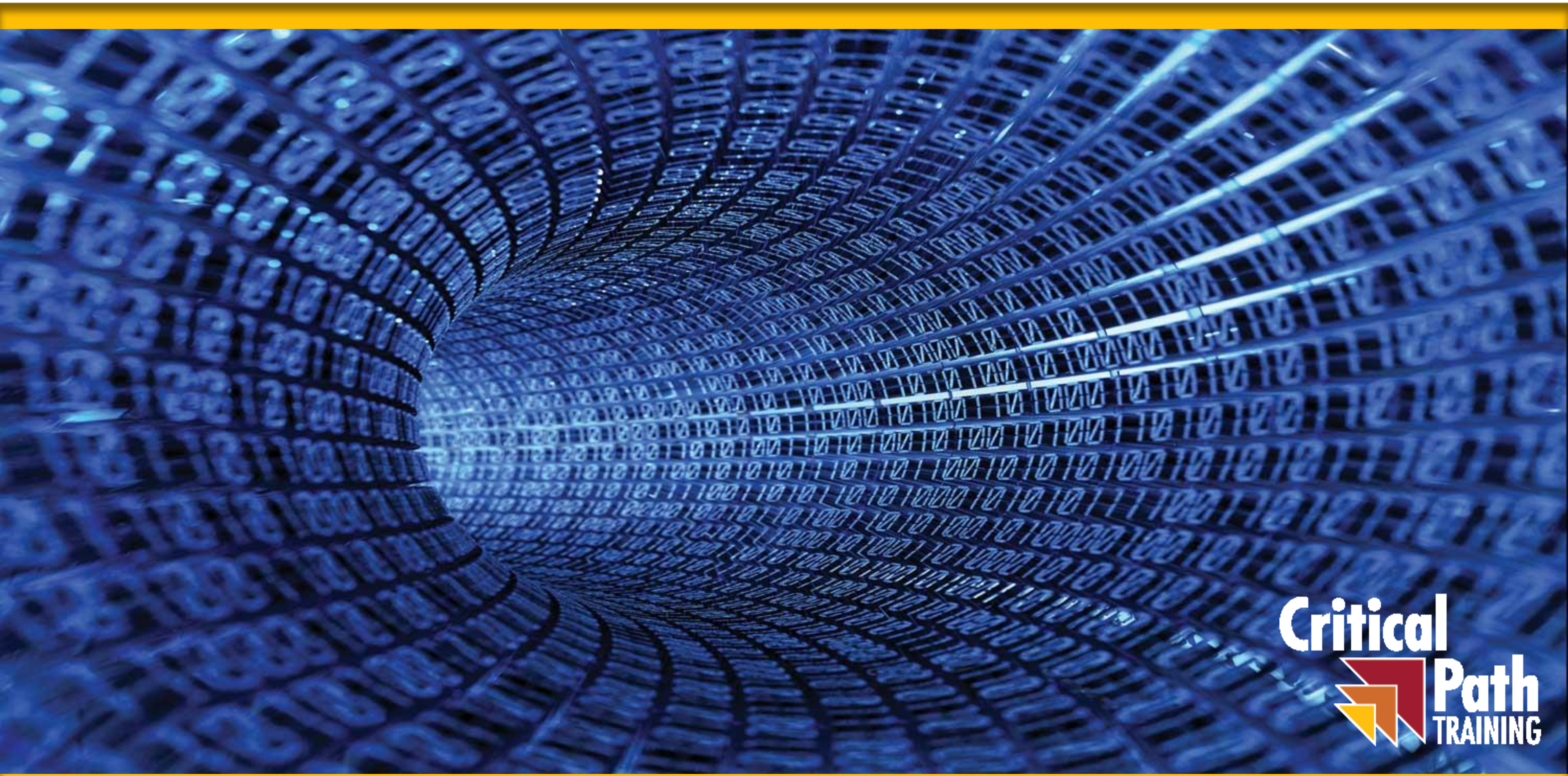
Securing Power BI Embedded Solutions using Row Level Security

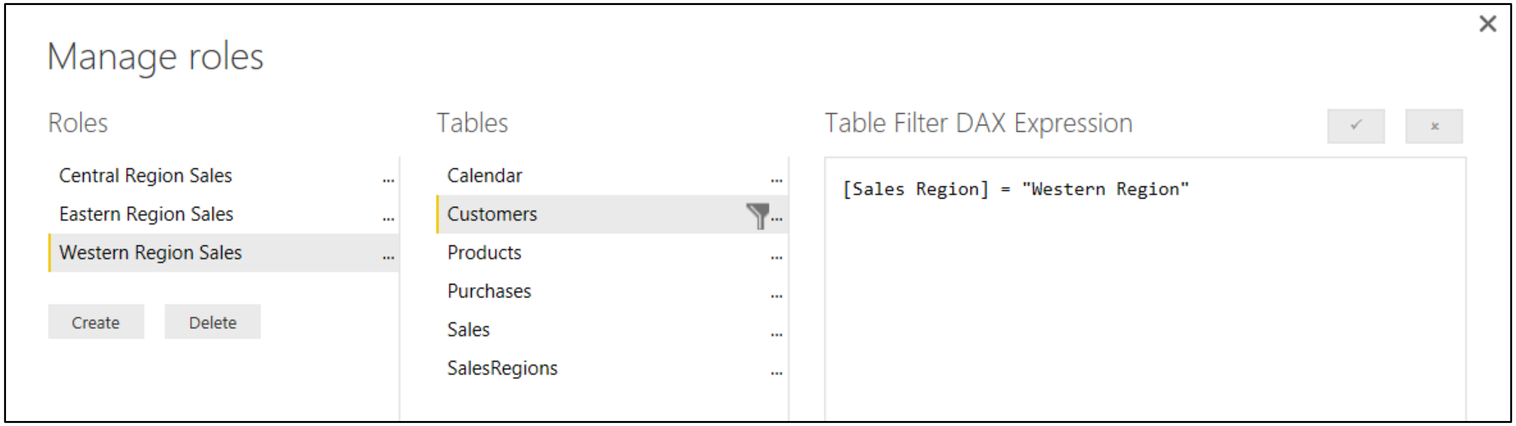


Agenda

- Understanding Row-Level Security (RLS) in Power BI
- Adding RLS Roles to a Power BI Desktop Project
- Deigning a Dynamic RLS Security Scheme
- RLS with the User-Owns-Data Model
- RLS with the App-Owns-Data Model
- Generating Embed Tokens with EffectiveIdentity

