



devscope

Power BI 4 Developers

Rui Romano

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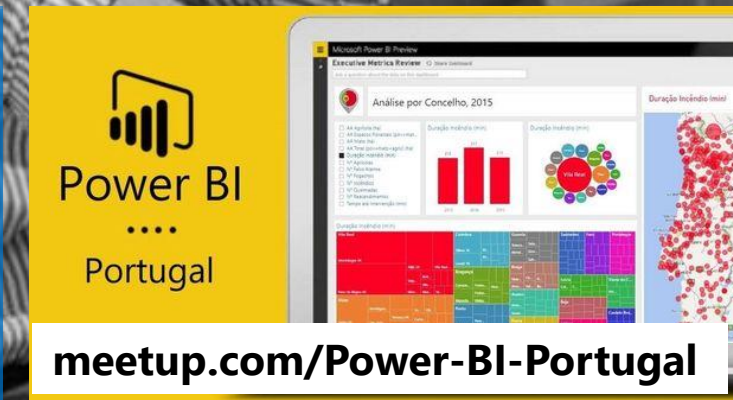
#PowerBIAddict #DataEngineer
#DataArchitect #MSFTBI #MVP
#DataPlatform #Dev #PBIPortugal

Head of BI @ DevScope – Porto, PT

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- 🌐 <https://ruiromanoblog.wordpress.com>
- in <https://www.linkedin.com/in/ruiromano/>
- 🐦 @RuiRomano

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Agenda

Intro & Discussion over multiple Power BI Developer topics

- Power BI Embedded
- Power BI Template Apps
- Custom Visuals
- REST APIs / Devops

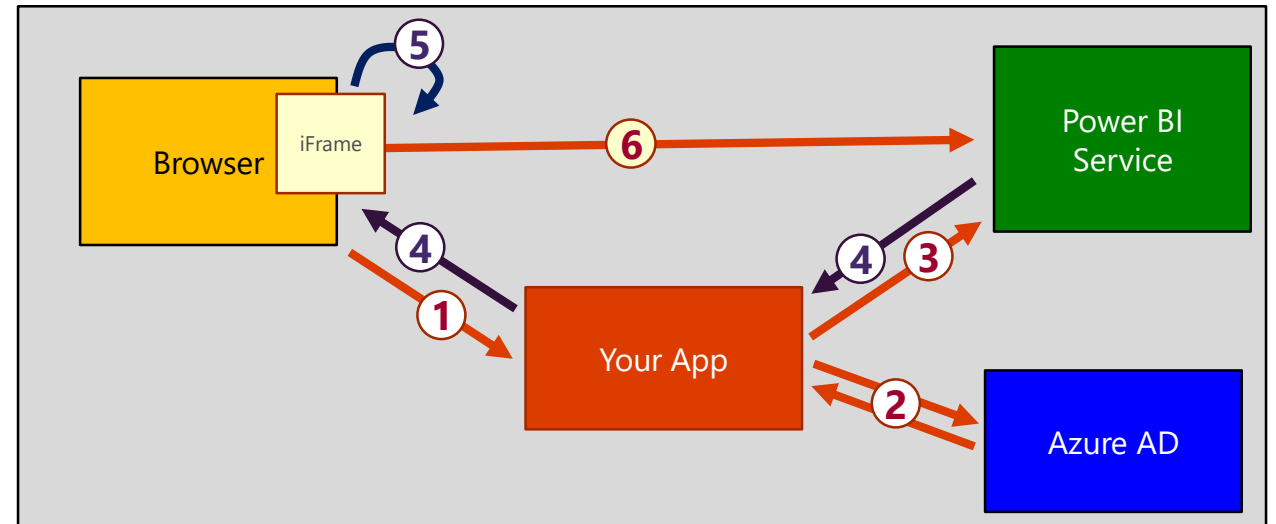
Power BI Embedded?

