Security		
ByUser (1)	Members (1)	
	People or groups who belong to this role	
	Enter email addresses	
	Add	
	- J ×	

Note that as the owner of the dataset you have published, RLS will not have any effect even if you add yourself as a member.



6.0 Reference Articles on RLS

There are a few good articles on RLS on the Internet which is listed below:

- https://Power BI.microsoft.com/en-us/documentation/Power BI-admin-rls/
- http://radacad.com/dynamic-row-level-security-with-power-bi-made-simple

In addition, the above example is modified from the following blog posts:

- https://www.kasperonbi.com/power-bi-desktop-dynamic-security-cheat-sheet/
- <u>https://community.Power Bl.com/t5/Community-Blog/Power-Bl-Dynamic-Row-Level-Security-Tips-to-get-it-working/ba-p/76865</u>