What Is Row-level Security (RLS)

- Security Scheme based on Named Roles
  - Roles are defined using Power BI Desktop
  - Each role is scoped to the dataset within a PBIX project
- Role defined using one or more DAX expressions
  - DAX expressions restrict which rows are accessible



Manage roles

Roles

- Central Region Sales
- Eastern Region Sales
- Western Region Sales

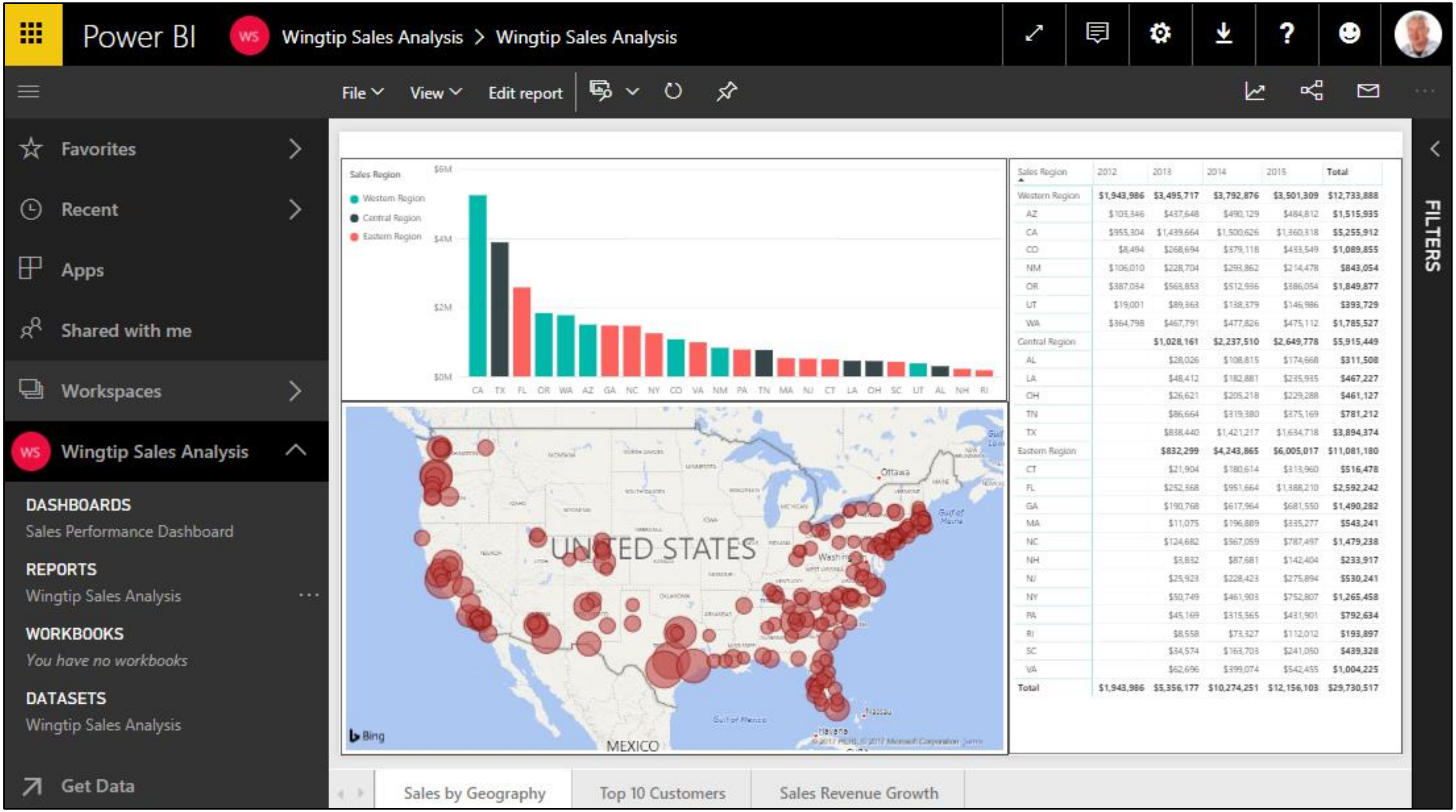
Tables

- Calendar
- Customers
- Products
- Purchases
- Sales
- SalesRegions

Table Filter DAX Expression

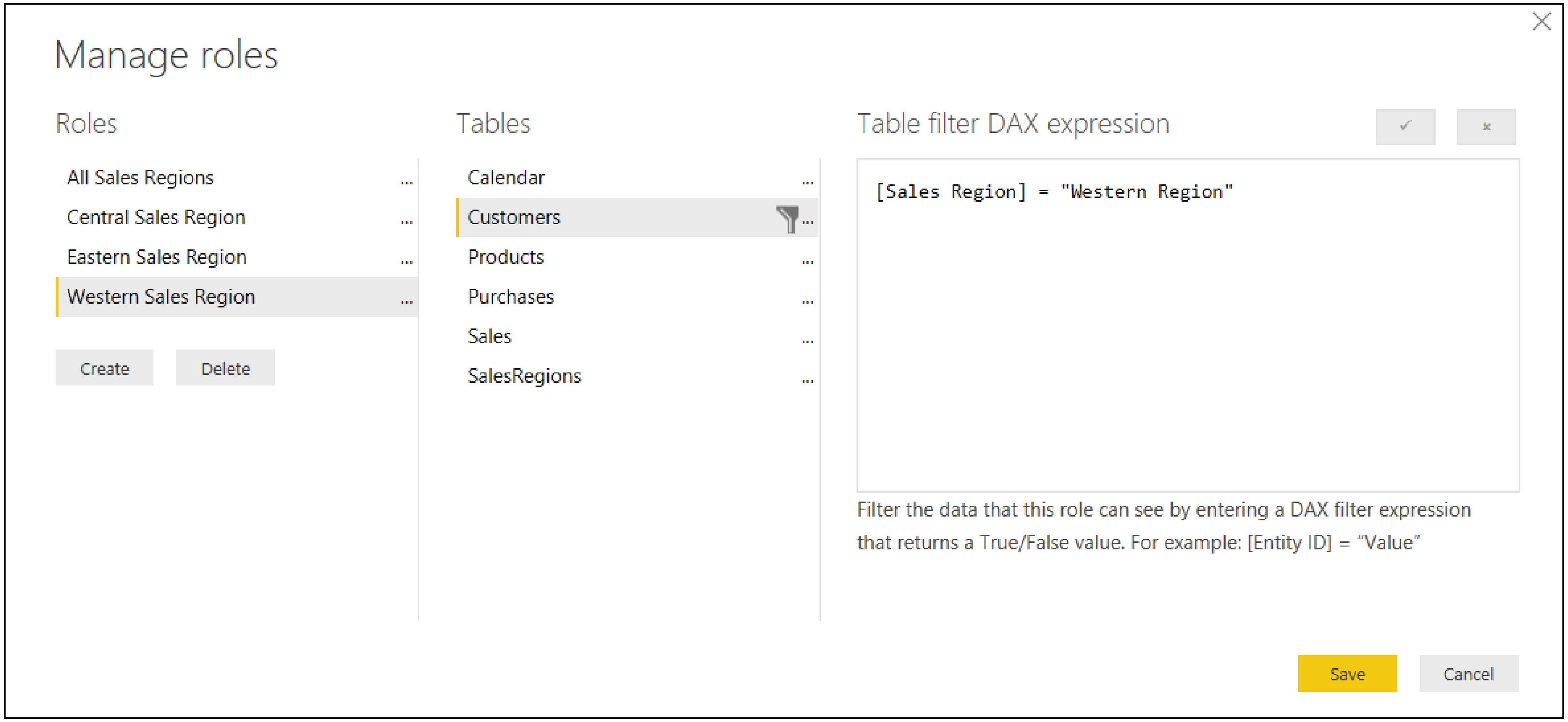
```
[Sales Region] = "Western Region"
```