Integrate Power BI into your Application

Extend your App analytic capabilities quickly / lower cost

JavaScript API + REST API

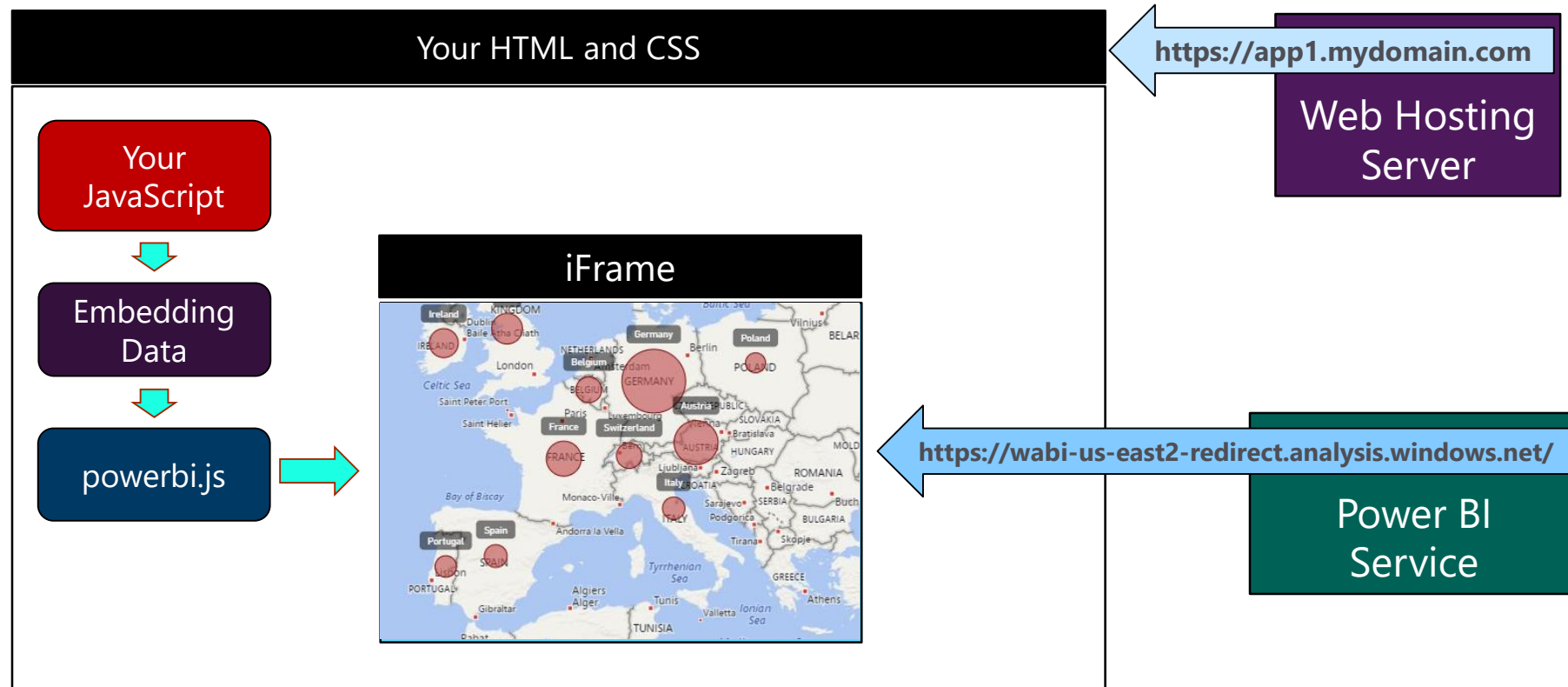
OAuth 2.0 + Open ID



Report Embedding

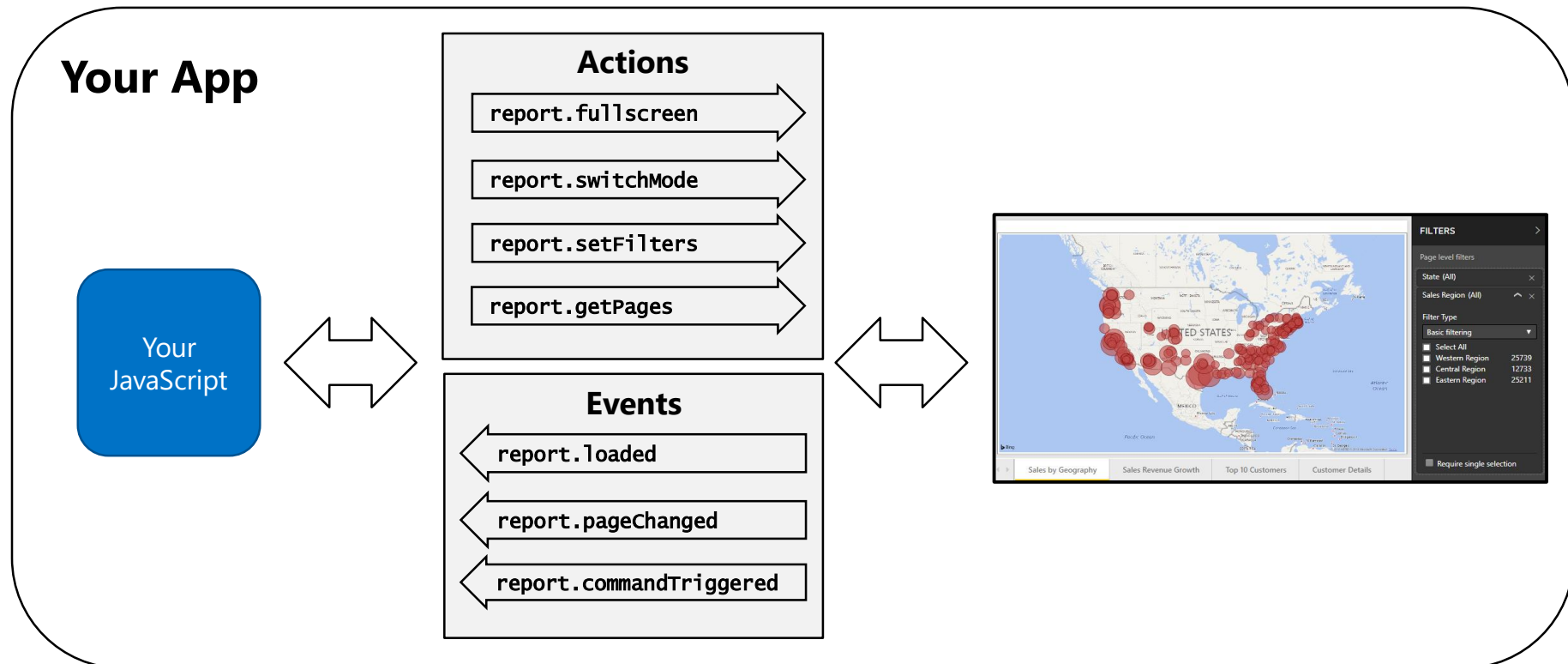
Embedding involves creating an iFrame on the page

- [Power BI JavaScript API](#) transparently creates iFrame and sets source to Power BI Service
- ***The iFrame and hosting page originate from different DNS domains***



2 Way communication between App and Power BI

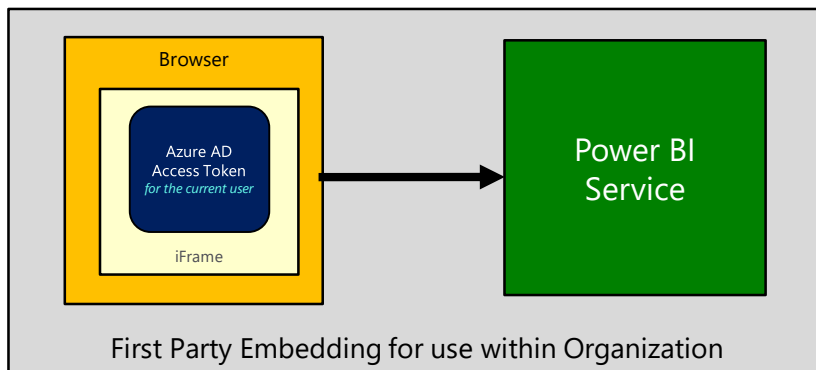
- Programming based on asynchronous requests and promises
- Embedded objects programmed using actions and events



Power BI Embedded Modes

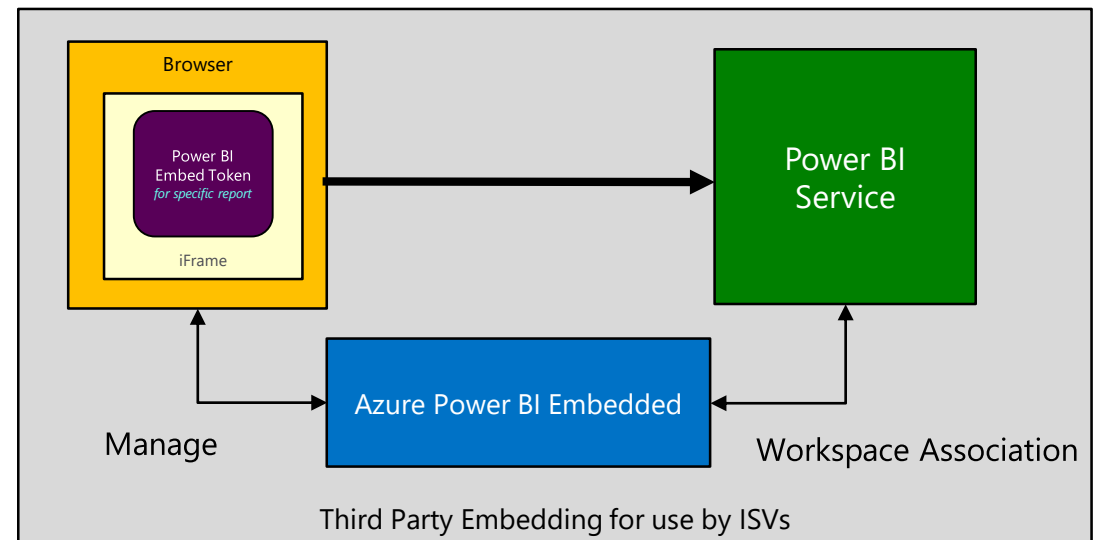
User-Owns-Data

- All users require a Power BI license
- Useful in corporate environments
- App authenticates as current user
- Your code runs with user's permissions
- User's access token passed to browser



App-Owns-Data

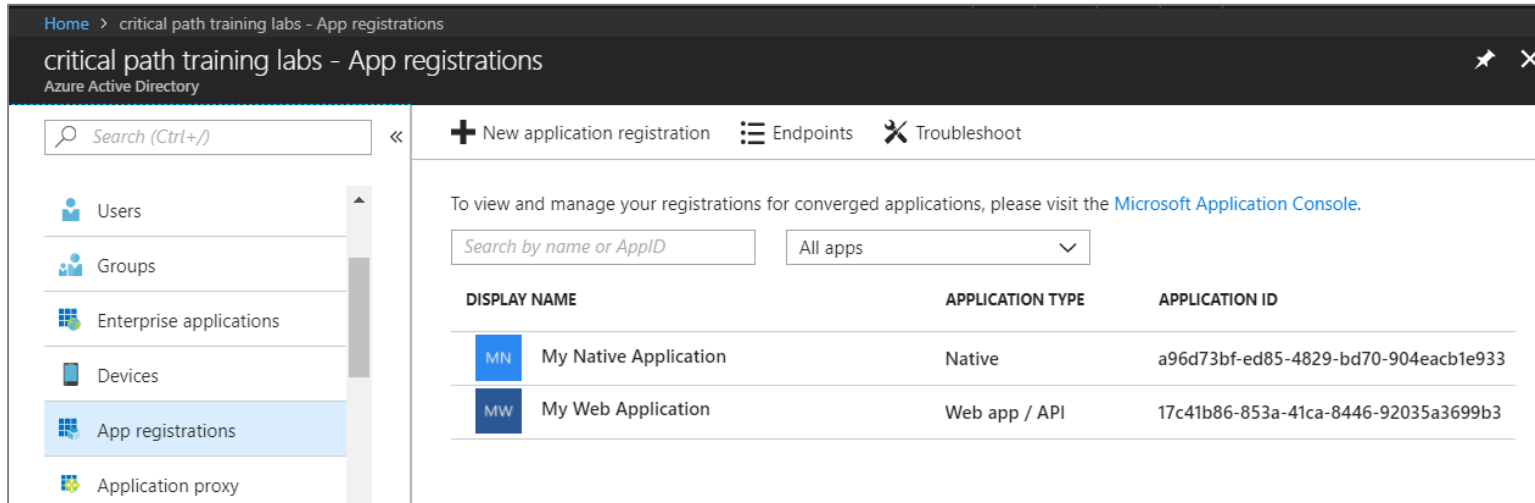
- Power BI licenses are not required!
- Useful for commercial applications
- App authenticates with app-only identity
- Your code runs with admin permissions
- Embed token passed to browser
- Requires Azure Power BI Embedded (Production)



Azure AD Applications / Service Principal

Creating applications required for AAU authentication

- Applications are as Native application or Web Applications
- Application identified using GUID known as application ID
- Application ID often referred to as client ID or app ID
- **Can be used as Service Principal (aka Master Account)**