Common RLS Scenario



Sales Region	2012	2013	2014	2015	Total
Western Region	$1,943,986	$3,495,717	$3,792,876	$3,501,309	$12,733,888
AZ	$103,346	$437,648	$490,129	$484,812	$1,515,935
CA	$955,304	$1,439,664	$1,500,626	$1,360,318	$5,255,912
CO	$8,494	$268,694	$379,118	$433,549	$1,089,855
NM	$106,010	$228,704	$293,862	$214,478	$843,054
OR	$387,034	$563,853	$512,936	$386,054	$1,849,877
UT	$19,001	$89,363	$138,379	$146,986	$393,729
WA	$364,798	$467,791	$477,826	$475,112	$1,785,527
Central Region		$1,028,161	$2,237,510	$2,649,778	$5,915,449
AL		$28,026	$108,815	$174,668	$311,508
LA		$48,412	$182,881	$235,935	$467,227
OH		$26,621	$205,218	$229,288	$461,127
TN		$86,664	$319,380	$375,169	$781,212
TX		$838,440	$1,421,217	$1,634,718	$3,894,374
Eastern Region		$832,299	$4,243,865	$6,005,017	$11,081,180
CT		$21,904	$180,614	$313,960	$516,478
FL		$252,368	$951,664	$1,388,210	$2,592,242
GA		$190,768	$617,964	$681,550	$1,490,282
MA		$11,075	$196,889	$335,277	$543,241
NC		$124,682	$567,059	$787,497	$1,479,238
NH		$3,832	$87,681	$142,404	$233,917
NJ		$25,923	$228,423	$275,894	$530,241
NY		$50,749	$461,903	$752,807	$1,265,458
PA		$45,169	$315,565	$431,901	$792,634
RI		$8,558	$73,327	$112,012	$193,897
SC		$34,574	$163,703	$241,050	$439,328
VA		$62,696	$399,074	$542,455	$1,004,225
Total	$1,943,986	$5,356,177	$10,274,251	$12,156,103	$29,730,517

Configuring RLS in the Power BI Desktop



Manage roles

Roles

- All Sales Regions
- Central Sales Region
- Eastern Sales Region
- Western Sales Region

Tables

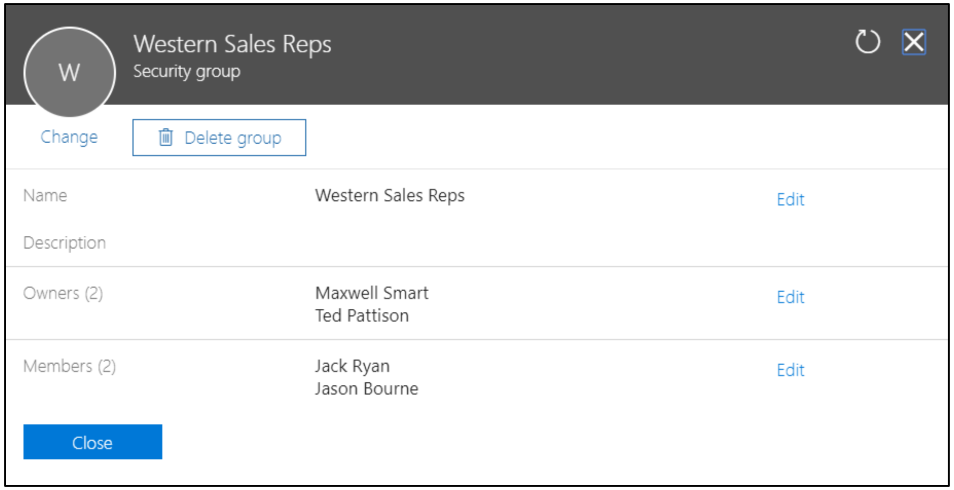
- Calendar
- Customers
- Products
- Purchases
- Sales
- SalesRegions

Table filter DAX expression

```
[Sales Region] = "Western Region"
```

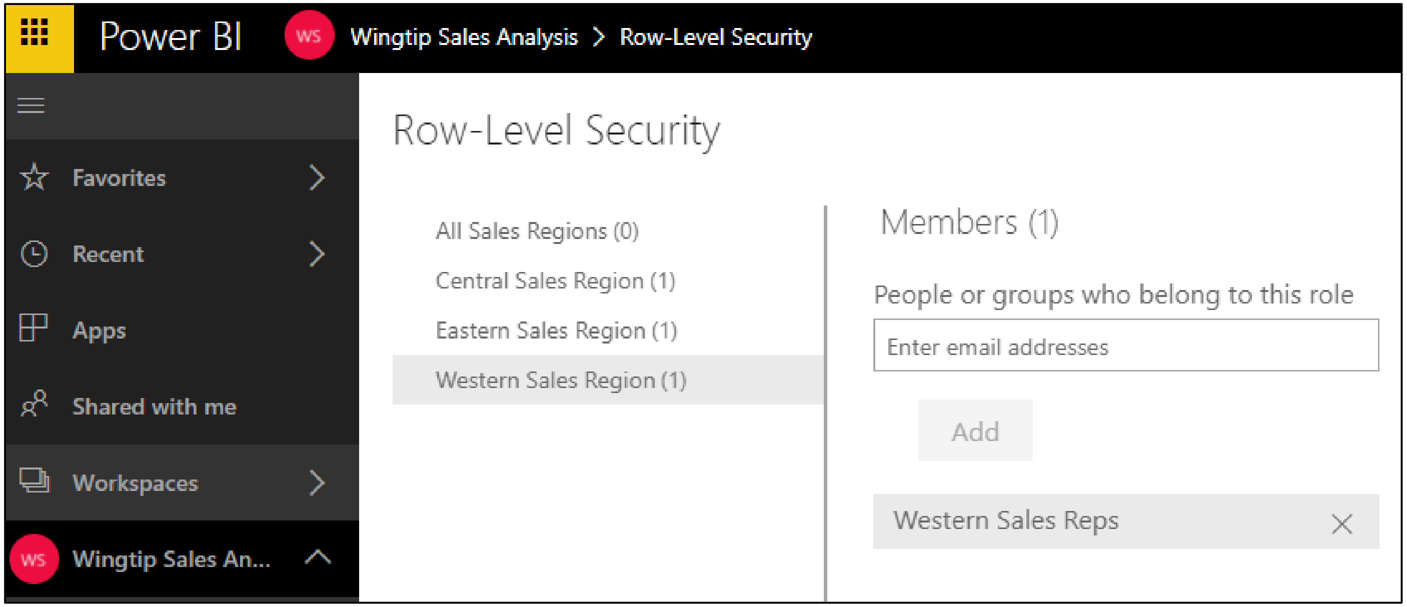
Filter the data that this role can see by entering a DAX filter expression that returns a True/False value. For example: [Entity ID] = "Value"

Configuring RLS in the Power BI Service



Western Sales Reps
Security group

Name	Western Sales Reps	Edit
Description		
Owners (2)	Maxwell Smart Ted Pattison	Edit
Members (2)	Jack Ryan Jason Bourne	Edit



Row-Level Security

- All Sales Regions (0)
- Central Sales Region (1)
- Eastern Sales Region (1)
- Western Sales Region (1)

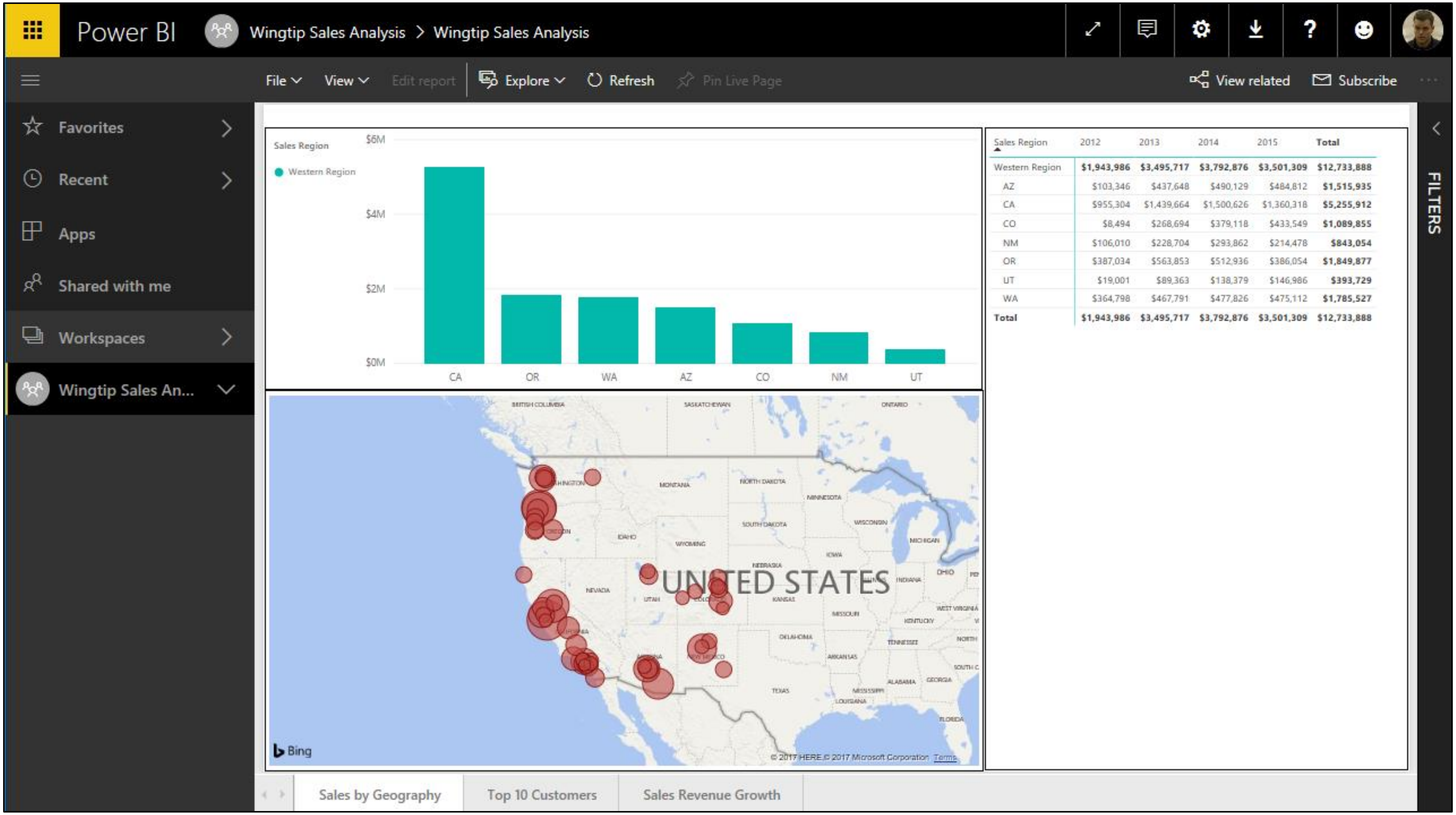
Members (1)