Home > critical path training labs - App registrations

critical path training labs - App registrations

Azure Active Directory

Search (Ctrl+/)

Users

Groups

Enterprise applications

Devices

App registrations

Application proxy

+ New application registration



Endpoints

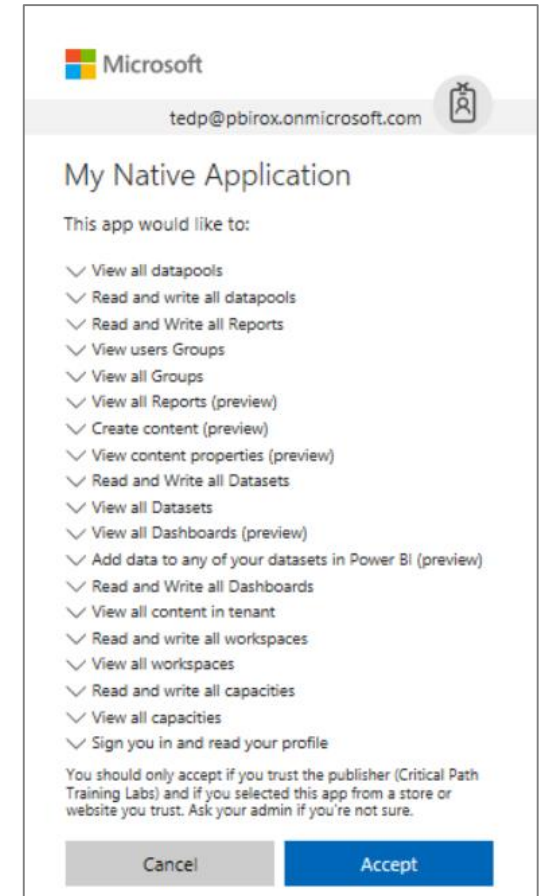
Troubleshoot

To view and manage your registrations for converged applications, please visit the [Microsoft Application Console](#).

Search by name or AppID

All apps

DISPLAY NAME	APPLICATION TYPE	APPLICATION ID
 My Native Application	Native	a96d73bf-ed85-4829-bd70-904eac1e933
 My Web Application	Web app / API	17c41b86-853a-41ca-8446-92035a3699b3



Microsoft

tedp@pbiox.onmicrosoft.com

My Native Application

This app would like to:

- View all datapools
- Read and write all datapools
- Read and Write all Reports
- View users Groups
- View all Groups
- View all Reports (preview)
- Create content (preview)
- View content properties (preview)
- Read and Write all Datasets
- View all Datasets
- View all Dashboards (preview)
- Add data to any of your datasets in Power BI (preview)
- Read and Write all Dashboards
- View all content in tenant
- Read and write all workspaces
- View all workspaces
- Read and write all capacities
- View all capacities
- Sign you in and read your profile

You should only accept if you trust the publisher (Critical Path Training Labs) and if you selected this app from a store or website you trust. Ask your admin if you're not sure.

Cancel Accept

Sample Code – Server Side (App Owns Data)

PowerBIClient SDK

Enumerate Metadata

Generate Tokens

```
public static ReportEmbeddingData GetReportEmbeddingData() {  
    PowerBIClient pbiclient = GetPowerBIClient();  
  
    var report = pbiclient.Reports.GetReportInGroup(workspaceId, reportId);  
    var embedUrl = report.EmbedUrl;  
    var reportName = report.Name;  
  
    // create token request object  
    GenerateTokenRequest generateTokenRequestParameters = new GenerateTokenRequest(accessLevel: "view");  
  
    // call to Power BI Service API and pass GenerateTokenRequest object to generate embed token  
    string embedToken = pbiclient.Reports.GenerateTokenInGroup(workspaceId,  
                                                                report.Id,  
                                                                generateTokenRequestParameters).Token;  
  
    return new ReportEmbeddingData {  
        reportId = reportId,  
        reportName = reportName,  
        embedUrl = embedUrl,  
        accessToken = embedToken  
    };  
}
```

Sample Code – Client Side

powerbi.js library

Configure the embed object

Apply Filters / Layout /...

```
<div class="pure-g">  
  <div id="embedContainer"> </div>  
</div>
```

```
// data required for embedding Power BI report  
var embedReportId = "ba274ba0-93be-4e53-af65-fdc8a559c557";  
var embedUrl = "https://app.powerbi.com/reportEmbed?reportId=ba274ba0-93be-4e53-af65-fdc8a559c557&groupId=7f4";  
var accessToken = "eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsIngldCI6I1Rpb0d5d3dsahZkRmJYWjgxM1dwUGF5OUFsVSIImtpZ0";  
  
// Get models object to access enums for embed configuration  
var models = window['powerbi-client'].models;  
  
// create embed configuration object  
var config = {  
  type: 'report',  
  id: embedReportId,  
  embedUrl: embedUrl,  
  accessToken: accessToken,  
  tokenType: models.TokenType.Aad  
};  
  
// Get a reference to the embedded report HTML element  
var reportContainer = document.getElementById('embedContainer');  
  
// Embed the report and display it within the div container.  
var report = powerbi.embed(reportContainer, config);
```

DEMO

- [Power BI Embedded Playground](#)
- [Sample App](#)

Sample tool

Showcase NEW

Documentation

Microsoft Power BI Embedded Playground

Samples

Code

Embed

Interact

Select mode to embed your report in:

☒ View mode ⓘ

☐ Edit mode ⓘ

☐ Create mode ⓘ

Select token type:

☒ Embed token

☐ AAD token

Fill in the fields below to get the code to embed y...

Embed Token

Embed URL

Code

▶ Run

📄 Copy

```
// Read embed application token from
textbox
var txtAccessToken =
$('#txtAccessToken').val();

// Read embed URL from textbox
var txtEmbedUrl =
$('#txtReportEmbed').val();

// Read report Id from textbox
var txtEmbedReportId =
$('#txtEmbedReportId').val();
```

APP OWNS DATA SAMPLE

APP Reports • User Owns Data

WWI - SALES ANALYSIS

Sales Overview

\$22.63M
Sales Amount

-9.39%
% Sales Amount vs T...

-0.20%
% Sales Amount vs LY

📅

01/01/2014 01/12/2014

Sales Amount and Sales Amount (ly) by Month

Sales Amount Sales Amount (ly)

Sales Amount and Sales Profit by Category and Category

Category Accessories Clothing Electronics Food Gifts Toys

Sales Amount by Category

Accessories Clothing Toys Food Electronics Gifts

Sales Amount by Buying Group

N/A Wingtip Toys Tailspin Toys

Sales Amount by Country, State Province and Category

Learn more

- Ted Pattinson MBAS Session + Github
 - <https://community.powerbi.com/t5/MBAS-Gallery/Microsoft-Power-BI-Developing-with-Power-BI-embedding/m-p/712578>
 - <https://github.com/CriticalPathTraining/PowerBiEmbedded>
- Power BI Embedded Playground
 - <https://microsoft.github.io/PowerBI-JavaScript/demo/v2-demo/>
- Microsoft JavaScript API
 - <https://github.com/Microsoft/powerbi-javascript/wiki>

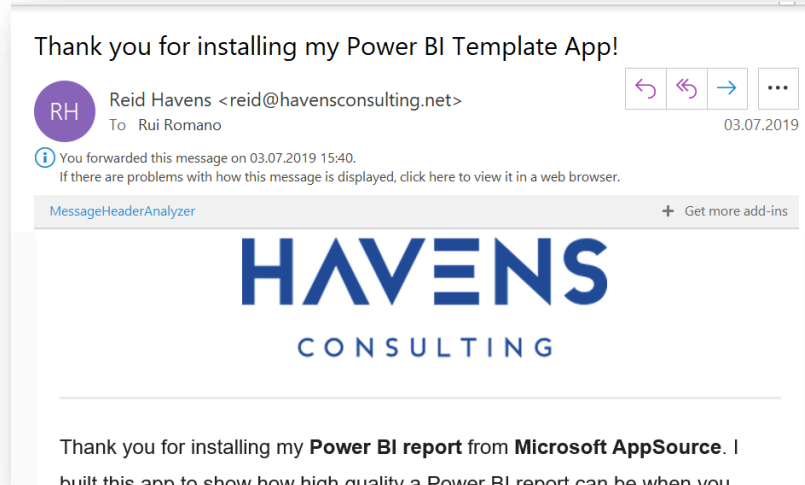
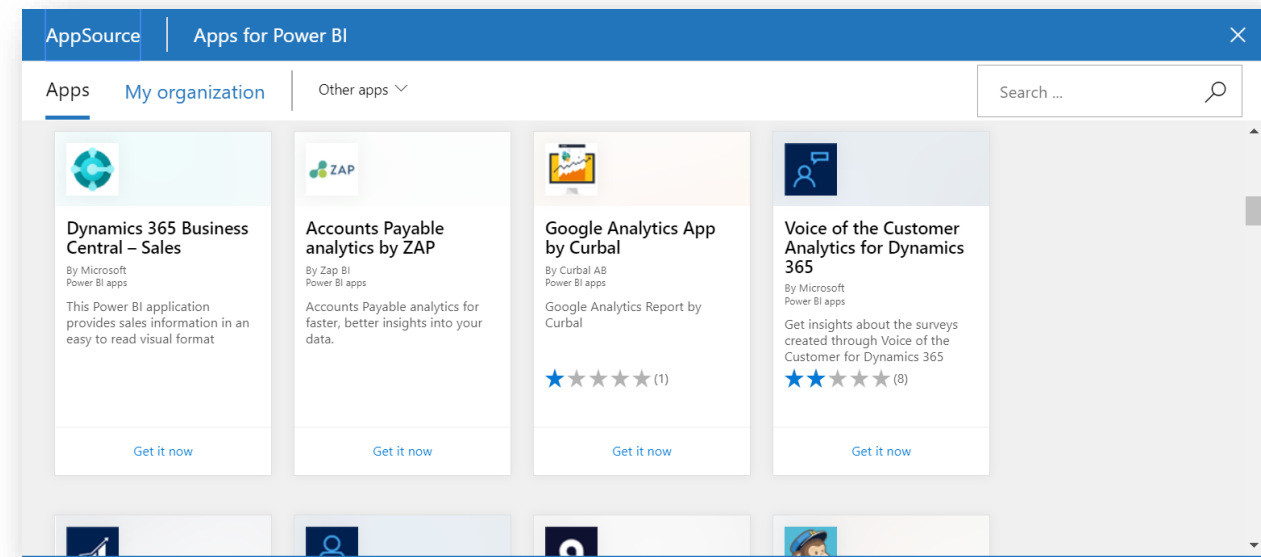
Template Apps

Low cost (customer & supplier)