People or groups who belong to this role

Enter email addresses

Western Sales Reps

RLS Enforcement



Sales Region	2012	2013	2014	2015	Total
Western Region	**$1,943,986**	**$3,495,717**	**$3,792,876**	**$3,501,309**	**$12,733,888**
AZ	$103,346	$437,648	$490,129	$484,812	**$1,515,935**
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Total	**$1,943,986**	**$3,495,717**	**$3,792,876**	**$3,501,309**	**$12,733,888**

DEMO

Configuring Row-level Security

Agenda

✓ User Authentication and Identity

✓ Power BI Tenant Administration

✓ Data Security

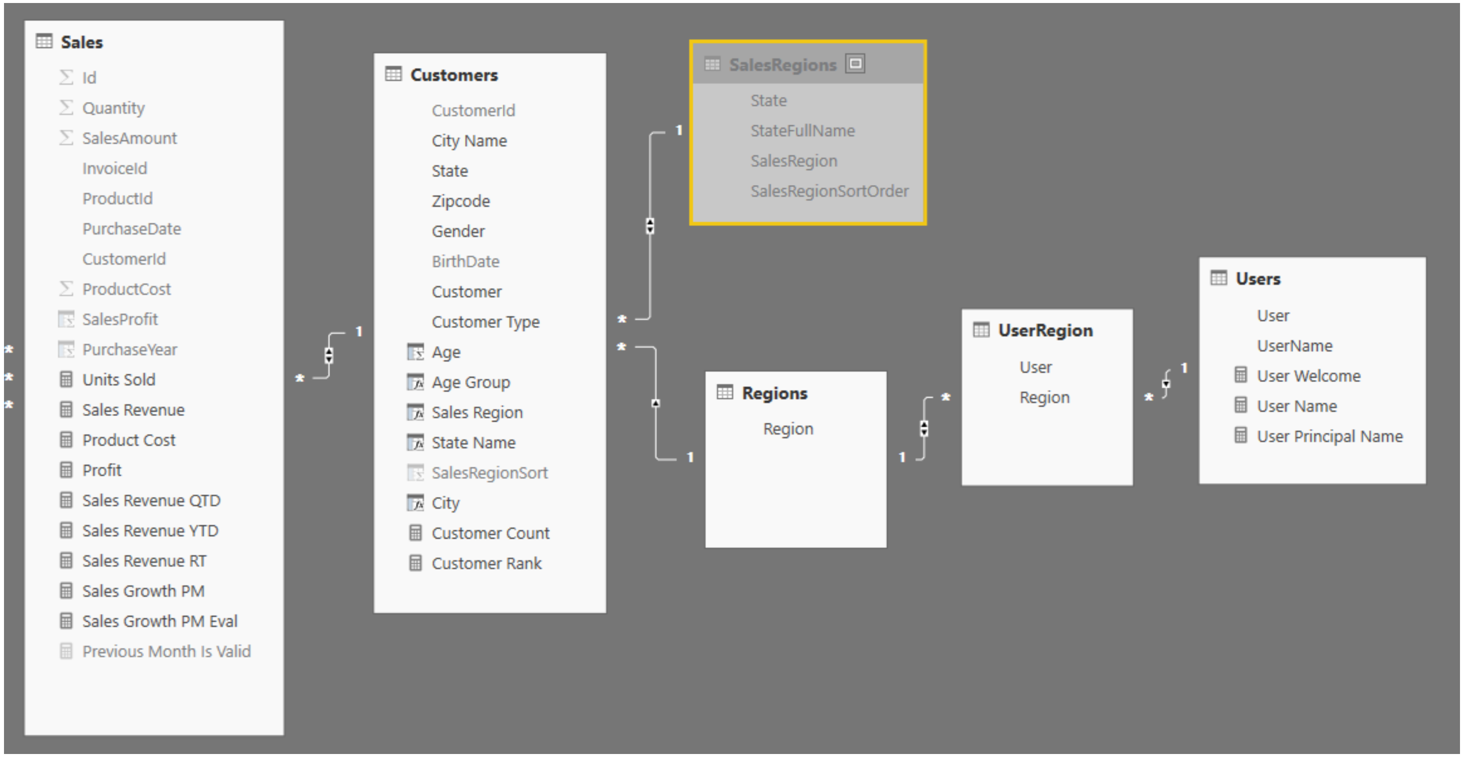
✓ App Workspaces

✓ Row Level Security

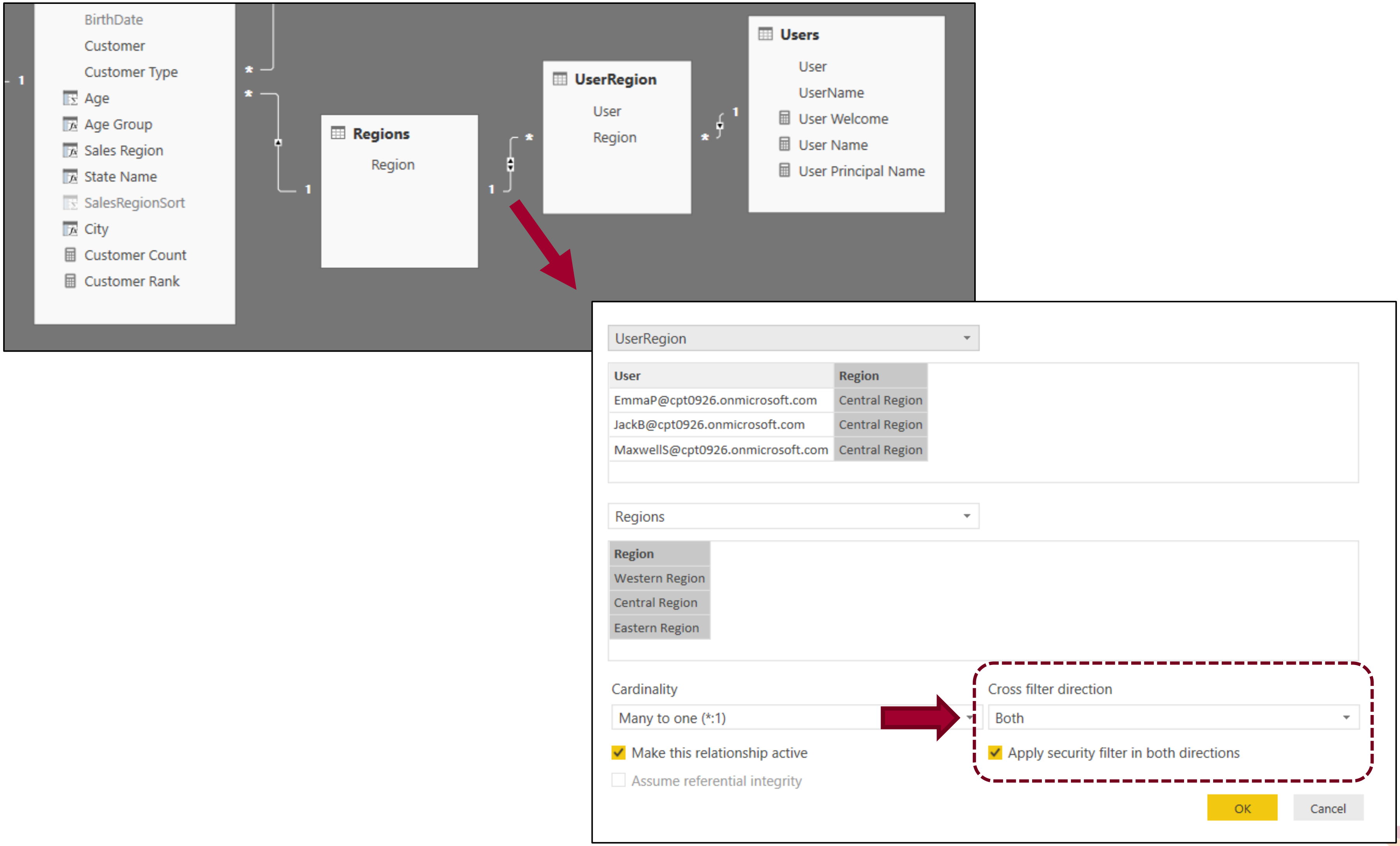
➢ Dynamic Row Level Security

Dynamic RLS

- Design pattern for data-driven security
  - RLS set up to use login name of current user
  - Permission assignments are included as part of dataset
  - Implemented using bi-directional cross-filtering



Configuring Cross-direction Filtering



UserRegion

User	Region
EmmaP@cpt0926.onmicrosoft.com	Central Region
JackB@cpt0926.onmicrosoft.com	Central Region
MaxwellS@cpt0926.onmicrosoft.com	Central Region

Regions

Region
Western Region
Central Region
Eastern Region

Cardinality: Many to one (*:1)