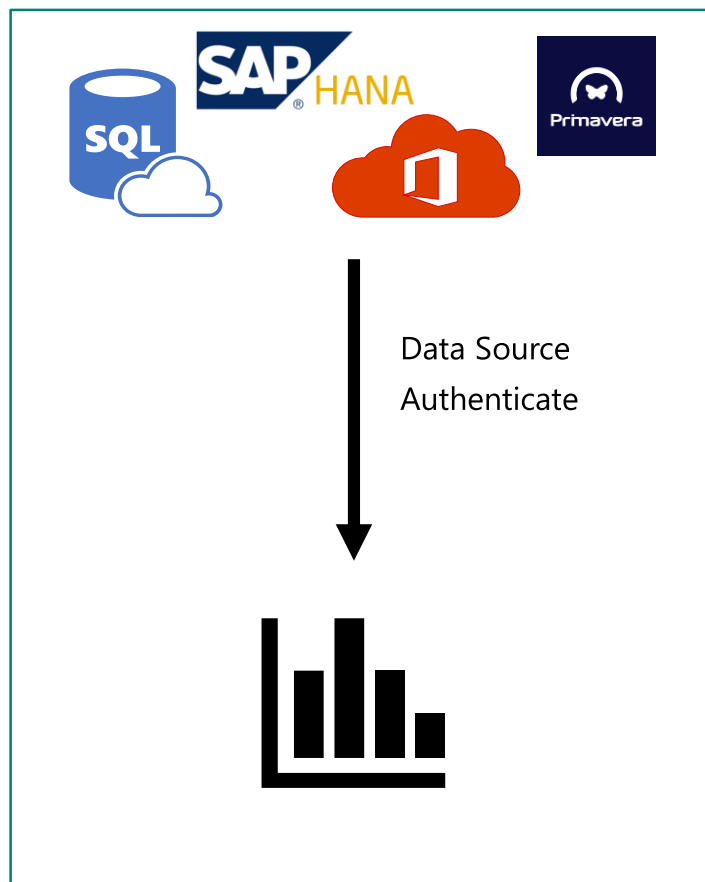
Easy Installation & Distribution

Give powerful analytics to your end-user

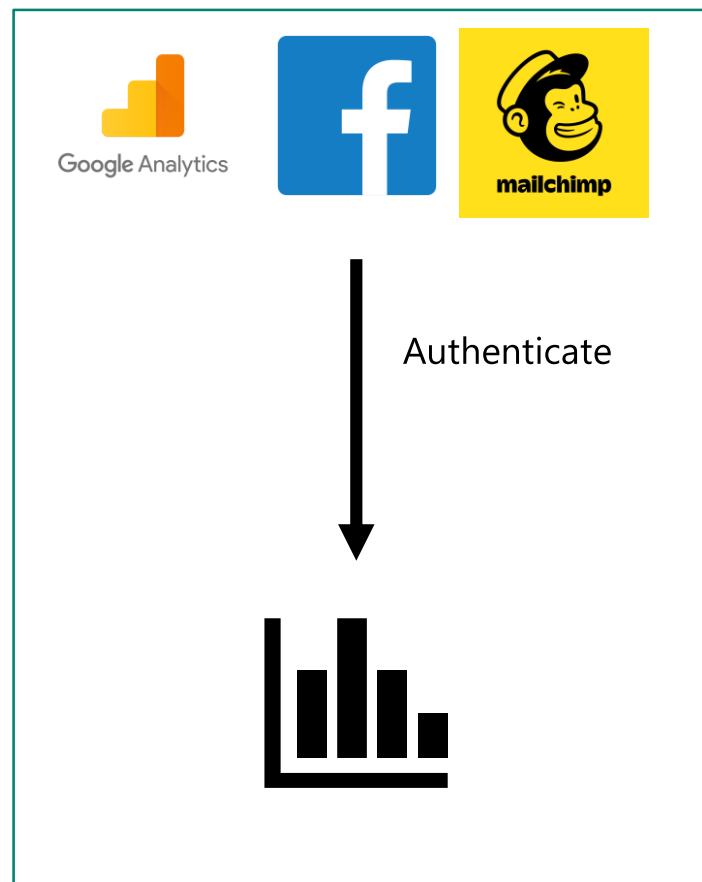
Big Opportunity for Marketing



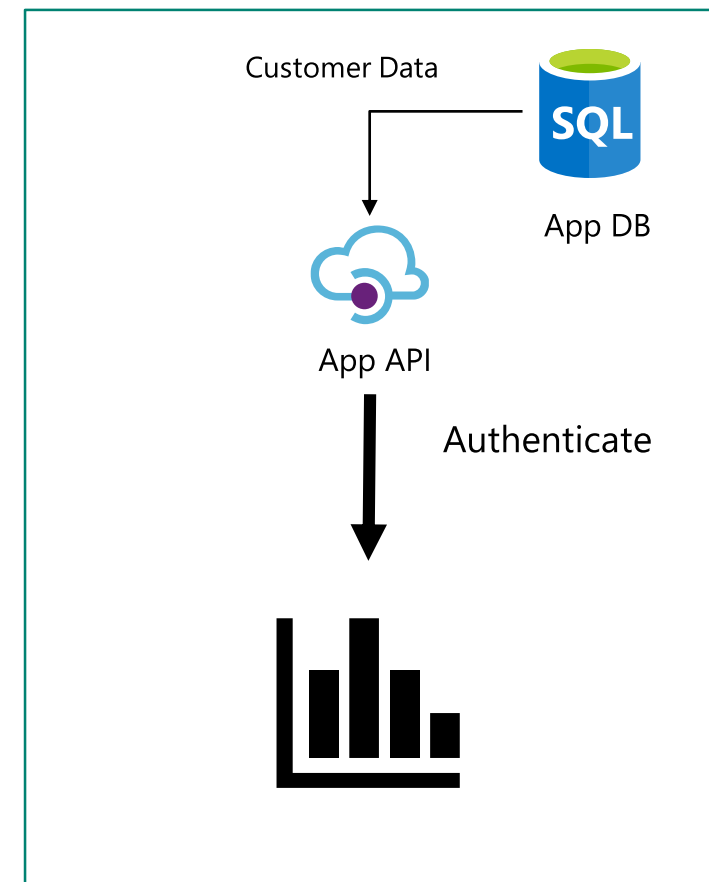
Template apps Use Cases



Standard Data Template
Ex: Finance / HR



Cloud Data Sources Template
Ex: Google Analytics



Your App Template
Ex: Low cost to provide
state of the art analytics

Publishing Options

Private - Link Sharing

Just share the app link with your users

Public – AppSource

Available in AppSource – the template app Marketplace

Need to be approved by Microsoft

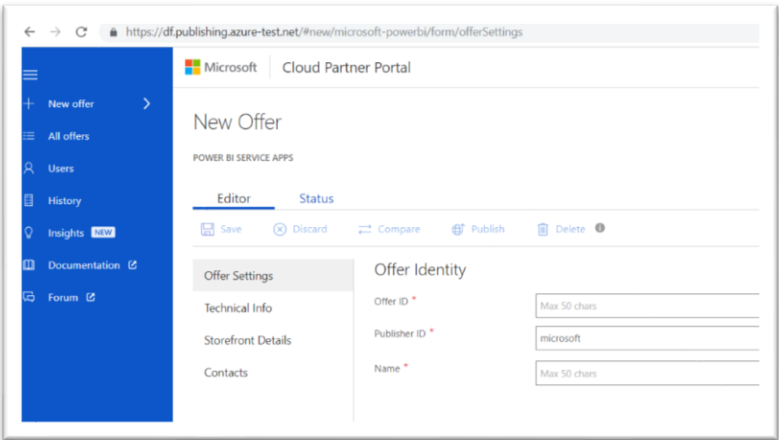
<https://docs.microsoft.com/en-gb/azure/marketplace/cloud-partner-portal/power-bi/cpp-publish-offer>

Release Management

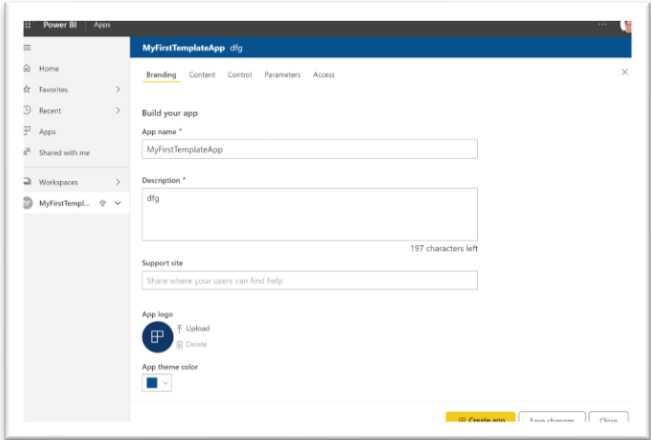


Template apps provide codeless experiences

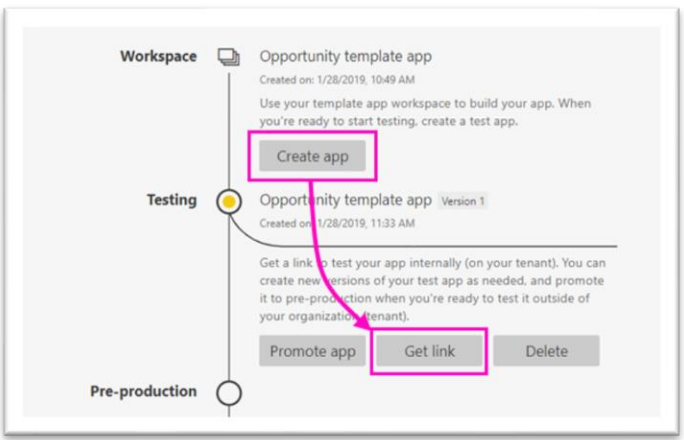
Self service for publishers



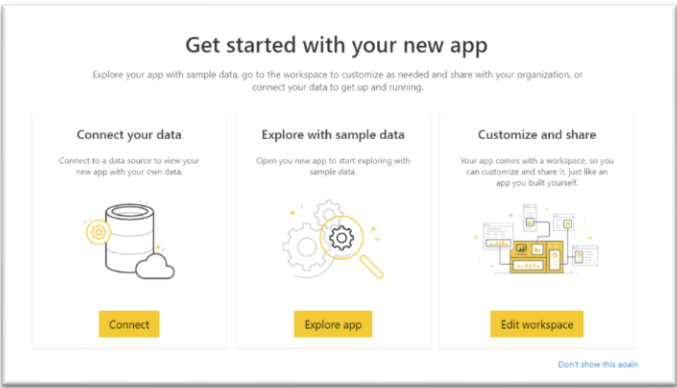
Publisher app control



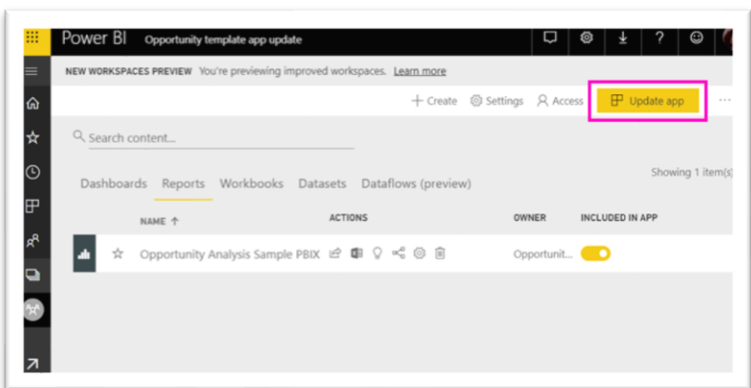
Apps developer experience



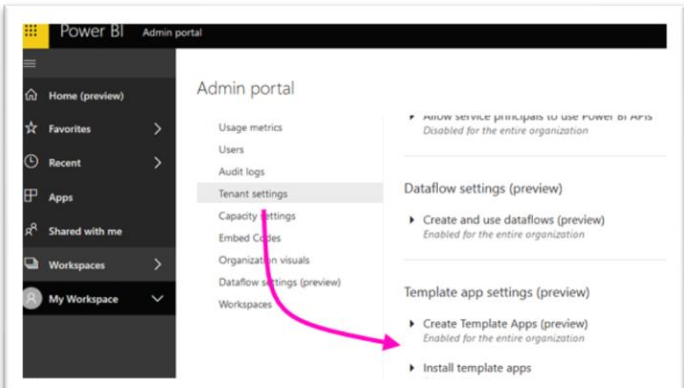
Sample experience



Fully customized content



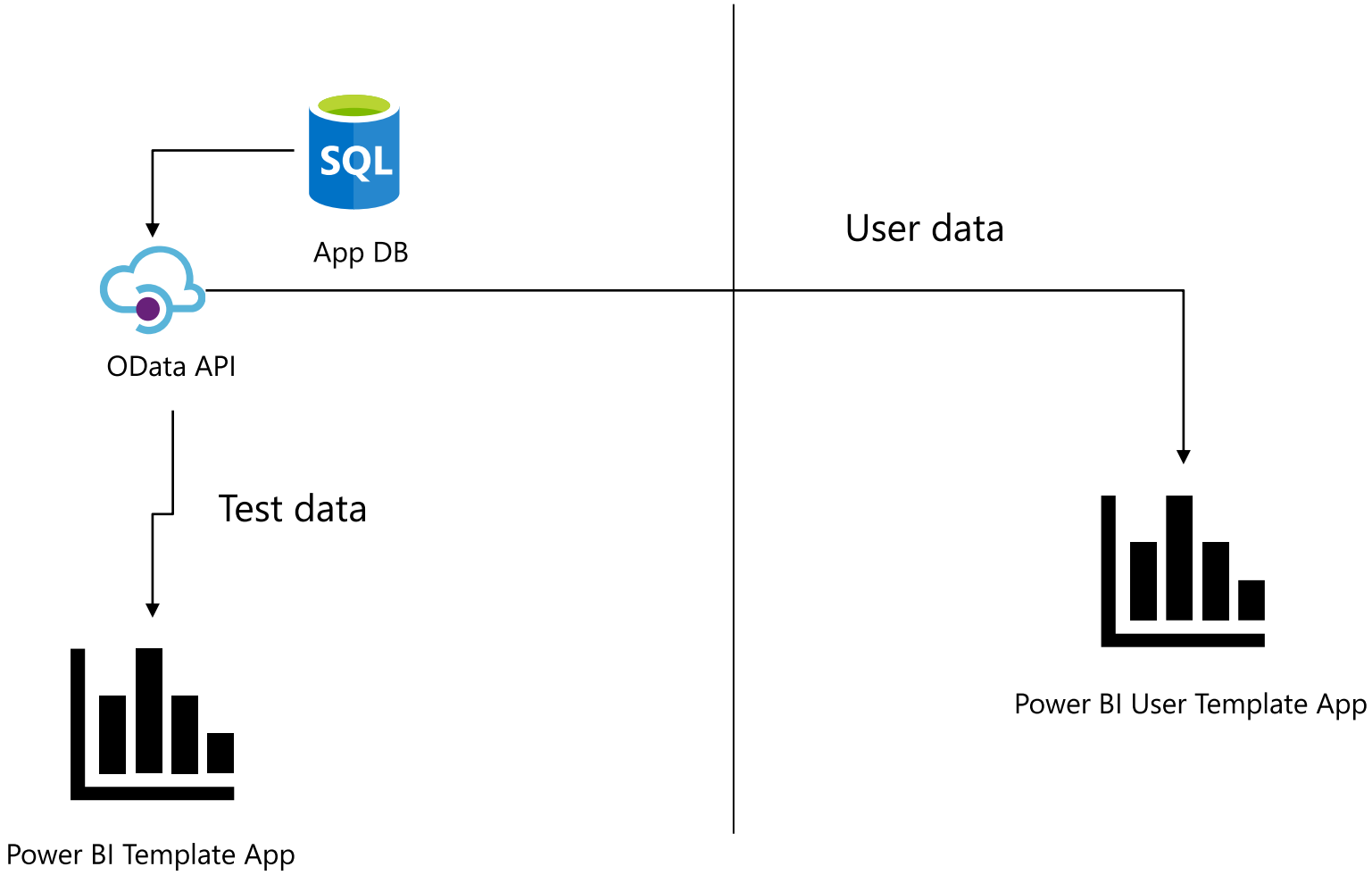
Enterprise governance



Northwind Template App

Northwind Power BI Tenant

Customer Power BI Tenant



DEMO

- Install Template App from App Source
- Northwind App

AppSource | Apps for Power BI

< Apps



Google Analytics Report

Havens Consulting Inc

★★★★★ 4.2 (29)

Overview [Reviews](#)

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Products
[Power BI apps](#)

Publisher
Havens Consulting Inc

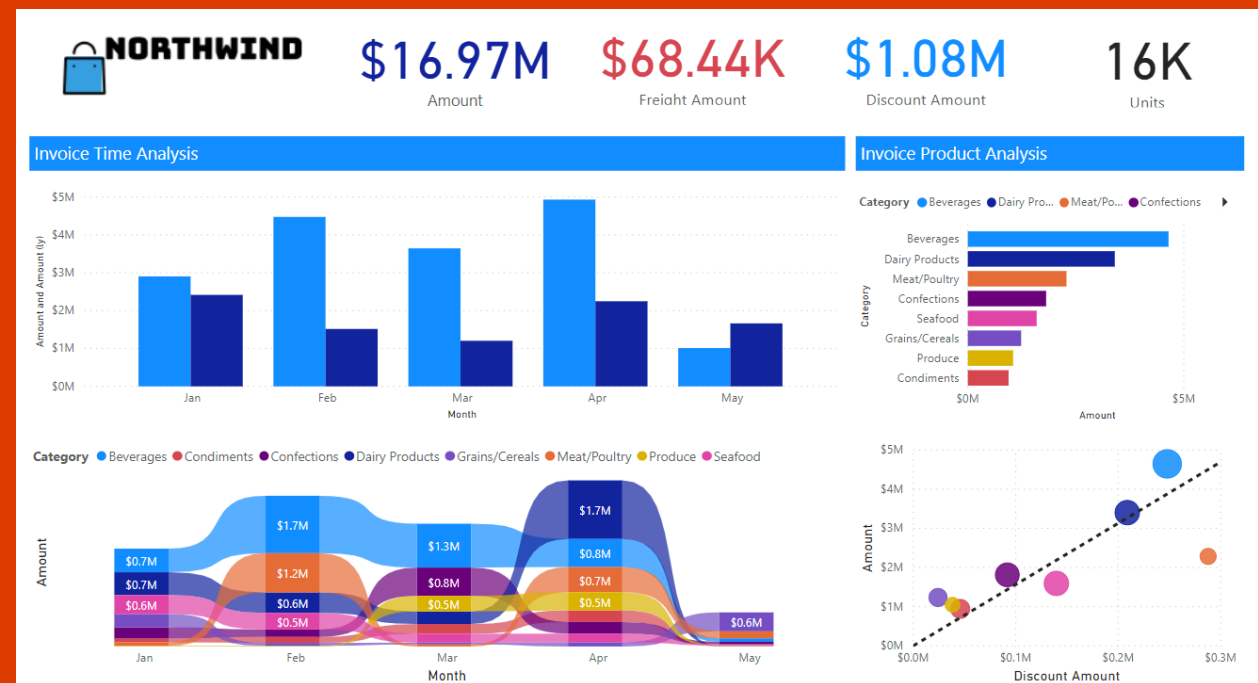
Acquire Using
Work or school account

Categories
[Analytics](#)

Products supported
Google Analytics

Google Analytics Report

Provides a detailed report built off the **last six months** of Google Analytics data. Allowing for a deep dive analysis on daily page views with forecasting and adjustable rolling average, month-over-month traffic gain or loss, top pages visited, traffic source trends over time, and more. Once you log in with credentials you'll be prompted to enter your Google Analytics View ID. This will replace the sample data with the last six months of your sites data. Depending on the size of your data, the initial load may take some time due to the speed of the Google Analytics API. On average, it can load about 35,000 rows a minute. If you would like access to all historical data for this report please visit our products page to purchase the report file. <https://www.havensconsulting.net/files-and-templates>



Learn more

- MBAS Template Apps Session by Gil Raviv
 - <https://community.powerbi.com/t5/MBAS-Gallery/Microsoft-Power-BI-Introducing-Power-BI-template-apps/m-p/712531>

Balance Sheet using Power BI

https://www.youtube.com/watch?v=4VzQEx29u_o&t=1767s

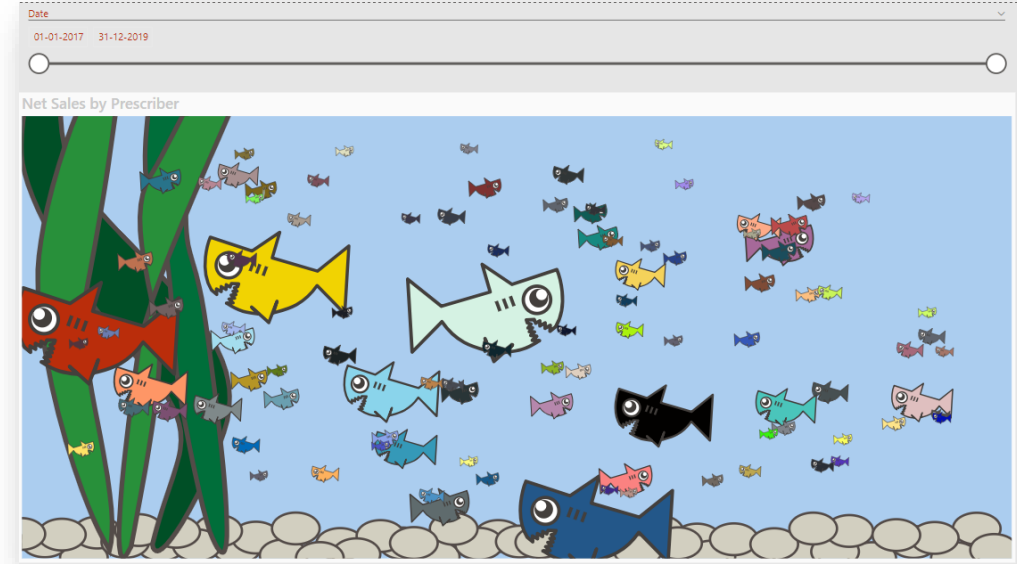
Custom Visuals

The ability to create new visuals that can be added to a report that are not included “out of the box”

Existing visuals developed by the community are available in the marketplace, or you can add them from a file.

There are over 200 existing visuals in the marketplace.

<https://appsource.microsoft.com/en-us/marketplace/apps?product=power-bi-visuals>



A screenshot of the Microsoft AppSource marketplace. The header shows the Microsoft logo, "AppSource" with a dropdown arrow, and a search bar labeled "Search Microsoft AppSource". On the left, there are filters for "Products" (Web Apps, Add-Ins, Dynamics 365, Office 365, Power BI apps, Power BI visuals, Dynamics NAV), "Categories" (Analytics, Filters, Gauges, Infographics, KPI, Time), and "Industries" (Agriculture, Education, Distribution, Financial services). The main content area shows "App results (221)" with a grid of visualizations. The first row includes "Variance Chart - XViz" (by Visual BI Solutions, 5 stars, 21 reviews, "Additional purchase may be required"), "SandDance 2019" (by Microsoft Corporation, 4.5 stars, 1 review, "Free"), "Pdf Viewer" (by Daniel Sallander, 4.5 stars, 9 reviews, "Free"), and "KPI Ticker by MAQ Software" (by MAQ LLC, 4.5 stars, 12 reviews, "Free"). Each card has a "Get it now" button and a heart icon.