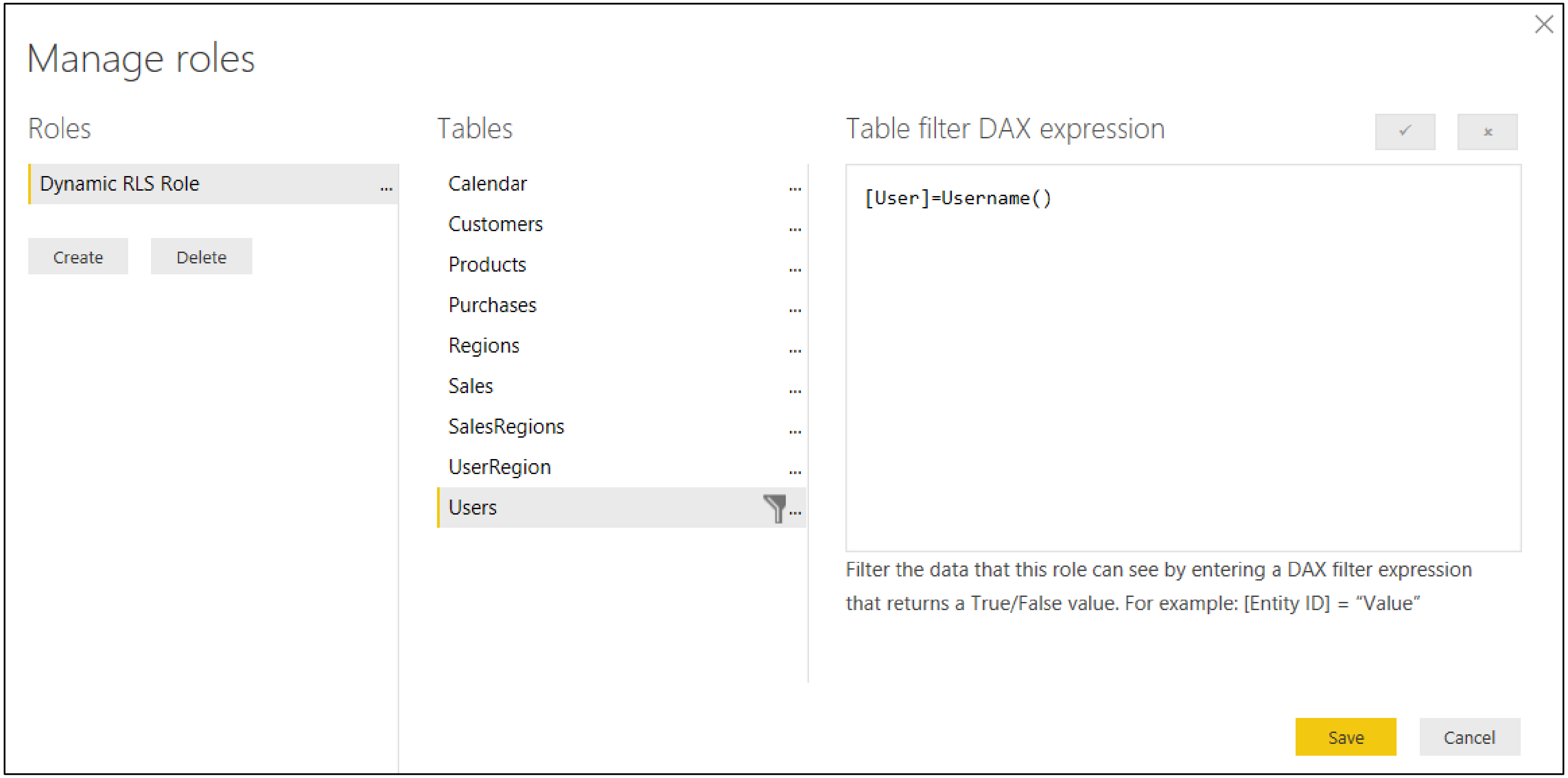
Cross filter direction: Both

☑ Make this relationship active

☑ Apply security filter in both directions

☐ Assume referential integrity

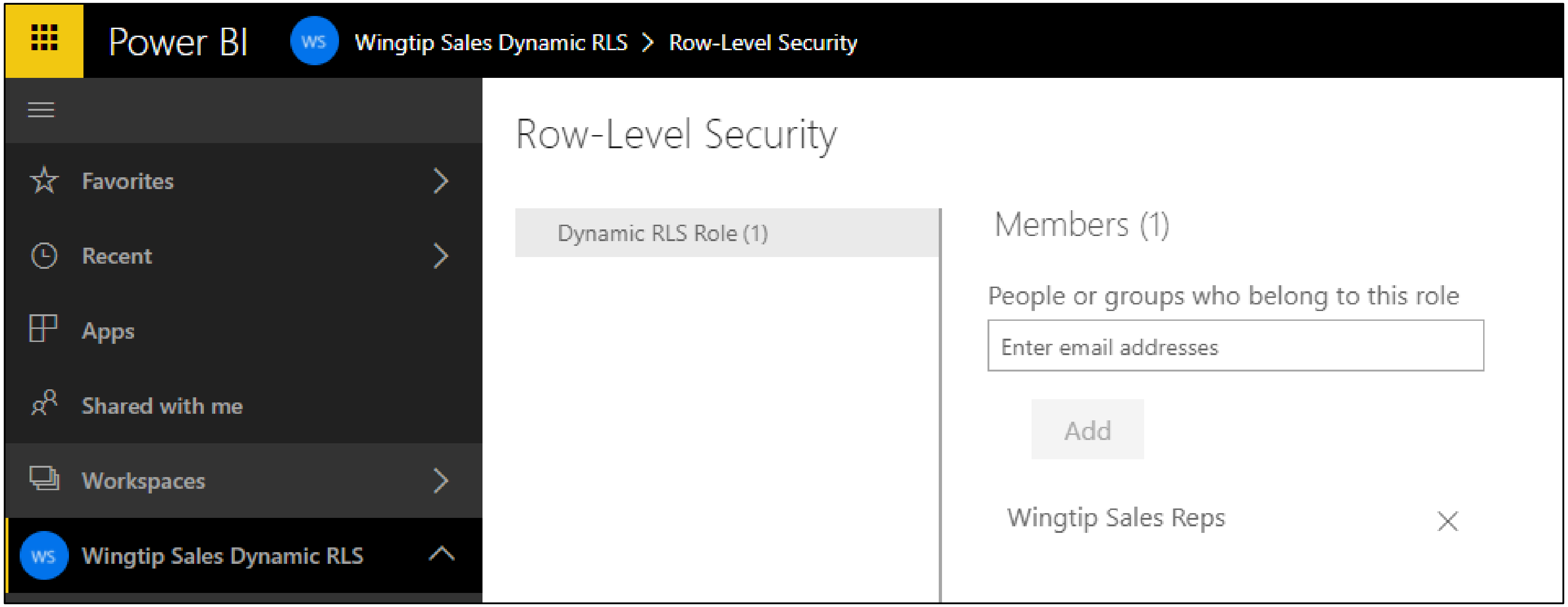
Dynamically Tracking the Current User



```
[User]=Username()
```

Filter the data that this role can see by entering a DAX filter expression that returns a True/False value. For example: [Entity ID] = “Value”

All Users Must Be Added To a Role


Power BI
WS
Wingtip Sales Dynamic RLS > Row-Level Security
Favorites
Recent
Apps
Shared with me
Workspaces
WS
Wingtip Sales Dynamic RLS