What do you need?

- Code Editor, ex: [VSCode](#)
- [Node.JS](#)
- Power BI Account

First time setup: <https://github.com/microsoft/PowerBI-visuals>

> npm i -g powerbi-visuals-tools

> pbviz --install-cert

(to create a secure connection between local machine & powerbi.com)

<https://docs.microsoft.com/en-us/power-bi/developer/custom-visual-develop-tutorial>

Creating a Custom Visual

Create a new template visual

> pbiviz new MyVisual

Enable debugging

> pbiviz start

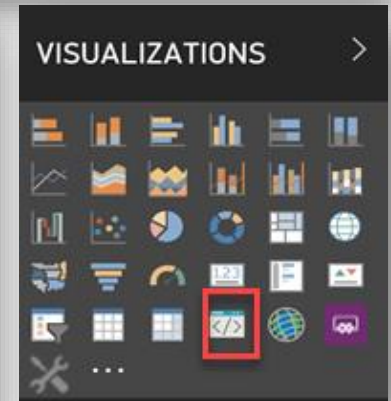
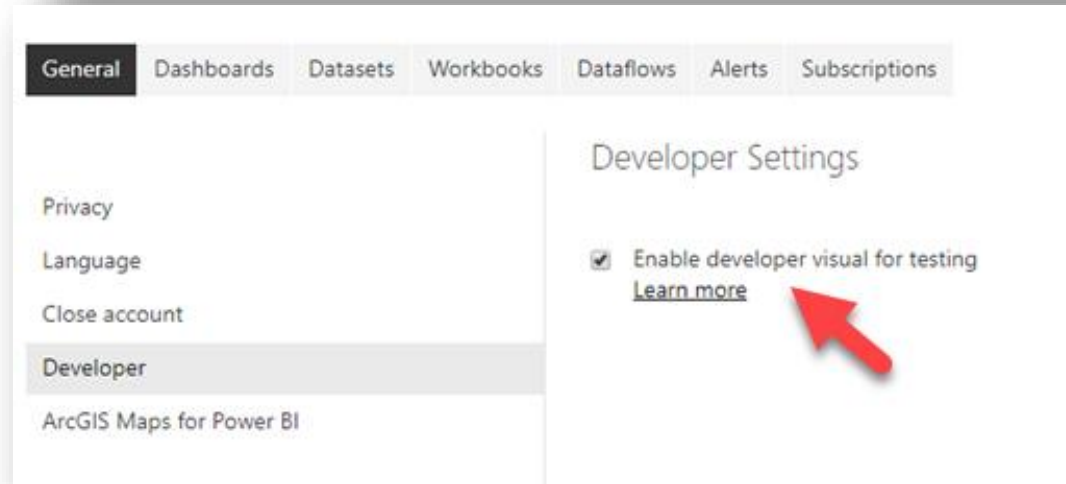
Test/Debug at powerbi.com

```
C:\@Repos\Github\pbideveloper\CustomVisuals>pbiviz new MyAwesomeVisual
info Creating new visual
info Installing packages...
info Installed packages.
done Visual creation complete

C:\@Repos\Github\pbideveloper\CustomVisuals>cd myAwesomeVisual

C:\@Repos\Github\pbideveloper\CustomVisuals\myAwesomeVisual>pbiviz start

info Starting server...
info Start preparing plugin template
i [wds]: Project is running at https://localhost:8080/webpack-dev-server/
i [wds]: webpack output is served from /assets
```



Key Files

pbiviz.json

Contains configuration of the visual: name, icon image, author, dependencies, API version, etc

capabilities.json

Formatting options, data fields and mappings

src/visual.ts

Code to display the visual

style/visual.less

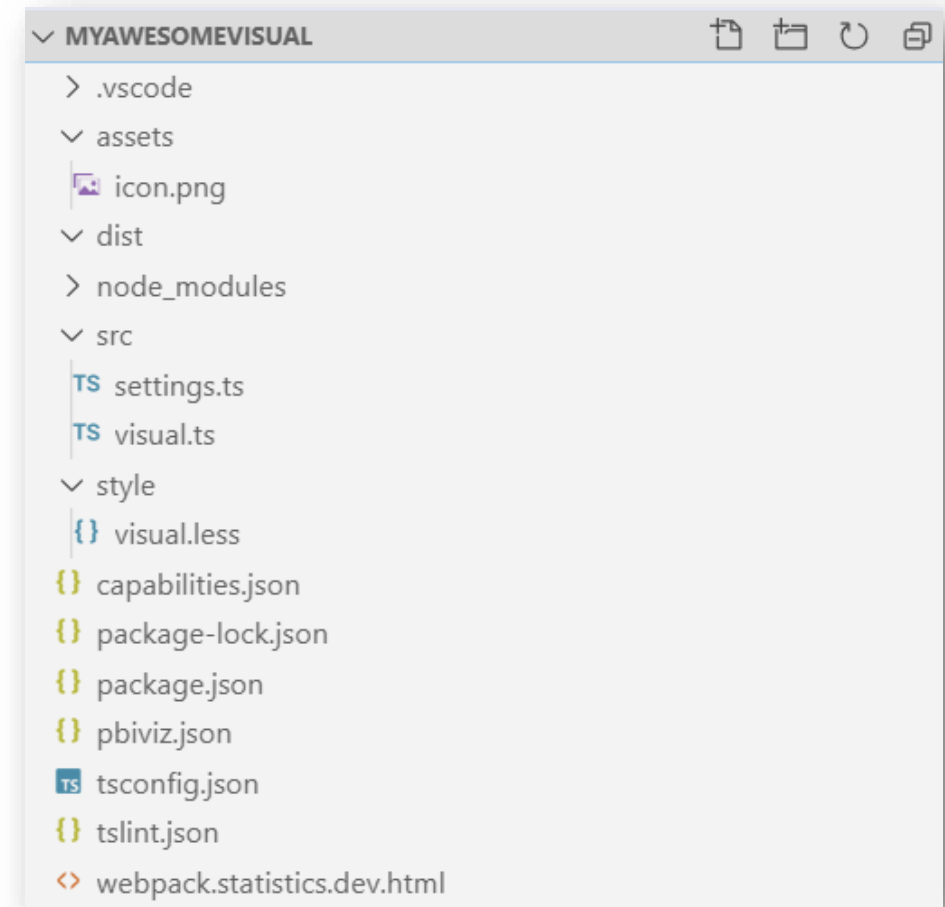
CSS styling of the visual output

src/settings.ts

Code to manage the formatting options / visual settings

assets/icon.png

Icon displayed in Power BI visualisations selector



Publishing Options

File

Can be shared over email etc

Organization Visuals

Published privately to everyone within your organization

Public – AppSource

Available in AppSource – the visuals Marketplace

Monetization through [In-App-Purchases](#)

Certified Visuals

Visuals in the Marketplace that meet specified code requirements

DEMO

- Custom Visual
- Filter by List


```
C:\@Repos\Github\pbideveloper\CustomVisuals>pbviz new MyAwesomeVisual
info Creating new visual
info Installing packages...
info Installed packages.
done Visual creation complete

C:\@Repos\Github\pbideveloper\CustomVisuals>cd myAwesomeVisual

C:\@Repos\Github\pbideveloper\CustomVisuals\myAwesomeVisual>pbviz start

info Starting server...
info Starting server...
i ?wds? : P
i ?wds? : w
```


Apps > **Filter by List by Devscope**



Filter by List by Devscope [save for later](#)

DEVSCOPE-Soluções Sistemas Tecnologias Informação

★★★★★ 4.1 (31)

 PBI Certified

Overview [Reviews](#)

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Free

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[Power BI visuals](#)


Publisher
DEVSCOPE-Soluções Sistemas Tecnologias Informação

Acquire Using
Work or school account

Apply filter values for a report in bulk

Filter by List is a Power BI visual that allows users to apply filter values for a report in bulk. By default, in order to filter a report with a large number of categories, such as 100 products, users need to check each box in the filter pane individually. With Filter by List, you can just paste the entire list of products into the slicer visual and do it immediately.

Add-in capabilities



Enter Field Values
Ex: SK001, SK002, SK003
Ex:
SK001
SK002
SK003

Learn more

- James Dales MBAS Session
 - <https://community.powerbi.com/t5/MBAS-Gallery/Microsoft-Power-BI-How-to-build-a-custom-visual-for-Power-BI/m-p/711408>
- Microsoft Docs
 - <https://docs.microsoft.com/en-us/power-bi/developer/custom-visual-develop-tutorial>
- GitHub Repo
 - <https://github.com/microsoft/PowerBI-visuals>

Power BI Service API

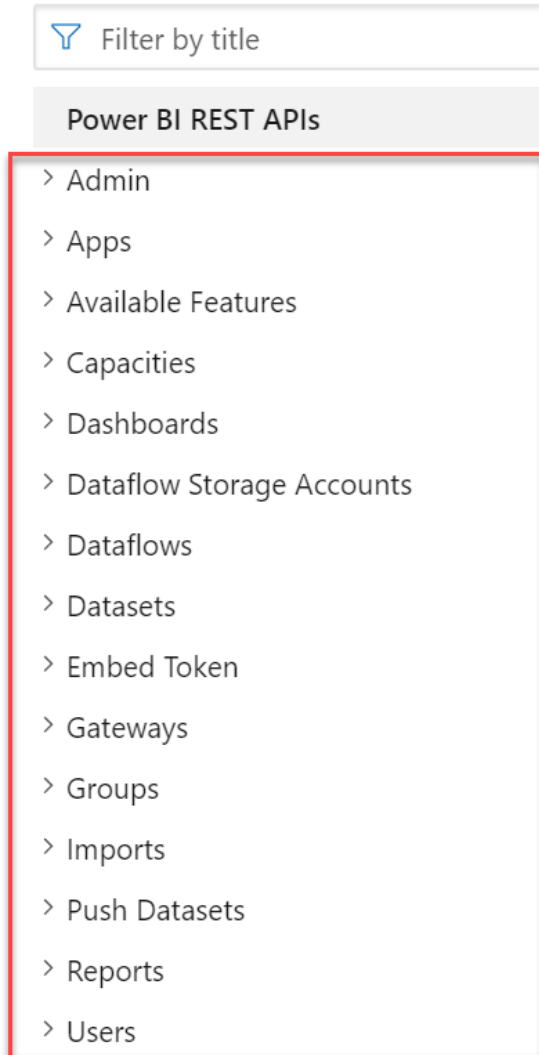
What is the Power BI service API?

- API built on OAuth2, OpenID Connect, REST and ODATA
- API secured by Azure Active Directory (AAD)
- API to interact with workspaces, datasets, reports, dashboards, gateways,...
- API also often called "Power BI REST API"

What can you do with the Power BI service API?

- Publish PBIX project files
- Index all your Power BI Content
- Update connection details and datasource credentials
- Create workspaces and clone content across workspaces
- Create streaming datasets in order to build real-time dashboards

Power BI REST API



Power BI REST APIs

07/25/2019 • 2 minutes to read •    

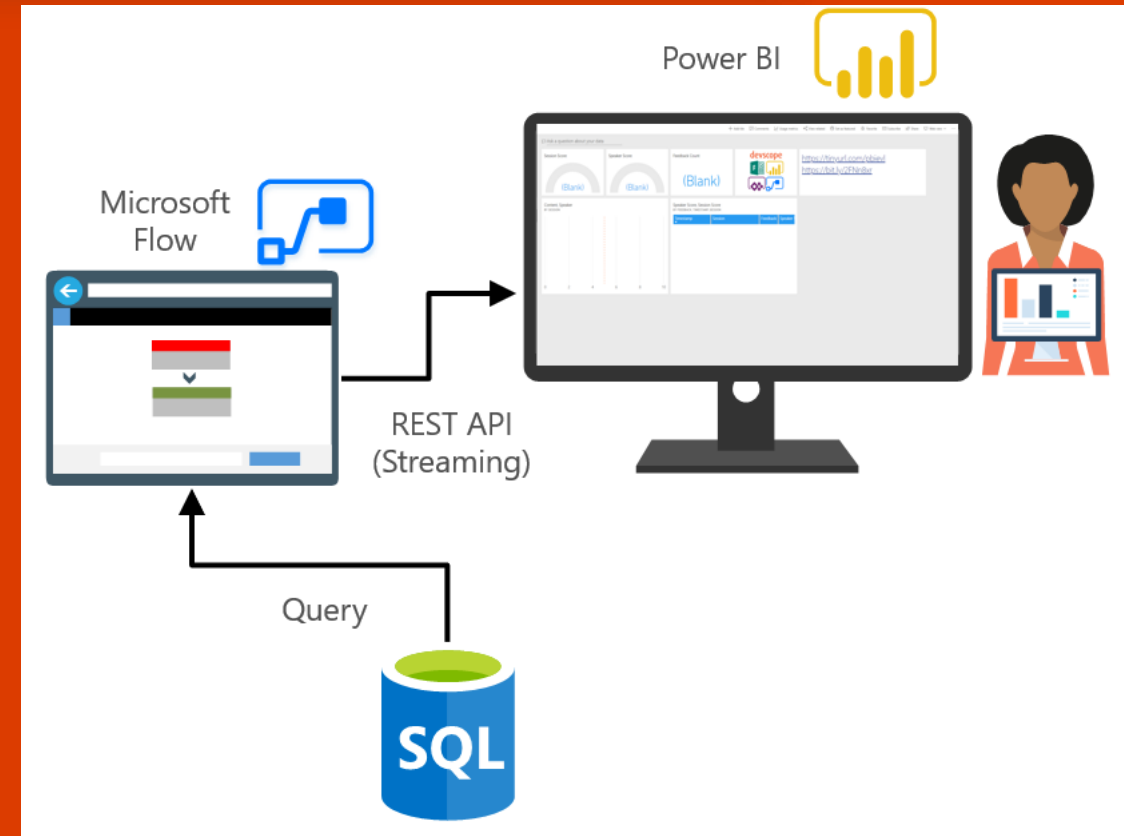
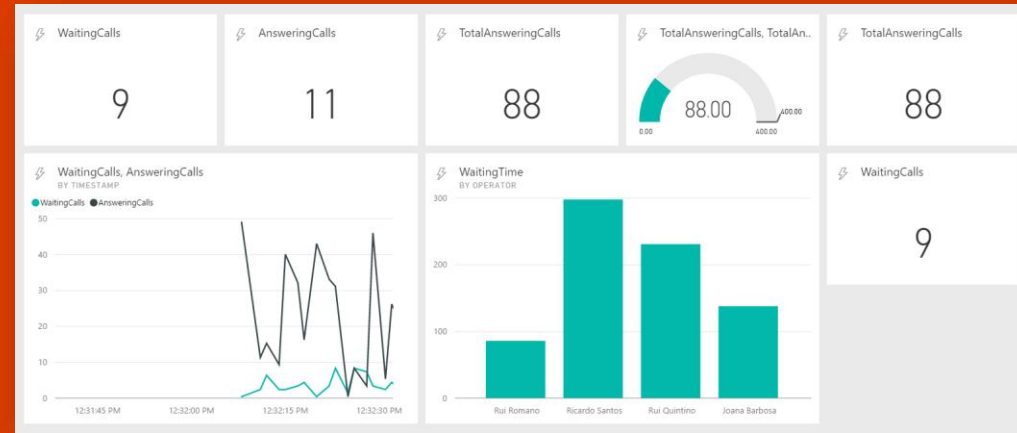
Power BI REST API provides service endpoints for embedding, administration, and user resources.

REST Operation groups

Operation group	Description
Admin	Operations for working with administrative tasks.
Apps	Operations for working with Apps.
Available Features	Operations that return available features.
Capacities	Operations for working with capacities.
Dashboards	Operations for working with dashboards.
Dataflow Storage Accounts	Operations for working with dataflow storage accounts.

DEMO

- REST API Playground
- Realtime DataSets
- REST API to Automate Publish
- Governance



Obrigado!

The DevScope logo, consisting of a red square with the word "devscope" in white lowercase letters.

Rui.Romano@DevScope.net



<https://ruiromanoblog.wordpress.com>

@RuiRomano

DevScope Suite of Power BI tools



PowerBI Tiles

Embed Power BI Reports in PowerPoint presentations, Word documents or Outlook messages.

[Try Now](#)



PowerBI Robots

Schedule and automatically send Power BI data to anyone, anywhere.

[Try Now](#)



PowerBI SmartPivot

Connect data from Power BI or OLAP cubes to Excel, search for any values in the data model and apply filters in bulk.

[Try Now](#)

**WHILE
WAITING
PLEASE JOIN
SLIDO.COM
CODE:
PBIPT16**