Row-Level Security

Dynamic RLS Role (1)

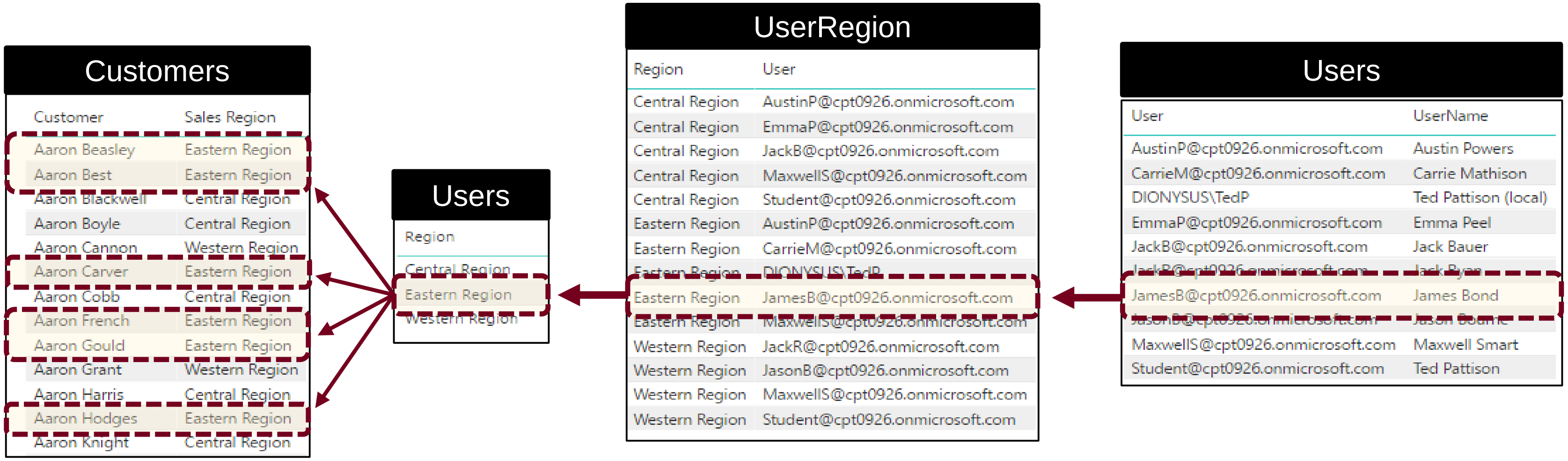
Members (1)

People or groups who belong to this role

Enter email addresses

Wingtip Sales Reps

Dynamic RLS Table Filtering



Customers

Customer	Sales Region
Aaron Beasley	Eastern Region
Aaron Best	Eastern Region
Aaron Blackwell	Central Region
Aaron Boyle	Central Region
Aaron Cannon	Western Region
Aaron Carver	Eastern Region
Aaron Cobb	Central Region
Aaron French	Eastern Region
Aaron Gould	Eastern Region
Aaron Grant	Western Region
Aaron Harris	Central Region
Aaron Hodges	Eastern Region
Aaron Knight	Central Region

Users

Region
Central Region
Eastern Region
Western Region

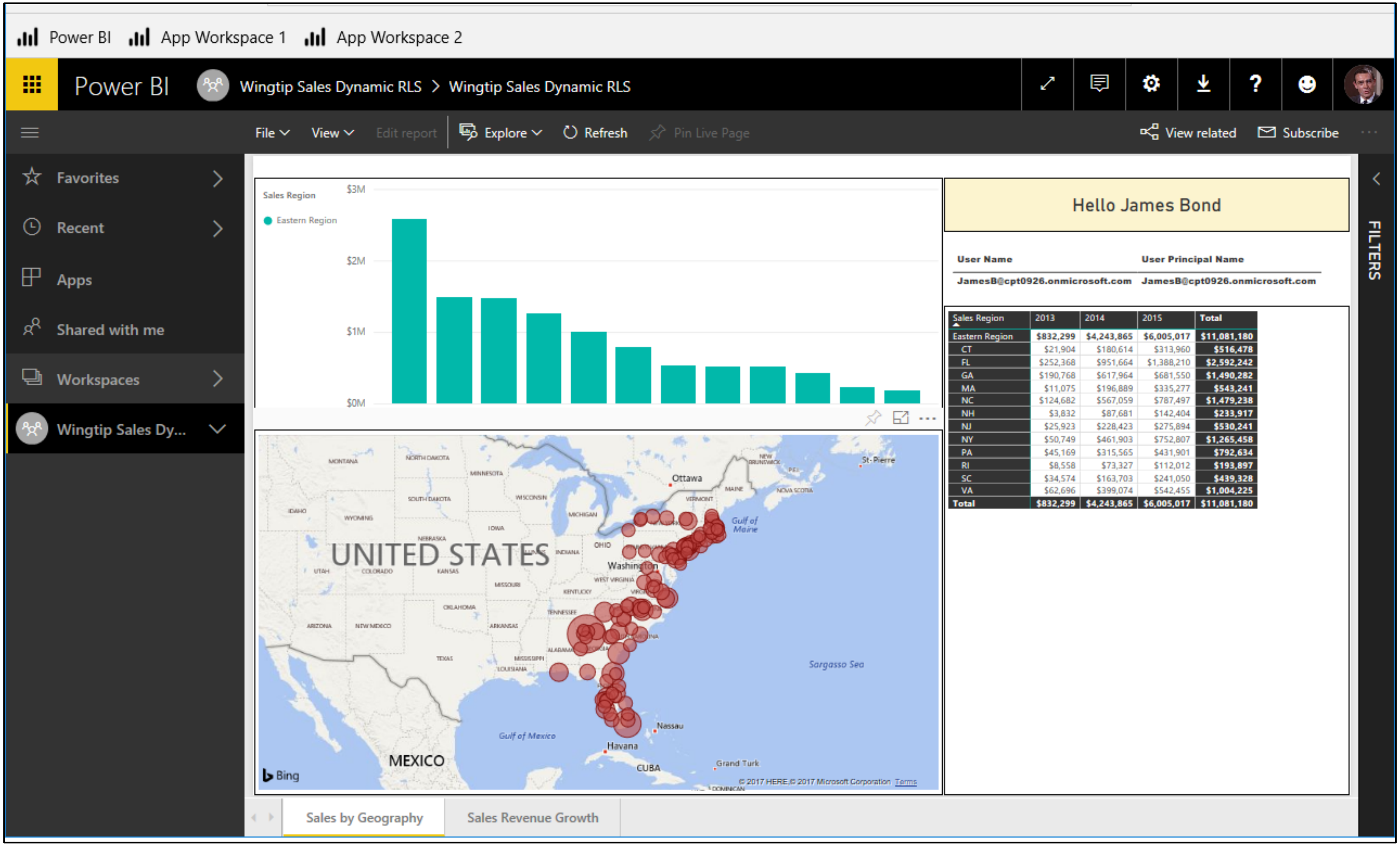
UserRegion

Region	User
Central Region	AustinP@cpt0926.onmicrosoft.com
Central Region	EmmaP@cpt0926.onmicrosoft.com
Central Region	JackB@cpt0926.onmicrosoft.com
Central Region	MaxwellS@cpt0926.onmicrosoft.com
Central Region	Student@cpt0926.onmicrosoft.com
Eastern Region	AustinP@cpt0926.onmicrosoft.com
Eastern Region	CarrieM@cpt0926.onmicrosoft.com
Eastern Region	DIONYSUS\TedP
Eastern Region	JamesB@cpt0926.onmicrosoft.com
Eastern Region	MaxwellS@cpt0926.onmicrosoft.com
Western Region	JackR@cpt0926.onmicrosoft.com
Western Region	JasonB@cpt0926.onmicrosoft.com
Western Region	MaxwellS@cpt0926.onmicrosoft.com
Western Region	Student@cpt0926.onmicrosoft.com

Users

User	UserName
AustinP@cpt0926.onmicrosoft.com	Austin Powers
CarrieM@cpt0926.onmicrosoft.com	Carrie Mathison
DIONYSUS\TedP	Ted Pattison (local)
EmmaP@cpt0926.onmicrosoft.com	Emma Peel
JackB@cpt0926.onmicrosoft.com	Jack Bauer
JackR@cpt0926.onmicrosoft.com	Jack Ryan
JamesB@cpt0926.onmicrosoft.com	James Bond
JasonB@cpt0926.onmicrosoft.com	Jason Bourne
MaxwellS@cpt0926.onmicrosoft.com	Maxwell Smart
Student@cpt0926.onmicrosoft.com	Ted Pattison

Dynamic RLS Enforcement



Hello James Bond

User Name	User Principal Name
JamesB@cpt0926.onmicrosoft.com	JamesB@cpt0926.onmicrosoft.com

Sales Region	2013	2014	2015	Total
Eastern Region	$832,299	$4,243,865	$6,005,017	$11,081,180
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DEMO

Configuring Dynamic Row-level Security

Summary

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- Deigning a Dynamic RLS Security Scheme
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- RLS with the App-Owns-Data Model
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